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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

August 10, 1984

DOCKETED USNRC

'84 AGO 15 P1:56

OFFICE OF SECRETARY DOCKETING & SERVICE BRANCH

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

Glenn O. Bright
Dr. James H. Carpenter
James L. Kelley, Chairman

In the Matter of CAROLINA POWER AND LIGHT CO. et al. (Shearon Harris Nuclear Power Plant, Unit 1)	Docket 50-400 OL ASLBP No. 82-468-01 OL

Wells Eddleman's Contentions on Harris Emergency Plan Brochure

Under orders as noted in the Board's 8-03-84 Order at 25, Wells Eddleman hereby files the following contentions on the Harris plant brochure "Safety Information for the Shearon Harris Nuclear Power Plant" (Carolina Power and Light Company).

227-A: The brochure is deficient in discussing respiratory protection measures for sheltering and/or evacuation because it fails to explain the best such means of protection, does not tell a which means are relatively ineffective or totally ineffective, and does not give sufficient emphasis to respiratory protection. NUREG/CR 2272 demonstrates substantial variability, e.g. that a higher quality wet towel (4 layers) protects much better than a sheet, shirt or handkerchief (against everything but CH_3I). Similar variations are observed for dry towels. Respirators (e.g. 3M #8710) perform best, and this should be mentioned in the brochure. Otherwise sheltering may not be effective in protecting public health and safety.

227-B: The brochure's discussion of respiratory protection

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is deficient because it doesn't take sufficient account of the need for, and most effective means of, sealing around the respiratory protection. NUREG/CR-2958 establishes that leakage is least when pantyhouse are used to attach the protection, and much less if only the corners are taped, for example. The need for sealing, the effective means to do it, and the need to pre-stock materials (e.g. pantyhose or tape) to do it should be stated in the brochure. Otherwise, inappropriate responses or ineffective sheltering may take place.

227-C: As the primary means of public education under 10 CFR 50.47(b)(7) the brochure must assure that persons in the EPZ, including transients, understand the danger of a nuclear accident as well as how to avoid it. The brochure should be improved in clarity, particularly in labeling the pictures on page 1 (e.g. 1 2 3 4) to make it clear that these are steps in a sequential process. Also the language concerning the process should be improved, e.g. by positive language under step 1: e.g. STAY INDOORS. TURN YOUR RADIO OR TV to your EBS STATION; GET A BATTERY POWERED RADIO IF YOU HAVE ONE. DO NOT EVACUATE. It is vital that the information concerning what to do in an emergency be as clear and easy to understand as possible.

227-D. The brochure needs to be clarified on page 1 to avoid inappropriate or possibly dangerous actions: In the 3d +4th columns concerning school children, there should be an explicit reference (e.g. to the page re school sheltering/evacuations) to which anxious parents can turn for information. If day care center children are to be sheltered/evacuated, this should be stated. The instruction to shelter pets and livestock should be clarified -- people should not endanger themselves or use valuable time sheltering animals when this may endanger their lives or health. In the 4th column the necessity to sign in at the evacuation center should be underscored.

227-E. The brochure (p.1) treatment of sheltering is not clear enough about protection from airborne radioactive materials. This protection is a necessary thing in an accident. 50.47(a)(1). It should explain that the reason you close windows and doors, cut off fans, fires or heaters, etc. is to KEEP FROM DRAWING RADIOACTIVE MATERIALS INTO THE HOUSE along with air. Similarly it should tell people how to effectively reduce breathing risk through the use of properly sealed breathing protective devices (e.g. as described in Contentions 227-A and B above). It fails to advise persons staying indoors to adopt breathing protection.

227-F. The Brochure's treatment of sheltering is deficient in that it doesn't explain the necessity to get as far from walls and windows as possible, with as much mass (walls or other objects) between you and the outside as possible. Without such instructions, people may shelter in inappropriate parts of buildings. This will not be "effective" 50.47(a)(1 The instruction "few or no windows" (p.1 col. 3) is misleading if rooms farther from the house walls are available. Instead, the brochure should have persons identify a sheltering space in their home (and tell them how to do it), which they then write in the box on page one, probably after item 1: Our in-home shelter is ...____________.

227-G. The information "When you hear the sirens" on p.2 is poorly organized, wordy, often stated in passive voice, and fails to adequately answer important questions like "Why not evacuate just to be extra-safe?". The information should begin with a description of the siren signal for nuclear accidents. It should explain how it is different from fire, police, and ambulance sirens (a long steady tone of 3 to 5 minutes). It should explain when the system is tested, and why. It should describe back-up actions later. It should be written in shorter sentences. The answer to why-not-evacuate should be that you may get more radiation outside than inside.

227-H. The EBS Stations list on page 3 should emphasize the

24-hour radio and TV stations, so that in evacuations at night people will be able to tune in. It should emphasize the need to get hold of portable, or other battery powered radios whenever a real emergency occurs (in case of power failures during/connected with the emergency). The information in the long (nearly as invisible as the warnings in cigarette ads) box at the bottom of the page should be placed in a colored, prominent box higher on the page, so that people will know these MOST IMPORTANT INSTRUCTIONS, e.g. Do what the EBS Station says, If it's different from what's in this booklet, do what the station says. Otherwise, inappropriate actions, or inadequate information flow (thru not tuning in to an on-air station, or losing info when the power is off) could result, violating NUREG-0654 II.G and II.E.5 and 6.

227-I. The instructions for sheltering on page 4 do not adequately explain why sheltering may be the best thing to do. It should explain that people will be ordered to take shelter when they will get less radiation exposure by staying inside, than they would get if they evacuated or stayed outside. It should emphasize the importance of keeping out outside air (e.g. taping leaky windows), staying away from the outside walls and roof of shelters, keeping as much mass between you and the outside as possible, and respiratory protection as described in contentions 227A and B. Without such instructions clearly presented, ineffective actions may result, violating 10 CFR 50.47(a)(1). People should be encouraged to find their best home sheltering areas in advance, and be told how to do that.

227-J. The instructions for sheltering (p.4) do not adequately explain how long one might possibly have to stay in shelter, and how to receive information (either about changing conditions, evacuation, that the accident is over, etc) if you don't have a portable radio to take with you to shelter. It might, e.g. suggest leaving your TV on, very loud, or taking the phone with you.

If such instructions aren't given, or another way to provide information provided, NUREG-0654 II.E.6 may be violated, and inappropriate actions (e.g. automatically coming out after 3 or 4 hours even though a radioactive release continues) may ofcur, violating 10 CFR 50.47(a)(1).

227-K. In the sheltering instructions (p.4) a risk-benefit instruction for sheltering pets or livestock is very important, but not included. If you would have to go outside to do this, and a radioactive plume is near or present, the risk may be gbeater than the benefit. Some notice of this risk/benefit and instructions to listen to your EBS station for information on outside radiation levels, is very important for persons who make their living with (or partly with) livestock, and for those who might be tempted to go outside to search for a pet or pets. While the plan cannot stop people from inappropriate actions in such situations, it needs to warn them, or it violates 10 CFR 50.47 (a)(1) by not reasonably assuring that appropriate protective measures can and will be taken.

227-L. The information on evacuation is not always clearly identifiable or well presented. Since evacuation is the most difficult of the possible emergency actions, it is most important that the instructions for it be extremely straightforward and clear. For example, it's clearly important to use the exact route in the plan, even though some such routes look circuitous or turn odd directions. This goes unsaid. The need for contamination checks of vehicles during evacuation is not mentioned. The importance of not driving too fast or trying to pass up other drivers, because the opposite lanes are needed for emergency vehicles, police, fire, wreckers etc. is not mentioned. There are no instructions for the handicapped except to fill out a card (not much help if an accident is occurring) -- there should be some special instructions here for such persons.

227-M. The evacuation information, p.5, is deficient in not (1) explaining why doors and vents on cars should be closed and houses should be closed up (to prevent radioactive material from getting in), does not explain respiratory protection well (it should be as requested in 227 A and B above), does not advocate taping over vents on cars whose vents don't seal tightly when closed; (2) emphasizing the importance of not contaminating others, especially for evacuees who do not choose to go to the evacuation center (3) emphasizing the importance of signing in at the evacuation center, & encouraging it, e.g. ~~especially~~ for the purpose of making later insurance claims. Without these emphases, inappropriate action may occur.

227-N. The provisions for sheltering livestock for an evacuation, and taking pets with you, are insufficient on page 5 because they do not address the risks and benefits of taking time to provide for livestock versus the risk or being outside to go and come from doing that, breathing hard while working, etc. As to pets, you are instructed to take them with you only if you will not stay at an evacuation center, but this ignores how many people feel about pets and may confuse people and even delay their evacuating because they are not sure they can provide for their pets if they don't have an alternate place to stay. It would be clearer to stay that after you sign in at the EC, places for people with pets to stay will be found.

227-O. Because the very important maps of the EPZ zones, evacuation routes, and the schools charts are not yet available, intervenor explicitly points out here that their accuracy, clearness, readability and usefulness are crucial to evacuation (and to sheltering where parents may be so concerned for their children that they may go to them at school, if they are not convinced the children will be adequately taken care of). Legibility of all this information is likewise important. These matters cannot be adequately taken care of without seeing that the info on pp 6,7 and 9 meets these standards. That cannot be done until the info appears. E.G. reducing the standard EPZ map to 8½ x 11 inches would be illegible. Evacuation zones or routes printed in different colors (one for each zone and its routes, e.g.)

227-P. The information for handicapped persons (p.8) is deficient because it doesn't tell you what to do if you haven't sent in the card, e.g. checking with neighbors to see if they can notify you in an accident, help you close your home if youx must shelter, etc. The information is also deficient in not advising of helpful actions to take while waiting for help, e.g. appropriate breathing protection (per 227 A and B), locating items you need to take in an evacuation, even if you can't assemble or carry them yourself, locating open windows and staying away from drafts, etc. Without such information, handicapped persons may take inappropriate actions or not take appropriate protective actions which they can perform, violating 50.47(a)(1).

227-Q. The information on page 10 (sirens) is deficient in not referencing page 3 re EBS stations, and the box on page 1 where you are supposed to write names of EBS stations. This could resultx in delays when a test or accident occurs, in people's tuning in to the emergency broadcast stations. This would not be timely notification, in violation of 10 CFR 50.47(b)(5) and (b)(7).

227-R. The nature of the danger, as presented on pp 11-122, is understated, misleading and vague. The existence of background radiation is irrelevant in evacuations or sheltering, and the discussion seems to indicate that radiation is so common that it's almost OK. It ignores a substantial body of scientific information (e.g. work of John Gofman, Radiation and Human Health 1981, K.Z. Morgan, Cancer and Low-Level Ionizing Radiation, Bull At. Sci. 9/78) that holds that low-level exposure is potentially harmful, by presenting the information in a self-contradictory manner -- radiation's in everything, but it could be harmful. This should be clarified and related directly to nuclear accidents, not to background. The contradiction between the initial statements about background radiation and the instruction to "go to a place with no radiation" in the middle of the page is especially confusing.

227-S. The description of radiation omits its most important characteristics to the average person -- it cannot be detected by any of our senses (vision, hearing, touch) and it is transmissible. The nature of harmful health effects -- genetic damage and cancer, ~~xx~~
non-
other diseases, is not mentioned. This information is misleading
Persons who don't know risks may underestimate them.
and could lead to inappropriate actions. Also radiation detectors should be discussed here -- why they are not always sensitive enough to tell you if you're in danger , why you should listen to the EBS. The brochure should explain these dangers of radiation and how the emergency plan is set up to help you avoid it by sheltering or evacuation ixf necessary.

227-T. The information on p.11 is confusing and misleading in its discussion of nuclear accidents. Although a reactor cannot create a nuclear-bomb-like explosion, radioactive material can get out of reactors -- the plant can "blow up" fræm steam explosions, hydrogen explosions, ATWS or other breaches of containment. The reader should be told that the plant can release radioactive material and gases into the air during an accident, and that the wind could carry it to persons in the EPZ. The most important fact about nuclear accidents is that they are possible. That's why evacuation plans exist. The brochure should not mislead or confuse people on this important point, or people may not take the brochure or its instructions or EBS instructions seriously, leading to inappropriate actions violating 10 CFR 50.47(a)(1).

227-U. The brochure's discussion of contamination on p.11 is inadequate because it (1) doesn't explain the amount of washing necessary for best decontamination, or that radiation detectors are needed to be sure it's off; (2) doesn't adequately explain how to reduce exposure from breathing or swallowing radioactive material (e.g. don't eat anything that's been outside, avoid eating during evacuation, take respiratory protection measures); (3) seems to imply evacuation is the only way to deal with "shine" and ground radiation, without explaining that it can be reducted through getting farther from the radiation sources or putting shielding (mass) between you and the radiation. This all violates NUREG-0654 ~~50.47~~ II.G.1(c).

227-V. Information on decontamination should be highlighted, and preventive measures and first-aid procedures for contamination should be at least mentioned, if not listed off and explained in detail (the latter would be better), per NUREG-0654 II.G.1(c). This is an essential part of emergency preparedness for nuclear accidents because it enables people to care for themselves, reduce radiation exposure, and reduce transmission of radioactive materials (provided the importance of decontamination in evacuations is emphasized). Again, the undetectable nature of radiation to the five normal senses people have, should be emphasized.

227-W. The information on page 12 is perhaps confusing and misleading in that it first emphasizes safety (touting CP&L's performance) and then says evacuation plans must be tested. Assuring residents that an accident is "unlikely" is irrelevant and against the brochure's purpose, which is to tell people what to do in an emergency. Claims of safety and comparisons with other energy sources are likewise irrelevant. Instead, the space would be better used clearly defining the emergency conditions, e.g. "lower plant safety" and saying the plan was made because "we care".

Information must be accurate per NUREG-0654 section II G's intent, + esp II.G.2

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the matter of CAROLINA POWER & LIGHT CO. Et al.) Docket 50-400
Shearon Harris Nuclear Power Plant, Unit 1) O.L.

CERTIFICATEOF SERVICE

I hereby certify that copies of WB Contentions on Harris Plant Emergency Planning Brochure, and of List/Exhibits on Eddleman 41 (addl) HAVE been served this 10 day of August 1984, by deposit in the US Mail, first-class postage prepaid, upon all parties whose names are listed below, except those whose names are marked with an asterisk, for whom service was accomplished by (for"41" documents) sending a list and an offer to provide copies on request; this was approved by the Board today in a conference call. Docketing and service agrees to accept 1 or 2 copies if the list is provided.

Judges James Kelley, Glenn Bright and James Carpenter (1 copy each)
Atomic Safety and Licensing Board (1 copy only of 41 documents)
US Nuclear Regulatory Commission
Washington DC 20555

*George F. Trowbridge (attorney for Applicants)
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*Ruthanne G. Miller
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Attn Dockets 50-400/401 O.L.
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E Plan only
Spence W Perry
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Washington DC 20740

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Certified by Wells Eddleman

I&A resp3
Breathing protection

Catawba

Comments were also recently received from FEMA via NRC with copies provided to the service list.

1-14 WHAT IS THE EFFECTIVENESS OF BREATHING THROUGH A DAMP CLOTH FOR REMOVING AIRBORNE RADIOACTIVE VOLATILES AND PARTICULATES? EXPRESS QUANTITATIVELY FOR PROBABLE TYPES OF FABRIC. HOW DEPENDENT IS THE EFFICIENCY OF REMOVAL ON CONCENTRATION IN THE ATMOSPHERE? (DPC, H. D. Brewer)

a. Effectiveness is measured in terms of the fraction of contamination that passes through the material. For example, a material that has an effectiveness factor of 0.3 would allow 30% of the contamination to pass through.

Effectiveness of several readily available materials has been measured by D. W. Cooper and published as NUREG/CR-2272, SAND-81-7143. According to this research, a damp cloth such as a sheet folded to 6 layers would have an effectiveness for particulates of between .91 and .22 depending on the particle diameter. For volatiles the effectiveness was determined to be .45.

b. Effectiveness of other probable types of fabric are tabulated below. This information is based on estimated penetration through expedient respiratory protection materials at 50 Pa (0.2 in H_2O) pressure drop and 1.5 cm/s face velocity.

DRY

Material	No. layers	Aerosol particle diameter (μm)			I_2[b]	CH_3I[b]
		0.4	1	5		
3M respirator[a] # 8710	2	.03	.004	<.01		
Sheet	20	.66	.64	.020	1.0	0.6[c]
Shirt	15	.54	.59	.070		
Lower-quality towel	20	.53	.41	.015		
Higher-quality towel	6	.24	.13	<.01		0.6[c]
Handkerchief	14	.61	.54	.032		

WET

Material	No. layers	Aerosol particle diameter (μm)			I_2[b]	CH_3I[b]
		0.4	1	5		
Sheet	6	.91	.88	.22	.45 .15[d]	.8[c] 1.0[d]
Shirt	6	1.0	.51	<.02		
Higher-quality towel	4	.20	<.01	<.01	.21 .10[d]	1.0
Handerchief	2	.98	.95	.37		

a. Available commercially in single-layer thickness.
b. Taken from tests at 1.0 cm/s, assuming penetration is the product of single-layer penetrations.
c. Not shown to be statistically different from 1.00.
d. Wetted with 5% by weight baking soda solution.

c. Cooper has also performed research (NUREG/CR-2958, SAND - 82-7084) to determine the effect of leakage around the seals for different materials, using several methods of attachment. The effectiveness factors including leakage are tabulated below.

Mask	# Layers	Attachment Method	Effectiveness Factor (including leakage)
3M - #8710*	1	Pantyhose	.0058
3M - #8710	1	Fully taped	.015
3M - #8710	1	Strapped	.18
J&J - HRI8131**	1	Fully taped	.042
J&J - HRI8131	1	Tied	.361
Shirt (Oxford)	4	Fully taped	.306
Shirt (Oxford)	4	Corners taped	.744
Handkerchief	4	Fully taped	.236
Handkerchief	4	Corners taped	.676
Handkerchief	4	Pantyhose	.277
Toweling (washcloth)	1	Fully taped	.389
Toweling (washcloth)	1	Corners taped	.603
Toweling (washcloth)	2	Corners taped	.298

*Dust respirator

**Surgical mask

d. The effectiveness factors would not depend on concentration.

7-7 HAVE EPZ RESIDENTS BEEN CLEARLY AND IN SUFFICIENT DETAIL ADVISED AS TO WHAT CONSTITUTES INADEQUATE SHELTER? WHAT STRUCTURES ARE LESS EFFECTIVE THAN A CLOSED AUTOMOBILE? (DPC, P. F. Carter, H. D. Brewer)

a. See response to 7-6.

b. For external exposure, any structure would provide better protection than a closed automobile. Dose reduction depends on two factors;

- distance
- attenuation by passage of radiation through material.

Since cars provide little distance and little attenuation, they are not as effective as larger volume houses, buildings, etc. The following reduction factors are provided by WASH-1400, Appendix VI;

	Cars	Wood Frame House (No Basement)	Masonry House (No Basement)
Passing Cloud	1.0	0.9	0.6
Deposited Material	0.5	0.4	0.2

For inhalation exposure, the dose reduction is very dependent on infiltration rates. Cars have high infiltration rates and as such would provide less protection than structures.

7-11 WHAT ADVICE CAN BE GIVEN EPZ RESIDENTS IN REGARD TO CONTINUING SHELTERING IF THERE IS A COMMUNICATIONS BREAKDOWN. FOR EXAMPLE IF THE RESIDENT'S LINE POWERED RADIO OR TV BREAKS DOWN OR IS NOT SUPPLIED WITH POWER? (DPC, P. F. Carter)

See Brochure, Page 8, last line, "In case of an emergency, fire, police and rescue units would patrol the affected areas and sound their sirens." Further, use of battery powered radios and car radios would allow EPZ residents to receive information if they lost power.

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NOTICE TO PARTIES RE EDDLEMAN 41 DOCUMENTS

Parties to the 8-10-84 conference call may know that I am filing approx 500 pages of documents on Contention 41, pipe hanger / QA defects. A list of these documents is attached. If you want a copy of any of these items, please contact me at 919-286-3076 or by mail to 718-A Iredell St., Durham, NC 27705.

Thanks,

Wells Eddleman

DS03

DOCUMENT LIST ON D+S (i)
EDDLEMAN CONTENTION 41
AUG-10-1984
(per conference call/oral order 8-09-84)
8-10+/

4-28-82 USNRC Region II Ltr/Attachments to CP+L re I+E Raport 50-400/82-03

File: SH P-1/2 9-12-80 Construction QA Section Personnel Training (4pp)

CP+L Corporate QA Dept 3-16-81 CQA-1 (41.1(b) response) Personnel Training + Qualification

"SHERRON HARRIS POWER PLANT QC RECEIVING TRAINING PROGRAM"

"Outline for Welder Training Class" + training info (approx 25 pp)

PW-AS-446 (4pp - 3+1 attachmt)
AS 392 Rev 1 (3pp)
FCR-AS-334 Rev'1 (3pp)
PW-AS-391 (2pp)
PW-AS-414 (6pp)

WELD INSP REPORTS PRODUCED IN 1984 (~60pp)

1-18-82 EBASCO EB-S-1730 File #'s 5Q-P-1
5Q-M-30
LTR TO JOHN HARRIS,
SOUTHWEST FABRICATING + WELDING CO
re Fabrication Isometrics

CP+L SHNPP General Welding Procedure MP-08 [Rev 0 11/9/79; Rev 8 4/27/84] General welding Procedure for structural steel (seismic/non-seismic) and hangers. (69 pp. total) DOC# 00641

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CP+L Corporate Quality Assurance Dept.: "Visual Examination of Seismic I, Structural and Hanger Welds (SHNPP) Initial date: 10/20/82 (19 pp. total) DOC# 000643

CP+L Corp. Quality Assurance Dept. / Engineering + Construction QA/QC Section: "Weld Control" Initial date: 3/16/81 DOC# 00642

CP+L SHNPP General Welding Procedure MP-10: Repair of Base Materials + Weldments Rev 0 - 4/28/78, Rev. 11 - 2/16/84 (34 pp. total) DOC# 000644

CP+L / SHNPP Welder Evaluation Reports. DOC #'s 000645 - 000659 (14 pp total)

these together

LTR TO O'REILLY FROM PARSONS Dated 10/3/83 COVERING 2nd Interim report Re: "Shop welding Deficiencies in Seismic I Pipe Hangers (Item 95) + Undersize Skewed Tee Fillet Welds on Seismic I Hangers (Item 72)" DOC # 000622

Same as above with report "Pipe Hangers Previously Accepted by QC Welding Inspectors (Item 96) and Undersized Skewed Tee Fillet Welds on Seismic I P.H's (Item 72) DOC # 000622

CP+L SHNPP FCR-AS-4294 (7 pp.) DOC # 000621

(3)

CP+L SHNPP WORK PROCEDURE WP-110 "Installation of Seismic Pipe Hangers + Supports for Seismically Analyzed Pipe" Rev 0-3/1/79, Rev 10 - 4/9/84. Doc# 000618

AWS D1.1 Structural Weldments Inspection Criteria Modifications 3/9/84 (from EBASCO) Doc# 000626

AWS D1.1 Same as above but marked "Preliminary" dated 8/12/83 Doc. # 000624

"Effect of WELD UNDERCUT ON THE TENSILE BEHAVIOR of Low Strength Steel" Marked "Preliminary" (also EBASCO) Doc# 000625

CP+L Corp QA Dept. / Engineering and Construction Quality Assurance / QC Section: "Seismic Pipe Hanger Inspection Documentation System" 9/13/82 Doc# 000620

CP+L SHNPP Procedure Change Notice for Procedure # WP-139 - Rev 0 - Change # 2 "Pipe Hanger Work Package Preparation ~~Doc~~ Approved CP+L 4/12/84. Doc# 000619

Weld Inspection Criteria (for CP+L QA program) no date Doc# 000617

CP+L SHNPP FCR-H-979 Rev. 3 (5 pages) 12/10/82 Doc # 000614

CP+L / George White: "FCR-H-979 Rev 3 Justification" (no date) Many docs attached. Doc # 000613 39 pp total

LTR From Parsons to O'Reilly 3/21/84 RE: Shop Welding Deficiencies in Pipe Hangers (Item 55) and Undersize Skewed Tee Fillet Welds (Item 72) covering Report "Interim #3 (4 pp. total Doc# 000592

(4)

LTR From CP+L/PARSONS TO O'REILLY Re: Engineering Review of Completed Phase II Pipe Hangers, Item 48 - (3/5/84) (1 p.) DOC # 000590

LTR From CP+L/Parsons to O'Reilly 3/9/84 with attached reply to RII: WPR 50-400/84-03 violation. Doc #000591 (2 pp)

MEMO (CP+L intra) TO PARSONS FROM N.J. CHIANGI 9/23/83 Re: Pipe Support Installation Program (3 pp) Doc # 000588

Memo (CP+L intra) To CHIANGI From Parsons 12/15/83 Re: above (2 pps) doc # 000589

Memo (CP+L Intra) To Parsons from Chiangi 10/24/83 Re: above attached QA Surveillance Sheet (6 pp. total) Doc # 000593

LTR from PARSONS to O'REILLY 11/18/83 re: IE inspection Report NOS. 50-400/83-25 and 50-401/83-25 (Bemis) Doc # 000594 (17 pp total)

LTR + 4th Interim Report re: Shopwelding Deficiencies on Seismic Class I Cable Tray, Conduit, + HVAC hangers, Item 77 From Parsons to O'Reilly. Doc 000595 (4 pp)

QA/QC Personnel Training sheets (with descriptions of trainings given + attendees) from 1/27/83 - 4/5/84. (~50 pps) Doc # 616

CP+L SHNPP	PW-H-338	1 p	Doc # 326
	PW-H-303	1 p	" 327
	FCR-H-286	4 pp total	328

CP+L "Reinspection" from Pete Fiala PHP-1237, 3/31/81 Doc # 310 (1 p)

" " " PHP-1154, 3/2/81

Doc # 309 (1 p)

" " " " PHP-696 12/9/80 Doc 301 (1 p)

CP+L "Reinspection" report from Pete Fiala # PHP-629 ⑤
12/3/80 Doc # 306 (1p)

" " PHP-1004
1/28/81 Doc # 297 (1p)

CP+L "Corrective Action + Disposition of Hanger Reinspection" NO. RR-153, 2/10/81, Doc 291 (1p)

CP+L Same as above No. RR-298, 4/29/81, Doc 286 (1p)

CP+L Same as above NO. RR-046, 12/15/80, Doc 279 (1p)

CP+L Same as above NO. RR-241, 4/16/81, Doc 274 (2pp)

Memo (CP+L intra) To R. Hanford from David Timberlake
12/9/80, Re: Welder Craft Training - Bi-Monthly Update (44 pp. total) with attachments of class outline, procedures.

CP+L Corrective Action + Disposition of Hanger Reinspection No. HR-21 (but no report attached nor doc #. Dated 1/28/81

LTR from Parsons to O'Reilly 3/31/83 re: Seismic Class I Electrical, HVAC + CONDUIT SUPPORTS INSTALLED + ACCEPTED THAT WERE NOT IN ACCORDANCE WITH DESIGN, Item 119

LTR Chiangi → O'Reilly 3/24/82 Re: undersized Skewed T welds (Item 72)

LTR Chiangi → O'Reilly 9/13/82 Re: Hangers previously accepted by QC welding Inspector (Item 96)

(Dated used is date requested by discipline engineer) ⑥

PW-AS-380 1/9/81 (1 p + attachment 2)

FCR-AS-372 Rev. 1 1/13/81 (3 pp inc. attachments)

FCR-AS-356 12/18/80 (1 p)

PW-AS-354 12/12/80 (2 pp)

FCR-AS-350 12/12/80 (9 pp) No doc #'s

PW-AS-349 Rev. 1 3/10/81 (4 pp)

PW-AS-347 12/8/80 (3 pp)

FCR-AS-334 Rev. 1 12/17/80 (2 pp)

FCR-AS-218 Rev 2 8/26/80 (1 p)

PW-AS-152 Rev 2 3/26/81 (6 pp)

PACKAGE OF HANGER WELD INSPECTION FORMS and
HR-030, HR-038, HR-040, HR-042, HR-046
HR-008, HR-011, HR-012, HR-014, HR-041
(33 pp total)

FCR-H-863 7/28/81 Doc 332 (4 pp)
PW-AS-1528 5/5/82 " 485 (1 p)
FCR-AS-1924 9/14/82 " 487 (5 pp)
PW-AS-215 4/28/80 " 476 (3 pp)
PW-AS-467 3/12/80 " 478 (3 pp)
PW-AS-541 4/21/81 " 479 (4 pp)
FCR-AS-807 9/10/81 " 480 (4 pp)
PW-AS-1125 1/8/82 " 482 (5 pp)
PW-AS-1245 2/16/82 " 483 (3 pp)

(7)

PACKAGE OF PIPE HANGER PROBLEMS:

PHP #			Doc #
	7126	8/30/83	434
	1644	9/24/81	440
	5824	5/9/83	458
	1382	8/3/81	472
	2389	2/15/82	361
	6015	6/6/83	459
	4413	11/8/82	423
	3069	5/18/82	362
	3392	6/17/82	419
	4041	9/21/82	418
	4312	10/28/82	391
	3985	9/1/82	410
	3464	6/28/82	409
	1966	11/9/81	422
	1306	4/17/81	471
	1246	4/3/81	469
	1135	2/24/81	468
	1104	2/16/81	467
	2050	11/19/81	448
	1401	8/7/81	447
	1515	8/25/81	443
	1644	9/24/81	440
	1004 (2 of these)	1/28/81	438
	1055	not visible	436
	1548	8/31/81	442
	1515	8/25/81	443
	1484	8/24/81	444
	1461	8/19/81	445
	1401	8/7/81	447

PHP Package cont. (8)

PHP# 2050	11/19/81	Doc # 448
2005	11/12/81	449
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5562	4/18/83	458
5677	5/2/83	457
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5279	3/14/83	461
6958	8/16/83	462
977	1/16/81	466
1104	2/16/81	467
1246	4/3/81	469
1306	4/17/81	471
636	12/4/80	473
2576	3/11/82	358
2510	3/5/82	359
3025	5/11/82	363
2989	5/6/82	364
2953	4/30/82	365
2772	4/13/82	369
1932	11/2/81	370
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2325	2/11/82	377
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2198	1/20/82	380
3801	8/12/82	382

PHP package cont. (9)

	reported	
PHP # 605	11/25/80	docket # 384
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540	11/18/80	387
7398	9/29/83	394
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903	1/15/81	401
3179	5/27/82	405
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4184	10/4/82	417
775	1/2/81	428
795	1/2/81	429
815	1/10/81	430
1778	10/20/81	374

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L 5/24 41.11 P. Cook [illegible]

QA Taylor

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

APR 28 1982

Carolina Power and Light Company
ATTN: Mr. J. A. Jones, Senior Executive
Vice President and Chief
Operating Officer
411 Fayetteville Street
Raleigh, NC 27602

Gentlemen:

Subject: IE Report Nos. 50-400/82-03 and 50-401/82-03

This refers to the investigation conducted by Mr. J. Y. Vorse of this office on December 11, 1981 to February 26, 1982, of activities authorized by NRC Construction Permit Nos. CPPR-158 and CPPR-159 for the Shearon Harris facility.

Areas examined during the investigation and our findings are discussed in the enclosed investigation report. Within these areas, the investigation consisted of selective examinations of procedures and representative records, interviews with personnel, and observations by the investigator.

During the investigation, it was found that certain activities under your license appear to violate NRC requirements. These items and references to pertinent requirements are listed in the Notice of Violation enclosed herewith as Appendix A. Elements to be included in your response are delineated in Appendix A.

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

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

5/20 @ 10:A[illegible]

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

Sincerely,

James P. O'Reilly

James P. O"Reilly
Regional Administrator

Enclosures:
1. Appendix A, Notice of Violation
2. Investigation Report Nos. 50-400/82-03 and 50-401/82-03

cc w/encl:
R. Parsons, Site Manager

APPENDIX A

NOTICE OF VIOLATION

Carolina Power and Light Company
Shearon Harris

Docket No. 50-400
License No. CPPR-158

Based on the results of the NRC investigation conducted on December 11, 1982 to February 26, 1982, and in accordance with the NRC Enforcement Policy 47 FR 9987 (March 9, 1982), the following violations were identified.

A. 10 CFR 50, Appendix B, Criterion XVIII, as implemented by section 1.8.5.17 of the PSAR, require that inspection records identify the individuals who performed the inspection.

Contrary to the above, a welding inspector signed inspection records indicating he had inspected welds and found them acceptable when, in fact, the welds had been inspected by other individuals and he had not personally inspected the welds.

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

B. 10 CFR 50, Appendix B, Criterion II, as implemented by section 1.4.9 (1.58) of the PSAR requires the licensee to comply with ANSI N45.2.6-1973.

Contrary to the above, the licensee did not comply with section 2.2 of ANSI N45.2.6-1973 in that two individuals performed weld inspections before they were certified by the licensee as being qualified to perform the assigned work.

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

Pursuant to the provisions of 10 CFR 2.201, you are hereby required to submit to this office within thirty days of the date of this Notice, a written statement or explanation in reply, including: (1) admission or denial of the alleged violations; (2) the reasons for the violations if admitted; (3) the corrective steps which have been taken and the results achieved; (4) corrective steps which will be taken to avoid further violations; and (5) the date when full compliance will be achieved. Consideration may be given to extending your response time for good cause shown.

APR 2 8 1982

Date:_______________

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

APR 2 8 1982

INVESTIGATION REPORT NO. 50-400/82-03 and 50-401/82-03

SUBJECT: Carolina Power and Light Company
Shearon Harris Nuclear Plant
Unit 1

Improper Welding Inspection Practices

DATES OF INVESTIGATION: December 11, 1981 - February 26, 1982

INVESTIGATOR: J. Y. Vorse, Regional Investigator, Enforcement and Investigations Staff — Date Signed: 04.19.82

REVIEWED BY: Carl E. Alderson, Director, Enforcement and Investigations Staff — Date Signed: 4.22.82

A. INTRODUCTION

On December 4, 1981, the NRC Resident Inspector assigned to Carolina Power and Light Company's Shearon Harris nuclear power plant, advised Region II that several personnel had complained to him that a welding inspector was not performing visual weld inspections properly. The personnel who complained had no first hand knowledge; however, the rumor among the welders and welding inspectors was that if a hanger was located in an inaccessible area, the individual would not inspect the weld but would sign it off as acceptable. One complainant identified a specific hanger which was rumored to have not been properly inspected by the welding inspector. This hanger was inspected by the Resident Inspector and all welds appeared to be acceptable. However, the adjacent hanger had one weld which appeared to be rejectable. The Resident Inspector later learned the hanger welds had been inspected and accepted by the welding inspector in question.

Based on the number of personnel who were complaining about the welding inspector's weld inspection practices and the potential impact on the welding inspection program, an investigation was initiated by Region II on December 11, 1981, under the authority provided by Section 161.c of the Atomic Energy Act of 1954, as amended.

B. SCOPE OF INVESTIGATION

A review of the information supplied by the Resident Inspector disclosed one allegation to be addressed during the investigation. This was:

> A welding inspector was signing off welds on hangers and pipes as acceptable when he had not visually inspected them.

During the course of the investigation, the Investigator held discussions with numerous current licensee and licensee contractor employees. Formal interviews were conducted with 59 individuals who were considered by the Investigator to have potential knowledge of the alleged acts or practices. The investigation also included an inspection of randomly selected hangers and pipes which had been inspected by the particular welding inspector during the time frame the rumors began forming.

The investigation included a review of appropriate regulatory requirements, NRC records and licensee procedures and records including:

- 10 CFR 50, Appendix B
- Shearon Harris Quality Assurance Program
- Personnel Training and Qualification
- Visual Examination of Welds Procedure

This investigation was conducted by one investigator and two inspectors requiring a total of 42 man-hours of investigative and inspection activity on-site.

C. CONCLUSIONS

The allegation was substantiated in that the welding inspector had signed off weld inspections he had not personally performed; however, the welds had been inspected by inspector trainees who were working with the inspector. This results in two violations of NRC requirements:

1. Inspections were performed by uncertified welders; and

2. Inspection records do not reflect the correct identity of the individuals who performed the inspection.

DETAILS OF INVESTIGATION

CAROLINA POWER AND LIGHT

SHEARON HARRIS NUCLEAR PLANT

DECEMBER 14, 1981 - JANUARY 22, 1982

A. INDIVIDUALS CONTACTED

The following individuals were contacted during the course of the investigation.

Carolina Power and Light (CP&L)

G. A. DeBarres, QA Weld Inspector
K. A. Douglas, QA Weld Monitor
R. L. Faulkner, QA Weld Control and Surveillance
S. M. Freeman, QA Weld Inspector
A. B. Giles, QA Technician
J. C. McDonnell, QA Weld Inspector
A. Lucas, Senior Resident Engineer
E. W. Mercer, QA Weld Inspector
S. W. Montastle, QA Weld Inspector
R. M. Parsons, Site Manager
W. H. Pere, QA Weld Inspector
K. B. Stanley, QA Weld Inspector
R. B. Strickland, Mechanical Inspector
G. G. Tingen, QA Weld Inspector
T. Wait, QA Welding Supervisor

Daniels Construction Company

Crew P-21: Reactor Auxiliary Building (RAB)

R. V. McLeod, General Foreman
W. W. Burton, Pipe-Fitter Helper
R. J. Carr, Welding Foreman
J. F. Goodsell, Welder
B. W. Nguyen, Welder
K. M. Norton, Welder
J. A. Owens, Welder
G. S. Peck, Pipefitter
R. D. Symank, Welder
M. D. Warlick, Welder

Crew P-35 (RAB)

W. T. Bohan, Foreman
D. L. Cauble, Welder
R. W. George, Pipe-Fitter
W. J. Jenkins, Welder
T. R. Merideth, Welder
M. D. Tatham, Welder
J. C. Woznick, Welder

Crew P-17 (RAB)

D. E. Bradford, Pipe-Fitter
C. A. Brigman, Foreman
R. L. Grant, Pipe-Fitter
T. M. Lazafame, Pipe-Fitter
W. H. Martin, Welder
J. E. Newsome, Welder
J. B. Starnes, Pipe-Fitter Helper
L. L. Whitehead, Pipe-Fitter
S. J. Whitlock, Fitter

Crew P-14 (Waste Process)

R. A. Gardner, Foreman
W. C. Lynch, Welder
T. Smith, Welder
W. B. Surber, Welder

Crew P-20 (Waste Process)

J. A. Brincheck, Welding Supervisor
K. T. Davis, Pipe-Fitter Helper
J. D. Foster, Pipe-Fitter
D. P. Freeman, Welder
C. F. Green, Jr., Welder
J. W. Kilgore, Pipe-Fitter Helper
J. F. Lynch, Pipe-Fitter
D. C. Martin, Welder
D. M. Shargots, Welder
R. R. Stone, Pipe-Fitter
N. C. Sulton, Welder
G. G. Wilbon, Welder

Daniels Technical Services, Ltd.

D. A. Sands, QA Welding Inspector
B. L. Holcombe, QA Welding Engineer

Nuclear Regulatory Commission (NRC)

G. F. Maxwell, Resident Inspector

B. ALLEGATION

Occasionally, a welding inspector, Individual A, did not visually inspect welds on seismic hangers and piping. However, he signed documentation showing that he had.

C. BACKGROUND

The Resident Inspector at Shearon Harris nuclear site expressed concerns about certain workers approaching him and complaining about a welding inspector, Individual A. Several workers stated they were hearing other workers saying that Individual A was not looking at some welds he was signing off as acceptable. One individual stated to the Resident Inspector that if a weld was located in a difficult to access location, Individual A would not acquire the appropriate scaffolding to allow him to have access to the weld to be inspected. The Resident Inspector was further informed that he could find an unacceptable weld on seismic category 1 pipe hanger numbered A-3-236-1-CC-H-469. The Resident Inspector looked at the welds on that hanger and found no rejectable welds. However, on an adjacent hanger, No. A-3-236-1-CC-H-342 the Resident Inspector found what was, in his opinion, a rejectable weld. It was later determined by the resident inspector that this weld had been inspected by Individual A. Three additional hangers were looked at by the Resident Inspector and no rejectable welds were noted.

D. INTERVIEWS OF WELDING INSPECTORS

Eight weld inspectors including a supervisor, as well as four other personnel involved in the QA weld inspection program were interviewed by the Investigator. One individual stated he had heard rumors that Individual A "inspected from the floor". Two individuals stated they heard rumors that Individual A sometimes shined his flashlight on hangers from the floor but did not go up and visually check the welds. Five individuals stated they were aware that Individual A had a very bad case of arthritis during the summer months of 1981 and were surprised when they saw him up on the scaffolding. Two welding inspectors, Individuals B and C, stated they inspected welds before they (the inspectors) were certified. Individuals B and C provided the Investigator with signed statements which contained the following information in essence:

Individual B started work as a welding inspector trainee beginning sometime in September 1980. Initially, he was under the direct supervision and received on-the-job-training from Individual A. Individual A showed him what to look for regarding acceptability and when to reject a weld. After about 2 months, Individual B began inspecting welds by himself, particularly in areas which were relatively inaccessible and high up. Individual A remained on the floor signing off the weld inspection documentation and provided Individual B with a sticker showing the weld had been inspected. Individual B placed the stickers on the hangers on which he had inspected welds. Individual B estimated that he had inspected welds by himself on approximately 50-75 hangers most of which were on the 90ft. and 236ft. elevations in the Reactor Auxiliary Building. Although he inspected the welds prior to being certified in January 1980, Individual B had no misgivings about those welds he accepted. In fact, he believes he was on the conservative side and inspected all welds in accordance with AWS D1.1-75 Standards.

Individual C began his on-the-job-training with Individual A in October 1981 for pipe hanger welding inspection. Individual C estimates that he spent 3 weeks, 40 hours per week with Individual A and, although he could not recall how many hangers they inspected, he estimates he alone inspected about 75% of the welds. That is, those welds which were difficult to get to because of the need to climb scaffolds or physically difficult to get to. When he rejected welds the first several times, Individual A climbed the scaffold, looked at the welds and agreed they were rejectable. Thereafter, Individual C rejected and accepted welds without Individual A looking at them. Individual A always signed the weld inspection forms (Weld Data Report (WDR QA 34 and traveler)) as well as the weld inspection sticker. Individual C estimates that he inspected welds on about 100 hangers by himself before he was certified. In all of these situations, Individual A signed the documentation. Like Individual B, Individual C had no reservations about the welds he had accepted. He also inspected the welds according to AWS D1.1-75 standards.

E. INTERVIEWS OF CRAFT PERSONNEL

Forty-two Craft personnel comprised of welding foremen, welders, pipe-fitters, and pipe-fitter helpers were interviewed by the Investigator. Twenty-seven individuals had no knowledge of Individual A and could provide no pertinent information. Three individuals stated they heard rumors that Individual A would inspect from the floor and shine his flashlight on the welds. Five individuals stated they observed Individual A performing inspections on welds which were high up and difficult to get to. One welder, Individual D stated that Individual A accepted welds without looking at them. A signed statement was provided to the Investigator by Individual D which contained the following information in essence:

> Sometime in the late spring or early summer, Individual D was assigned to assist Individual A in locating and providing access for inspection of welds on piping. This transpired on a Saturday with no one else in the general area. The pipes were located in the waste process area, elevation 236. Individual A remained on the floor and Individual D climbed the scaffolds and ladders, placing stickers on pipes signifying the welds had been inspected. Individual A signed off the paperwork. Individual D estimates that this activity took place on approximately 100 welds, all non-safety Category 6 and 7. Individual D expressed concerns to co-workers and opined that this was the source of all the subsequent talk going around the plant about Individual A not inspecting the welds. Individual D thought Individuals E and F may have knowledge about similar occurrences.

Individual E was interviewed and stated he had no first hand knowledge about improper welding inspection. Individual E only acknowledged hearing rumors that Individual A had welders put stickers on pipes for him. Individual F was interviewed by the Investigator and he provided a signed statement containing the following information in essence:

> Individual F, a pipefitter helper, estimates he assisted Individual A in locating welds approximately 500 times. Most of the welds were easily accessible and were looked at by Individual A. On one occasion, however, in September 1981, Individual A glanced at two category 7 (non-safety related) welds which were located approximately 20 ft. above him. These were off the "MY column" and "column 2" of the East-West Hallway of the waste process area. Individual A signed the inspection sheet and handed the carbon copy to Individual F for the craft records. He also gave Individual F two filled out stickers instructing him to place them by the welds. However, Individual F did not do so because there was no scaffolding or ladder available, so he took the stickers home. Individual F was later requested by the Resident Inspector to provide him with the stickers. Only one was still available and this was given to the Resident Inspector by Individual F. This same sticker was later provided to the Investigator. The sticker bears the initials of Individual A.

Based on the information provided by Individual D regarding Individual A's not inspecting welds on a Saturday when no others were in the indicated area, a foreman, Individual G was asked to provide the names of craft personnel who assisted Individual A on Saturdays. Individual G provided those names to the Investigator. They were: Individuals H, I, J, K, L and M. These personnel were interviewed. Individuals H, I, J and M stated they observed Individual A inspect welds from scaffolds and ladders on Saturdays and he always appeared to be inspecting carefully. Individual K stated he observed Individual A inspect the welds although he seemed reluctant to go high. Individual L stated he assisted Individual A with approximately 100 weld inspections. On one occasion, Individual A shined his flashlight from a distance and accepted one weld. This, according to Individual L, was on code 6 and 7 non-safety related piping, located high off the floor.

F. INTERVIEW OF INDIVIDUAL A (WELDING INSPECTOR)

Individual A was interviewed at Shearon Harris on December 17, 1981 and he provided a signed statement containing the following information in substance:

> Regarding signing off welds that he did not actually look at, but which were inspected by trainees, Individual A explained that he was always within close proximity to them. When questioned by the Investigator as to whether or not he remained at floor level while the trainee inspected welds high on the scaffolds, Individual A declined to state where his exact physical location was except that he was in the "immediate vicinity". Individual A explained that sometime around April 1981, EBASCO began sending revisions requiring reinspection of some pipe hangers. Subsequently, for about a 3 month period, Individual A went out and looked at the respective hangers. No welds had to be inspected but he did have to verify the hanger was physically present. Therefore, Individual A would often shine his flashlight on the hanger while standing on the floor to ensure the hanger was present and in its proper location. He would then sign off the revised drawing and give to whoever was assisting him, a sticker indicating the date the hanger was "inspected" to the latest revision. The assistant would then place the sticker somewhere on the hanger. Individual A believes this may have been misconstrued by others in the vicinity that he was signing off welds without actually looking at them. In fact, none of the welds on the hanger required any inspection. Individual A estimates that he inspected approximately 100 hangers in this manner. Individual A denied having not inspected welds on pipes or hangers, but signing them off as acceptable.

G. WELD INSPECTIONS BY NRC

Based on the statements, made by several individuals, that Individual A signed off pipe welds without inspecting them, the Region II Engineering Inspection Branch was requested to conduct an inspection of randomly sampled welds on hangers and pipes. It was further requested that they draw samples from:

Areas which were relatively difficult to access;

Welds which were inspected on Saturdays; and

Welds which were inspected during the April-September 1981 time frame.

The results of the reinspection of welds conducted by NRC inspectors are documented in NRC Inspection Report Nos. 50-400/82-01 and 50-400/82-06. A summary of that inspection is included herewith as Enclosure 1. Two violations were identified by the inspectors and they are discussed in the referenced inspection report.

H. REVIEW OF LICENSEE PROCEDURES

The problem of uncertified individuals performing inspections and the inspection reports for those inspections being signed off by a certified inspector was discussed with the CP&L Site Manager and Senior Resident Engineer. They stated that such actions were permissible in accordance with licensee procedure CQA-1, "Personnel Training and Qualification".

A review of that procedure disclosed that Paragraph 7.1 contains the following:

> "Emphasis will be on firsthand experience gained through actual performance of processes, tests examinations, and inspections. As the inspector in training develops proficiency, he may be allowed to perform certain functions with minimal supervision; however, he will not be permitted to "sign-off" hold points in verification of quality requirements for work activities."

In response to the Investigator's comments regarding the inspection records being signed by an inspector who had not actually inspected the weld, the licensee's site management representatives stated that the certified inspector was accepting responsibility for the welds, therefore the inspector would only permit the trainees to accomplish the inspection when he believed they were qualified.

The licensee's procedure and implementation of the procedure is inconsistent with the requirements of ANSI N45.2.6-1973 which the licensee committed to follow in that the trainees had not been certified to perform the inspections in question; that is, no "certificate of qualification" meeting the requirements of Section 2.2.4 of the Standard had been completed for the individuals.

The licensee's procedure is also inconsistent with Criterion 17 of Appendix B to 10 CFR 50, which requires that inspection records identify the inspector who performed the inspection. An inspector cannot "accept responsibility" for an inspection that he did not personally perform.

I. FINDINGS

The allegation was substantiated in that the welding inspector signed inspection records indicating that he had inspected welds and found them acceptable when, in fact, he had not personally inspected the welds. This action results in two violations of NRC requirements. These are:

1. The inspection records did not identify the individuals (B and C) who had actually performed the inspections as required by 10 CFR 50, Appendix B, Criterion XVII and Section 1.8.5.17 of the PSAR; and

2. The inspections were performed by individuals (B and C) who were not certified to perform the inspections in accordance with ANSI N45.2.6-1973 as required by 10 CFR 50, Appendix B, Criterion II and Section 1.4.9(1.58) of the PSAR.

These violations appear to be the direct result of inadequacies in licensee procedure CQA-1 (Rev. 4), "Personnel Training and Qualification" or the licensee's interpretation of that procedure as discussed in Paragraph H above.

ENCLOSURE 1

Followup on Regional Request

Certain pipe welds and a random sample of difficult access welds on seismic supports inspected by a certain welding inspector during a particular time frame were reviewed by inspectors from the Materials and Processes Section.

1. The following seismic Category I welds were re-examined by Region II inspectors during the week of January 19-22, 1982:

COMPONENT ID/WELD NO.	SYSTEM	ITEM INSPECTED
CS-H-1790	Chemical and Volume Control	Seismic Hanger
CX-H-1623	Chilled Water Return	Seismic Hanger
CC-H-469	Component Cooling	Seismic Hanger
BD-H-144	Blowdown	Seismic Hanger
BR-H-731	Boron Recycle	Seismic Hanger
CS-H-137	Chemical and Volume Control	Seismic Hanger
RM-H-366	Reactor Make-up Water	Seismic Hanger
SI-H-1018	Safety Injection	Seismic Hanger
SF-H-704	Spent Fuel Pool Cooling and Cleanup	Seismic Hanger
CC-H-800	Component Cooling	Seismic Hanger
CT-H-205	Containment Spray	Seismic Hanger
SW-H-2343	Service Water	Seismic Hanger
*CC-H-342	Component Cooling	Seismic Hanger

*NOTE: This hanger was alleged to be unacceptable.

In addition to the above welds, the inspectors also inspected the following welds on the laundry and hot shower tank #591-48, that were alleged to be rejectable.

ISOMETRIC	WELD JOINT	SYSTEM
1-WL-1095	FW-3708	Waste Liquid
1-WL-1092	FW-3702	Waste Liquid
1-WL-1090	FW-3697	Waste Liquid

Discrepancies noted as a result of the NRC reinspection are as follows:

a. The inside of the box frame windows for hanger CC-H-469 had not been welded. A review of the records for this hanger revealed that the weld inspector had mistakenly referenced a field change that would have deleted these welds if the hanger had been designed for a twelve inch pipe or smaller. Hanger CC-H-469, however, was designed for two 18-inch pipes.

b. Field pipe welds FW-3708, FW-3702, and FW-3697, located on the top of the laundry and hot shower tank, had small arc strikes on the base metal adjacent to the field welds. Carolina Power and Light Company (CP&L) procedure NDEP-601 for visual examination of welds, paragraph 9.11, states that "weld and adjacent base metal shall be free of visible arc strikes, weld spatter and mishandling marks".

c. In addition to the above pipe field welds, arc strikes and weld spatter were noted on vendor welds between the above field welds and the tank. The weld inspector had not reported this condition as required by paragraph 19.9 of CP&L's Quality Assurance Program for Radioactive Waste Management System.

   The three examples noted above were reported as a violation of 10 CFR 50, Appendix B, Criterion V and was assigned number 50-400/82-01-03, Failure to Follow Procedures/Instructions for Visual Examination of Welds and Reporting of Discrepancies.

d. As a result of the reinspections conducted during January, the Region II inspectors concluded that the samples taken were representative of the more difficult inspections the inspector in question had made on seismic supports. Although one item of noncompliance was found, the NRC inspectors concluded that this was an oversight by the welding inspector. When reading the instructions he apparently failed to see that the field change had size limitations. The NRC inspectors found inspection stickers with the individual in question's name on supports that were very high and difficult to reach.

   This indicated that the weld inspector had made the inspections since all of the reinspected supports were examined during the period that the weld inspector was working alone. As for the reinspection of the three pipe welds that were examined by the inspector in question, two discrepancies were noted in this area and reported above. The Region II inspection concluded that a larger sample of pipe welds; particularity Non-ASME welds inspected by this individual would need to be reinspected on a subsequent inspection. An inspector follow-up item 400/82-01-05, Inspection of Pipe Welds was open to track this problem.

2. During the week of February 23-26, 1982 the Non-ASME welds listed below were re-examined by Region II. The safety significance of this non-ASME pipe is established by section 1.8 of the Harris FSAR, which commits to Regulatory Guide 1.143. The Guide identified the radioactive waste management systems as an activity important to safety and requires inspection in accordance with ANSI B31.1. CP&L procedure NDEP-601, Revision 0, conforms with the requirements of ANSI B31.1 and is the procedure used by CP&L for visual inspection of the Waste Processing System.

WELD JOINT NO.	SYSTEM	DATED INSPECTED
*1-WL-641-FW-2353	Waste Processing	9-09-81
*1-WL-642-FW-2358	Waste Processing	7-18-81
1-WL-364-FW-1857	Waste Processing	6-27-81
1-WL-324-FW-1856	Waste Processing	6-27-81
1-WL-365-FW-1846	Waste Processing	Date not recorded by NRC
1-WL-365-FW-1848	Waste Processing	6-27-81
1-WL-608-FW-2305	Waste Processing	8-11-81
1-WL-646-FW-2364	Waste Processing	7-21-81
1-WL-644-FW-2370	Waste Processing	8-11-81
1-2-WL-142-FW-1319	Waste Processing	8-18-81
*1-2-WL-142-FW-1318	Waste Processing	Inspection Sticker had been removed
1-WL-717-FW-4016	Waste Processing	7-28-81
1-WL-717-FW-4017	Waste Processing	7-23-81
1-WL-679-FW-4051	Waste Processing	7-22-81
1-WL-717-FW-4015	Waste Processing	7-22-81
1-2-WL-143-FW-1316	Waste Processing	8-24-81

* NOTE: This joint was unacceptable

Discrepancies noted as a result of NRC reinspection were as follows:

(a) Butt weld joint #'s 1-WL-641-FW-2353 and 1-WL-642-FW-2358 had insufficient weld metal deposited on the external surface of the weld prep resulting in areas of external weld concavity.

(b) Weld joint #1-2-WL-142-FW-1318 had two arc strikes. One of the arc strikes resulted in a pit in the base metal which had not been ground or liquid penetrant inspected.

The discrepancies noted above were reported as violation number 50-400, 401/82-06-01, "Failure to Follow Procedure for Visual Examination of Pipe Welds."

As a result of the above reinspections the licensee committed to reinspect all Non-ASME pipe weld joints inspected by the welding inspector in question and submit a list of their findings to NRC. This reinspection had commenced prior to this inspector leaving the site on February 26, 1982 and additional discrepancies had been identified by the licensee.

UNITED STATES
NUCLEAR REGULATORY COMMISSIC
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

BRZ Recd 2/25/83 ef

FEB 2 3 1983

Carolina Power and Light Company
ATTN: Mr. E. E. Utley
Executive Vice President
411 Fayetteville Street
Raleigh, NC 27602

41-11

Gentlemen:

SUBJECT: REPORT NOS. 50-400/83-05 AND 50-401/83-05

This refers to the routine safety inspection conducted by Mr. J. W. York of this office on February 1-4, 1983, of activities authorized by NRC Construction Permit Nos. CPPR-158 and CPPR-159 for the Shearon Harris facility and to the discussion of our findings held with Mr. R. M. Parson, Project General Manager, at the conclusion of the inspection.

Areas examined during the inspection and our findings are discussed 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.

Within the scope of this inspection, no violations or deviations were disclosed.

Two new unresolved items resulted from this inspection and are discussed in the enclosed report. These items will be examined during subsequent inspections.

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

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

Sincerely,

D. M. Verrelli, Chief
Project Branch 1
Division of Project and
Resident Programs

Enclosure:
Inspection Report Nos. 50-400/83-05
and 50-401/83-05

cc w/encl:
R. M. Parsons, Project General Manager

UNITED STATES
NUCLEAR REGULATORY COMMISS.
REGION II
101 MARIETTA ST., N.W., SUITE 3100
ATLANTA, GEORGIA 30303

Report Nos: 50-400/83-05 and 50-401/83-05

Licensee: Carolina Power and Light Company
411 Fayetteville Street
Raleigh, NC 27602

Docket Nos: 50-400 and 50-401

License Nos: CPPR-158 and CPPR-159

Facility Name: Harris 1 and 2

Inspection at Harris site near Raleigh, North Carolina

Inspectors: John W. York 2/22/83
J. W. York Date Signed

W. C. Liu 2/22/83
W. C. Liu Date Signed

Approved by: J. J. Blake 2/22/83
J. J. Blake, Section Chief Date Signed
Engineering Programs Branch
Division of Engineering and Operational Programs

SUMMARY

Inspection on February 1-4, 1982

Areas Inspected

This routine, unannounced inspection involved forty-six inspector-hours on site in the areas of independent inspection effort, safety-related pipe support and restraint systems, and other safety-related piping system.

Results

Of the three areas inspected, no violations or deviations were identified.

REPORT DETAILS

1. Persons Contacted

   Licensee Employees

   *R. Parsons, Project General Manager
   *L. Loflin, Manager-Engineering
   *N. Chiangi, Manager-Engineering and Construction-QA/QC
   *G. Forehand, Director-QA/QC
   *A. Lucas, Assist. Project Gen. Manager
   *M. Vernon, Superintendent, QC
   *E. Willett, Resident Mechanical Engineer
   *D. Whitehead, Supervisor, Site QA/QC
   *R. Hanford, Resident Engineer, Met./Welding
   *M. Thompson, Sr. Resident Engineer
   *A. Fuller, Prinicpal Engineer-Mechanical
   *G. Simpson, Principal Construction Specialist
   *C. Osman, Principal Specialist-QA/QC
   *J. Nevill, Principal Engineer-Engineering

   Other licensee employees contacted included construction inspectors, technicians, QC inspectors, and office personnel.

   *Attended exit interview

2. Exit Interview

   The inspection scope and findings were summarized on February 4, 1983, with those persons indicated in Paragraph 1 above. The licensee was informed of the inspection finding listed below. The licensee acknowledged the inspection finding with no dissenting comments.

   a. (Open) Unresolved Item, 400/83-05-01, Ground Areas on pipe support/restraint No. 1-SW-H-376, Paragraph 6.a.

   b. (Open) Unresolved Item, 400/83-05-02, Administrative procedure for approval of drawings associated with Design Change Notifications, Paragraph 6a.

3. Licensee Action on Previous Enforcement Matters

   Not inspected.

4. Unresolved Items

   Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in Paragraph 6.a.

5. Independent Inspection Effort - Units 1 and 2 (92706)

The inspectors toured the Carolina Power and Light Research Laboratories near the Shearon Harris Nuclear Plant in order to ascertain the capabilities of these laboratories in the metallurgical and mechanical testing areas. Since the testing for the weld procedure qualifications is performed by these laboratories, the inspectors reviewed the calibrations for the tensile and charpy impact testers.

6. Safety-Related Pipe Support and Restraint Systems - Unit 1 (50090)

The licensee divides the installation and inspection of pipe supports/restraints into three phases. Phase I involves the installation of the piping and support/restraint. Phase II involves the adjustment of struts, placement of shims in box frame restraints, and the inspection of the support/restraint after it has been totally completed. Phase III involves the comparison of the stress isometric to the as-built locations of the supports/restraints to insure that the analysis was performed for as-built conditions. Shearon Harris Unit 1 has approximately fifty supports/restraints in the Phase II condition.

The inspectors evaluated the following parts of the support/restraint program:

(a) Observation of work and work activities

The inspectors in conjunction with licensee welding and construction inspectors reinspected the following five supports/restraints that were in the Phase II condition:

- Hanger/Restraint No. 1-SW-H-376 in the Service Water System
- Hanger/Restraint No. 1-PD-H-1590 in the Plumbing and Drainage System
- Hanger/Restraint No. 1-4-WG-H-522 in the Waste Processing System
- Hanger/Restraint No. 1-4-WG-523 in the Waste Processing System
- Hanger/Restraint No. 1-SW-H-4/3 in the Service Water System

At the time of the inspection it appeared that all of the supports/restraints conformed to the drawing with the exception of support/restraint No. 1-SW-H-376. This support/restraint had two apparent overground areas, one on the northwest (NW) corner and one on the southwest (SW) corner. Both areas were just above a fillet weld on the same vertical tube steel member. In a telephone communication on February 7, 1983, the licensee stated that measurements were made on that date using an ultrasonic thickness device that showed the wall thickness in the ground area on the NW corner to be 0.230" and on the SW corner 0.235". The tolerances for the thicknesses on the tube steel are maximum 0.275" and minimum 0.225". Therefore, the areas met the minimum wall thickness requirement and were not reportable. Until the results of the licensee's inspection and the method used for inspecting ground areas on other hangers can be reviewed, this will be Unresolved Item No. 400/83-05-01, Ground Areas on Pipe Support/Restraint No. 1-SW-H-376. During the inspection, it was noted that the piping tolerances were indicated on Drawing No. CAR-2165, G107S02 (02 indicates sheet 2) with the approval initials in the sign off block and a Professional Engineering (PE) Seal. It appeared that the field installation tolerance for the supports/restraints inspections were being taken from sheet 1 of the drawing. The appropriate signatures and PE Seal were not affixed to this sheet. The licensee stated that sheet 1 was a Design Change Notification (No. 530-0769 Rev. 2). There was insufficient time during this inspection to review the licensee's procedure for handling Design Change Notifications and drawings and the safety significance was not of a level that would warrant an extended inspection. Until the relationship concerning approval signatures for these documents can be reviewed with the licensee, this will be Unresolved Item No. 400/83-05-02, Administrative Approval of Drawings Associated with Design Change Notifications.

(b) Review of QA Implementing Procedures

The inspectors conducted a general review of QA procedures to verify that all craft, NDE, and inspection personnel associated with the installation of pipe supports and restraints have been trained; that documentation for quality requirements of materials and components are met prior to installation; and that nonconformances and defects are documented and processed in accordance with established procedures. The following QA procedures were partially reviewed by the inspectors:

- Procedure CQA-1, "Personnel Training and Qualification", Rev. 12
- Procedure QAI-1.2, "QA/QC Personnel Qualification Requirements", Rev. 13
- Procedure NDEP-10, "Training Qualification and Certification of Nondestructive Examination Personnel", Rev. 3
- Procedure TP-40, "Training and Qualification of Construction Inspection Personnel", Rev. 4
- Procedure CQC-2, "Nonconformance Control", Rev. 4
- Procedure CQC-6, "Receiving Inspection", Rev. 0

(c) Review of Work Procedures

The applicable code for safety-related pipe support and restraint systems is the ASME Boiler and Pressure Vessel Code, Section III, Division 1, 1971 Edition including all addenda through Summer 1973. Mechanical snubbers shall be to 1977 code plus addenda through Summer 1978. The inspectors observed various activities and documents associated with the installation of supports and restraints to determine if code and procedure requirements were being met. The inspectors reviewed the following work procedures pertaining to safety-related pipe support and restraint systems to determine whether they were approved by authorized licensee personnel:

Work Procedure	Approved Date
MP-06, "General Welding Procedure for Carbon and Alloy Steel Pipe Weldments", Rev. 14	07/23/82
TP-04, "Calibration of Controlled Tools", Rev. 20	01/12/83
TP-34, "Inspection of the Installation of Safety-Related Pipe Hangers", Rev. 6	09/15/82
TP-39, "Inspection of Drilled-In Expansion Anchors", Rev. 4	10/13/82
WP-33, "Installation of Wedge Expansion Bolt Anchors", Rev. 6	09/28/82
WP-110, "Installation of Seismic Pipe Hangers and Supports for Seismically Analyzed Pipe", Rev. 7	11/11/82

In addition, the inspectors partially reviewed those work procedures to assure that technical adequacy of activities pertaining to safety-related pipe support and restraint systems were being met. This review was also performed to ensure that provisions for required preinstallation and in-process inspections are performed in a timely manner, and that bolts, nuts and washers are of the proper type and correctly installed.

Within the areas inspected, no violations or deviations were identified.

7. Safety-Related Piping - Unit 1

The inspector examined the welding activities described below relative to safety-related piping to determine whether applicable codes and specifications were being met. The applicable code for this work is the ASME Boiler and Pressure Vessel Code, Section III, Subsections NC and ND, 1974 Edition including Addenda through Winter 1976.

a. Observation of Welding Activities (55183)

The below listed welds were examined in process to determine work conducted in accordance with traveler; welder identification and location; welding procedure; WPS assignment; welding technique and sequence; materials identity; weld geometry; fit-up; temporary attachments; gas purging; preheat; electrical characteristics; shielding gas; welding equipment condition; interpass temperature; interpass cleaning; process control systems; identity of welders; qualifications of inspection personnel; and weld history records.

Weld No.	System
FW-1977	Service Water
FW-159	Residual Heat Removal
FW-142	Safety Injection
FW-2008	Service Water
FW-1950	Service Water
CS-103-2-SW-1	Chemical and Volume Control

b. Welder Qualification (55187)

The following welder qualifications records were reviewed:

Welder Symbol	System Observed Welding
B-7	Residual Heat Removal
C-53	Residual Heat Removal
D-76	Service Water

The following welder performance qualification tests were observed in progress:

Welder ID	WPS
32/353	1A4
32/354	1A4

Within the areas inspected, no violations or deviations were identified.

APF-001
Rev.
11/5/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of 23

FCR/ AS 334 Rev 1

Type of Request: ☐ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☒ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: ☒ Q ☐ Non-Q

Cable Tray, Conduit, and HVAC Hanger Supports

Conflict/Condition

Reference Documents or Attachment All structural steel HVAC, Conduit and cable tray support hanger drawings.

There are numerous cases in the field where the constructor has not welded connections for support hangers as per drawing due to the lack of accessibility or misinterpretation of the drawings. See attached sketches for typical areas of difficulties.

Recommended Action:
☐ Please Investigate and Resolve
☒ Please Resolve as Follows

In area where accessibility limits the constructibility of a weld or where there was a misinterpretation of the design drawing, allow the field the option to relocate the welds as proposed on page three.

Uncontrolled Copy

Justification: The required length of weld will be maintained and the relocation of the weld as proposed on page three will not compromise the structural integrity of the support hangers.

Requested by: [signature] 12/17/80
Discipline Engineer Date

Site Approval: C S Hinnant by AML 12-18-80
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy) Chuck French

DOCUMENT CONTROL (Copy) Vic Safarian
(Copy)
(Copy)

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FEB 2 1981
SHEARON HARRIS N. P. P.

12

ECP-AS-384 Rev.1

Design Organization Approval (AE)☒ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments:

J.N.

Nicholas C. Tassoulas AE 1/27/81 Mario S. Vedittello ASE 1/28/81

Signature Title Date Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

J. F. Nevill 2/2/81 J. F. Nevill 2/2/81

Discipline Engineer Date MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

C.S. Hinnant for AML 2-2-81

Senior Resident Engineer Date

Second Distribution:

(Original) Document Control

(Copy)

(Copy)

(Copy)

(Copy)

(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control

(Copy)

(Copy)

(Copy)

(Copy)

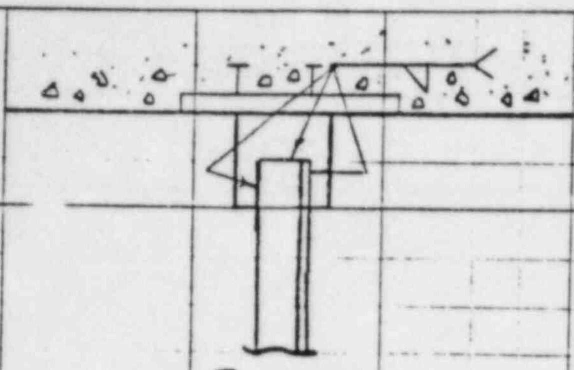
(Copy)

BY______ DATE ______ POWER PLANT CONSTRUCTION SHEET 3 OF 3

CHKD. BY____ DATE ______ COMPUTATION SHEET DEPT. ______

SUBJECT ______ FCR-AS-334 Rev. 1

FORM NO. 1630



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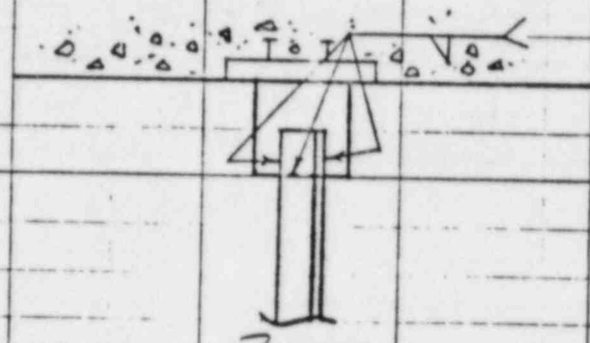

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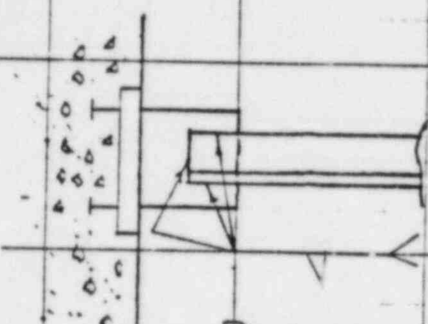

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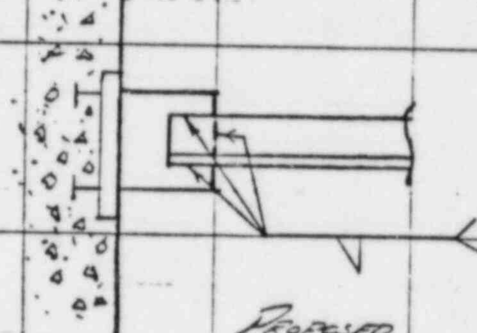

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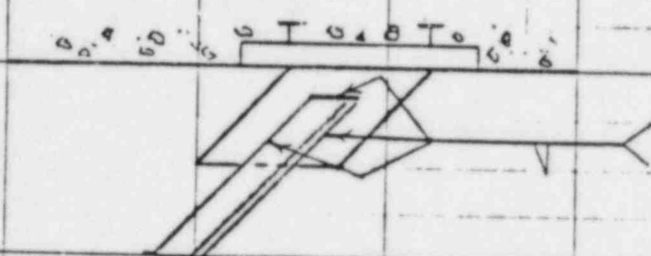

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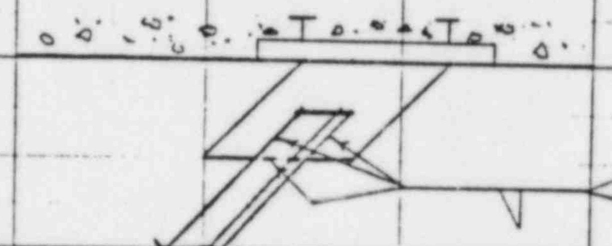

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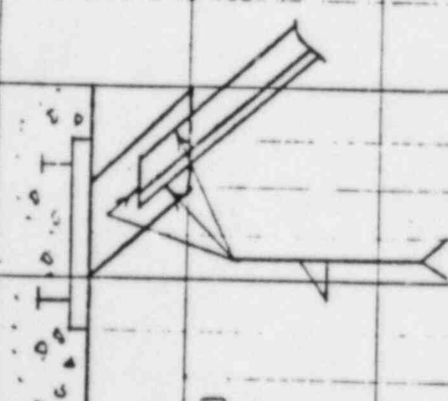

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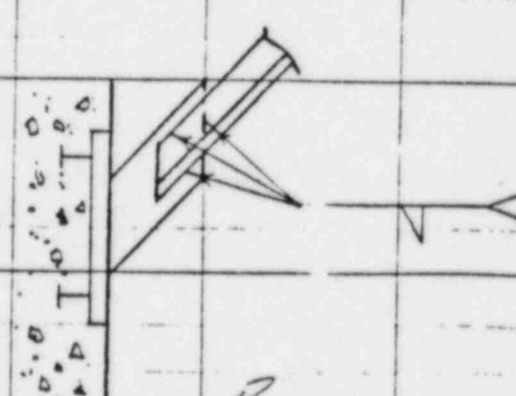

PROPOSED

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APF-001
Rev. 17
11/6/80

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AP-IX-05
Exhibit 1

Design Organization Approval (AE) ☒ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments:

J.W.
Nicholas C. Tarsoula AE 2/17/81
Signature Title Date

Walt [signature] PE 2/17/81
Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

[signature] 2/15/81
Discipline Engineer Date

[signature] 2/15/81
MHPE or PDE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

Bill [signature] for [illegible] 2/20/81
Senior Resident Engineer Date

Second Distribution:
(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
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(Copy)
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FEB 3 1981
M. WEBER
CIVIL ENGINEERING DEPT.

APF-001
Rev. 17
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of 2

ORIGINAL

FCR/PW AS-391

Type of Request: ☐ Field Change	☒ Permanent Waiver to "use-as-is" ☒ See Recommended Action	☐ ASME Section III Division 2 ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: RAB #1 HVAC Duct Support Weld Symbol Interpretation

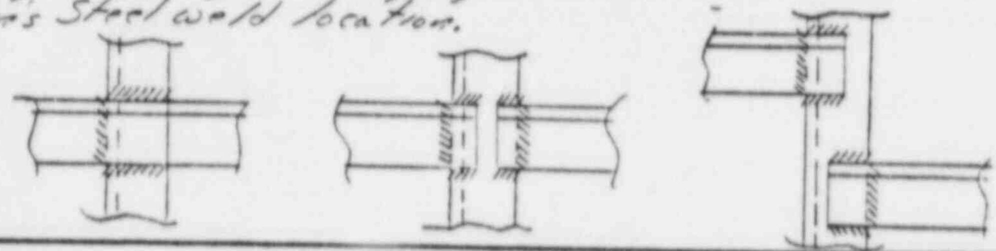
☒ Q
☐ Non-Q

Conflict/Condition

Reference Documents or Attachment Peden Steel Contract No C-3991 N Sheet E-21 (1364-16292 R0)

Peden's weld connection detail drawing as mentioned above indicates that the sides or edges to be welded are as sketched below. Ebasco's information pertaining to the proper sides to be welded is in conflict with Peden's Steel weld location.

Hatch marks indicates welded sides



Recommended Action:

☐ Please Investigate and Resolve
☐ Please Resolve as Follows

Allow the field to weld the sides indicated as shown in the above sketches for the above mentioned Peden Steel drawing.

Justification:

By Ebasco; AS-BUILT CONDITION SATISFIES DESIGN-INTENT.

Requested by:

Discipline Engineer   Date 1/26/81

Site Approval:

C.S. Hinnant for AML   1-27-81
Senior Resident Engineer   Date

First Distribution:
(Original) Design Organization
(Copy) Chuck French
(Copy)
(Copy)
(Copy)

12

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

(26)

ORIGINAL

FCR/PW AS 446

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ Field Change ☒ See Recommended Action ☐ ASME Section III Division 2 ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: HVAC, Cable Tray, and Conduit Support Hangers - Weld Connection Locations ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment All structural steel HVAC, Cable Tray and Conduit Support Hanger Drawings

Prior to receiving drawing clarifications and revisions, the field welded joint connections as shown on the attached continuation sheet #1 as indicated by hatch marks (////). The circle symbol (oooo) indicates where the design weld location should ~~of~~ had been welded.

Recommended Action: ☐ Please Investigate and Resolve ☒ Please Resolve as Follows

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Allow to use as is.

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SHEARON HARRIS N. P. P.

Justification: Due to the previous misinterpretation of the design drawings and the training sessions held since becoming aware of the misinterpretation of the design welds, discrepancies as shown on continuation sh 1 for newly erected hangers will be to a minimum and the existing conditions will not adversely affect the structural integrity.

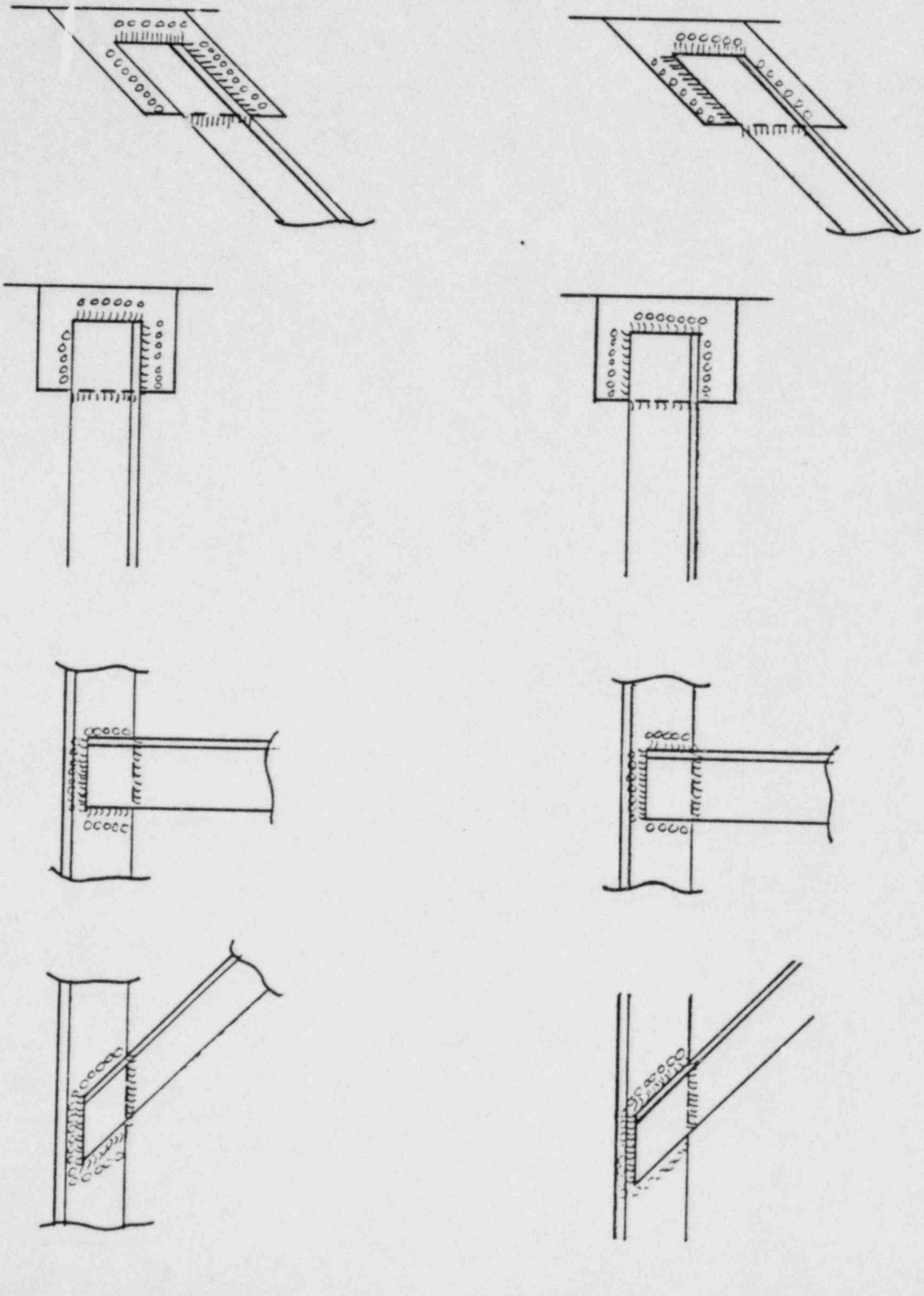
Requested by: [signature] 3/5/81
Discipline Engineer Date

Site Approval: [signature] for RHL 3-5-81
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy) Chuck French
(Copy)
(Copy)
(Copy)

Continuation Sheet 1

Pg 3 of 3
PN AS-446



EBASCO ATTACHMENT TO FCR-AS-446

COMMENTS:

As per telecon between Chuck French of CP&L and O S Yue of Ebasco on 4/15/81. Approval of welding any 3 sides of joint connection apply to hanger framings and hanger member to gusset plate joint in which it connects to embedded strip plates only.

APF-001
Rev. 1.?
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

(86)

ORIGINAL

AP-IX-05
Exhibit 1
Page 1 of 23

~~FCR~~/PW 446

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☐ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: HVAC, Cable Tray, and Conduit Support Hangers - Weld Connection Locations ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment: All structural steel HVAC, Cable Tray and Conduit Support Hanger Drawings

Prior to receiving drawing clarifications and revisions, the field welded joint connections as shown on the attached continuation sheet #1 as indicated by hatch marks (/////). The circle symbol (oooo) indicates where the design weld location should have been welded.

Controlled Copy

Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

FOR INFORMATION ONLY

Allow to use as is.

DOCUMENT CONTROL
RECEIVED
APR 23 1981
SHEARON HARRIS N. P. P.

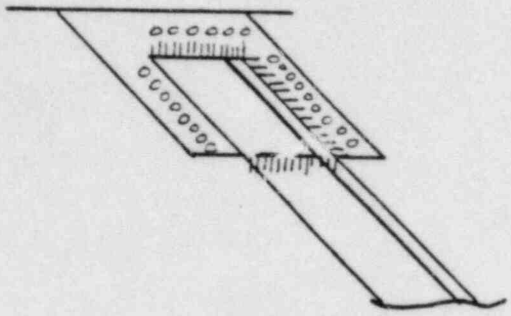
Justification: Due to the previous misinterpretation of the design drawings and the training sessions held since becoming aware of the misinterpretation of the design welds, discrepancies as shown on continuation sh 1 for newly erected hangers will be to a minimum and the existing conditions will not adversely affect the structural integrity.

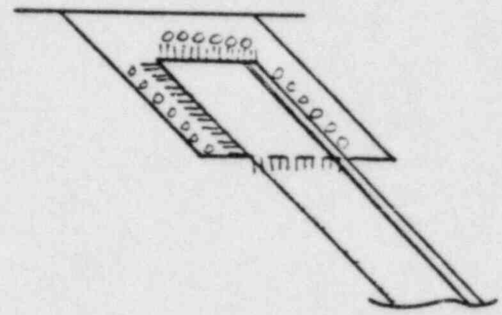
Requested by: [signature] 3/5/81
Discipline Engineer Date

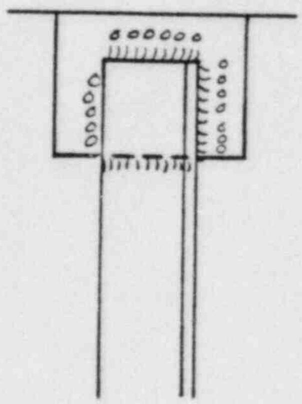
Site Approval: [signature] for PHL 3-5-81
Senior Resident Engineer Date

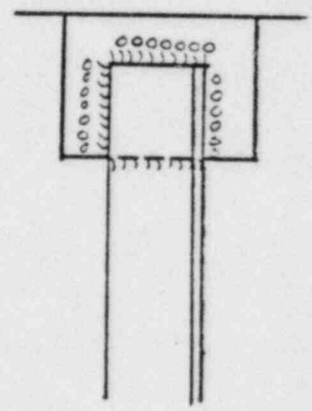
First Distribution:
(Original) Design Organization
(Copy) Chuck French
(Copy)
(Copy)
(Copy)

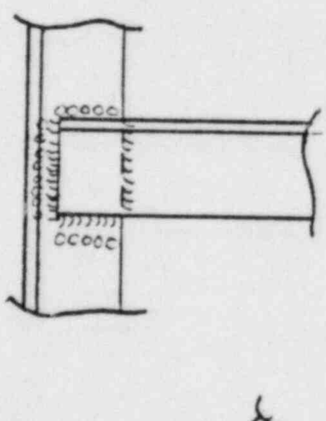
Continuation Sheet 1

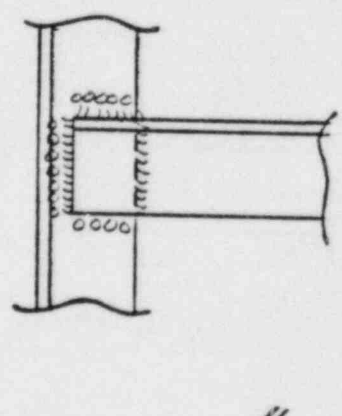


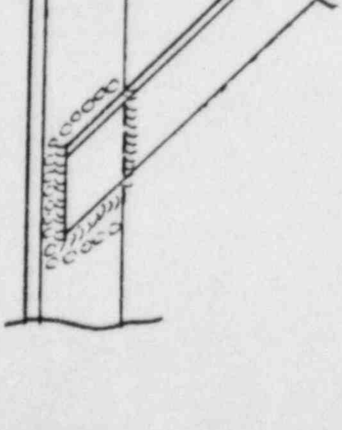


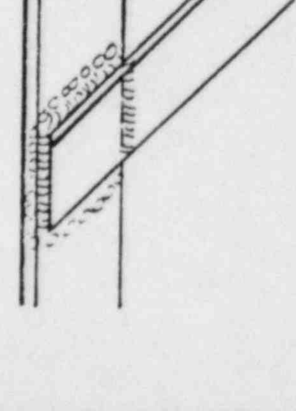












EBASCO ATTACHMENT TO FCR-AS-446

COMMENTS:

As per telecon between Chuck French of CP&L and O S Yue of Ebasco on 4/15/81. Approval of welding any 3 sides of joint connection apply to hanger framings and hanger member to gusset plate joint in which it connects to embedded strip plates only.

File: SH P-1/2

CONSTRUCTION QA SECTION
PERSONNEL TRAINING

Date: September 12, 1980

Training Period: 1½ hours

Topic: Hanger inspection & documentation
(see attached outline)

Instructor: V. Safarian

The following personnel attended the above described training:

Pete Tingen
Judi McDonnell
Steve Mountcastle
William Pere
Ward Mercer
~~Al Wade~~
T.J. Wait

Instructor

Outline for Retraining

A. Responsibility of Welding Inspectors

  1. Quality not Quantity

B. Inspection in accordance with requirements of Hanger Package

  1. Check PW, DCN, other pertinent data

C. Inspection in accordance with the Dwg.

  1. Weld symbol review (AWS)
  2. Verification of # of welds in accordance with the Dwg.
  3. Verification of type of welds in accordance with Dwg.
  4. RCI if question occurs in Dwg.
  5. No sign off if hanger not in accordance with Dwg. Package.

D. Documentation

  1. Dwg. sign off
  2. Traveler sign off
  3. Seismic WDR sign off

File: SH P-1/2

CONSTRUCTION QA SECTION
PERSONNEL TRAINING

Date: 4/6/81

Training Period: 2 hours

Topic: Post Weld Heat Treatment

Instructor: Fasih Shaikh- Welding Engineering

The following personnel attended the above-described training:

Bruce Giles
Ward Mercer
Pete Tingen
Jim Root
Judi McDonnell
Bill Russell
Bill Pere
Steve Mountcastle
Andy Bartrom
Clay Rhodes
T.J. Wait

Distribution:
Personnel files for
above personnel

Instructor

File: SH P-1/2

FOR INFORMATION ONLY

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Date: 12-10-81

Training Period: December 10, 1981 for 1 hour

Topic: Inspection and documentation of Seismic Pipe Hangers

Instructor T.J. Wait

The following personnel attended the above described training:

James Root
Bill Pere
Ken Stanley
Steve Mountcastle
Gilbert DeBarros

Instructor

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: June 18-21, 1979

SUBJECT COVERED: Training for Visual Weld Examination

INSTRUCTOR: [signature]

LENGTH OF CLASS: 8-hours

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. Rhett Hunt
2. George Daniel
3. Robert Cates
4. David Holler
5. DAVID C. WHITEHEAD
6.
7.
8.
9.
10.

COMMENTS: AWS D.1.1 WAS UTILIZED AS CODE REFERENCE.

VERIFIED BY: [signature]
David C. Whitehead
QA SPECIALIST

8/13/79
Date

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: August 9, 1979

SUBJECT COVERED: A.W.S. Welding Symbols

INSTRUCTOR: [signature]

LENGTH OF CLASS: 1- hour

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. David Holler
2. Rhett Hunt
3. ~~Walt Leavitt~~ did not attend
4. Robert Cates
5. George Daniel
6. David Whitehead
7.
8.
9.
10.

FOR INFORMATION ONLY

COMMENTS: AWS D1.1 WAS USED AS CODE REFERENCE

VERIFIED BY: David C. Whitehead 8/13/79

David C. Whitehead
QA SPECIALIST

Date

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: 9/11/79

SUBJECT COVERED: PARTIAL PENETRATION & FULL PENETRATION WELD SYMBOLS. WHEN POST WELD HEAT TREATMENT IS REQUIRED FOR EMBED PLATES.

INSTRUCTOR: GEORGE M. DANIEL

LENGTH OF CLASS: 30 MIN.

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. Richard Bussey
2. [illegible]
3. M. Lloyd Hollis
4. Robert Leggett
5. [illegible]
6. Robert Cotten
7. Barbara Howl
8.
9.
10.

COMMENTS:

VERIFIED BY: David C. Whitehead 9/11/79

David C. Whitehead
QA SPECIALIST

Date

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: 11-16-79

SUBJECT COVERED: PWHT (POST WELD HEAT TREAT) REQUIREMENTS FOR EMBED PLATES WELDED INTO A TEE FULL OR PARTIAL PENETRATION AS DELINEATED IN RCI-W-021 REV.1

INSTRUCTOR: Jeffrey V.P. Meleg

LENGTH OF CLASS: 20 min

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. Robert Carter
2. Barbara Howe
3. Richard Bussey
4. David Hower
5. [illegible]
6. [illegible]
7.
8.
9.
10.

COMMENTS: CLASS WAS SATISFACTORY AND ALL QUESTIONS WERE ANSWERED. LENGTH OF CLASS WAS 20 MIN.

VERIFIED BY: RR David C Whitehead 11/16/79

David C. Whitehead
QA SPECIALIST

Date

.3-S- 1730

bc: H Oslick
E Gebet
W Szablowski
J Joseph
I Grosz
M Gagliardi/P Fiala

R Hall
File Custodian
Mech File

EBASCO

JAN 18 1982
EB-S-1730
File Nos.: 5Q-P-1
5Q-M-30

Mr John Harris, Project Manager
Southwest Fabricating and Welding Co, Inc
PO Box 9449
Houston, TX 77011

Dear Mr Harris:

Subject: CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
SF & W'S FABRICATION ISOMETRICS
P O NY-435035

Attached please find the list of SF & W'S Fabrication Isometrics which have been reviewed by Ebasco. Letters shown in the remarks column for each drawing refer to notes applicable to that particular drawing as follows:

X - Reviewed without comments, proceed with fabrication

Y - Reviewed with comments, do not proceed with fabrication without receipt of Ebasco's comment print

Please note that the required resubmittal of the prints to SF & W Company will follow shortly.

Very truly yours,

E. Gebet

E Gebet
Assistant Project Manager

PF:mc
Attachment

cc: L I Loflin
L H Martin
Plant Manager c/o C R Gibson
R M Parsons

SOUTHWEST FAB.		EBASCO		REMARKS
ISO NO.	REV	DWG NO. 1364-	REV	
1-SI-133	1	47156	1	X
141	1	46922	1	
150	1	45059	1	
151	1	45470	1	
2-CS-237	1	46910	1	
238	1	46911	1	
239	1	46912	1	
127	2	43057	1	
176	2	41182	2	
177	2	41192	2	
178	2	41191	2	
179	2	41190	2	
180	1	41189	1	
181	1	41188	1	
182	1	41187	1	
183	1	41186	1	

SOUTHWEST FAB.		EBASCO		REMARKS
ISO NO.	REV	DWG NO. 1364-	REV	
2-CS-200	1	47035	1	X
185	2	41184	2	
201	1	47036	1	
203	1	47038	1	
204	1	47039	1	
205	1	47040	1	
206	1	47041	1	
207	1	47042	1	
209	1	47157	1	
210	1	47044	1	
211	1	47045	1	
212	1	47158	1	
213	1	47159	1	
218	1	47050	1	
220	1	47052	1	
224	1	47054	1	

SOUTHWEST FAB.		EBASCO		REMARKS
ISO NO.	REV	DWG NO. 1364-	REV	
2-CS-226	1	47056	1	X
227		46900		
228		46901		
229		46902		
230		46903		
231		46904		
233		46906		
234		46907		
235		46908		
236		46909		
240		46913		
241		46914		
242		46915		
243		46916		
244		46917		
245		47160		

SOUTHWEST FAB. ISO NO.	REV	EBASCO DWG NO. 1364-	REV	REMARKS
2-CS-248	1	47163	1	X
249		47164		
250		47165		
251		47166		
252		47167		
253		47168		
254		47169		
255		47170		
256		47171		
260		47175		
262		47177		
263		47178		
264		47179		
265		47180		
266		47181		
267		47182		

SOUTHWEST FAB. ISO NO.	REV	EBASCO DWG NO. 1364-	REV	REMARKS
2-CS-268	1	47183	1	X
269		47184		
270		47185		
271		47186		
272		47187		
273		47188		
274		47189		
275	2	47190		
276	1	47191		
277		47192		
278		47193		
279		47149		
280		47150		
281		47151		
282		47152		
284		45837		
2-CT-16		45040		

CONTROLLED DOCUMENT

ASME
SECTION III

CAROLINA POWER & LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT
ENGINEERING AND CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL SECTION

41.1 b

PERSONNEL TRAINING AND QUALIFICATION

NUMBER:		INITIAL ISSUE DATE:
CQA-1[illegible]		March 16, 1981
RECOMMENDED FOR APPROVAL BY: G. L. Forehand DIRECTOR - SHNPP QA/QC		APPROVED BY: [illegible signature] MANAGER - E&C QA/QC

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY CORPORATE QUALITY ASSURANCE DEPARTMENT QA/QC - HARRIS PLANT SECTION	NUMBER CQA-1	REVISION [illegible]

TITLE: PERSONNEL TRAINING AND QUALIFICATION

1.0 PURPOSE

The intent of this procedure is to establish requirements and guidelines for training and qualification of personnel assigned to perform QA/QC activities at a nuclear power plant.

2.0 SCOPE

This procedure is applicable to the site Quality Assurance/Quality Control Unit personnel who perform inspections, surveillances, examination or testing activities; that are intended to assure quality of construction or to verify conformance to quality requirements; and personnel who review and accept or approve inspection, examination or test documentation or other quality affecting documents (e.g. procedures, instructions and specifications). Nondestructive Examination (NDE) personnel training and qualification will be in accordance with Reference 1. For the purposes of this procedure, references to inspection activities includes surveillance. This is an ASME Section III procedure.

3.0 REFERENCES

1. Corporate QA Department Nondestructive Examination Manual (NDE Manual)
2. Instruction QAI-1.1, Visual Acuity and Color Perception Tests
3. Instruction QAI-1.2, QA/QC Personnel Qualification Requirements

4.0 RESPONSIBILITIES

4.1 Manager - QA/QC - Harris Plant Section

The Manager - QA/QC - Harris Plant Section shall be responsible for staffing the QA/QC Unit with personnel meeting the appropriate classification requirements.

4.2 Director - QA/QC

The Director - QA/QC shall have overall responsibility for implementation of this procedure.

4.3 Superintendent - QC

The Superintendent - QC is responsible to the Director - QA/QC for implementation of this procedure.

4.4 Quality Assurance/Quality Control Subunit Supervisors

QA/QC Subunit Supervisors shall have overall responsibility for implementation of this procedure in their assigned areas of responsibility.

4.5 Quality Assurance/Quality Control Specialists/Engineers

Site QA/QC Specialists/Engineers shall be responsible for indoctrination, training, qualification and evaluation of QA/QC personnel in their assigned areas of responsibility.

5.0 EDUCATION AND EXPERIENCE

5.1 Personnel performing QA/QC activities shall meet the education and experience requirements set forth in Appendix A.

5.2 Acceptable equivalents to the education levels listed in Appendix A are as follows:

1. In lieu of high school: Military (USAFI), state, county, or local school system high school equivalency GED; or two (2) years experience in construction operation or inspection work similar to that covered by the inspection activity.

2. In lieu of 2-year degree in engineering/technology: Satisfactory completion of college credits which can be evaluated to be comparable to that required for a 4-year degree; or two (2) years experience as a QA/QC Inspector in a nuclear program.

3. In leiu of a 4-year degree in non-engineering discipline: Satisfactory completion of college credits which can be evaluated to be comparable to that required for a 4-year degree; or two (2) years experience as a QA/QC Inspector in a nuclear program.

4. In lieu of a 4-year degree in engineering: Four (4) years experience as a QA/QC Inspector in a nuclear program.

5.3 The experience levels listed in Appendix A are for directly related experience in work that is technically equivalent to that which will be covered by the specific inspection/testing activity. Prior experience in construction operation or inspection work which is only similar to the inspection/testing activity may be substituted for directly related experience on a 2-month for 1-month basis, not to exceed two-thirds of the total inspection experience requirement.

5.2 Prior experience may be applied to the experience level requirements for more than one inspection/testing activity provided the requirements of 5.3 above are met.

6.0 PHYSICAL CONDITION

6.1 QA/QC inspection personnel shall meet the physical requirements for the particular CP&L classification involved at initial hiring.

6.2 Contracted personnel employed to augment CP&L QA/QC inspectors shall meet the physical requirements of their employers.

6.3 QA/QC and augmented inspection personnel shall be tested to assure:

1. Natural or corrected near distance acuity such as being capable of reading the J-1 letters on a standard Jaeger"s test-type chart or equivalent test type.

2. The capability for distinguishing and differentiating contrast between colors as demonstrated by practical demonstration or test performance.

6.4 Personnel that fail the near distance acuity or color sense testing may be evaluated and, through satisfactory demonstration of capability to perform the required inspections, found acceptable for certification for a sub-category of inspection. The personnel records shall reflect the evaluation process used and any inspection limitations imposed.

6.5 The test specified in 6.3 (or as allowed by 6.4) shall be conducted on an annual basis.

6.6 Prior to fuel loading applicable QA/QC inspection and supervisory personnel (including contract personnel) involved in plant Start-Up/Operations activities will participate in the company sponsored respiratory protection program annual physical.

7.0 INDOCTRINATION AND TRAINING

7.1 Newly assigned personnel (CP&L and augmented) will be trained in the performance of their intended assignment(s). Training shall be accomplished through a program consisting of indoctrination and on-the-job training (OJT) under the direct supervision of qualified personnel. The degree of training will depend on the amount of previous experience and training.

Emphasis will be on firsthand experience gained through actual performance of processes, tests, examinations and inspections. As the inspector in training develops proficiency, he may be allowed to perform certain inspection functions under the supervision of the qualified inspector; however, the qualified inspector is responsible for reinspection to the extent necessary to verify the accuracy of the trainee's inspection. Holdpoint "sign-off" shall be accomplished by the qualified inspector and certifies his acceptance of the completed work.

7.2 (a) Personnel performing QA/QC activities shall be indoctrinated in those project informational areas necessary for effective coordination and accomplishment of their assigned activities and responsibilities. Indoctrination shall be documented on QA/QC Personnel Indoctrination Check-Off (Form QA-47) and consist of, but not be limited to:

1. Organization and Organizational Relationships
2. Introduction to appropriate site personnel
3. Duties and Responsibilities
4. CP&L - CQA/CQC Procedures, Instructions, reports records and filing system.
5. Technical objectives of site CQA/CQC Procedures.
6. Codes and Standards to be employed.

(b) QA/QC personnel involved with plant Start-Up/Operations prior to fuel loading will receive indoctrination in:

1. Radiological Health & Safety Program
2. Emergency Action
3. Industrial Safety Program
4. Fire Protection Program
5. Security Program

7.3 Appendix A to this procedure specifies the training time required for the individual inspection/testing activities. Where the inspector in training has been previously certified for the inspection/testing activity by another organization, the classroom* hours may be reduced by one-half and the OJT** hours may be reduced by two-thirds. Personnel qualified for construction phase QA/QC activities including those qualified through teh CI training program, are considered qualified for equivalent Start-Up and Operation phase QA/QC activities provided indoctrination is received and documented in applicable Start-Up/Operation phase procedures.

Notes: *Classroom training includes lectures, discussions, and demonstrations of the uses of documents, tools, and equipment related to the inspection/testing activity; and the administration of appropriate examinations and tests.

**Where equally applicable to more than one inspection/testing activity, OJT time may be applied to each of the appropriate activites.

7.4 Formal training administered by the QA/QC Specialist/Engineers/Subunit Supervisors to develop or maintain the proficiency of inspection personnel, shall be documented. Those training records shall include the following information:

1. Name of Inspector
2. Subject Matter
3. Date
4. Time Spent
5. List of Attendees

8.0 QUALIFICATION PRIOR TO CERTIFICATION

Prior to assignment to perform specific inspection/testing functions, QA/QC personnel shall meet the minimum requirements for the assignment as delineated in Appendix A. Classroom, self-study and practical demonstrations shall be performed and documented in accordance with Reference 3.

8.0 (cont.)

Qualification records of company personnel transferred, from other units or personnel hired from organizations which provide direct services to the QA/QC Unit, will be reviewed for acceptance against the requirements of this procedure. The Inspector's personnel file will be annotated to show the results of the review and identify any training and/or testing required prior to certification. Where no additional training is required, certification/recertification may be affected based on previous qualifications.

9.0 CERTIFICATION

9.1 Subunit Supervisors, QA/QC Specialists and Engineers

9.1.1 Subunit Supervisors, QA/QC Specialist and Engineers are assigned supervisory and technical responsibilities based solely on combinations of formal education, previous training, previous work experience and completion of indoctrination to satisfactorily perform their assignments. Such personnel are considered qualified without examination to perform the following functions as applicable to the activities within their assignments:

1. Train, qualify and supervise QA/QC personnel in inspection, monitoring and testing assignments.

2. Develop and administer oral/written qualification examinations.

3. Evaluate capabilities and performance of QA/QC personnel.

4. Evaluate results of examinations, inspections and tests.

5. Develop and prepare new QA/QC procedures and instructions.

6. Review QA/QC and Construction operations procedures and instructions for appropriate commitments and requirements.

7. Technical review of site generated documents which furnish documentary evidence of the quality of nuclear safety related items and of activities affecting quality.

9.1.1 (cont.)

8. Review of procurement documents for inclusion of QA requirements.

9. Review of Suppliers' documentation to assure procured items comply with QA requirements of procurement documents.

10. Plan, schedule and supervise inspections and surveillance of construction and operations activities.

11. Identify quality problems and initiate, recommend or provide resolutions.

9.1.2 Other activities assigned to the Subunit Supervisors are as follows:

9.1.2.1 QA Surveillance

1. Perform QA Surveillance of construction installation, inspection and testing activities.

2. Perform QA Surveillance of selected general activities supporting rather than directly related to the installation, testing or inspection of permanent plant items or structures.

3. Perform technical document review of construction QA Records.

9.1.2.2 Civil & Structural

1. Sampling and testing of concrete materials (i.e. cement, aggregate, admixtures and water).

2. Concrete production.

3. Sampling and testing of plastic concrete and grout.

4. Compressive testing of concrete and grout.

9.1.2.2 (cont.)

5. Tensile testing of reinforcing steel bars and cadweld specimens.

6. Installation of Mechanical splices (cadwelds) in concrete reinforcing bars.

7. Calibration and field adjustment of measuring devices.

8. Windsor Probe System of testing concrete strength in place.

9.1.2.3 <u>Materials & Records</u>

1. Receipt storage and issue of nuclear safety related plant items and consumables.

2. Construction site procurement of nuclear safety related plant items and consumables.

3. Accumulations, review, filing and control of records which are required to furnish documentary evidence of the quality of nuclear safety related items and of activities affecting quality.

4. Control of construction and operations control documents.

5. Control of records of permanent plant items transferred between units or off-site.

6. Assembly of Code Data Reports for submittal to the National Board.

9.1.2.4 <u>Mechanical & Welding</u>

1. Installation and pressure testing of piping systems, components and HVAC duct work.

2. Field fabrication/modification of piping subassemblies.

9.1.2.4 (cont.)

3. Application of "N" type symbol stamp to ASME Code Class piping and subassemblies and systems.
4. Preparation of ASME Code Data Reports.
5. Cleanliness inspections of piping systems and components.
6. Inspection of code valves.
7. Qualification of welders and welding operators.
8. Field welding of ASME Code Class and non-code class piping.
9. Installation welding of pressure boundary components.
10. Installation welding of Seismic Category I structural steel members, hangers and supports.
11. Field fabrication welding of piping subassemblies, tanks, structural steel members, hangers and supports (including studs).
12. Installation welding of steel liner plate.
13. Post-weld heat treatment.

9.1.2.5 Start-Up/Operations

1. Procedure Review
2. Turnovers
3. Document Review
4. Maintenance and Modification Control
5. QA Surveillance of Start-Up/Operations
6. Inspections

9.?.3 Personnel, not necessarily classified as QA/QC Specialists/Engineers may be assigned supervisory responsibilities within their areas of technical expertise when evaluated by the QA/QC Subunit Supervisor as being capable of performing the supervisory assignment. The evaluation shall be documented and shall take into account the following factors:

1. Education

2. Experience

3. Demonstration of Capability

9.2 Personnel performing QA/QC activities will be eligible for certification after complying with paragraphs 8.0 or 9.0 as applicable. Certification shall be documented on QA/QC Personnel Qualification/Certification (Form QA-?) and shall contain, but not be limited to, the following information:

1. Employer's Name

2. Name of person being certified

3. Activity qualified to perform

4. Date of certification and effective period

5. Basis for certification

6. Signature of Director or his designee

9.3 Certification by the Director means the inspector is qualified to perform the following as applicable to the inspection/testing activity:

1. Record inspection, examination and testing data.

2. Implement approved inspection, examination and testing procedures.

3. Plant inspections, evaluations and tests; set-up tests, including preparation and set-up of related equipment.

4. Evaluate the validity and acceptability of inspection, examination and test results.

9.3 (cont.)

5. Report inspection, examination and test results.

6. Supervise other inspection/testing personnel.

7. Train other personnel.

8. Use calibrated tools and equipment required for the inspection/testing activity.

9.4 Appendix A to this procedure identifies the individual supervisory and inspection/testing activites for which QA/QC personnel may be assigned.

10.0 NEW INSPECTION ACTIVITIES

In the event a new work activity and the associated inspection activity are concurrent so as to preclude prior qualification of inspection personnel, inspection of the work shall be under supervisory control of the cognizant QA/QC Specialist, Engineer or Subunit Supervisor. Assistance from the cognizant discipline engineer and manufacturer's representative may be requested to facilitate initial qualification of inspection/testing personnel. The required OJT may be waived upon satisfactory demonstration of ability to perform the inspection/testing function.

11.0 EVALUATION AND RECERTIFICATION

11.1 The job performance of QA/QC personnel shall be evaluated at intervals not to exceed two (2) years. QA/QC personnel who have not performed inspection/testing activities for which qualified within a period of one year shall be re-evaluated prior to assignment to perform that inspection or test.

11.2 If the results of the performance evaluation(s) are satisfactory, the individual's certification shall be continued.

11.3 If, during the above evaluation or at any other time, it is determined that the capabilities of an individual do not meet the requirements of the inspection/testing activity, that individual shall be removed from the activity until such time that the required capability has been demonstrated.

11.4 Recertification will be documented on QA-49A Forms.

12.0 RECORDS

12.1 A file of QA/QC personnel certifications (completed QA-49/49A Forms) shall be retained in QA Records.

12.2 A file of records required to support the certification of personnel assigned to perform QA/QC activities shall be established and maintained. The file shall include, as a minimum:

1. Visual Acuity Test Results (Form QA-[illegible])
2. Physical Examination Results or Equivalent Statement
3. Resume' of Education and Experience
4. Indoctrination (Form QA-47)
5. Other training such as the respiratory protection program, health physics, security, etc..

13.0 APPENDIX

13.1 Appendix A, QA/QC Education, Experience & Training Requirements

CA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
CIVIL/STRUCTURAL					
Concrete Compression Testing	2	1	0	2	24
Sieve Analysis	2	1.	0	2	16
Field Testing of Concrete	2	1	0	2	32
Rebar & Cadweld Tensile Testing	2	1	0	3	24
Concrete Material Testing	4	2	0	2	40
Grout Testing	2	1	0	1	16
Cement False Set Testing	2	1	0	2	16
Concrete Batch Plant Inspector	12	4	2	4	40
In-Place Concrete Test by Windsor Probe System	2	1	0	2	16
Cadweld Inspector	8	4	2	4	40

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR./TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
MATERIALS & RECORDS					
Receipt Inspector					
1. Secondary (QR Received)	12	8	4	4	20
2. Rebar	16	8	6	4	20
3. NSR Categories I & II Off-the-Shelf Items Consumables	16	8	6	4	20
4. Stock Steel & Bolting Stock Tubing, Pipe and Fittings (FP & Radwaste) Stock Tubing, Pipe and Fittings (Code Class)	24	12	7	6	20
5. Weld Filler Materials	40	22	16	8	20
6. Engineered Items (Seismic I) Engineered Items (NSR Categories I & II, Radwaste & Fire Protection) Primary -Engineered Items	44	22	17	8	37
Purchase Requisition Review					
1. Non "Q"-List Items	8	4	2	8	20
2. "Q" -List Items	24	12	6	8	40
QA Records Clerk	8	N/A	N/A	8	80

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
MECHANICAL/WELDING					
Cleanness Inspector	8	4	2	[illegible]	20
Pressure Testing Inspector	8	6	4	-	20
Valve and Component Installation Inspector	24	8	4	-	30
Pipe Spool Fabrication/ Modification Inspection	12	8	4	-	20
Pipe, Pool Liner Weld Inspector	24	12	6	[illegible]	80
Structural Weld Inspector	16	8	4	[illegible]	30
Stud Welding Inspector	16	8	4	-	40
Post Weld Heat Treatment Inspector	8	4	2	[illegible]	40

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	• WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
START-UP					
Turnover - Mechanical	24	4	2	2	16
Turnover - HVAC	24	4	2	2	16
Turnover - Electrical	24	4	2	2	16
Turnover - I&C	24	4	2	2	16
Turnover - Structural/Civil	24	4	2	2	16
Cleanliness Inspections	8	4	2	2	20
Instrumentation Inspections	24	12	2	4	20
Mechanical Inspections	24	12	4	6	40
Electrical Inspections	24	12	4	6	40
Surveillance - PSI/ISI	24	12	4	3	20
Surveillance - Operations	24	12	4	2	20
Surveillance - Maintenance	24	12	4	3	20
Surveillance - E&RC	24	12	4	3	20
Surveillance - Start-Up Activities	24	12	4	2	20
Surveillance - Administrative	24	12	4	2	10
Surveillance - Technical Support	24	12	4	2	10
Surveillance - General (Refer to Note 1)	24	12	4	4	20

Note:
1. General surveillance certification will cover basic items such as cleanliness, housekeeping, training and qualifications. This certification will provide the methods for preparing, conducting and reporting surveillances.

QA QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	HRS. EXPERIENCE REQUIRED: HIGH SCHOOL	HRS. EXPERIENCE REQUIRED: 2-YR ENGR/TECH 4-YR NON-ENGR	HRS. EXPERIENCE REQUIRED: 4-YR ENGR	HRS. TRAINING: CLASS-ROOM	HRS. TRAINING: OJT
START-UP					
Maintenance Instruction Review	24	8	2	2	12
Start-Up Instruction Review	24	8	2	[illegible]	12
E&RC Instruction Review	24	8	2	2	12
General Procedures & Instruction Review	24	8	2	[illegible]	12
WR&A Review	16	8	2	2	12
CWR&A Review	16	8	2	2	12
STs/PTs Review	16	8	2	2	12
Plant Modification Review	24	12	4	[illegible]	24
Calibration Nonconformances Review	12	12	1	[illegible]	4

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR. TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
MISCELLANEOUS (Non-Inspection/Testing Activities)					
QA/QC Subunit Supervisors	468	364	260	N/A	N/A
QA/QC Specialist	312	208	104	N/A	N/A
QA/QC Engineer	N/A	N/A	96	N/A	N/A

QA [illegible] EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	MOS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
QA SURVEILLANCE					
Concrete Placement Monitor	24	8	4	8	40
Concrete Testing Monitor	24	8	4	8	40
Grout Placement Monitor	12	4	2	8	16
Structural Steel Erection Monitor	12	4	2	4	40
Cadwelding Control Monitor	12	4	2	4	40
Soils Control Monitor	24	8	4	8	40
Expansion Anchor Installation Monitor	12	4	2	2	16
Electrical Raceway Conduit Installation Monitor	24	8	4	4	20
Cable Pulling, Termination and Testing Monitor	24	8	4	4	20
Cleanness Control Monitor	12	4	2	2	20
Protective Coating Application Monitor	24	8	4	4	50
Mechanical Equipment Installation Monitor	24	8	4	4	30
Hydrostatic Test Monitor	12	6	4	4	20
Hanger & Support Installation Monitor	24	8	4	4	36
Piping Installation Monitor	24	8	4	4	30
HVAC Ductwork Installation Monitor	16	8	4	4	20
Receiving Inspection Monitor	44	22	17	8	40
In-Process Weld Quality Qualifications Monitor	24	12	6	8	40
Final Weld Quality Monitor	24	12	6	8	40
Non-Destructive Examination Monitor	44	22	17	8	40
General Activity Monitor (Refer to Note [illegible])	24	8	4	4	2[illegible]
Electrical Equip. Instrumentation Installation Monitoring	24	8	4	-	2[illegible]

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	YRS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR. TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
QA SURVEILLANCE (cont.)					
Note: 1. Qualification of QA/QC Inspectors for surveillance of on-site contractor activities is provided by qualification for specific surveillance activities. For example, surveillance of contractor welding activities shall be performed by an inspector qualified in weld control surveillance. 2. Qualification of QA/QC Inspectors for technical review of site generated records is provided by specific activity qualification. QA/QC Inspectors qualified for specific activity are thereby qualified to review records generated within the scope of that activity. 3. Site QA Surveillance personnel may be considered qualified for general surveillance by virtue of their qualification in one or more specified surveillance activities. In this case, the qualification shall require the completion of required indoctrination, self-study and classroom training; additionally, personnel shall meet the education and experience requirements outlined in this Appendix. OJT, practical demonstrations, and examinations shall not be required when qualification is accomplished by this method					

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	MIN. EXPERIENCE REQUIRED			REQ. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
QA SURVEILLANCE (cont.)					
4. Site QA Surveillance personnel may be considered qualified for surveillance of inspection activities for which they hold or have held valid CP&L certification. In this case, the qualification shall require the completion of required indoctrination and self-study. Additionally, personnel shall meet the education and experience requirements outlined in this appendix. No additional OJT, classroom training, practical demonstrations and examinations shall be required when qualification is accomplished by this method.					

File:
Training
T4C

EXHIBIT 2

17 OCTOBER 1980

TO: ~~RAY Hanford~~ RH 10/20/80

FROM: David Tinkeldale

SUBJECT: Welder Training Class

On Friday October 17, 1980 I conducted **two** welder training classes for the structural welders (#32 craft) and some CP&L personnel (engineers and Q.A.). Attached is an outline and list of attending personnel.

to be produced in response to 41-7

P. O. Box 101, New Hill, N. C. 2756?
October 3, 1983

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-126

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986-90 - 900,000 KW - UNITS 1 & 2
SHOP WELDING DEFICIENCIES IN SEISMIC I PIPE HANGERS
SUPPLIED BY BERGEN-PATERSON, ITEM 95
UNDERSIZE SKEWED TEE FILLET WELDS ON SEISMIC I
PIPE HANGERS, ITEM 72

Dear Mr. O'Reilly:

Attached is our second interim report on the subject items which were deemed reportable per the provisions of 10CFR50.55(e) and 10CFR, Part 21, on August 13, 1982 (Item 95) and November 5, 1982 (Item 72). Carolina Power and Light Company is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by December 1, 1984.

Thank you for your consideration in this matter.

Yours very truly,

R. M. Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

000322

bcc: Mr. H. R. Banks
Mr. N. J. Chiangi
Mr. A. B. Cutter
Dr. T. S. Elleman
Mr. G. L. Forehand
Mr. B. J. Furr
Mr. S. Hinnant
Mr. L. I. Loflin
Mr. R. E. Lumsden
Mr. M. A. McDuffie
Mr. C. H. Moseley, Jr.
Mr. R. M. Parsons
Mr. Sheldon D. Smith
Mr. J. L. Willis
Mr. S. R. Zimmerman
Mr. H. W. Bowles
Dr. J. D. E. Jeffries
Mr. M. F. Thompson
Mr. J. Nevill

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNITS NOS. 1 AND 2

INTERIM REPORT NO. 2

SHOP WELDING DEFICIENCIES IN SEISMIC I
PIPE HANGERS SUPPLIED BY BERGEN-PATERSON
ITEM 95

UNDERSIZE SKEWED TEE FILLET WELDS ON
SEISMIC I PIPE HANGERS
ITEM 72

1983

REPORTABLE UNDER 10CFR50.55(e)
REPORTABLE UNDER 10CFR21

SUBJECT: Deficient shop welds on pipe hangers previously accepted by Bergen-Paterson (B-P) and Ebasco Welding Inspectors.

ITEM: Seismic Pipe Hangers

SUPPLIED BY: Bergen-Paterson Pipe Support Corporation, Laconia, New Hampshire

NATURE OF DEFICIENCY:

1. Missing and undersized welds
2. Cosmetic weld defects
3. Undersized skewed tee welds
4. Deficient welds accepted by B-P inspectors and Ebasco Vendor Quality Assurance (VQA) inspectors

DATE PROBLEM OCCURRED: Prior to October 1, 1982

DATE PROBLEM REPORTED: On August 13, 1982 CP&L (Mr. N. J. Chiangi) notified the NRC (Mr. A. Hardin) that this item (Item 95) was reportable under 10CFR50.55(e) and 10CFR, Part 21. In our November 5, 1982 letter, CP&L (Mr. R. M. Parsons) notified the NRC (Mr. J. P. O'Reilly) that this item (Item 72) was reportable under 10CFR50.55(e) and 10CFR, Part 21.

SCOPE OF PROBLEM: Seismic Category I pipe hangers which were inspected at the source of fabrication prior to October 1, 1982.

SAFETY IMPLICATIONS: Deficient welds could cause a safety-related pipe hanger to fail under seismic conditions. As a result, if not corrected, they could adversely affect the safe operation of this facility. However, no hangers evaluated to date with the above type deficiencies have been found to adversely affect the safe operation of this facility.

REASON THE DEFICIENCY IS REPORTABLE: The conditions reported in Item 95 and Item 72 represent breakdowns in B-P and Ebasco QA programs which allowed supports to be shipped with welds which were not in accordance with design criteria. This incident was identified as reportable under 10CFR50.55(e) and 10CFR, Part 21, due to the extensive evaluation required and the breakdown in the QA programs.

CORRECTIVE ACTION:

1. Hangers with shop weld deficiencies were identified during the following processes:

   A. Receipt Inspection.

   B. Inspection in the warehouse prior to hanger inssuance to the field.

   C. Inspection in the field of installed hangers which had not been previously inspected by CP&L for shop weld deficiencies (does not include those hangers

CORRECTIVE ACTION (cont'd.):

D. Reinspection of pipe hangers that were installed or partially installed and inspected prior to June 26, 1982. This includes the 347 hangers which were previously reinspected as part of the Corrective Action to NRC Report 50-400/82-03. The June 26, 1982 date was selected because the QC weld inspection program was expanded to include shop welds. 346 hangers which had been installed and inspected prior to June 26, 1982 were removed, voided, or declassified to non-seismic by a subsequent drawing revision and therefore were not reinspected.

2. 449 hangers with defective shop welds were identified by processes A and B (see above).

   1862 hangers were reinspected by Processes C and D. 728 were identified with shop weld deficiencies.

   Deficiencies were resolved as follows:

   Welds were cut out.

   Design drawing revisions were issued as a result of Engineering evaluation.

   Welds were reworked and upgraded to meet the acceptance criteria of FCR-H-979.

   Some hangers were on hold due to engineering problems which precluded rework at this time. These hangers will be dispositioned in accordance with the appropriate drawing revision when the engineering holds are removed.

3. Instruction measures have been established to control pipe hangers which have not been installed but were received prior to October 1, 1982. We have taken the option to inspect shop welds prior to issue from the warehouse or to inspect shop welds at the same time field welds are inspected. Defective welds will be identified on DDR's for control and evaluation.

PREVENTIVE MEASURES TAKEN TO AVOID FURTHER NONCOMPLIANCE:

1. Field Change Request (FCR) H-979 was developed and issued to provide weld inspection acceptance criteria for both field and shop welds based on the AWS D1.1 code and B-P design criteria.

2. Ebasco VQA began performing in-process inspections and 100% inspection of hanger welds on October 1, 1982. This is to be performed throughout the remainder of the B-P purchase order.

PREVENTIVE MEASURES
TAKEN TO AVOID FURTHER
NONCOMPLIANCE (cont'd.)

3. Ebasco VQA management regularly visits the B-P Laconia facility to confer with the Ebasco VQA representative and to witness the VQA inspector's activities.

4. B-P welders and inspectors and Ebasco VQA inspectors have received additional training in weld acceptance criteria.

5. 100% shop weld inspection is presently being performed on site for hangers received from B-P to ensure this problem does not reoccur.

FINAL REPORT:

Corrective action has been completed on all active hangers. Those hangers on engineering hold will be reinspected and reworked when they become active again, or they will be cancelled if they are voided. For this reason, we cannot close this item until December 1, 1984.

P. O. Box 101, New Hill, N. C. 2756?
October 3, 1983

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-127

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986-90 - 900,000 KW - UNITS 1 & 2
SEISMIC PIPE HANGERS PREVIOUSLY ACCEPTED BY
QC WELDING INSPECTOR - ITEM 96
UNDERSIZE SKEWED TEE FILLET WELDS ON
SEISMIC I PIPE HANGERS - ITEM 72

Dear Mr. O'Reilly:

Attached is our second interim report on the subject items which were deemed reportable per the provisions of 10CFR50.55(e), on August 13, 1982 (Item 96) and November 5, 1982 (Item 72). Carolina Power and Light Company is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by December 1, 1984.

Thank you for your consideration in this matter.

Yours very truly,

R M Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

000323

bcc: Mr. H. R. Banks
Mr. N. J. Chiangi
Mr. A. B. Cutter
Dr. T. S. Elleman
Mr. G. L. Forehand
Mr. B. J. Furr
Mr. S. Hinnant
Mr. L. I. Loflin
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Mr. R. M. Parsons
Mr. Sheldon D. Smith
Mr. J. L. Willis
Mr. S. R. Zimmerman
Mr. H. W. Bowles
Dr. J. D. E. Jeffries
Mr. M. F. Thompson
Mr. J. Nevill

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

INTERIM REPORT NO. 2

PIPE HANGERS PREVIOUSLY ACCEPTED BY
QC WELDING INSPECTORS
ITEM 96

UNDERSIZED SKEWED TEE FILLET WELDS ON
SEISMIC I PIPE HANGERS
ITEM 72

1983

REPORTABLE UNDER 10CFR50.55(e)

SUBJECT: Deficient field welds on pipe hangers previously accepted by QC welding inspectors.

ITEMS: Seismic Pipe Hangers

SUPPLIED BY: N/A - Hangers furnished by Bergen-Paterson, but problem deals with field welds.

NATURE OF DEFICIENCY:

1. Missing and undersized welds
2. Cosmetic weld defects
3. Inaccurate and incomplete QC documentation
4. QC inspections performed by personnel whose work was suspect
5. Undersized skewed-tee field welds

DATE PROBLEM OCCURRED: Prior to July 29, 1982

DATE PROBLEM REPORTED: August 13, 1982 - CP&L (N. J. Chiangi) notified the NRC (A. Hardin) that this item (Item 96) was reportable under the provisions of 10CFR50.55(e). In our November 5, 1982 letter, CP&L (R. M. Parsons) notified the NRC (J. P. O'Reilly) that this item (Item 72) was reportable under 10CFR50.55(e).

SCOPE OF PROBLEM: 3749 Seismic Category I pipe hangers that were installed or partly installed and inspected prior to June 26, 1982 were identified and reinspected. This includes the 349 hangers which were previously reinspected as part of the corrective action to NRC Report 50-400/82-03.

The June 26, 1982 date was selected because the QC weld inspection program was expanded to include shop welds on installed hangers (refer to Item 95). Inspector training was conducted prior to June 26, 1982 to ensure satisfactory inspector performance.

347 hangers which had been installed and inspected prior to June 26, 1982 were removed, voided, or declassified to non-seismic by a subsequent drawing revision and therefore were not reinspected.

SAFETY IMPLICATION: Deficient welds could cause a safety-related pipe hanger to fail under seismic conditions. As a result, if not corrected, they could adversely affect the safe operation of this facility. However, no hangers evaluated to date with the above type deficiencies have been found to adversely affect the safe operation of this facility.

REASON THE DEFICIENCY IS REPORTABLE: The conditions reported in Item 96 and Item 72 were identified as reportable under 10CFR50.55(e) due to the extensive evaluation required and the breakdown in the QA program.

CORRECTIVE ACTION:

1329 hangers were identified with deficient field welds as a result of the reinspection effort. Deficiencies were resolved as follows:

Welds were cut out.

Design drawing revisions were issued as a result of Engineering evaluation.

Welds were reworked and upgraded to meet the acceptance criteria of FCR-H-979.

Some hangers were on hold due to engineering problem which precluded rework at this time. These hangers will be dispositioned in accordance with the appropriate drawing revision when the holds are removed.

To ensure that hangers requiring reinspection were not overlooked, QCI 19.3 requires that during the final review process all SWDR's in the hanger work package will be checked to ensure that inspections performed prior to June 26, 1982 have been reinspected and accepted. Any hangers inadvertently missed during the reinspection effort will be reinspected and appropriately dispositioned.

PREVENTIVE MEASURES TAKEN TO AVOID FURTHER NON-COMPLIANCE:

1. A pipe hanger inspection documentation instruction (QCI) 19.3 was developed and issued.

2. Additional training classes were held with required attendance for both craft and QC weld inspection personnel involved in pipe hanger inspection. Training classes covered items such as measurement of skewed-tee welds, visual acceptance criteria, proper documentation, applicable work procedures, etc.

3. New QC weld inspector candidates are interviewed by the QA/QC Specialist in addition to passing a written examination to ensure they are aware of project requirements pertinent to their assignments,

4. Each inspector's documentation of weld inspections is reviewed after each phase of inspection to ensure completeness and correctness.

5. Supervisory audits are routinely performed in accordance with Quality Assurance Instruction (QAI) 1.3 on each QC Inspector's field work to ensure his satisfactory performance and to ensure that the work complies with the design documents.

6. A system was developed to aid in the resolution of technical inquiries that inspector supervision is unable to resolve. Technical inquiries are stated on a Request for Information (RFI) form and forwarded to the QA engineering unit which was established on site to provide engineering support for inspection activities.

PREVENTIVE MEASURES
TAKEN TO AVOID
FURTHER NONCOMPLIANCE (cont'd.):

7. Field Change Request (FCR) H-979 was developed and issued to provide weld inspection acceptance criteria for both field and shop welds based on AWS D1.1 code and Bergen-Paterson design criteria. Procedure NDEP-605 was issued to address the specific conditions governing pipe hanger weld inspections.

FINAL REPORT: Corrective action has been completed on all active hangers. Those hangers on engineering hold will be reinspected and reworked w en they become active again, or they will be cancelled if they are voided. For this reason, we cannot close this item until December 1, 1984.

APF-001 approved for Use [initials] 8/26/83
Rev. 21
8/83

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER
FCR/PW AS-4294

AP-IX-05
Exhibit 1

PAGE 1 OF 7

ORIGINAL

☐ Permanent Waiver
☑ Field Change
☑ Non-ASME
☐ ASME Sect. III Div. 1
☐ ASME Sect. III Div. 2

☑ Q ☐ Non-Q
Category II
Nonconformance N/A
Building General
Elevation General

RFTs N/A
Isometrics N/A
Instruments N/A
Valves N/A
Lines N/A
Cables N/A

List All Reference Documents (Drawings, Specs., FCR's, DCN's, Procedures, Etc.)

2165-A-003 R/4

Description WELD INSPECTION CRITERIA

Conflict/Condition

ASPECTS OF THE WELD INSPECTION CRITERIA REQUIRED CLARIFICATION.

Recommended Action:

☐ Please investigate/Resolve
☑ Please Resolve As Follows

REVISE CRITERIA AS SHOWN ON ATTACHED PAGES

RECEIVED
DOCUMENT CONTROL
JAN 27 1984
SHEARON HARRIS N.P.P.

000621

Requested By: William [signature] 1/10/84
Discipline Engineer Date

Site Approval: [signature] 1/10/84
Resident Engineer / HPES - Prin. Eng. Date

APF-001 Approved For Use [initials] 8/26/83
Rev. 21
8/83

AP-XIV-05
Exhibit 1

FCR/PW AS-4294

PAGE 2 OF 7

Preliminary Approval: ☐
Work may proceed prior to final analysis

Discipline Engineer Date
MHPE or PPE Date

Design Organization Approval ☐ AE ☐ NSSS ☑ NPED Only ☐ Other

Telephone Resolution ☐ Yes ☑ No Design Organization Attachments ☐ Yes ☑ No

☐ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, Etc.) to be changed:

Comments:

Signature Title Date Signature Title Date

CP&L Harris Plant Engineering Approval

HPES Attachments ☐ Yes ☑ No

☑ Approved as Recommended ☐ Rejected ☐ Conditional Approval

Reference Documents:

[signature] 1/27/84 1/27/84
Discipline Engineer Date

[signature] 1/27/84
MHPE or PPE Date

Distribution: (Specify those to receive "prior to analysis" dist. by *)
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed As Approved ☐ Yes ☐ No
Comments:

Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

1.0 SCOPE

The intent of this design document is to provide the CP&L QA program with acceptance criteria that satisfies the design requirements and thereby allowing clarification from strict code interpretation during receipt inspection, reinspection, and field welding inspection. This criteria is applicable to both primary (first inspection, uncoated) and secondary inspections (receipt inspection included with quality release or reinspection, coated) for structural weldments designed to AWS D1.1 requirements. Secondary inspections may be performed through coatings. Primary inspections shall not be allowed through coatings unless allowed by the engineer. Any item not specifically covered in this criteria shall refer back to AWS D1.1.

This criteria covers joints which provide framing for components, such as cable tray, HVAC, conduit supports, instrument racks, ducting air control dampers, doors, hatch covers, pipe supports, etc. This is to include any item welded to AWS D1.1 standards.

This criteria is applicable to any weld joint where these imperfections are to be visually inspected per AWS D1.1.

As per AWS D1.1, welds with acceptable imperfections in combination shall be acceptable.

Based on the QA programs for acceptance prior to vendor release (or acceptance of field welds), any defects not identified during primary inspection and subsequently covered by coatings are not considered significant.

Visual inspection of welds shall be in accordance with AWS D1.1 except as modified below:

All visual inspection shall be performed at an eye-to-examination surface distance of no more than 24 inches, the inspector position within an angular region of 30 to 90 of the examination surface by personnel possessing 20/20 visual acuity. Visual aids which do not enhance 1X capability, such as mirrors, may be used. Visual inspection shall be used unless otherwise noted on design documents.

2.0 ACCEPTABILITY CRITERIA

2.1 Oversize Fillet Welds

Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be used in lieu of intermittent welds.

2.2 Undersize Fillet Welds

The leg of 1/4" and larger fillet welds may be 1/16" less than the required weld size for a continuous span of 2", provided there is no less than a 6" separation between each undersize increment. For welds less than 8" long, a continuous undersize span of 25% of the total weld run length will also apply. All 1/16" undersize increments less than 1/2" in length will be acceptable. For intermittent welds, 1/16" less than that required size will be accepted provided the undersize condition is no more than 40% of the weld length.

The leg of 3/16" fillet welds may be 1/32" less than the required according to the above provisions or 1/16" less for 10% of the length.

It is to be understood that the thickness of coatings on secondary inspections are not considered detrimental and the weld size criteria shall not be adjusted. Any unique application of coatings (excessive thickness, putty) shall be brought to the attention of QA management for resolution.

2.3 Porosity

Pores between 1/16" and 1/8" diameter shall be acceptable when separated by a minimum of one inch. Isolated pores less than 1/16" diameter shall be disregarded. Clustered porosity including all sizes to 0.030" contained within up to a 3/8" diameter circle shall be acceptable. Linear, in-line pores shall be considered as clustered porosity. It is to be understood that porosity not visible through coatings on secondary inspection are not considered significant.

2.4 Weld Profile

Fillet and butt weld convexity can be accepted without limit.

2.5 Craters

Welds may have underfilled craters provided underfill depth does not exceed 1/16" and the crater has a smooth contour blending gradually with the adjacent weld and base metal with no evidence of cracking.

2.6 Undercut

Steels 5/16" or thicker which were produced to a maximum specified tensile strength of 60,000 psi may contain weld undercut up to 1/16" in depth for a continuous span of 2" provided its surface width is less than 0.100" and there is no less than a 6" separation between each undercut increment.

Weld runs less than 8" long may contain a continuous undercut span of 25% of the total weld length. All undercut less than 1/2" in length will be accepted provided the above width limit is adhered to. Undercut up to 1/32" depth is acceptable in all steels and all thicknesses.

2.7 Cracks

Cracks are unacceptable. It is to be understood that secondary inspections are intended to identify cracks that result from shipping damage or stress relief and, if relevant, would appear through the coating.

2.8 Arc Strikes

Arc strikes in high-strength, low-alloy steels (minimum specified tensile strength greater than 60,000 psi), shall be removed by grinding. The ground area shall be visually inspected to assure complete removal of the arc strike.

For other maximum specified 60,000 psi tensile steels, arc strikes shall be visually examined and accepted if no cracking is evident. If cracking is evident, the repair shall conform with Section 3.10 of AWS D1.1. Arc strike regions in these lower strength steels shall not require power brushing or grinding before visual examination. It is to be understood that cracks in arc strikes not visible through coatings on secondary inspections are not considered significant.

2.9 Fusion

Lack of fusion which does not exceed 1/4" in length when measured transverse or along the weld and each increment separated by 6" is acceptable.

For welds between 1" and 6" in length, 1/4" maximum lack of fusion is acceptable. For welds less than 1", lack of fusion is

Criteria for lack of fusion in transverse direction is applicable only in start/stop location.

Criteria for lack of fusion shall apply to overlap also. It is to be understood that lack of fusion not visible through coatings on secondary inspections is not considered significant. Any unique application of coatings (excessive thickness, putty) shall be brought to the attention of QA management for resolution.

P. O. Box 101, New Hill, N. C. 2756
October 3, 1983

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-126

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986-90 - 900,000 KW - UNITS 1 & 2
SHOP WELDING DEFICIENCIES IN SEISMIC I PIPE HANGERS
SUPPLIED BY BERGEN-PATERSON, ITEM 95
UNDERSIZE SKEWED TEE FILLET WELDS ON SEISMIC I
PIPE HANGERS, ITEM 72

Dear Mr. O'Reilly:

Attached is our second interim report on the subject items which were deemed reportable per the provisions of 10CFR50.55(e) and 10CFR, Part 21, on August 13, 1982 (Item 95) and November 5, 1982 (Item 72). Carolina Power and Light Company is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by December 1, 1984.

Thank you for your consideration in this matter.

Yours very truly,

R. M. Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

000322

bcc: Mr. H. R. Banks
Mr. N. J. Chiangi
Mr. A. B. Cutter
Dr. T. S. Elleman
Mr. G. L. Forehand
Mr. B. J. Furr
Mr. S. Hinnant
Mr. L. I. Loflin
Mr. R. E. Lumsden
Mr. M. A. McDuffie
Mr. C. H. Moseley, Jr.
Mr. R. M. Parsons
Mr. Sheldon D. Smith
Mr. J. L. Willis
Mr. S. R. Zimmerman
Mr. H. W. Bowles
Dr. J. D. E. Jeffries
Mr. M. F. Thompson
Mr. J. Nevill

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNITS NOS. 1 AND 2

INTERIM REPORT NO. 2

SHOP WELDING DEFICIENCIES IN SEISMIC I
PIPE HANGERS SUPPLIED BY BERGEN-PATERSON
ITEM 95

UNDERSIZE SKEWED TEE FILLET WELDS ON
SEISMIC I PIPE HANGERS
ITEM 72

1983

REPORTABLE UNDER 10CFR50.55(e)
REPORTABLE UNDER 10CFR21

SUBJECT: Deficient shop welds on pipe hangers previously accepted by Bergen-Paterson (B-P) and Ebasco Welding Inspectors.

ITEM: Seismic Pipe Hangers

SUPPLIED BY: Bergen-Paterson Pipe Support Corporation, Laconia, New Hampshire

NATURE OF DEFICIENCY:

1. Missing and undersized welds
2. Cosmetic weld defects
3. Undersized skewed tee welds
4. Deficient welds accepted by B-P inspectors and Ebasco Vendor Quality Assurance (VQA) inspectors

DATE PROBLEM OCCURRED: Prior to October 1, 1982

DATE PROBLEM REPORTED: On August 13, 1982 CP&L (Mr. N. J. Chiangi) notified the NRC (Mr. A. Hardin) that this item (Item 95) was reportable under 10CFR50.55(e) and 10CFR, Part 21. In our November 5, 1982 letter, CP&L (Mr. R. M. Parsons) notified the NRC (Mr. J. P. O'Reilly) that this item (Item 72) was reportable under 10CFR50.55(e) and 10CFR, Part 21.

SCOPE OF PROBLEM: Seismic Category I pipe hangers which were inspected at the source of fabrication prior to October 1, 1982.

SAFETY IMPLICATIONS: Deficient welds could cause a safety-related pipe hanger to fail under seismic conditions. As a result, if not corrected, they could adversely affect the safe operation of this facility. However, no hangers evaluated to date with the above type deficiencies have been found to adversely affect the safe operation of this facility.

REASON THE DEFICIENCY IS REPORTABLE: The conditions reported in Item 95 and Item 72 represent breakdowns in B-P and Ebasco QA programs which allowed supports to be shipped with welds which were not in accordance with design criteria. This incident was identified as reportable under 10CFR50.55(e) and 10CFR, Part 21, due to the extensive evaluation required and the breakdown in the QA programs.

CORRECTIVE ACTION:

1. Hangers with shop weld deficiencies were identified during the following processes:

   A. Receipt Inspection.

   B. Inspection in the warehouse prior to hanger inssuance to the field.

   C. Inspection in the field of installed hangers which had not been previously inspected by CP&L for shop weld deficiencies (does not include those hangers [illegible]

CORRECTIVE ACTION (cont'd.):

D. Reinspection of pipe hangers that were installed or partially installed and inspected prior to June 26, 1982. This includes the 347 hangers which were previously reinspected as part of the Corrective Action to NRC Report 50-400/82-03. The June 26, 1982 date was selected because the QC weld inspection program was expanded to include shop welds. 346 hangers which had been installed and inspected prior to June 26, 1982 were removed, voided, or declassified to non-seismic by a subsequent drawing revision and therefore were not reinspected.

2. 449 hangers with defective shop welds were identified by processes A and B (see above).

1862 hangers were reinspected by Processes C and D. 728 were identified with shop weld deficiencies.

Deficiencies were resolved as follows:

Welds were cut out.

Design drawing revisions were issued as a result of Engineering evaluation.

Welds were reworked and upgraded to meet the acceptance criteria of FCR-H-979.

Some hangers were on hold due to engineering problems which precluded rework at this time. These hangers will be dispositioned in accordance with the appropriate drawing revision when the engineering holds are removed.

3. Instruction measures have been established to control pipe hangers which have not been installed but were received prior to October 1, 1982. We have taken the option to inspect shop welds prior to issue from the warehouse or to inspect shop welds at the same time field welds are inspected. Defective welds will be identified on DDR's for control and evaluation.

PREVENTIVE MEASURES TAKEN TO AVOID FURTHER NONCOMPLIANCE:

1. Field Change Request (FCR) H-979 was developed and issued to provide weld inspection acceptance criteria for both field and shop welds based on the AWS D1.1 code and B-P design criteria.

2. Ebasco VQA began performing in-process inspections and 100% inspection of hanger welds on October 1, 1982. This is to be performed throughout the remainder of the B-P purchase order.

PREVENTIVE MEASURES TAKEN TO AVOID FURTHER NONCOMPLIANCE (cont'd.)

3. Ebasco VQA management regularly visits the B-P Laconia facility to confer with the Ebasco VQA representative and to witness the VQA inspector's activities.

4. B-P welders and inspectors and Ebasco VQA inspectors have received additional training in weld acceptance criteria.

5. 100% shop weld inspection is presently being performed on site for hangers received from B-P to ensure this problem does not reoccur.

FINAL REPORT: Corrective action has been completed on all active hangers. Those hangers on engineering hold will be reinspected and reworked when they become active again, or they will be cancelled if they are voided. For this reason, we cannot close this item until December 1, 1984.

FORM NO. 1779-A

CONSTRUCTION PROCEDURES MANUAL SHNPP	PROCEDURE NO. WP-110	DATE As Approved
WORK PROCEDURE DESCRIPTION INSTALLATION OF SEISMIC PIPE HANGERS AND SUPPORTS FOR SEISMICALLY ANALYZED PIPE	REVISION 10	
	PAGE 1 OF 22	

FEB 18 1981 Rev. 4
AUG 29 1980 Rev. 3
APR 09 1984 Rev. 10
MAY 20 1980 Rev. 2
MAR 21 1979 Rev. 1

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

WORK PROCEDURE

WP-110

DOCUMENT CONTROL
RECEIVED
MAR 1 1979
SHEARON HARRIS N. P. P.

NOV 28 1983 Rev. 9
APR 22 1983 Rev. 8
NOV 15 1982 Rev. 7
DEC 4 1981 Rev. 6
JUN 3 1981 Rev. 5

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
0	Issued for Use.	ORIGINATOR	Edward M. McLean	3-1-79
		CONSTRUCTOR	W. D. Goodman	3-1-79
		E&C Q.A.	N/A	
		CP&L	R M Lucas	3-1-[illegible]
		DES. ENG. *	N/A	-
1	Revised as Noted.	ORIGINATOR	Edward M. McLean	3-20-[illegible]
		CONSTRUCTOR	W. D. Goodman	3-20-[illegible]
		E&C Q.A.	N/A	
		CP&L	R M Lucas	3-20-79
		DES. ENG. *	N/A	
2	Revised as Noted. Added Exhibit 1.	ORIGINATOR	[illegible]	5-13-80
		CONSTRUCTOR	W. D. Goodman	5-15-80
		E&C Q.A.	N/A	
		CP&L	R M Lucas	
		DES. ENG. *	N/A	

000618

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

WORK PROCEDURE

WP-110

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
3	Revised as Noted. Added Exhibits 2 and 3. Incorporated Procedure Deviation Notice #1.	ORIGINATOR	Warren Barnes	8-21-80
		CONSTRUCTOR	[illegible] for WDG	8-21-80
		E&C Q.A.	N/A AML by CSH AM	
		CP&L	A. M. Lucas by CSH AM Lucas 8-25-80	8/22/80
		DES. ENG. *	N/A ~~AML~~ by CSH AM	
4	Revised as Noted. Revised Exhibit 3. Incorporated. Deviation Notices 1 and 2.	ORIGINATOR	Wallace Bender	1-14-81
		CONSTRUCTOR	W. D. Goodman	1-15-81
		E&C Q.A.	N/A AM	
		CP&L	AM Lucas	1-18-81
		DES. ENG. *	N/A AM	
5	Revised as Noted. Incorporated Deviation Notices 1 and 2. Revised Exhibit 2. Added Appendix A.	ORIGINATOR	Alex Fuller	6-3-81
		CONSTRUCTOR	W. D. Goodman	6-03-81
		E&C Q.A.	N/A AM	
		CP&L	AM Lucas	6-3-81
		DES. ENG. *	N/A AM	

CAROLINA POWER & LIGHT COMPANY APR 09 1984 Rev. 10

SHEARON HARRIS NUCLEAR POWER PLANT NOV 28 1983 Rev. 9

APR 22 1983 Rev. 8

WORK PROCEDURE

WP-110

DOCUMENT CONTROL
RECEIVED
NOV 15 1982 Rev. 7
SHEARON HARRIS N. P. P.

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
6	Revised As Noted. Incorporated Deviation Notices 2 and 3. Revised Exhibit 1 and Appendix A. Added Exhibit 4.	ORIGINATOR	[signature]	12/4/81
		CONSTRUCTOR	[signature]	12-04-81
		E&C Q.A.	N/A [initials]	
		CP&L	[signature]	12-4-81
		DES. ENG. *	N/A [initials]	
7	Revised As Noted. Incorporated Deviation Notices As Applicable. Added Exhibit 5-8 and Appendices B through J.	ORIGINATOR	[signature]	11-11-82
		CONSTRUCTOR	[signature]	11-11-82
		E&C Q.A.	N/A [initials]	
		CP&L	[signature]	11-11-82
		DES. ENG. *	N/A [initials]	
8	Revised As Noted. Incorporated Deviation Notices As Applicable. Revised Exhibits and Appendices as Noted.	ORIGINATOR	[signature]	4-21-83
		CONSTRUCTOR	[signature]	4-21-83
		E&C Q.A.	NA EEW	
		CP&L	E.E. Willcox for MFT	4-21-83
		DES. ENG. *	NA EEW	

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

WORK PROCEDURE

WP-110

* * REVIEWED BY QA/QC FOR COMPLIANCE WITH THE APPLICABLE QA AND CODE REQUIREMENTS.

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3100 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
9	Revised As Noted. Incorporated Deviation Notices As Applicable. Revised Exhibits And Appendices. Added New Exhibits Entirely For Exhibits 1, 2, and 4.	ORIGINATOR	P.J. Howell	11/28/83
		CONSTRUCTOR	W.D. Goodman	11-28-83
		QA/QC REVIEW * *	M.M. Reed	11/28/83
		CP&L	Max D. Davis	11/28/83
		DES. ENG. *	N/A	11/28/83
10	Incorporated Procedure Change Notices 2, 3, 4, and 5. Revised As Noted. Revised Appendices A-F and H-K. Added Exhibit 7.	ORIGINATOR	Randy [illegible]	4-3-84
		CONSTRUCTOR	W.D. Goodman	4-3-84
		QA/QC REVIEW * *	M.M. Reed	4/3/84
		CP&L	[illegible] for MFT	4/3/84
		DES. ENG. *	N/A	4/3/84
		ORIGINATOR		
		CONSTRUCTOR		
		QA/QC REVIEW * *		
		CP&L		
		DES. ENG. *		

1.0 SCOPE

1.1 This procedure describes the steps to be followed for the installation of seismic pipe supports and spring hangers on seismically analyzed pipe.

1.2 For construction purposes, a pipe hanger can be identified to be in accordance with this procedure if it supports a Safety Class I, II, or III pipe or MS or FW pipe by means of a spring cannister except hangers east of the seismic break as defined by FCR-H-1145, or if the hanger sketch is stamped seismic, or if the format of the load sheet is in accordance with Exhibit 6 or if it is a Bergen-Paterson fire protection pipe hanger.

2.0 REFERENCES

2.1 MP-08, General Welding Procedure for Structural Steel and Hangers

2.2 TP-34, Inspection of the Installation of Seismic I Pipe Hangers/Large Bergen-Paterson Frames and Supports for Seismically Analyzed Pipe

2.3 WP-112, Control of Materials and Equipment That May Be Harmful to Stainless Steel

2.4 WP-48, Temporary Construction Loads Supported From Permanent Plant Equipment

2.5 WP-102, Installation of Piping

2.6 MP-06, General Welding Procedure for Carbon Steel Weldments

2.7 MP-07, General Welding Procedure for Stainless Steel Weldments

2.8 CAR 2165-G-801 Flow Diagram - Reactor Coolant System

2.9 TP-04 Calibration of Controlled Tools

2.10 WP-108, Protective Coatings - Service Level I Embedded Steel Plate, Service Level II Steel Surfaces and Balance-of-Plant Steel Surfaces

2.11 SD/C-A-1018, Identification of Bergen-Paterson Hanger Parts

2.12 SD/C-A-1019, Neutral Axis of Odd-Shaped Structural Members

2.13 WP-25, Field Engineering

2.14 MP-05, Permanent Marking of Site Material and Components

2.15 WP-139, Pipe Hanger Work Package Preparation

2.16 WP-140, QA Records Review (Seismic Pipe Hangers and Supports for Seismically Analyzed Pipe)

2.17 CAR 2165-G-107S01, Field Installation Tolerances for Pipe Hangers

3.0 GENERAL

3.1 Introduction

Unless otherwise noted, the tolerances in the following sections may be used for construction of a pipe hanger. However, to exceed these tolerances, a Field Mod (Exhibit 1) must be obtained from the Hanger Engineer. These Mods will allow work and inspections to proceed to completion. The tolerances described herein may also be applied to the Mod requirements.

3.2 Location Tolerances

1. The reference dimensions provided on the hanger drawing for elevations and column line offsets should be used for locating hangers during initial hanger fit-up but not for inspection. R10
2. Dimensions from pipe attachments to pipe elbows or fittings shall be modded. The dimensional tolerance is ±1/2".
3. Hangers should not be located within 15" of a pipe (butt) weld if the hanger supports Class 1 or 2 pipe.
4. Hangers shall not be installed on a pipe elbow, fitting or butt weld. R10
5. Pipe clamps may be installed over Code Data Tags provided the clamp halves remain approximately parallel. Box frame hangers may not be installed over Code Data Tags without obtaining a Work Directive from the Hanger Engineer.

3.3 Geometry Tolerance

1. Geometry may vary ± 1/2" from the design dimension however this tolerance can not be used to reduce weld length (Example: Structural Steel overlapping embed plates) or to reduce the clearance requirements around the pipe.
2. Slopes and angles may vary from design provided the location and geometry dimensions are maintained.

(3.3.)

3. Sway supports must be within $\pm 3^{o}$ of the design requirements.
4. The neutral axis of structural members shall be used as reference lines for geometric configurations (see SD/C-A-1019).
5. Strut lengths must be within 1/2" of design.
6. Plate sizes shall be + 1/2", -1/4" from the Bill of Material requirements. R10

3.4 Steel Attachment Tolerances

1. Hangers are to be attached within ± 1/2" of the embed centerline(s).
2. Hangers attaching to cinch anchored base plates shall attach within the tolerance given on the anchor bolt and base plate detail sheet of the hanger sketch.
3. Hangers should attach to the correct embed type which is detailed on the hanger sketch. If the embed in the field is designated as a Dubose plate, reduced tolerances will be necessary and should be provided via a Hanger Mod.
4. Hangers must attach within ± 1/2" of the centerline of a structural steel member (existing steel) and may move ± 1/2" along the axis of the structural steel member. In the containment building the centerline of the structural steel member shall be assumed to be on the azimuth required by design.
5. Attachments to strip plates with threaded studs must be surrounded by acceptable studs. See Figures 1 and 2. A threaded stud is not acceptable if it is disengaged by more than 1/8" or if there is a weld within 1/2" of the stud.

If otherwise obtain a Hanger Mod from the Hanger Engineer if possible.

Figure 1:
All four must
be acceptable.

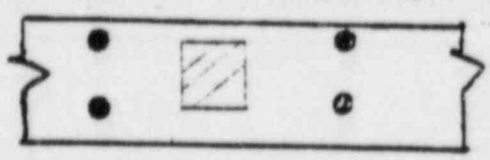
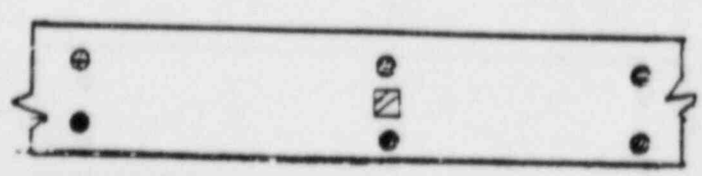


Figure 2:
All six must
be acceptable.



3.5 Box Frame Hangers

1. Clearances

   1. Clearances around the pipe in a box frame hanger must be achieved. However, the pipe can not be cold pulled (forced out of its relaxed position) in order to do so.
   2. If the clearance is specified as 1/16" by design, then the clearances must meet the criteria laid out in Appendix I. R10
   3. If the clearance specified by design is more than 1/16" then contact the Discipline Mechanical Engineer for requirements via a Field Mod.
   4. For one-way box restraints, the Hanger Engineer must issue a Mod to detail the clearance requirements.
   5. The pipe and the hanger shall be visually square with respect to the other; however, clearances shall meet the skewness requirements of Appendix I.

2. Shims

   1. Shims shall be installed in accordance with the Field Mod around the pipe if clearances are not acceptable.
   2. Shims called for by the design sketch may be deleted by a Field Mod if the pipe clearances are acceptable.
   3. Shim material must be A-36 or A-569 carbon steel. If otherwise, a Field Mod must be obtained from the Hanger Engineer.
   4. Shim plates must be in contact with the hanger member at the points where the shim is welded to the hanger member and free of lubricant. Shim surfaces shall not be sandblasted. R10
   5. The shim shall overhang the hanger member enough to allow for the weld on both sides. R10
   6. The centerlines of the shim and pipe shall be aligned within the $\pm$ 1/2" of each other.

(3.5.2.)

7. The shim and shim weld details shall be provided on a Field Mod.
8. Weld length shall be within +1/4"-0" of the length specified on the Mod. R10

3.6 Catalog Parts

1. Combinations of WBA, sway supports and/or pipe clamps must conform with the requirements of Appendix A unless noted otherwise.
2. All combinations must be aligned, in order to ensure the strut does not bind with the WBA or Clamp ears. Part numbers 1000 and 1001 should be fitted to other items using the load pin as the neutral axis. R10
3. Catalog parts may be identified by part numbers or checked against the dimensions provided in the Site Drawing (SD/C-A-1018). Also see Appendix E.
4. Care should be exercised to ensure load pins, bolts, nuts, washers, and pipe clamp halves for different hangers/or parts are not indiscriminately exchanged. An inspector shall verify material grades for load pins, bolts and nuts prior to Final Acceptance. (See Appendix C and F).
5. If the load pin must be removed from the end attachment, a light lubricant and punch should be used to facilitate removal. Care must be taken to prevent the lubricant from contacting stainless steel pipe.
6. The holes in the ears of the WBA or pipe clamps shall not be ground in order to reinsert the load pin. However, the ends of the load pins may be lightly filed to remove mushrooming caused by forced installation. The shank of the load pin shall not be ground for any reason. Also, light tapping may be used to remove or install the load pins. If the end attachment ears are damaged in the process, the end attachment must be replaced. Cotter pins must be spread in opposite directions to prevent the load pin from slipping out.

(3.6.)

7. Bearings should be tightly engaged between the ears of the WBA or pipe clamp. Any gaps should not exceed the clearances specified in Appendix B. Contact the Hanger Engineer if the clearance cannot be reduced with spacer washers per Appendix G.
8. When installing the struts, care must be taken to ensure that the pipe is not forced out of its relaxed position (this is called cold pull).
9. Tightening of bolts, studs, threaded rod, and U-bolts shall be in accordance with Appendix F. Nuts should be fully engaged on the threads (when the point of the threaded portion is outside the plane of the nut) and should not bear against the bolt shanks. R10
10. Instructions for tightening bolts and nuts in applications other than pipe clamps, U-bolts, threaded rod supports, and springs should be obtained from the Hanger Engineer.
11. To shorten or lengthen strut assemblies (outside built in adjustment), the Hanger Engineer must provide detailed instructions to the craft via a Field Mod.
12. For telescoping struts, there must be 1/4" minimum engagement between the strut and the shank prior to welding. (A 1/4" hole may have to be drilled 1/4" minimum from the end of the barrel to verify shank engagement.) The shank and pipe strut must be aligned. The weld size between the shank and tubing shall be provided on a Mod even if noted otherwise on the Bergen Paterson sketch.

3.7 <u>General Guidelines</u>

1. <u>Lift Points</u>

Installed pipe hangers shall not be used as lift points for loads other than the ones approved by WP-48. The welding of temporary attachments to hangers shall be in accordance with MP-08. All welded temporary attachments will be removed from the hanger prior to any inspections.

(3.7.)

2. Pipe Cleanliness

The external surface of all stainless steel piping shall be cleaned of all contaminants (Reference WP-112) prior to the placing of a pipe clamp around the pipe or surrounding the pipe with a window hanger. Rust on the external surface of stainless steel pipe is acceptable, as is dust which accumulates during normal construction activities. Vendor identification markings may be left on the pipe. Contact the Pipe Superintendent or his designee if cleanliness has not been attained. R10

3. Box Frame and Anchor-Type Support Box Frame Hangers should not be welded out (tack welds should be sufficiently large to ensure safety). Anchors should not attach (including tack welded) to the pipe until the pipe is installed hard point to hard point. R10

4. Temporary Pipe Supports

   1. Temporary hangers shall be erected to support the pipe in accordance with WP-102 Section 4.2.5.7. These supports should not be removed nor should permanent supports be reworked if the work would compromise the required spacings for the pipe supports.

   2. Temporary hangers shall also be erected in lieu of permanent hangers when necessary to support RFTs. They shall not be erected (insofar as practicable) in the same location as the permanent support. These temporary hangers will be tagged and may only be removed after the permanent supports have been installed. A Work Directive is necessary for this effort.

5. Coating Requirements

Per WP-108, all steel going into the containment building shall be coated to Service Level I requirements; all stock steel shall be coated to Service Level I requirements prior to issue to the field. Prior to coating, hangers shall be hard marked for hanger and

(3.7.5. cont'd)

material identifications; stock steel shall be hard marked for material identification. The installation of pipe hangers shall not make an area (steel or concrete) which requires protective coatings inaccessible for application of coating or required inspection of coatings. If installation of an item would cause an area to be inaccessible then prior to the installation, the Pipe Hanger Superintendent or designee shall contact the Paint Superintendent and/or CI Coatings Inspector to verify that required coatings and inspections have been performed and accepted. R10

6. Material Marking

All steel for future installations shall be hard marked in accordance with MP-05 for material identification. This shall be witnessed by a QC Inspector. If markings will be removed or covered by a construction activity prior to a final QC signoff, the marking shall be transferred and witnessed by the QC Inspector. There shall be no unmarked stock steel in the field surplus room.

7. Snubbers

Since snubbers can't be installed until just prior to Hot Functional testing, "Surrogate" snubber assemblies shall be used in place of the Pacific Scientific part of the B-P snubber assembly (part #2540) load sizes .35, .65, 1.5, 6 and 15. This "Surrogate" snubber assembly will permit weldout of the transition tube to the proper length. A Field Mod shall be issued detailing the transition tube weld and "L" dimension, reference SD/C-A-1018. R10

8. Access Interferences

If the hanger creates an access interference in a doorway, aisle, or stairwell, etc., or if an interference prevents the hanger from performing its design function, the hanger should not be installed and the Hanger Engineer should be contacted.

(3.7)

9. Stainless Steel Straps

Stainless steel straps shall not be installed with the pipe hangers even if specified by design. Mods or design revisions are necessary to delete this item from the Bill of Materials.

10. Stiffener Plates

Stiffener plates may be coped or trimmed as necessary in order for the item to be fitted between the flanges of W-shapes.

11. Welded Pipe Attachments (WPA)

Although the installation of WPA's is in accordance with other procedures, it should be verified that all parts of the WPA are installed as designed. Box frame hangers that interface with the WPA should not be installed until the WPA is welded out.

12. Valve Hangers

Valve hangers should not be installed until after the valve has been welded out.

13. Voided Hangers

A Work Directive shall be issued with voided hangers to have them removed from the field. CI and QC must verify the work was accomplished and sign the Work Directive.

14. Spring Hangers and Fire Protection Hangers

All spring hangers and nonseismic fire protection hangers were within the scope of WP-109 (Installation of Nonseismic Hangers). As a result, fitup gaps were not recorded, hanger geometry and locations were not checked, and structural welds were not inspected by QC. Spring hangers on seismically analyzed pipe per Revision 7 and Bergen-Paterson fire protection hangers per Revision 8 are within the scope of WP-110. Although the inspector cannot go back and check fitup gaps or other in-process inspections, the inspectors can verify geometry and location and perform a final visual inspection of the welds. For hold points which cannot be met due to installation prior to this procedure, the inspector can so note on the Traveler and/or SWDR.

(3.7.)

15. Variable Supports

To assure the proper installation of spring type variable supports/hangers, the following criteria shall be adhered to:

1. Name plates shall be visible and accessible.
2. Sufficient travel clearance shall be provided for piping movement between spring hanger parts and other structures, piping, conduit, etc.
3. Rods are permitted freedom of swing. R10
4. Preset pin shall be checked for installation/engagement.
5. Adjust rods to remove slack only, this shall be accomplished by rotating turnbuckle/coupling and then tighten locking nuts.
6. Where trapeze type spring design is encountered, the as-built location of the pipe to be supported shall adhere to design location relative to centerlines of springs within ± 1/4" and the trapeze shall be visually level.

16. Constant Supports

(To be addressed later.)

17. Material Requisitioning

1. Hangers may be requisitioned from the warehouse using the hanger numbers found on the hanger sketches. The material shall consist of all pieces received for the current drawing revision and, if necessary, those items taken from seismic surplus stock. For hangers utilizing snubbers, the warehouse will withhold the snubber and snubber extension if a separate requisition is made for specific parts needed. The parts being withheld can be requisitioned at a later date. At the time of requisitioning, the requisitioner should use the hanger sketch to inventory the materials for the hanger.
2. Hanger material shall be placed in a clean, dry area designated by the area superintendent and/or hanger superintendent.

(3.7.17.)

3. All material superseded by later drawing revisions shall be removed from the field. Usable surplus material should be returned to the warehouse in a timely manner. This should avoid work-area congestion and misuse of material.
4. Scrap material shall be sent to the designated scrap location.
5. Material (Pipe Hangers) may be sent to surplus from Controlled Storage via a CMR. The CMR will state the material that is to be sent to surplus. Provided that is the case the welds will not be removed and only a material verification from QA is required. When material is released to the field from surplus all shopwelds will be cut out and the material appropriately stamped for identification per section 3.7.6. R10

18. Welding

1. Welding shall be in accordance with Reference 2.1.
2. The use of "Typical" weld symbols by Bergen-Paterson does not mean that welded joints are identical in geometric configuration or made up of parts the same size or shape. The "Typical" weld symbol designation is used for similar joints with the same size weld.
3. Welds may be oversized provided the overwelding does not have any detrimental effect on the weld, base material or overall integrity of the hanger. The extra weld is permissible without a Mod provided a weld size or length tolerance is not specified on the drawing as is the case with flexible connections and shims.
4. Bergen-Paterson supplied pipe clamps with shop welded attachments shall be considered B-P standard parts, therefore the shop welded attachments and shop welds do not require site inspection.
5. Arc strike on piping is not allowed. Contact the Discipline Engineer for guidance prior to the removal of any arc strike from pipe.
6. Welding to base plates that require grout should be done prior to grouting except in cases where welding will prohibit the grouting operation. If welding must be performed after

(3.7.18.6. cont'd)

grouting has been completed contact the Discipline Engineer for guidance.

7. Welding shall not proceed to a point where the inspection of previously made welds could not be performed.

19. Hanger Material Grade

For Bergen-Paterson supplied standard structural shapes the material grade is dependent on the material type. If the material grade is not specified on the B-P hanger sketch Bill of Materials then the material is as follows: R10

Material Type	Material Grade
Plate or Bar	SA-36
Angle	SA-36
Tube Steel	A-500 Gr. B
Pipe	SA-106 Gr. B
Channel	SA-36
Wide Flange	SA-36

20. Nonstructural Endcaps

Nonstructural end caps outside the Containment Building are not required to be welded out, they may be tack welded in place. The end caps shall be checked to ensure they cover the full surface area of opening and fit-up gaps do not exceed 3/16". The end cap size or weld need not be shown on a Mod or inspected. Weld mapping of Nonstructural Endcaps is not required therefore, fit-up gaps are not required to be listed on the SWDR.

3.8 Exhibit Instructions

Changes to the content of Work Directives, Travelers, and Hanger Mods must be initialed and dated. Signoff blocks on a Work Directive or the Traveler for a Hanger Mod should be dated on or after the change date.

1. Field Mods (Exhibit 1)

1. Field Mods shall be written and issued by the Resident Hanger Engineer or his designee.

(3.8.1)

2. Modifications to anchor-type supports or hangers on Class 1 lines must be limited to corrections in drafting errors, drawing clarifications, weld symbols, and geometry changes within ±2". R10

3. The field mod is comprised of two copies, one of which remains in the field for hanger installation, and the original which is routed to the work package group for assignment of FM# and routing to Document Control. (The FM# is a sequential tracking number).

4. If NDE requirement holdpoints or welding procedures are affected by the issuance of a Mod, the hanger package should be routed to Welding Engineering and QC Welding for the required changes to the SWDR.

5. The field copy of the Mod shall be considered active for ten calendar days. If a controlled (blue) copy has not been inserted in the hanger package within ten calendar days, all work on the hanger shall stop until a controlled copy is received.

6. Each Mod shall also have a unique number which shall consist of the Hanger Design revision, M for Mod, and an ascending number starting with 1 (Ex. 2/A M1). This numerical sequence starts over when a new design revision is received.

7. New design revisions shall supersede the previous design revisions and all Mods written against that revision.

8. Mods which conflict with an already active Mod shall not be issued until the active Mod has been voided. Voiding of Mods shall be accomplished as follows. The voided Mod shall be marked void, initialed, and dated by the Hanger Engineer. The subsequent Mod shall specify the Mod which was voided. This shall serve as notification to Document Control that a Mod was voided. R10

(3.8.1)

9. Mods which reflect a major redesign of the hanger should be sent through QC welding prior to weldout. R10

2. HIC Sticker (Exhibit 2)
The HIC sticker shall be located and completed by the Field Engineers.

3. Traveler (Exhibit 3)

1. The Traveler shall be initiated by the Hanger Engineer in order to control the in-process installation and inspections of the pipe hanger.

2. Work Directives, DCN's, PW's, FCR's, and Hanger Mods should be referenced in the applicable blocks at the top of the Traveler. Mod numbers (i.e., 2S1 M1) are listed under the RCI heading. If any of these documents are voided, the entry should be lined through, initialed and dated by the Hanger Engineer. Superseded documents do not need to be crossed out.

3. Engineered plate thickness determinations should be listed after 7/22/81 by the Hanger or Area Engineer.

4. The phase of construction - Preliminary or Final should be appropriately denoted. Completion of either phase shall be to the latest design revision and/or Mod (Examples 2/A M1 or 1S1 M4).

5. For the PRELIMINARY phase of construction, the FIT-UP and WELDOUT signoff blocks shall be initialed and dated by the foreman, the CI block initialed and dated by the Hanger Engineer, and the QC block initialed and dated by the Welding Engineer. The QC block may be marked N/A initialed and dated by the Hanger Engineer.

6. For the Final phase of construction and inspection, the FIT-UP AND WELDOUT blocks may be initialed and dated by the foreman. The CI and QC blocks shall be initialed and dated by CI and QC inspectors respectively. The CI and QC

(3.8.3.6 cont'd)

signoffs are for final acceptance of the hanger, however the actual inspection records are on TP-34 and the SWDR respectively.

7. Upon receipt of a new design which does not affect the as-built configuration and location of the hanger, signoff blocks shall be N/A'd, initialed and dated and the Hanger Engineer shall make an entry for that revision and note "as-built" on the traveler.

8. If the new revision does affect work, the work package is re-issued to the field for completion to that later revision.

4. Material Verification (Exhibit 4)

The Material Verification sheet shall be completed by the Hanger Engineer per the instructions provided in Appendix J.

5. Work Directives (Exhibit 5)

1. Work Directives shall be issued to detail Construction activities. This includes any work which will void out a previous inspection, however, the re-listing of weld joints in accordance with WP-139 on the SWDR shall serve as sufficient notice to the Craft as well as Inspection Groups that additional work is required.

2. Work Directives shall be initiated, signed and dated by the Hanger Engineer. R10

3. Work Directive Numbers shall be sequential starting with one. The number shall be assigned by the Hanger Work Package Group. R10

4. Signoff blocks shall be completed by the appropriate persons unless N/A'd by the Hanger Engineer. R10

6. Procedural Deviation (Exhibit 7)

The Procedural Deviation (P.D.) form shall be considered as an attachment to the Traveler (Exhibit 3) where CI shall list the rejectable conditions on the left side, sign and date at the bottom of the form. The Hanger Engineer shall address each discrepancy R10

(3.8.6. cont'd)

under the Corrective Action section on the right side, sign and date the bottom of the form. CI shall sign and date under the Hanger Engineer acknowledging that each discrepancy has been addressed. When CI rejects the hanger then the P.D. form shall be referenced by CI on the Traveler. A new P.D. form shall be issued for each inspection and have a unique number which shall consist of an ascending letter starting with A (Ex. PD-A) for each revision of the pipe support to which an inspection is made. Discrepancies addressed under the Corrective Action section may be resolved by the following actions: R10

1. Field rework is required. R10
2. Issuance of a Field Modification.
3. Stating that the condition is acceptable and has no relevant impact on design. There is no quantitative acceptance criteria for this condition and therefore it will not be reported back to the design organization.

4.0 PROCEDURE

4.1 The Field Engineers shall identify interferences and provide reference points (within ±1" of design) for hanger installation as requested. The reference points are easily identified by the orange sticker (Exhibit 2). These activities are referred to as the HIC-Hanger Installation Checkout-Program in WP-139.

4.2 The Hanger Engineer should establish that the hanger is not on hold for construction, engineering or quality reasons prior to generating the work package. The work package should consist of but not be limited to the Hanger Design drawing, SWDR, and Traveler (Exhibit 3). Instructions outlining work activities shall be included. In addition a Work Directive (Exhibit 5) detailing work instructions to the craft and inspectors shall be included. After the work package is made up in accordance with Reference 2.15 and it has been established that the hanger is ready for construction, it is issued to the Hanger Superintendent for installation.

4.3 If the Traveler has been signed off preliminary by CI or Hanger Engineering and by QC or Welding Engineering proceed to section 4.11. If the Traveler has been signed off preliminary by CI or Hanger Engineering only, then proceed to section 4.9.

4.4 The Hanger Engineer or the Craft Superintendent or their designees shall requisition the material from the warehouse when necessary.

4.5 The Craft Superintendent or his designee shall investigate the work area and call the Area or Hanger Engineer for an embed thickness determination if the hanger is to be attached to an engineered plate.

4.6 The Area or Hanger Engineer, when required, shall determine the engineered plate thickness and record the thickness on the Traveler.

4.7 The Craft Superintendent or his designee shall tack weld the hanger members in accordance with MP-08 and sign the Traveler. If NDE requirements are changed due to a Mod or member thickness exceeds 1-1/2", Welding Engineering should be contacted. Partial inspections by Welding Engineering and/or QC may be required.

4.8 The Hanger Engineer shall list the gap measurements on the SWDR (see Appendix K for criteria); examine the hanger for general geometry, location, and function per design; and signoff the Traveler for preliminary. The Resident Engineer or his designee shall issue Mods as necessary.

4.9 The Craft Superintendent or his designee shall weld the hanger members in accordance with MP-08 and sign the Traveler.

4.10 The Welding Engineer or his designee shall examine the welds for quality and size, as requested, and signoff the Traveler for preliminary.

4.11 The Craft Superintendent or his designee shall prepare the hanger to pass CI and QC Final Inspections — adjust struts, check clearances, ensure proper hardware, make remaining welds, etc.

4.12 The Welding Engineer or his designee shall examine all welds which have not already been investigated by Welding Engineering and again signoff the Traveler by noting "Ready for Final" beside the preliminary signoff.

4.13 The Hanger Engineer or his designee shall examine the hanger for completeness and correctness, verify material, complete Exhibit 4, Mod the as-constructed dimension from the centerline of the pipe attachment to the nearest pipe fitting or elbow, and again signoff the traveler by noting "Ready for Final" beside the preliminary signoff.

4.14 CI and/or QC shall inspect the hanger as required and signoff the Traveler for final when all work has been completed per the latest design.

R10

4.15 The Hanger Engineer shall issue a Work Directive for any revisions to the welding, geometry, material, or location of the hanger if rework is required. Work shall then proceed in accordance with the applicable steps listed above.

R10

4.16 The Hanger Engineer shall review the Q-documents per WP-140 and transmit them to QA Records Review Group after the hanger has been completed and inspected and an as-built of the hanger has been incorporated into the design drawing.

R10

4.17 The Hanger Engineer shall put a CWRA in the work package when required.

5.0 EXHIBITS AND APPENDICES

5.1 Exhibit 1 - Field Modification (Rev. 0-11/83)

5.2 Exhibit 2 - HIC Sticker (Rev. 0-11/83)

5.3 Exhibit 3 - Seismic Hanger Installation and Inspection Traveler (Rev. 2-4/83)

5.4 Exhibit 4 - Material Verification Form (Rev. 0-11/83)

5.5 Exhibit 5 - Work Directive (Rev. 1-11/82)

5.6 Exhibit 6 - Seismic Load Sheet (Rev. 0-11/82)

5.7 Exhibit 7 - Procedural Deviation (Rev. 0-3/84)

5.8 Appendix A - Catalog Part Combinations (Rev. 4-3/84)

5.9 Appendix B - Gap Tolerances at Load Pins (Rev. 5-3/84)

5.10 Appendix C - Fastener Types (Rev. 4-2/84)

5.11 Appendix D - Flow Chart (Rev. 1-3/84) R10

5.12 Appendix E - Strut Identifications (Rev. 2-3/84)

5.13 Appendix F - Tightening Criteria (Rev. 2-1/84)

5.14 Appendix G - Flat and Tapered Washer Reference Table (Rev. 1-11/83)

5.15 Appendix H - Installation Procedure For Main Steam B-Wall Supports (Rev. 2-2/84)

5.16 Appendix I - Clearance Tolerances (Rev. 3-3/84)

5.17 Appendix J - Material Verification Program (Rev. 3-3/84)

5.18 Appendix K - Gap Measurement Criteria (Rev. 1-1/84)

REV.0
1/83

EXHIBIT -1
WP-110

PROCEED AT RISK

☐ SEISMIC

☐ NON-SEISMIC

FM ______

SH ____ OF ____

FIELD MODIFICATION

CONDITION: ______

ENGINEER

DATE

WHITE ORIGINAL IS GOOD FOR 10 CALENDAR DAYS AND IS SUPERCEDED BY A BLUE CONTROLLED COPY.

SAMPLE

BOM

PIPE HANGER NO.

____ - ____ -H- ____

UNIT NO. SYSTEM HANGER NO.

MODIFICATION NUMBER

____ M ____

DRAWING REV. MOD. NO.

PROBLEM

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

EIC STICKER

RESERVED AREA

MECHANICAL DEPT

HANGER NO ____________

DO NOT ATTACH WITHIN

____

CREW NO ____ DATE ____

FORM NO. 30039
REV. 2
?/83

CAROLINA POWER & LIGHT COMPANY
SHNPP
SEISMIC HANGER INSTALLATION TRAVELER

EXHIBIT 3
WP-110

HANGER NO. ______ RFT NO. ______

STRESS NO. ______ LINE NO. ______

	ITEM TO ENGR. PL (TYPE)	THK
FCR/PW/DCN		
RCI		
WD		
MAT'L. REQ.		
APR. NO.		

	PROCEDURE	INITIAL	DATE	ITEMS TACKED WITH GAPS	COMMENTS
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				

SAMPLE

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

MATERIAL VERIFICATION

HANGER NO. ________

ITEM # REV. #

WAREHOUSE ISSUE VERIFICATION

1. These items were part of the as received as issued steel for this hanger.
Warehouse Engr. ________________________ Date __________

FIELD MATERIAL VERIFICATION

2. These items were part of the as received-as issued steel for this hanger. This was verified by comparing the as-received and issued revision against the as-constructed revision.

3. These items were substituted/added and there is documentation to record the source of the material. The source has been investigated and found to be legitimate with a C of C.

4. These items have been stamped for material identification and the material grade conforms with the requirements of the Bill of Materials.

5. These items have been etched for material identification and the material grade conforms with the requirement of the Bill of Materials.

6. These items are catalog parts.

7. Per sampling program, there is reasonable assurance that the material conforms to the ASTM material grade requirements of the Bill of Materials.

HANGER ENGINEER ________________________ DATE __________

REV. ________

B = bolt - list with 4 or 7
N = nut - list with 4 or 7
L = load pin - list with 5 - no sampling is permissible
S = shim - list with 4, 5, or 7

REV. 1
11/82

EXHIBIT 8
WP-110

WORK DIRECTIVE

WD — ____________

PIPE HANGER No. ______________________ REV. ______

SAMPLE

COMPLETED (HANGER FOREMAN) / DATE

ACKNOWLEDGED (C. L.) / DATE

ACKNOWLEDGED (Q.C.) / DATE

ACKNOWLEDGED (WELDING SUPV. FOR NON-Q) / DATE

REV. 0
11/82

SHEARON HARRIS NUCLEAR POWER PLANT

WP-110

SEISMIC LOAD SHEET

ITEM	QUAN.	PART NO.	SIZE	DESCRIPTION	WGT.			

INTERFERENCE CHECK

REF. B.P. COMPOSITE DWG. ____________

BY ____________ DATE ____________

(std/spec.) PAINT
BUNDLE & TAG
TOTAL

NOTES
1. (PA) DIMENSION LOCATES PIPE ATTACH. IN DESIGN POSITION
2. (STL) DIMENSION LOCATES CENTER LINE OF STEEL ATTACHMENT

MODEL CHECK
BY....... DATE.......

SAMPLE

		EQ#	EQ#	EQ#	EQ#	EQ#	EQ#
OPERATING	LD						
THERMAL	LD						
VIBRATION	LD						
LOCA	LD						
2 (OBE RESPONSE)	LD						
2 (OBE ZPA)	LD						
2 (PENT. REL. SEIS. DISPL.)	LD						
2 (WATER & STM. HAMMER)	LD						
RELIEF VALVE	LD						
WIND	LD						
HYDRO	LD						
HANGER WGT.							
FRICTION FORCE		Fx		Fz		Fz	

ONE-WAY RESTRAINTS
*DENOTES-LOADS INDICATED ARE ONE HALF OF LISTED CONDITION.

SEISMIC FORMAT

ADD LOCATION PLAN

STRESS ISO. #		REV.
STRESS CALC. #		REV.
STRESS PT. #		

INVOICE CODE | DESCRIPTION | APP | CHK | BY | DATE

P.O. NO. 3301 - UNIT NO.

SOUTHWEST FABRICATING & WELDING CO.

40

EBASCO SERVICES INC. (CAR-SH-M-30)

CAROLINA PWR. & LT. CO. - SHEARON HARRIS

BERGEN-PATERSON PIPESUPPORT CORP.

PIPING SYSTEM			
REF. DWGS.	PIPING	STRUCTURAL	
JOB NO.		FAB NO.	NO. REQ'D
MARK #		SHEET	REV

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

PROCEDURAL DEVIATION

PIPE SUPPORT ______________________ Rev.-________ Mod.-____ PD-________

Description of Discrepancy	Corrective Action
Construction Inspector ________ Date	Hanger Engineer ________ Date
	Acknowledged (CI) ________ Date

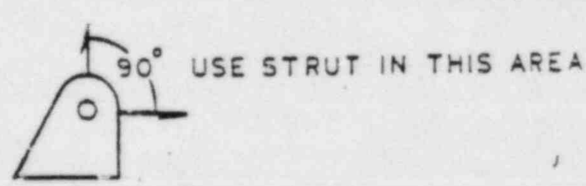
CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

CATALOGUE PART COMBINATIONS

Strut Part Number & Size	End Attachment (S.A.) & Size	End Attachment (P.A.) & Size	Paddle (S.A.) & Size	Paddle (P.A.) & Size
2000/2010-1.5	2003 -1.5/1001-1.5	2003 -1.5	2001 -1.5	2002 -1.5
2000/2010-3	2003 -3/1001-6	2003 -3	2001 -3	2002 -3
2000/2010-10	2003 -10	2003 -10	2001 -10	2002 -10
2000/2010-20	2003 -20	2003 -20	2001 -20	2002 -20
2100 -2.5	2003 -1.5	2003 -1.5	2101 -1.5	2101 -1.5
2100 -7	2003 -3	2003 -3	2101 -3	2101 -3
2100 -12	2003 -10	2003 -10	2101 -10	2101 -10
2100 -28	2003 -20	2003 -20	2101 -20	2101 -20
2100 -38	2003 -30	2003 -30	2101 -30	2101 -30
2100 -50	2003 -50	2003 -50	2101 -50	2101 -50
2100 -70	2003 -70	2003 -70	2101 -70	2101 -70
2100 -130	2003 -130	2003 -130	2101 -130	2101 -130
2100 -200	2003 -200	2003 -200	2101 -200	2101 -200
2200 -.65	2003 -.65	2003 -.65	2101 -.65	2101 -.65
2200 -1.5	2003 -1.5	2003 -1.5	2105 -1.5	2101 -1.5
2200 -3	2003 -3	2003 -3	2105 -3	2101 -3
2200 -10	2003 -10	2003 -10	2105 -10	2101 -10
2200 -20	2003 -20	2003 -20	2105 -20	2101 -20
2200 -30	2003 -30	2003 -30	2105 -30	2101 -30
2200 -50	2003 -50	2003 -50	2105 -50	2101 -50
2200 -70	2003 -70	2003 -70	2105 -70	2101 -70
2540 -.35	1001 -.35/.65	2003 -.65	N/A	2101 -.65
2540 -.65	1001 -.35/.65	2003 -.65	N/A	2101 -.65
2540 -1.5	1001 -1.5	2003 -1.5	N/A	2101 -1.5
2540 -6	1001 -6	2003 -3	N/A	2101 -3
2540 -15	1001 -15	2003 -10	N/A	2101 -10
2540 -50	1001 -50	2003 -50	N/A	2101 -50
2540 -120	1001 -120	2003 -130	N/A	2101 -130
2249 -.7	1000 -.7	2003 -.65		
2249 -1.5	1000 -4	2003 -1.5		
			SEE APPENDIX "E"	
2249 -25	1000 -25	2003 -20		
2249 -35	1000 -35	2003 -30		
72249-2.5	1000 -4	2003 -1.5		
72249-7	1000 -12	2003 -3		

The 2000, 2010, 2100, and 2200 strut assemblies may be rotated 180° so that the paddles can be at either the S. A. or P. A. end. When no stamped part number is available, the dimensions in SD/C-A-1018 should be used for identification. For the 1001 and 1000 end attachment, the strut must be used on the side opposite the reinforced side of the end attachment as shown.

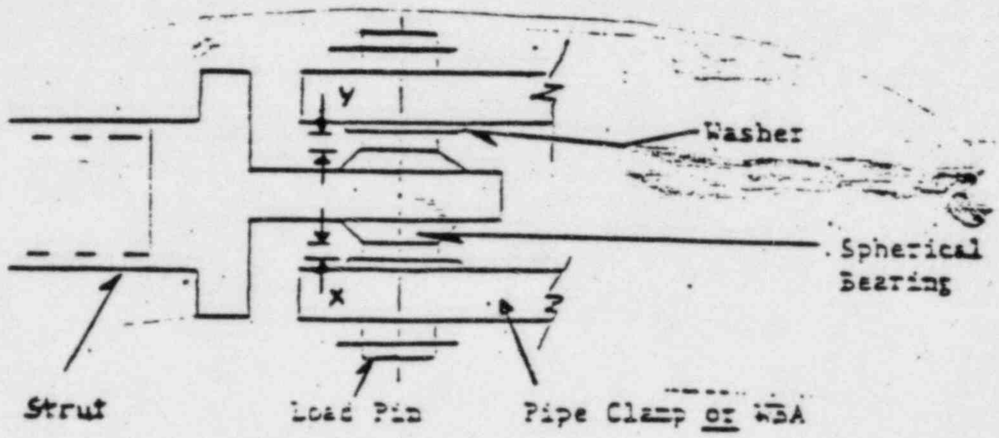
ew Part Number for 2003 is 1002.



CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

GAP TOLERANCES AT LOAD PINS

The maximum amount of play allowed between the end attachment and the strut is dependent on strut/end attachment combination used, see page 4 of 4. The maximum amount of play allowed between the 2600, 2602, 2640, and 2642 pipe clamps and the strut is dependent on the pin diameter, see page 2 of 4. Washers may have been installed by the vendor to reduce the gap. Note how the beveled edge, if applicable, of the washers is towards the paddle. See Appendix G for washer requirements for WBA and pipe clamps.



X + Y = Gap Tolerance in Appendix B

Stacked washers are allowable provided flat washers are used as spacers. The thickness of the stacked washers or the thickness of single washers does not have to be the same on both sides of the spherical bearing. When beveled washers are used the beveled washers shall be adjacent to the spherical bearing and correctly oriented (washer beveled toward the bearing). R4

GAP TOLERANCES AT LOAD PINS FOR PIPE CLAMPS

I. The gap tolerance at the load pins for 2600, 2602, 2640, and 2642 pipe clamps is dependent on the pin diameter. Clamp halves shall be approximately parallel. R5

Pin Diameter	Gap Tolerance
3/8	+ 1/16
1/2	+ 1/16
3/4	+ 1/16
1	+ 1/8
1-1/2	+ 1/8
1-3/4	+ 7/16
2	+ 7/16
2-1/2	+ 7/16
3-1/4	+ 3/4
4	+ 3/4

See 3.6.3.5.

II. The distance between the ears of the gravity pipe clamp (Part Numbers 91, 175, 298, 304, and 370) is dependent on the pipe diameter. Clamp halves shall be approximately parallel.

DISTANCE BETWEEN THE CLAMP EARS

	Part No.				
Pipe Size	91	175	298	304	370
3/4	5/8		3/4	1-1/16	
1	5/8		3/4	1-1/16	Consult
1-1/4	5/8		3/4	1-1/16	the
1-1/2			3/4	1-1/16	
2			3/4	1-1/16	Discipline
2-1/2			3/4	1-1/16	Mechanical
3			7/8	1-1/16	Engineer
4		3/4	1	1-1/16	
5	1-1/2	3/4	1	1-1/16	
6		7/8	1-1/8	1-7/16	
8	1-3/4	1	1-1/8	1-7/16	

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

DISTANCE BETWEEN THE CLAMP EARS (CONT'D)

	PART NO.				
Pipe Size	**81**	**175**	**298**	**304**	**370**
10	2	1	1-3/8	1-7/16	
12	2	1	1-5/8	1-7/16	Consult
14	2-1/4	1-1/8	1-5/8	2	the
16	2-1/4	1-1/8	1-5/8	2	Discipline
18	2-1/4	1-1/4	1-5/8	2	Mechanical
20	2-1/4	1-3/8	1-5/8	2	Engineer
24	2-1/4	1-5/8		2	
28	2-1/4				
30	2-1/4	2		2	
36	2-1/4			2	

The tolerance on the dimension between the ears of the above pipe clamps is also dependent on the pipe size.

Pipe Diameter	Maximum Total Gap at Load Bolt(in)
Under 1-1/2 incl.	- 1/32, + 1/32
Over 1-1/2 - 4 incl.	- 5/32, + 3/32
Over 4 - 8 incl.	- 5/32, + 3/16
Over 8 - 12 incl.	- 5/32, + 5/32
Over 12 - 18 incl.	- 9/32, + 5/32
Over 18	- 9/32, + 3/16

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

END ATTACHMENTS

END ATTACHMENT	STRUT ASSEMBLY WITH TOTAL ALLOWABLE GAP TOLERANCE (IN.) 2000 2010 2200	2100	2540 2410 2411	72249	2249
2003-.65	----	----	1/32 (PA)	----	1/16 (PA)
2003-1.5	1/16 (PA) (SA)	1/16 (PA) (SA)	1/16 (PA)	1/8 (PA)	1/8 (PA)
2003-3	1/16 (PA) (SA)	1/16 (PA) (SA)	1/16 (PA)	1/8 (PA)	1/8 (PA)
2003-10	1/16 (PA) (SA)	1/16 (PA) (SA)	1/16 (PA)	1/16 (PA)	1/16 (PA)
2003-20	1/8 (PA) (SA)	1/8 (PA) (SA)	----	1/8 (PA)	1/8 (PA)
2003-30	1/8 (PA) (SA)	1/8 (PA) (SA)	----	1/8 (PA)	1/8 (PA)
2003-50	1/8 (PA) (SA)	1/8 (PA) (SA)	1/8 (PA)	1/8 (PA)	1/8 (PA)
2003-70	1/8 (PA) (SA)	1/8 (PA) (SA)	----	----	1/8 (PA)
2003-130	1/8 (PA) (SA)	1/8 (PA) (SA)	1/8 (PA)	----	1/8 (PA)
2003-200	1/8 (PA) (SA)	1/8 (PA) (SA)	----	----	----
1001-.65	----	----	1/16 (PA)	----	----
1001-1.5	1/8 (PA) (SA)	----	1/8 (PA)	----	----
1001-6	1/8 (PA) (SA)	----	1/8 (PA)	----	----
ALL SIZES 1000	----	----	----	1/8 (SA)	1/8 (SA)
ALL SIZES 1001	----	----	1/8 (SA)	----	----
ALL SIZES 980	----	----	1/8 (SA)	----	----

NOTE: (PA) - PIPE ATTACHMENT END OF THE STRUT ASSEMBLY

(SA) - STEEL ATTACHMENT END OF THE STRUT ASSEMBLY

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

GAP TOLERANCES AT LOAD PINS FOR 2620 WELDED PIPE ATTACHMENTS

PART NO.	ALLOWABLE GAP TOLERANCE (IN.)
2620-.35	1/32
2620-.65	1/32
2620-1.5	1/32
2620-2.5	1/32
2620-3	1/32
2620-6	1/32
2620-7	1/32
2620-10	1/16
2620-12	1/16
2620-15	1/16
2620-20	1/16
2620-28	1/16
2620-30	7/32
2620-38	7/32
2620-50	7/32

R5

FASTENER TYPES
BOLTING MATERIAL

Part No.	(Old No.)	Sizes	Bolt Type SA-36	SA-307 Gr. B	SA-193 Gr. B-7	SA-194 Gr. 2H	Locking (See Note Methods 6 and 7)
175	(6100)	All		Bolts		Nuts	Lock Nuts
298	(6101)	All		Bolts		Nuts	Lock Nuts
304	(6150)	All		Bolts		Nuts	Lock Nuts
370	(6300)	All			Bolt/Studs	Nuts	Lock Nuts
2600		1.5 - 50		Bolts		Nuts	Lock Nuts
		70 - 200			Bolts/Studs	Nuts	Lock Nuts
2602		1.5, 3		Bolts		Nuts	Lock Nuts
		2.5			Bolts/Studs	Nuts	Lock Nuts
		7 - 50		Bolts		Nuts	Lock Nuts
2630		All			Bolts	Nuts	Lock Nuts
2632		All			Bolts	Nuts	Lock Nuts
2640		All		Bolts		Nuts	Lock Nuts
2642		.35 - 1.5		Bolts		Nuts	Lock Nuts
		6 - 50			Bolts/Studs	Nuts	Lock Nuts
6202		All		Bolts		Nuts	Lock Nuts
6252		.35		Bolts	Studs	Nuts	Lock Nuts
		.65 - 6		Bolts		Nuts	Lock Nuts
		15 - 50			Bolts/Studs	Nuts	Lock Nuts
6300		.61 - 1.13		Bolts		Nuts	Lock Nuts

Note 1: SA-307 Gr. B Bolts are marked with the Bethlehem Steel vendor markings in accordance with ASTM.

Note 2: SA-193 Gr. B-7 and SA 194 Gr. 2H Bolts/Studs/Nuts are marked for material grade, i.e., B-7 and 2H respectively.

Note 3: SA-193 Gr. B-7 Bolts/Studs/Nuts are acceptable alternatives to SA-307 Gr. B Bolts. However, the reverse situation does not apply.

Note 4: A-325 or A-490 Bolts are acceptable alternatives to SA-307 Gr. B and SA-193 Gr. B-7 Bolts/Studs, However the reverse situation does not apply. Bolts for Pipe Clamps may be reused.

Note 5: Locknuts shall be tightened in accordance with Appendix F.

Note 6: Anco or Coloc locknuts will be used in lieu of the standard nut/jam nut arrangements. R4

Note 7: The locknut and lockwire must be fully engaged on the threads of the stud or bolt.

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

LOAD PIN MATERIAL

The following chart shows the acceptable material grades for the listed catalog parts. The end marking 'A' stands for SA 564 type 630 material, 'B' stands for SA 193 grade B7 and 'C' stands for SA 36, SA 306 grade 60. Acceptable substitutes are as shown below.

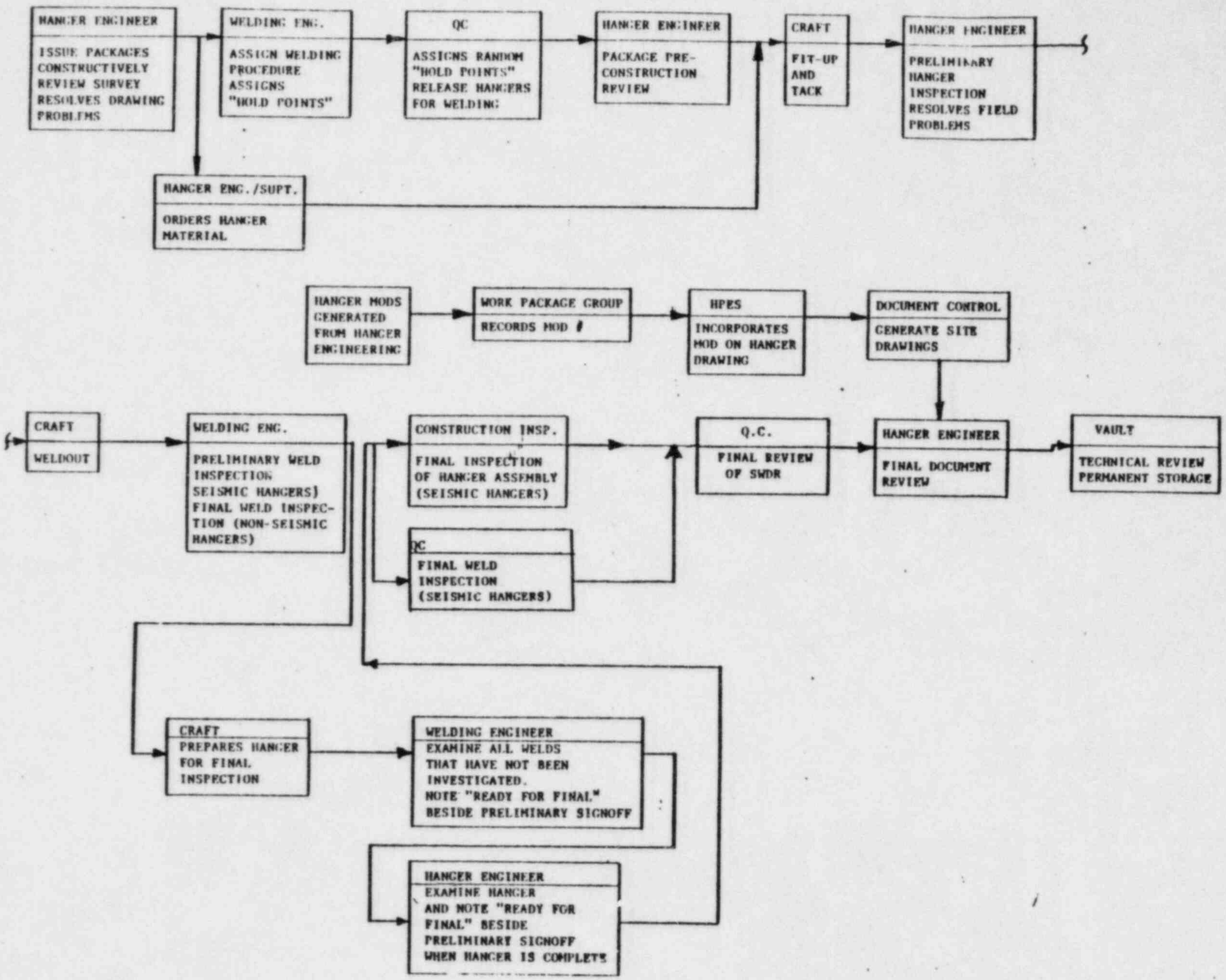
CATALOG PART NO.	MINIMUM LOAD PIN MATERIAL GRADE REQUIRED	ACCEPTABLE LETTERING END MARK SUBSTITUTES
91	SA-306 Grade 60, SA 36	A, B, C
113	SA-193 Grade B7	A, B
216	SA-306 Grade 60	A, B, C
276	SA-306 Grade 60, SA 36	A, B, C
304	SA-306 Grade 60, SA 36	A, B, C
370	SA-193 Grade B7	A, B
377	SA-306 Grade 60, SA 36	A, B, C
1000	SA-564 Type 630	A
1001	SA-193 Grade B7	A, B
2003	SA-193 Grade B7	A, B
2600	SA-193 Grade B7	A, B
2602	SA-193 Grade B7	A, B
2620	SA-193 Grade B7	A, B
2630	SA-193 Grade B7	A, B
2632	SA-193 Grade B7	A, B
2640	SA-193 Grade B7	A, B
2642	SA-193 Grade B7	A, B
6175	SA-564 Type 630	A

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

LOAD PIN MATERIAL

CATALOG PART NO.	MINIMUM LOAD PIN MATERIAL GRADE REQUIRED	ACCEPTABLE LETTERING END MARKS
6202	SA-193 Grade B7	A, B
6252	SA-193 Grade B7	A, B
6300	SA-193 Grade B7	A, B
6515	SA-193 Grade B7	A, B
6516	SA-193 Grade B7	A, B
6525	SA-564 Type 630	A
980 ---	SA-193 Grade B7	A, B

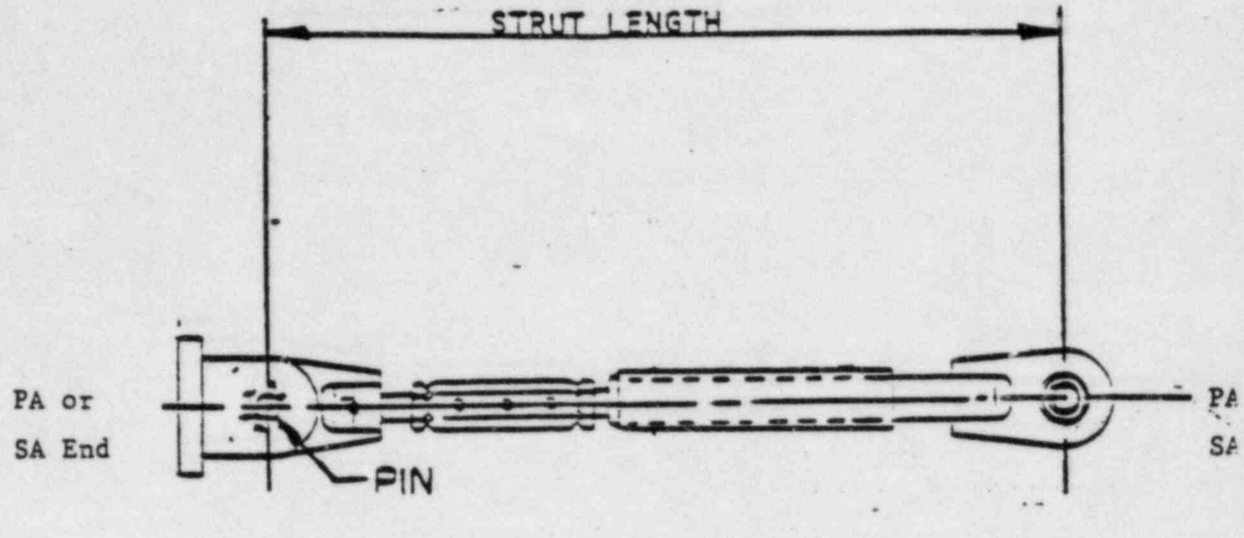
PIPE HANGER CONSTRUCTION FLOW CHART



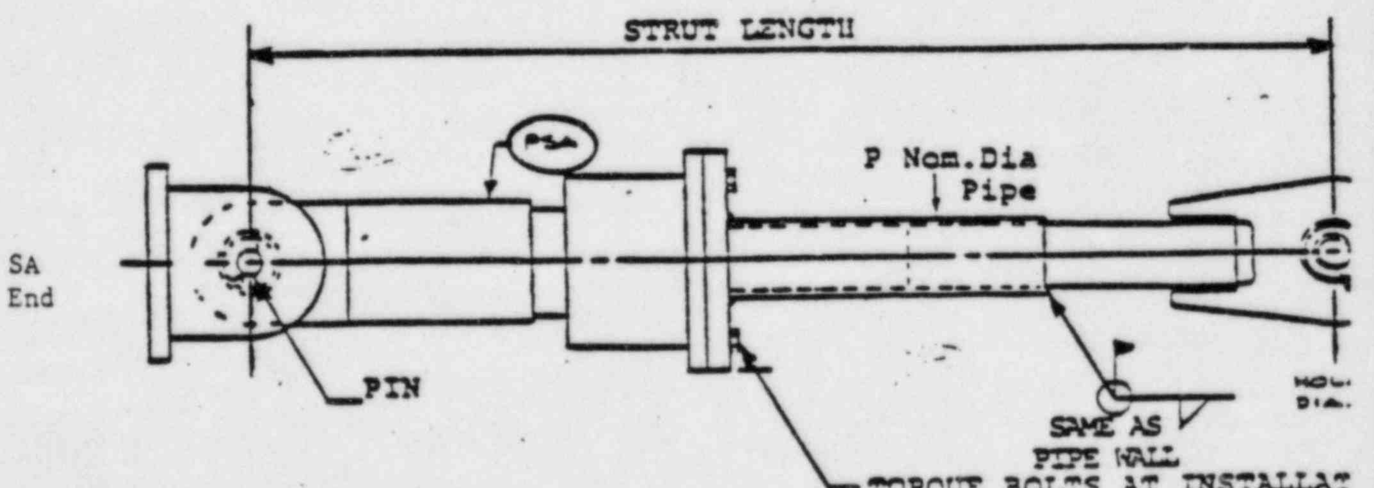
R1

R1

STRUT IDENTIFICATION

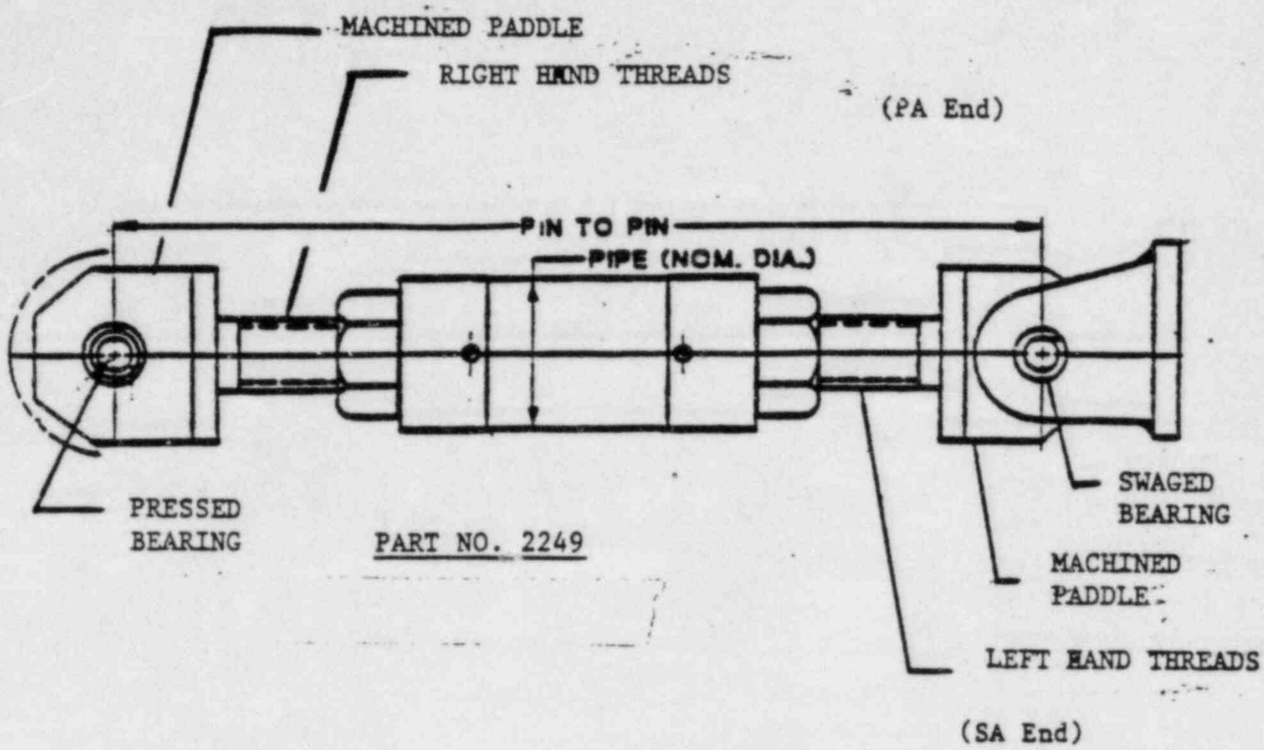


PART NO. 2200

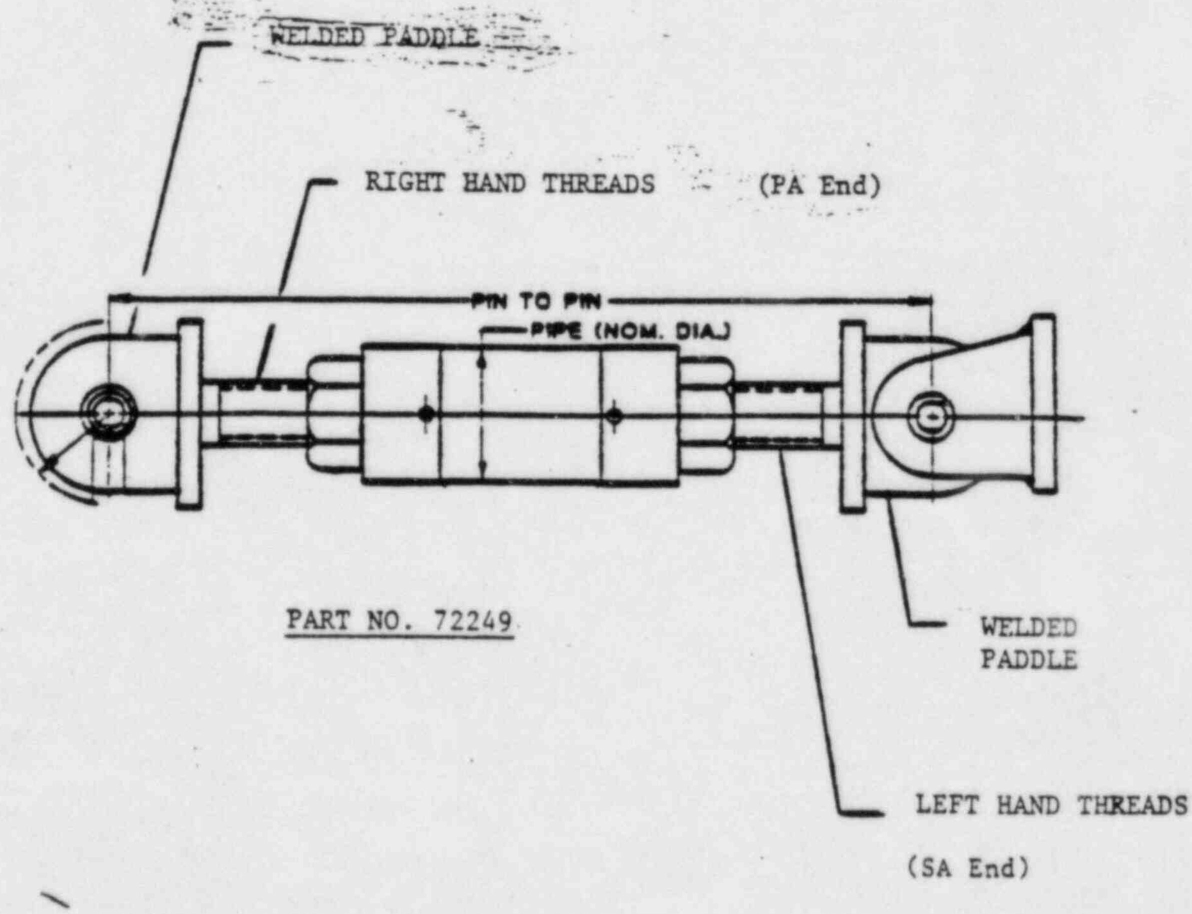


PART NO. 2540

STRUT IDENTIFICATION



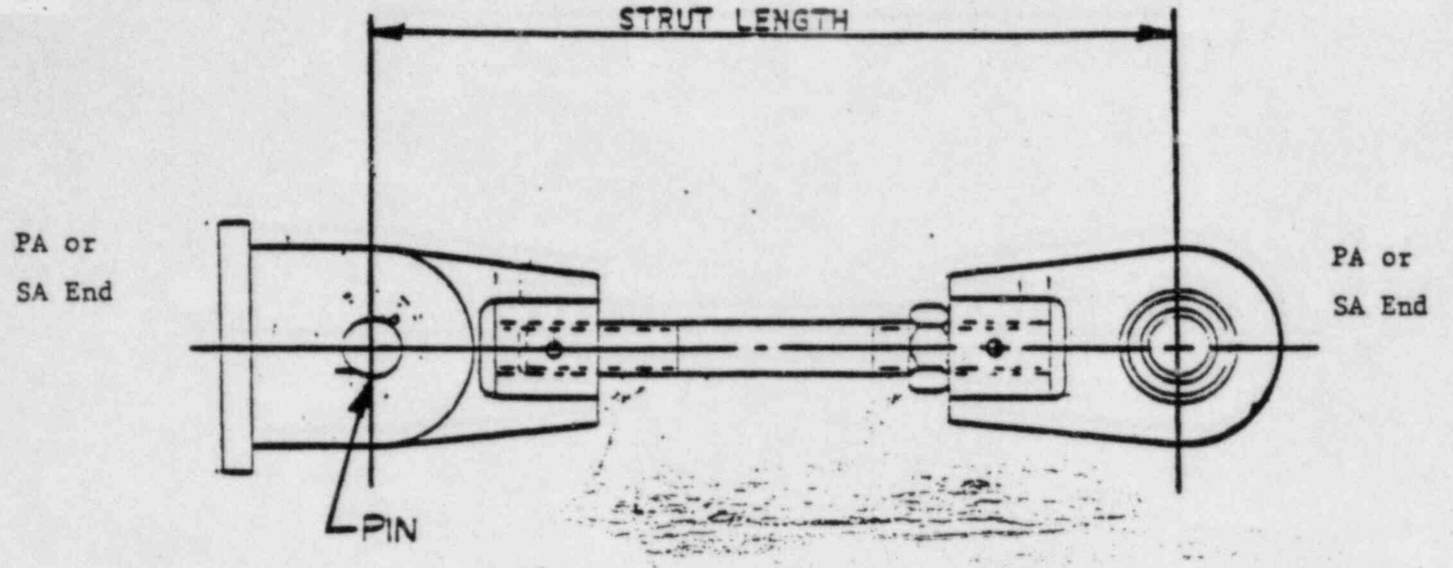
PART NO. 2249



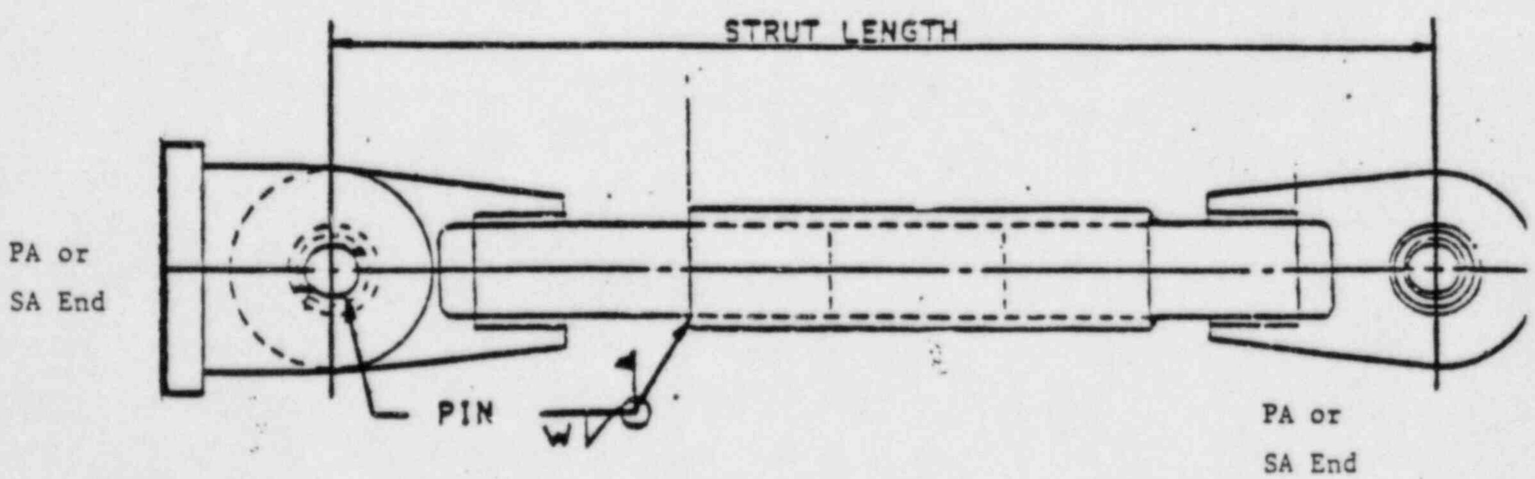
PART NO. 72249

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

STRUT IDENTIFICATION

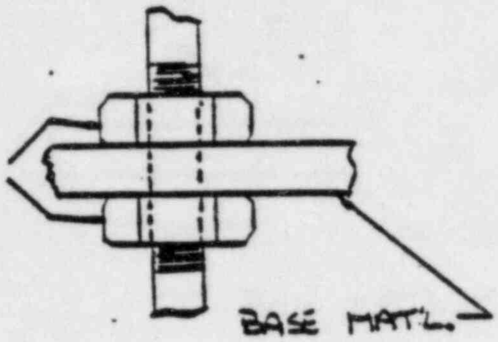


PART NO. 2000 or 2010



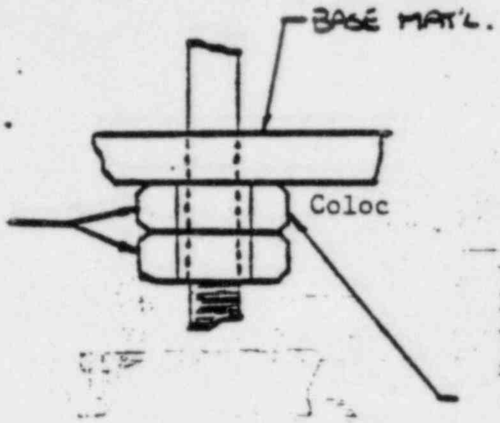
PART NO. 2100

"Snug Tight"
Against
Mating Surface



Detail A

Where (2) nuts are used on either side of a base material (e.g., U-bolts, welded beam attachments) (See Detail A), use standard A-194 2H nuts (Anco or Coloc lock nuts are permissible if the grip wire is clipped). R2

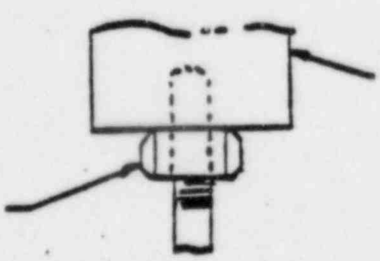


Detail B

R2

Where (2) nuts are detailed on the same side of a base material (e.g., U-bolts, rods and welded beam attachments) (See Detail B), use one A-194 2H Coloc or Anco lock nut For U-bolts, tighten only to point where (0) gap exists between pipe and U-Bolt (when (0) gap is specified on B-P hanger design sketch) to avoid damaging pipe. All other cases, tighten to point where nut to base material contact is made.

"Snug Tight"
Against
Mating Material

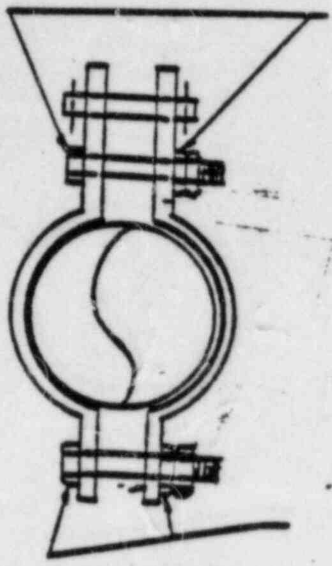


Detail C

Spring can or strut body assembly

Where a locking nut is required on a strut or spring can assembly. (See Detail C)

Material grade is not important since the nut is considered only a locking device. R2

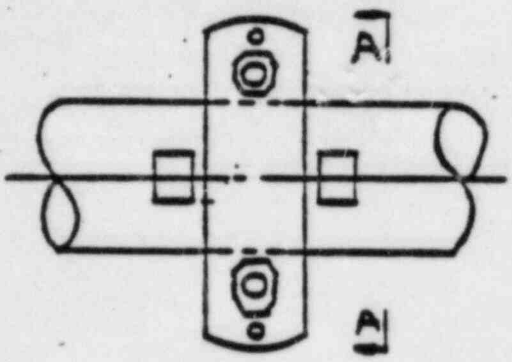


Tighten nut and bolt until the clamp cannot be rotated using moderate hand pressure and the gap is acceptable (Ref. FCR-H-1095). Clamp halves should not be significantly deflected by the tightening operation.

Where (3) bolt pipe clamp used (i.e., B-P Part #91, 304, 2600, 2602, 2640, 2642, 6202, 6252, 6300) Tighten as shown (Detail D)

Tighten to remove slack plus 1/2 turn (Approx.)

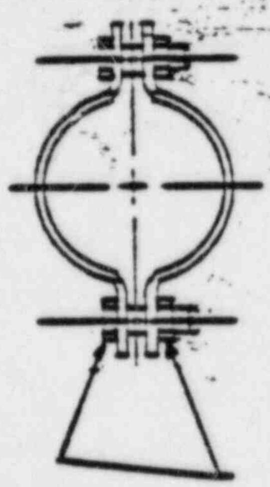
*Detail D



(2) Lug or
(4) Lug Config.
may exist

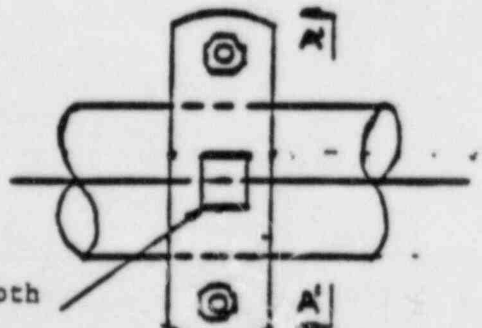
*Detail E
(Part No. 370)

"Snug Tight" against other nut (should use wrench on inside nut while tightening jam nut)



Where (2) bolt pipe clamp (Part No. 175, 298, & 370) used with lugs as shown (Detail E & F)

Tighten to remove slack plus approximately 1/2 turn (typical 2 bolts)



Typical both sides

Section A-A
Section A'-A'

Note: Anco or Coloc locknuts shall be used in lieu of the nut & jam nut combinations. R2

*Detail F
(Part No. 175,298)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

FLAT AND TAPERED WASHER REFERENCE TABLE

Structural Attachments

1000	-.7	flat	1001	-.35	flat	2003	-.65	flat
	-1.5	flat		-.65	flat		-1.5	tapered
	-4	flat		-1.5	flat		-3	tapered
	-12	tapered		-6	flat		-10	tapered
	-25	tapered		-15	tapered		-20	tapered
	-35	tapered		-50	tapered		-30	tapered
	-60	tapered		-120	flat		-50	flat
	-80	flat					-70	flat
	-130	flat					-130	flat
							-200	flat

Pipe Clamps

2600	-1.5	flat	2602	-1.5	flat	2640	-.35	flat	2642	-.35	flat
	-2.5	tapered		-2.5	tapered		-.65	flat		-.65	flat
	-3	tapered		-3	tapered		-1.5	flat		-1.5	flat
	-7	tapered		-7	tapered		-6	tapered		-6	tapered
	-10	tapered		-10	tapered		-15	tapered		-15	tapered
	-12	tapered		-12	tapered		-50	flat		-50	flat
	-20	tapered		-20	tapered		-120	flat			
	-28	tapered		-28	tapered						
	-30	tapered		-30	tapered						
	-38	tapered		-38	tapered						
	-50	flat		-50	flat						
	-70	flat									
	-130	flat									
	-200	flat									

Note: Tapered washers can be substituted for flat washers, but flat washers cannot be substituted for tapered washers. Hanger Mods are not required to substitute tapered for flat washers.

INSTALLATION PROCEDURE FOR MAIN STEAM SUPPORTS | R2

1.0 SCOPE

Additional instructions for the installation of the main steam B-wall supports and D-Wall Header Supports are provided in this Appendix. They shall be used in conjunction with the instructions provided elsewhere in the procedure. R2

The following hangers are affected by this Appendix:

MS-H-212 - 216	MS-H-48
MS-H-219	MS-H-64
MS-H-234, 235	MS-H-75
MS-H-237	
MS-H-345	

R2

2.0 REFERENCES

1. FCR-H-1186 grouting associated with B-P frames and hangers
2. TP-28, Inspection of Equipment Installation
3. WP-29, Grouting
4. TP-04, Calibration of Controlled Tools
5. WP-139, Pipe Hanger Work Package Preparation

3.0 GENERAL

1. Mating surfaces in contact with the concrete shall be stripped of all coatings prior to fitup.

2. Anchor bolts shall be clean and undamged prior to the installation of the frame or hanger boot.

3. The dimension between the boot plate and the face of the concrete shall be maintained to within $\pm$ 1/4" of design.

4. There should be 1/4" minimum grout cover on any shims used during erection. This is to ensure that the shims are not exposed which might cause rust and shim deterioration.

5. Tighten nuts finger tight. Washers may be installed later after grouting is complete.

6. Grouting shall commence after the nuts have been turned finger tight. Type II grout shall be used in conjunction with WP-29.

7. After grout is acceptable, snug the nuts to the full effort of a man using an open end wrench.

8. Tighten all anchor bolts to the designed pre-tension (see the hanger sketch) using a calibrated direct tension indicator.

9. If washers were not installed prior to grouting, then install one washer at a time, snugging each nut respectively. Then perform the action prescribed in 3.9 above.

10. Shopwelds and shopwelded members that were made inaccessible during fabrication or installation do not require inspection since the assembly received VQA inspection.

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

INSTALLATION PROCEDURE FOR MAIN STEAM SUPPORTS R2

4.0 PROCEDURE

1. The Hanger Superintendent shall:

    1. Work the hanger to the design drawing, this Appendix and WP-110 where applicable.
    2. Get the field engineers to provide benchmarks for CI.
    3. Notify Mechanical CI to inspect for pad preparation per TP-28.
    4. After setting the frame, notify Mechanical CI to check setting per TP-28.
    5. Notify the Area Engineer to initiate a grout pour card.
    6. Reference the grout pour card number on the Traveler.
    7. Notify Hanger CI to verify each anchor bolt is properly pre-tensioned.
    8. Notify Hanger CI to inspect as required per WP-110.
    9. Notify the appropriate group for a weld inspection per WP-110.

2. The Work Package Engineer shall:

    1. Prepare the package for construction in accordance with WP-139.

3. The Area Engineer shall:

    1. Initiate the grout pour card.
    2. Ensure that Type III grout is used.

4. The Field Engineer shall:

    1. Provide benchmarks.

5. Mechanical CI shall:

    1. Inspect per the appropriate procedures for equipment setting.

6. Hanger CI shall:

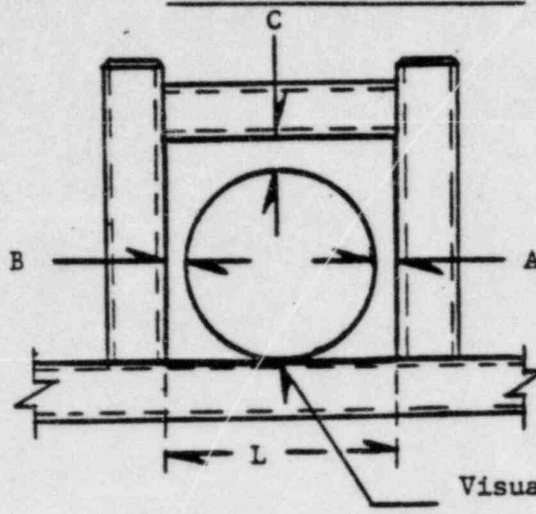
    1. Verify that the anchor bolts are properly pre-tensioned using a calibrated tension indicator.
    2. Verify the hanger was installed to the design drawing, this Appendix and WP-110.
    3. Verify the signed off copies of the grout pour card and Exhibit 1 of TP-28 are in the Work Package.

7. The Discipline Mechanical Engineer shall:

    1. Perform functions referenced in the body of WP-110 for Pipe Hanger Installation.

8. The weld inspections shall be performed by the appropriate group as detailed in WP-110.

CLEARANCES AROUND PIPE

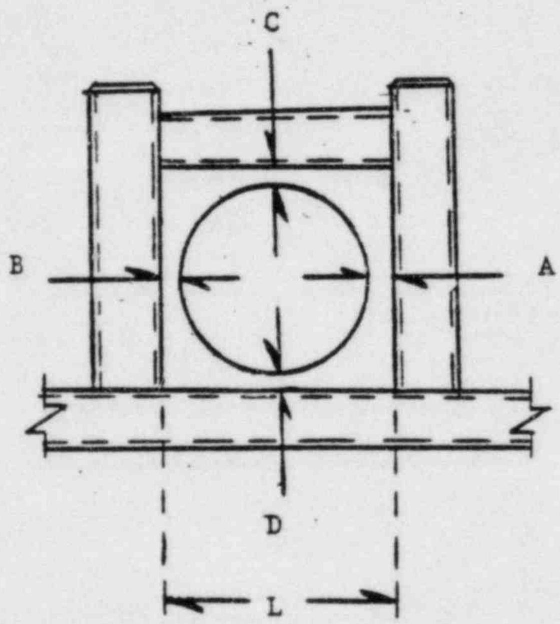


See Note Below

A + B = 1/32" (min.)
A + B = 1/8" (max.)
C = 1/32" (min.)
C = 1/8" (max.)

Figure 1

Horizontal Run of Pipe



See Note Below

A + B = 1/32" (min.)
A + B = 1/8" (max.)
C + D = 1/32" (min.)
C + D = 1/8" (max.)

Figure 2

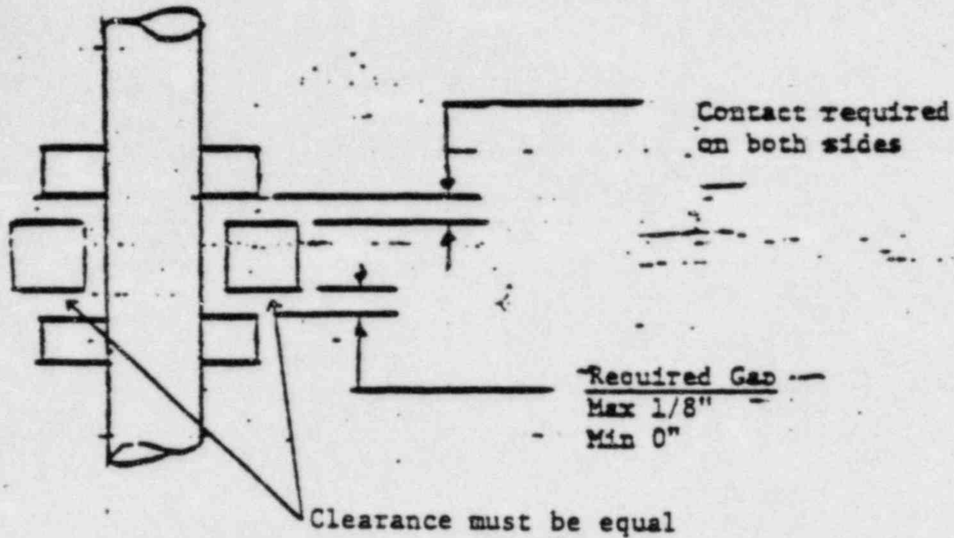
Vertical Run of Pipe

NOTE: See page 4 of 4 for cross sectional view detailing location with respect to hanger member where minimu and maximum clearances are to b checked

CAROLINA POWER & LIGHT COMPANY

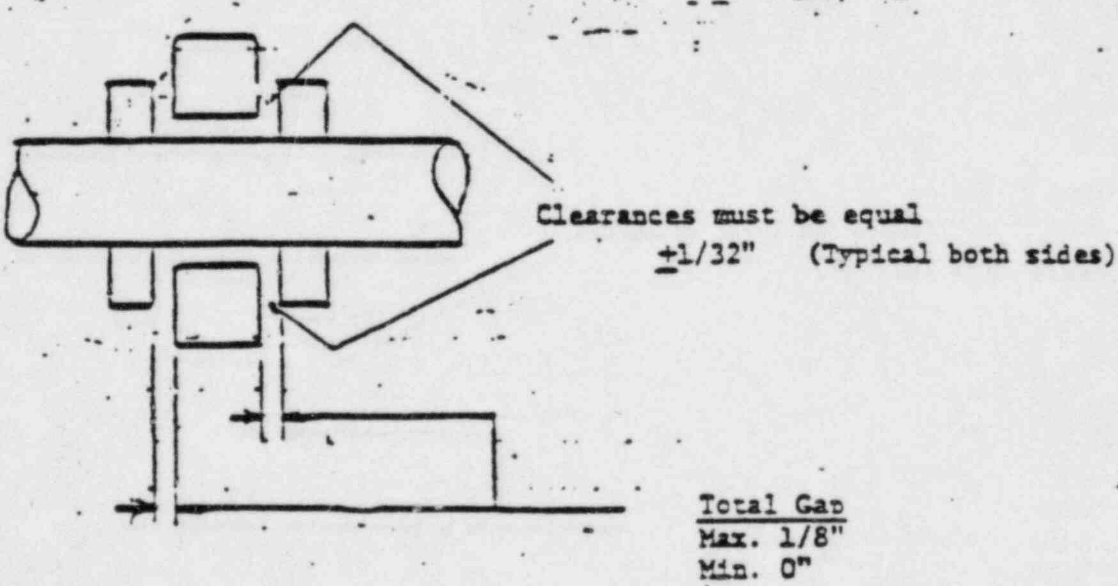
SHEARON HARRIS NUCLEAR POWER PLANT

CLEARANCES AROUND PIPE



VERTICAL PIPE

Figure 3



HORIZONTAL PIPE

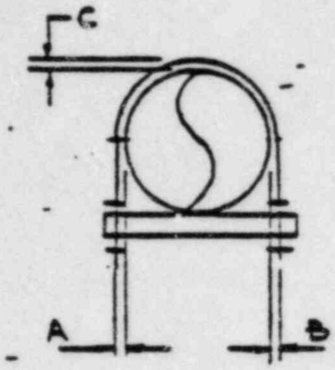
Figure 4

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

CLEARANCES AROUND PIPE

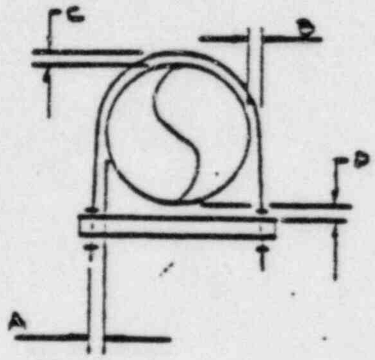
A. Design Requires 1/16" Clearance



Horizontal Pipe Run

A + B = Visual clearance min. 1/8" max. (read to nearest 1/16")

C = 1/8" max., visual clearance min. (read to nearest 1/16") Visual contact gravity side

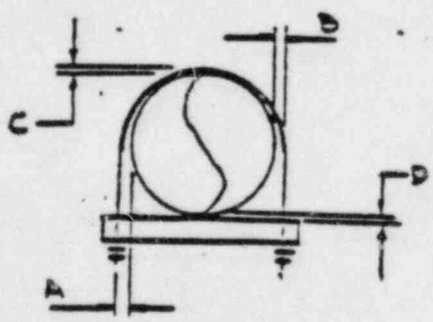


Vertical Pipe Run

A + B = Visual clearance min. 1/8" max. (read to nearest 1/16")

C + D = Visual clearance min. 1/8" max. (read to nearest 1/16")

B. Design Requires 0" Clearance



Horizontal or Vertical Pipe Run

A + B = 0" min. 1/8" max. (read to nearest 1/16")

C + D = 0"

CAROLINA POWER & LIGHT COMPANY

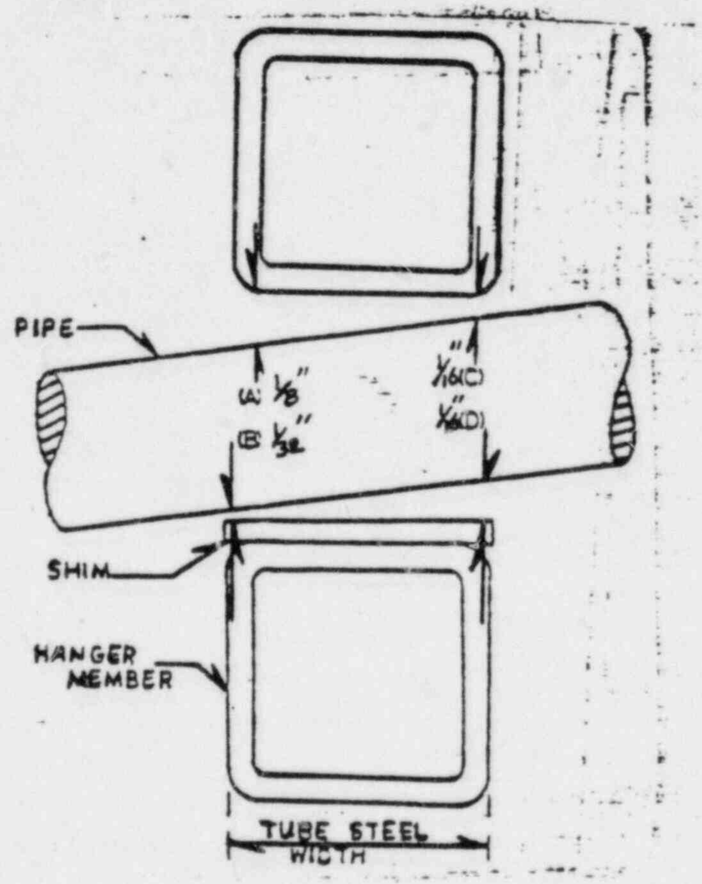
SHEARON HARRIS NUCLEAR POWER PLANT

CLEARANCES AROUND PIPE

Clearance shall be measured at the edge of the hanger member or shimplate as shown below. Care shall be exercised to ensure that pipe skewness with respect to the hanger shall not exceed 1/32" if the hanger member is less than 6" wide and 1/16" if the hanger member is 6" wide or greater. Contact the Discipline Mechanical Engineer if this cannot be achieved. If a shim is not required, pipe skewness with respect to the hanger is not a checkpoint. R3

Total maximum and minimum clearances are to be checked at the closest point on each side of the pipe regardless of whether or not shims are installed. R3

Example:



Clearances are to be checked at point (b) and (c). Although the clearances are acceptable (i.e., b + c = 1/32" + 1/16" = 3/32" minimum is 1/32", maximum is 1/8") the pipe is skewed more than 1/32" (i.e., a - c = 1/8" - 1/16" = 1/16"). This is unacceptable.

MATERIAL VERIFICATION PROGRAM

The following instructions are to be used by the Hanger Engineer to complete Parts 1-7 on Exhibit 4.

Part 1

All material which was issued prior to 9-6-83 maintained identification via material control. To ensure the controls were implemented, the Hanger Engineer shall need to know what material was received and issued for construction. The Warehouse Engineer shall provide that information in Part 1 of Exhibit 4. He shall research receipt records and list items and the drawing revision for which the material was supplied. He shall sign and date the entry.

	Items			Rev.
Example:	1	2	7	3

Part 2

The Hanger Engineer shall verify the as-built steel is the as-received as-issued material for the pipe hanger. He must perform a field check on the items listed in Part 1 and compare the physical parameters, except length, of the as-built steel to the Bill of Materials of the drawing revision for which the material was supplied. In addition, the hanger material must:

1. Be coated with red oxide primer (except in the Containment Building) or,
2. Be coated with flat white primer (only in the Containment Building) or,
3. Be coated with gloss white paint and stamped with the hanger number or,
4. Be an uncoated structural shape less than 6" long or,
5. Be an uncoated plate which has an exposed area less than 3" from a weld
6. Not be marked with another hanger number or PO number
7. Not have documentation in the package to indicate the material was supplied from surplus or stock.

MATERIAL VERIFICATION PROGRAM

If the material has been determined to be the original issue, the Hanger Engineer shall list the item numbers in Part 2 of Exhibit 4.

Part 3

The Hanger Engineer shall list those items in Part 3 of Exhibit 4 whose source of material can be determined from Work Package documentation (i.e., Speed Letter, RCI or CMR). However the source must be legitimate with a Certificate of Comformance from a qualified vendor. This is evidenced by a stamp - "Source Accepted" - on the CMR, Speed Letter, or RCI.

Part 4 & 5

All material issued after 9/6/83 will be stamped or etched for positive identification. The following will be the acceptance criteria for this material.

- A-36 plate, channel, wide flange, and angle shall be stamped with the △36 symbol unless it is less than 3/16" thick.
- A-500 Grade B tube steel shall be stamped the △36 symbol. R3
- U bolts and threaded rod will be stamped or etched with the material grade.
- Stock pipe tubing for struts shall be etched with the material grade.
- Steel other than A-36 or A-500 Grade B shall be stamped with the material grade. However some material was stamped with the purchase order number. That P. O. shall be entered on Exhibit 4 and investigated to ensure the material grade. R3

If the material is marked and is acceptable, the Hanger Engineer shall list the item numbers under Part 4 or 5 as appropriate.

MATERIAL VERIFICATION PROGRAM

Part 6

Catalog parts shall be identified by the physical characteristics of the item or by the stamped catalog part number. The catalog part identity must be in accordance with The Bill of Materials. The Hanger Engineer shall list these item numbers in Part 6 of Exhibit 4 and not under Parts 2, 3, 4, 5, or 7.

Part 7

A sampling program is set up for structural shapes, plates, and shims which cannot be identified under part 2, 3, 4, or 5. The Hanger Engineer shall list these items in Part 7 of Exhibit 4.

General Notes:

If more than one of an item is to be considered, each piece shall be listed in the appropriate section. For example, if there are two piece 7's and both pieces are stamped, Item 7 should be listed twice in Part 4. After the form is completed, the Hanger Engineer shall sign, date, and enter the drawing revision the items were checked against. A copy of the form shall be removed from the Work Package and returned to the office to determine the scope of the sampling program and to initiate any material testing.
Welded pipe attachments (trunnions, lugs, etc.), anchor bolts and cinch anchored plates shall not be listed on Exhibit 4. Nonstructural end cups and shims are considered Non-Q material, do not require verification of the material identification markings, and do not need to be entered on Exhibit 4. R3

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

GAP MEASUREMENT GUIDANCE CRITERIA

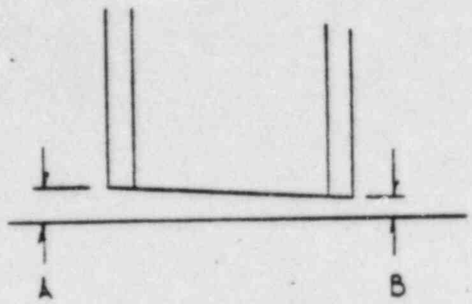


Fig. 1

Since gap A is larger than gap B, the gap shall be listed as A and the weld size must be increased by A.

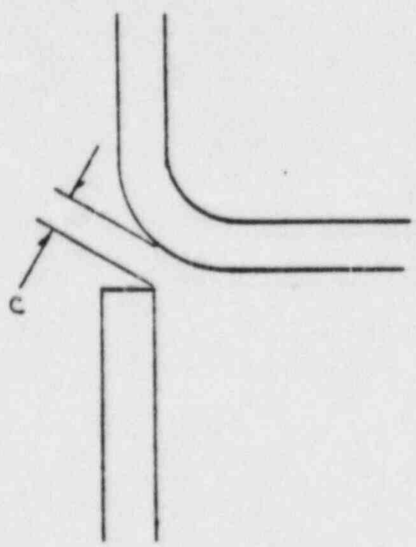


Fig. 2

For joints of this type, gaps should be measured at the root. If the weld requirement is a flare bevel, the gap should not exceed 3/16". and should be recorded as $\leq$ 3/16". R1

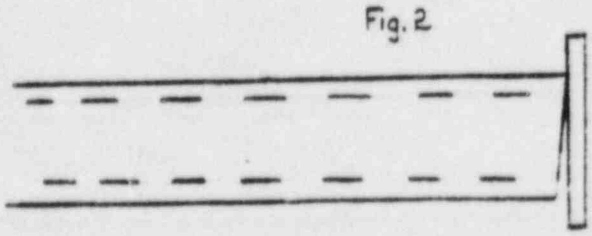


Fig. 3

Fitup gaps between non-structural end caps and tube steel should not be measured or recorded. R1

CONTROLLED DOCUMENT

ASME
SECTION III

CAROLINA POWER & LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT
ENGINEERING AND CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL SECTION

41.1b

PERSONNEL TRAINING AND QUALIFICATION

NUMBER:		INITIAL ISSUE DATE:
CQA-1		March 16, 1981
RECOMMENDED FOR APPROVAL BY: G. L. Forehand DIRECTOR - SHNPP QA/QC		APPROVED BY: [signature] MANAGER - E&C QA/QC

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY CORPORATE QUALITY ASSURANCE DEPARTMENT QA/QC - HARRIS PLANT SECTION	NUMBER	REVISION
	CQA-1	[illegible]

TITLE: PERSONNEL TRAINING AND QUALIFICATION

1.0 PURPOSE

The intent of this procedure is to establish requirements and guidelines for training and qualification of personnel assigned to perform QA/QC activities at a nuclear power plant.

2.0 SCOPE

This procedure is applicable to the site Quality Assurance/Quality Control Unit personnel who perform inspections, surveillances, examination or testing activities; that are intended to assure quality of construction or to verify conformance to quality requirements; and personnel who review and accept or approve inspection, examination or test documentation or other quality affecting documents (e.g. procedures, instructions and specifications). Nondestructive Examination (NDE) personnel training and qualification will be in accordance with Reference 1. For the purposes of this procedure, references to inspection activities includes surveillance. This is an ASME Section III procedure.

3.0 REFERENCES

1. Corporate QA Department Nondestructive Examination Manual (NDE Manual)
2. Instruction QAI-1.1, Visual Acuity and Color Perception Tests
3. Instruction QAI-1.2, QA/QC Personnel Qualification Requirements

4.0 RESPONSIBILITIES

4.1 Manager - QA/QC - Harris Plant Section

The Manager - QA/QC - Harris Plant Section shall be responsible for staffing the QA/QC Unit with personnel meeting the appropriate classification requirements.

4.2 Director - QA/QC

The Director - QA/QC shall have overall responsibility for implementation of this procedure.

4.3 Superintendent - QC

The Superintendent - QC is responsible to the Director - QA/QC for implementation of this procedure.

4.4 Quality Assurance/Quality Control Subunit Supervisors

QA/QC Subunit Supervisors shall have overall responsibility for implementation of this procedure in their assigned areas of responsibility.

4.5 Quality Assurance/Quality Control Specialists/Engineers

Site QA/QC Specialists/Engineers shall be responsible for indoctrination, training, qualification and evaluation of QA/QC personnel in their assigned areas of responsibility.

5.0 EDUCATION AND EXPERIENCE

5.1 Personnel performing QA/QC activities shall meet the education and experience requirements set forth in Appendix A.

5.2 Acceptable equivalents to the education levels listed in Appendix A are as follows:

1. In lieu of high school: Military (USAFI), state, county, or local school system high school equivalency GED; or two (2) years experience in construction operation or inspection work similar to that covered by the inspection activity.

2. In lieu of 2-year degree in engineering/technology: Satisfactory completion of college credits which can be evaluated to be comparable to that required for a 4-year degree; or two (2) years experience as a QA/QC Inspector in a nuclear program.

3. In leiu of a 4-year degree in non-engineering discipline: Satisfactory completion of college credits which can be evaluated to be comparable to that required for a 4-year degree; or two (2) years experience as a QA/QC Inspector in a nuclear program.

4. In lieu of a 4-year degree in engineering: Four (4) years experience as a QA/QC Inspector in a nuclear program.

5.3 The experience levels listed in Appendix A are for directly related experience in work that is technically equivalent to that which will be covered by the specific inspection/testing activity. Prior experience in construction operation or inspection work which is only similar to the inspection/testing activity may be substituted for directly related experience on a 2-month for 1-month basis, not to exceed two-thirds of the total inspection experience requirement.

5.2 Prior experience may be applied to the experience level requirements for more than one inspection/testing activity provided the requirements of 5.3 above are met.

6.0 PHYSICAL CONDITION

6.1 QA/QC inspection personnel shall meet the physical requirements for the particular CP&L classification involved at initial hiring.

6.2 Contracted personnel employed to augment CP&L QA/QC inspectors shall meet the physical requirements of their employers.

6.3 QA/QC and augmented inspection personnel shall be tested to assure:

1. Natural or corrected near distance acuity such as being capable of reading the J-1 letters on a standard Jaeger"s test-type chart or equivalent test type.

2. The capability for distinguishing and differentiating contrast between colors as demonstrated by practical demonstration or test performance.

6.4 Personnel that fail the near distance acuity or color sense testing may be evaluated and, through satisfactory demonstration of capability to perform the required inspections, found acceptable for certification for a sub-category of inspection. The personnel records shall reflect the evaluation process used and any inspection limitations imposed.

6.5 The test specified in 6.3 (or as allowed by 6.4) shall be conducted on an annual basis.

6.6 Prior to fuel loading applicable QA/QC inspection and supervisory personnel (including contract personnel) involved in plant Start-Up/Operations activities will participate in the company sponsored respiratory protection program annual physical.

7.0 INDOCTRINATION AND TRAINING

7.1 Newly assigned personnel (CP&L and augmented) will be trained in the performance of their intended assignment(s). Training shall be accomplished through a program consisting of indoctrination and on-the-job training (OJT) under the direct supervision of qualified personnel. The degree of training will depend on the amount of previous experience and training.

Emphasis will be on firsthand experience gained through actual performance of processes, tests, examinations and inspections. As the inspector in training develops proficiency, he may be allowed to perform certain inspection functions under the supervision of the qualified inspector; however, the qualified inspector is responsible for reinspection to the extent necessary to verify the accuracy of the trainee's inspection. Holdpoint "sign-off" shall be accomplished by the qualified inspector and certifies his acceptance of the completed work.

7.2 (a) Personnel performing QA/QC activities shall be indoctrinated in those project informational areas necessary for effective coordination and accomplishment of their assigned activities and responsibilities. Indoctrination shall be documented on QA/QC Personnel Indoctrination Check-Off (Form QA-47) and consist of, but not be limited to:

1. Organization and Organizational Relationships
2. Introduction to appropriate site personnel
3. Duties and Responsibilities
4. CP&L - CQA/CQC Procedures, Instructions, reports records and filing system.
5. Technical objectives of site CQA/CQC Procedures.
6. Codes and Standards to be employed.

(b) QA/QC personnel involved with plant Start-Up/Operations prior to fuel loading will receive indoctrination in:

1. Radiological Health & Safety Program
2. Emergency Action
3. Industrial Safety Program
4. Fire Protection Program
5. Security Program

7.3 Appendix A to this procedure specifies the training time required for the individual inspection/testing activities. Where the inspector in training has been previously certified for the inspection/testing activity by another organization, the classroom* hours may be reduced by one-half and the OJT** hours may be reduced by two-thirds. Personnel qualified for construction phase QA/QC activities including those qualified through teh CI training program. are considered qualified for equivalent Start-Up and Operation phase QA/QC activities provided indoctrination is received and documented in applicable Start-Up/Operation phase procedures.

Notes: *Classroom training includes lectures, discussions, and demonstrations of the uses of documents, tools, and equipment related to the inspection/testing activity; and the administration of appropriate examinations and tests.

**Where equally applicable to more than one inspection/testing activity, OJT time may be applied to each of the appropriate activites.

7.4 Formal training administered by the QA/QC Specialist/Engineers/Subunit Supervisors to develop or maintain the proficiency of inspection personnel, shall be documented. Those training records shall include the following information:

1. Name of Inspector
2. Subject Matter
3. Date
4. Time Spent
5. List of Attendees

8.0 QUALIFICATION PRIOR TO CERTIFICATION

Prior to assignment to perform specific inspection/testing functions, QA/QC personnel shall meet the minimum requirements for the assignment as delineated in Appendix A. Classroom, self-study and practical demonstrations shall be performed and documented in accordance with Reference 3.

8.0 (cont.)

Qualification records of company personnel transferred, from other units or personnel hired from organizations which provide direct services to the QA/QC Unit, will be reviewed for acceptance against the requirements of this procedure. The Inspector's personnel file will be annotated to show the results of the review and identify any training and/or testing required prior to certification. Where no additional training is required, certification/recertification may be affected based on previous qualifications.

9.0 CERTIFICATION

9.1 Subunit Supervisors, QA/QC Specialists and Engineers

9.1.1 Subunit Supervisors, QA/QC Specialist and Engineers are assigned supervisory and technical responsibilities based solely on combinations of formal education, previous training, previous work experience and completion of indoctrination to satisfactorily perform their assignments. Such personnel are considered qualified without examination to perform the following functions as applicable to the activities within their assignments:

1. Train, qualify and supervise QA/QC personnel in inspection, monitoring and testing assignments.

2. Develop and administer oral/written qualification examinations.

3. Evaluate capabilities and performance of QA/QC personnel.

4. Evaluate results of examinations, inspections and tests.

5. Develop and prepare new QA/QC procedures and instructions.

6. Review QA/QC and Construction operations procedures and instructions for appropriate commitments and requirements.

7. Technical review of site generated documents which furnish documentary evidence of the quality of nuclear safety related items and of activities affecting quality.

9.1.1 (cont.)

8. Review of procurement documents for inclusion of QA requirements.

9. Review of Suppliers' documentation to assure procured items comply with QA requirements of procurement documents.

10. Plan, schedule and supervise inspections and surveillance of construction and operations activities.

11. Identify quality problems and initiate, recommend or provide resolutions.

9.1.2 Other activities assigned to the Subunit Supervisors are as follows:

9.1.2.1 <u>QA Surveillance</u>

1. Perform QA Surveillance of construction installation, inspection and testing activities.

2. Perform QA Surveillance of selected general activities supporting rather than directly related to the installation, testing or inspection of permanent plant items or structures.

3. Perform technical document review of construction QA Records.

9.1.2.2 <u>Civil & Structural</u>

1. Sampling and testing of concrete materials (i.e. cement, aggregate, admixtures and water).

2. Concrete production.

3. Sampling and testing of plastic concrete and grout.

4. Compressive testing of concrete and grout.

9.1.2.2 (cont.)

5. Tensile testing of reinforcing steel bars and cadweld specimens.

6. Installation of Mechanical splices (cadwelds) in concrete reinforcing bars.

7. Calibration and field adjustment of measuring devices.

8. Windsor Probe System of testing concrete strength in place.

9.1.2.3 Materials & Records

1. Receipt storage and issue of nuclear safety related plant items and consumables.

2. Construction site procurement of nuclear safety related plant items and consumables.

3. Accumulations, review, filing and control of records which are required to furnish documentary evidence of the quality of nuclear safety related items and of activities affecting quality.

4. Control of construction and operations control documents.

5. Control of records of permanent plant items transferred between units or off-site.

6. Assembly of Code Data Reports for submittal to the National Board.

9.1.2.4 Mechanical & Welding

1. Installation and pressure testing of piping systems, components and HVAC duct work.

2. Field fabrication/modification of piping subassemblies.

9.1.2.4 (cont.)

3. Application of "N" type symbol stamp to ASME Code Class piping and subassemblies and systems.

4. Preparation of ASME Code Data Reports.

5. Cleanliness inspections of piping systems and components.

6. Inspection of code valves.

7. Qualification of welders and welding operators.

8. Field welding of ASME Code Class and non-code class piping.

9. Installation welding of pressure boundary components.

10. Installation welding of Seismic Category I structural steel members, hangers and supports.

11. Field fabrication welding of piping subassemblies, tanks, structural steel members, hangers and supports (including studs).

12. Installation welding of steel liner plate.

13. Post-weld heat treatment.

9.1.2.5 Start-Up/Operations

1. Procedure Review

2. Turnovers

3. Document Review

4. Maintenance and Modification Control

5. QA Surveillance of Start-Up/Operations

6. Inspections

9.1.3 Personnel, not necessarily classified as QA/QC Specialists/Engineers may be assigned supervisory responsibilities within their areas of technical expertise when evaluated by the QA/QC Subunit Supervisor as being capable of performing the supervisory assignment. The evaluation shall be documented and shall take into account the following factors:

1. Education
2. Experience
3. Demonstration of Capability

9.2 Personnel performing QA/QC activities will be eligible for certification after complying with paragraphs 8.0 or 9.0 as applicable. Certification shall be documented on QA/QC Personnel Qualification/Certification (Form QA-7) and shall contain, but not be limited to, the following information:

1. Employer's Name
2. Name of person being certified
3. Activity qualified to perform
4. Date of certification and effective period
5. Basis for certification
6. Signature of Director or his designee

9.3 Certification by the Director means the inspector is qualified to perform the following as applicable to the inspection/testing activity:

1. Record inspection, examination and testing data.
2. Implement approved inspection, examination and testing procedures.
3. Plant inspections, evaluations and tests; set-up tests, including preparation and set-up of related equipment.
4. Evaluate the validity and acceptability of inspection, examination and test results.

9.3 (cont.)

5. Report inspection, examination and test results.
6. Supervise other inspection/testing personnel.
7. Train other personnel.
8. Use calibrated tools and equipment required for the inspection/testing activity.

9.4 Appendix A to this procedure identifies the individual supervisory and inspection/testing activites for which QA/QC personnel may be assigned.

10.0 NEW INSPECTION ACTIVITIES

In the event a new work activity and the associated inspection activity are concurrent so as to preclude prior qualification of inspection personnel, inspection of the work shall be under supervisory control of the cognizant QA/QC Specialist, Engineer or Subunit Supervisor. Assistance from the cognizant discipline engineer and manufacturer's representative may be requested to facilitate initial qualification of inspection/testing personnel. The required OJT may be waived upon satisfactory demonstration of ability to perform the inspection/testing function.

11.0 EVALUATION AND RECERTIFICATION

11.1 The job performance of QA/QC personnel shall be evaluated at intervals not to exceed two (2) years. QA/QC personnel who have not performed inspection/testing activities for which qualified within a period of one year shall be re-evaluated prior to assignment to perform that inspection or test.

11.2 If the results of the performance evaluation(s) are satisfactory, the individual's certification shall be continued.

11.3 If, during the above evaluation or at any other time, it is determined that the capabilities of an individual do not meet the requirements of the inspection/testing activity, that individual shall be removed from the activity until such time that the required capability has been demonstrated.

11.4 Recertification will be documented on QA-49A Forms.

12.0 RECORDS

12.1 A file of QA/QC personnel certifications (completed QA-49/49A Forms) shall be retained in QA Records.

12.2 A file of records required to support the certification of personnel assigned to perform QA/QC activities shall be established and maintained. The file shall include, as a minimum:

1. Visual Acuity Test Results (Form QA-[illegible])
2. Physical Examination Results or Equivalent Statement
3. Resume' of Education and Experience
4. Indoctrination (Form QA-47)
5. Other training such as the respiratory protection program, health physics, security, etc..

13.0 APPENDIX

13.1 Appendix A, QA/QC Education, Experience & Training Requirements

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
CIVIL/STRUCTURAL					
Concrete Compression Testing	2	1	0	2	24
Sieve Analysis	2	1.	0	2	16
Field Testing of Concrete	2	1	0	2	32
Rebar & Cadweld Tensile Testing	2	1	0	3	24
Concrete Material Testing	4	2	0	2	40
Grout Testing	2	1	0	1	16
Cement False Set Testing	2	1	0	2	16
Concrete Batch Plant Inspector	12	4	2	4	40
In-Place Concrete Test by Windsor Probe System	2	1	0	2	16
Cadweld Inspector	8	4	2	4	40

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR. ENGR./TECH 4-YR. NON-ENGR	4-YR. ENGR	CLASS-ROOM	OJT
MATERIALS & RECORDS					
Receipt Inspector					
1. Secondary (QR Received)	12	8	4	4	20
2. Rebar	16	8	6	4	20
3. NSR Categories I & II Off-the-Shelf Items Consumables	16	8	6	4	20
4. Stock Steel & Bolting Stock Tubing, Pipe and Fittings (FP & Radwaste) Stock Tubing, Pipe and Fittings (Code Class)	24	12	7	6	20
5. Weld Filler Materials	40	20	16	8	20
6. Engineered Items (Seismic I) Engineered Items (NSR Categories I & II, Radwaste & Fire Protection) Primary -Engineered Items	44	22	17	8	37
Purchase Requisition Review					
1. Non "Q"-List Items	8	4	2	8	20
2. "Q" -List Items	24	12	6	8	40
QA Records Clerk	8	N/A	N/A	8	80

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	YRS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
MECHANICAL WELDING					
Cleanness Inspector	8	4	2	[illegible]	20
Pressure Testing Inspector	8	6	4	-	20
Valve and Component Installation Inspector	24	8	4	-	30
Pipe Spool Fabrication/ Modification Inspection	12	8	4	-	20
Pipe, Pool Liner Weld Inspector	24	12	6	[illegible]	80
Structural Weld Inspector	16	8	4	[illegible]	30
Stud Welding Inspector	16	8	4	-	40
Post Weld Heat Treatment Inspector	8	4	2	-	40

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	• WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
START-UP					
Turnover - Mechanical	24	-	2	2	16
Turnover - HVAC	24	-	2	2	16
Turnover - Electrical	24	-	2	2	16
Turnover - I&C	24	-	2	2	16
Turnover - Structural/Civil	24	-	2	2	16
Cleanliness Inspections	8	-	2	2	20
Instrumentation Inspections	24	12	2	4	20
Mechanical Inspections	24	12	4	6	40
Electrical Inspections	24	12	4	6	40
Surveillance - PSI/ISI	24	12	4	3	20
Surveillance - Operations	24	12	4	2	20
Surveillance - Maintenance	24	12	4	3	20
Surveillance - E&RC	24	12	4	3	20
Surveillance - Start-Up Activities	24	12	4	2	20
Surveillance - Administrative	24	12	4	2	10
Surveillance - Technical Support	24	12	-	2	10
Surveillance - General (Refer to Note 1)	24	12	4	4	20

Note:
1. General surveillance certification will cover basic items such as cleanliness, housekeeping, training and qualifications. This certification will provide the methods for preparing, conducting and reporting surveillances.

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASSROOM	OJT
START-UP					
Maintenance Instruction Review	24	8	2	2	12
Start-Up Instruction Review	24	8	2	[illegible]	12
E&RC Instruction Review	24	8	2	2	12
General Procedures & Instruction Review	24	8	2	[illegible]	12
WR&A Review	16	8	2	2	12
CWR&A Review	16	8	2	2	12
STs/PTs Review	16	8	2	2	12
Plant Modification Review	24	12	4	-	24
Calibration Nonconformances Review	12	12	1	[illegible]	4

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	WKS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR. TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
MISCELLANEOUS (Non-Inspection/Testing Activities)					
QA/QC Subunit Supervisors	468	364	260	N/A	N/A
QA/QC Specialist	312	208	104	N/A	N/A
QA/QC Engineer	N/A	N/A	96	N/A	N/A

QA QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	MOS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
QA SURVEILLANCE					
Concrete Placement Monitor	24	8	4	8	40
Concrete Testing Monitor	24	8	4	8	40
Grout Placement Monitor	12	4	2	8	16
Structural Steel Erection Monitor	12	4	2	4	40
Cadwelding Control Monitor	12	4	2	4	40
Soils Control Monitor	24	8	4	8	40
Expansion Anchor Installation Monitor	12	4	2	2	16
Electrical Raceway Conduit Installation Monitor	24	8	4	4	20
Cable Pulling, Termination and Testing Monitor	24	8	4	4	20
Cleanness Control Monitor	12	4	2	2	20
Protective Coating Application Monitor	24	8	4	4	50
Mechanical Equipment Installation Monitor	24	8	4	4	30
Hydrostatic Test Monitor	12	6	4	4	20
Hanger & Support Installation Monitor	24	8	4	4	36
Piping Installation Monitor	24	8	4	4	30
HVAC Ductwork Installation Monitor	16	8	4	4	20
Receiving Inspection Monitor	44	22	17	8	40
In-Process Weld Quality Qualifications Monitor	24	12	6	8	40
Final Weld Quality Monitor	24	12	6	8	40
Non-Destructive Examination Monitor	44	22	17	8	40
General Activity Monitor (Refer to Note 1)	24	8	4	4	2
Electrical Equip. Instrumentation Installation Monitoring	24	8	4	-	2

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	YRS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR. TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	OJT
QA SURVEILLANCE (cont.)					

Note:

1. Qualification of QA/QC Inspectors for surveillance of on-site contractor activities is provided by qualification for specific surveillance activities. For example, surveillance of contractor welding activities shall be performed by an inspector qualified in weld control surveillance.

2. Qualification of QA/QC Inspectors for technical review of site generated records is provided by specific activity qualification. QA/QC Inspectors qualified for specific activity are thereby qualified to review records generated within the scope of that activity.

3. Site QA Surveillance personnel may be considered qualified for general surveillance by virtue of their qualification in one or more specified surveillance activities. In this case, the qualification shall require the completion of required indoctrination, self-study and classroom training; additionally, personnel shall meet the education and experience requirements outlined in this Appendix. OJT, practical demonstrations, and examinations shall not be required when qualification is accomplished by this method.

QA/QC EDUCATION, EXPERIENCE & TRAINING REQUIREMENTS

INSPECTION/TESTING ACTIVITIES	YRS. EXPERIENCE REQUIRED			HRS. TRAINING	
	HIGH SCHOOL	2-YR ENGR/TECH 4-YR NON-ENGR	4-YR ENGR	CLASS-ROOM	[illegible]
QA SURVEILLANCE (cont.)					
4. Site QA Surveillance personnel may be considered qualified for surveillance of inspection activities for which they hold or have held valid CP&L certification. In this case, the qualification shall require the completion of required indoctrination and self-study. Additionally, personnel shall meet the education and experience requirements outlined in this appendix. No additional OJT, classroom training, practical demonstrations and examinations shall be required when qualification is accomplished by this method.					

File:
Training
T4C

EXHIBIT 2

17 OCTOBER 1980

TO: ~~RAY Hanford~~ RH 10/20/80

FROM: David Tinkerloface

SUBJECT: Welder Training Class

On Friday October 17, 1980 I conducted two welder training classes for the structural welders (#32 craft) and some CP&L personnel (engineers and Q.A.). Attached is an outline and list of attending personnel.

to be produced in response to 41-7

Outline for Welder Training Class.

I Introduction

A. Hand-out on weld symbols given to each person in class. (attached). Attendance Taken

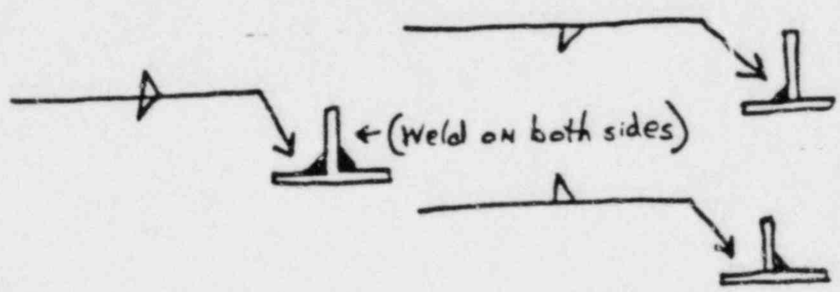
B. Reason men brought to class... Hanger Acti-

NRC

II Weld Symbols

A. Reference line :

Size & Type weld and finish informati given above & below reference line.

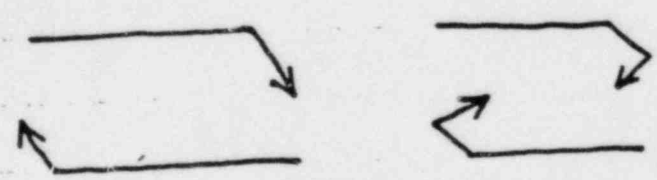


Information giv below line refe to arrow side of joint.

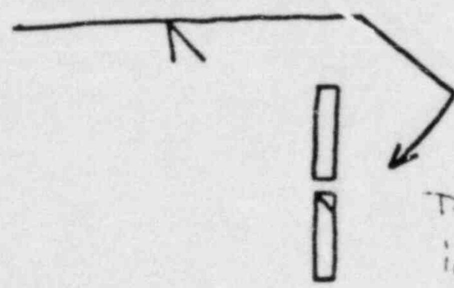
Information abc line refers to side of joint opposite arrow

Information always read left to right.

B. Arrow : designates where preparation and weld will be performed.



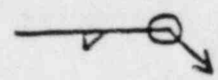
Broken arrow  shows which piece will be prepared. example on next page.

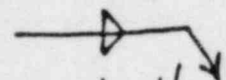
example: 

Desired bevel shou
in red.

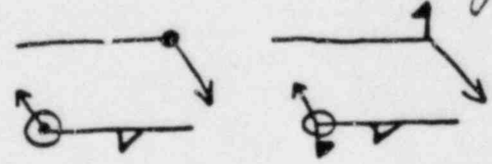
C. <u>Supplementry Symbol</u>:

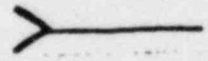
1. Weld All Around: O

ex.  requires continuous fillet weld All Arc member at joint.

Note: This should not be confuse with  which meAr fillet weld on both sides yet N All Around.

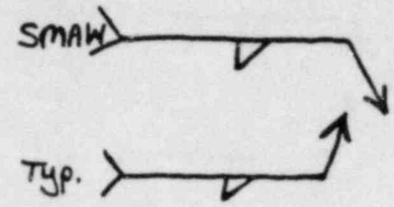
2. Field Weld symbol: old symbol •
New AWS symbol

ex. 

D. <u>TAil</u>: 

Used to specify welding process or specification or other supplementry information. <u>Often omitted</u>.

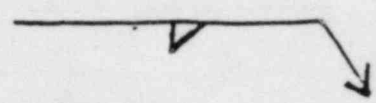
ex.



when "TYP." is specified, sometimes drawing is not clear. welder should get with forman to contact mechanical Engineers or Weld Engineer for clarification, when this is not clear.

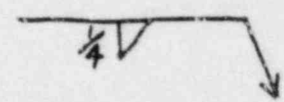
E. Typical weld symbols seen on Berg. Patterson Draw.

1. Fillet weld



a.) Size of fillet weld Always should be specified on drawing in front of fillet symbol.

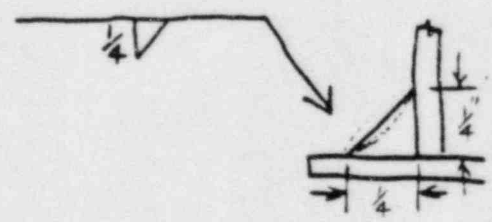
ex.



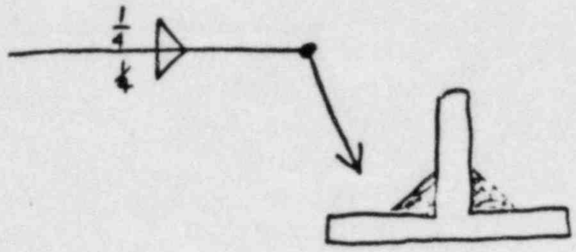
b.) measure fillets:

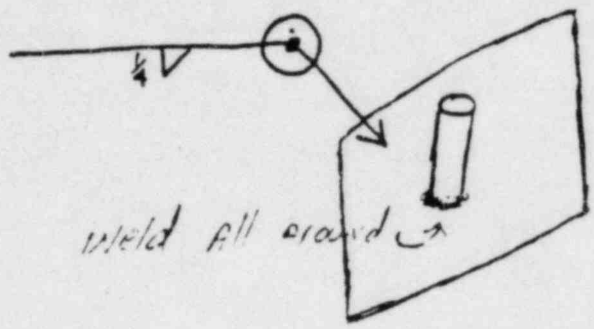
size is measure of leg length.

ex.

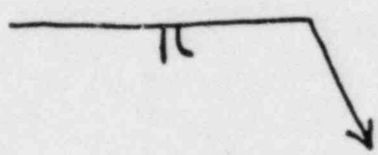


Excessive concavity or convexity of the fillet face is unacceptable.

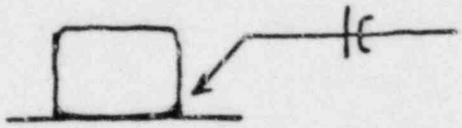




2. Flare Weld :

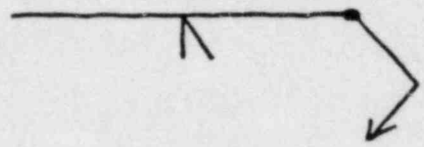


Example : Tube steel on plate



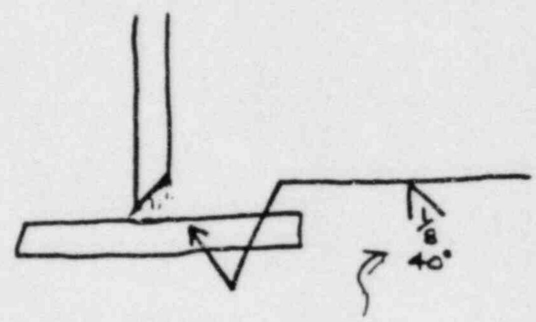
Note: This is not a full penetration weld.
Sometimes weld symbol on drawings calls for fillet weld rather than flare. This mistake should be brought to attention of mechanical Engineering.

3. Bevel



Full penetration bevel welds without backing should not be welded with WPS 1A1. Welder should be qualified for open root welding with WPS 1A3 prior to attempting these welds.

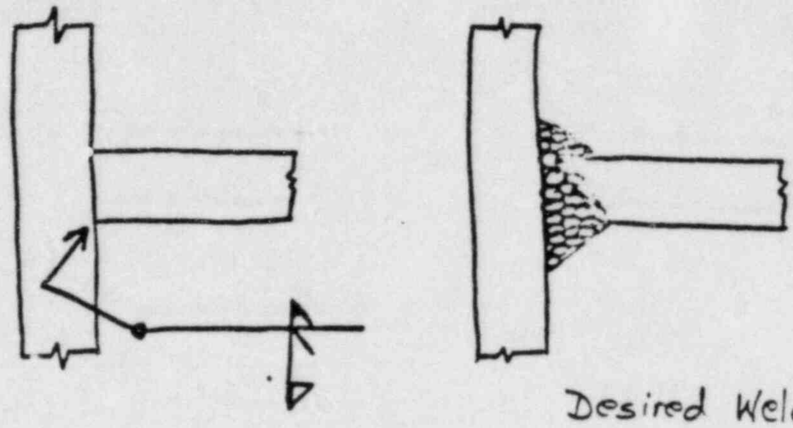
ex.



Root spacing and bevel angle. If not specified, see applicable procedures (WPS, MP

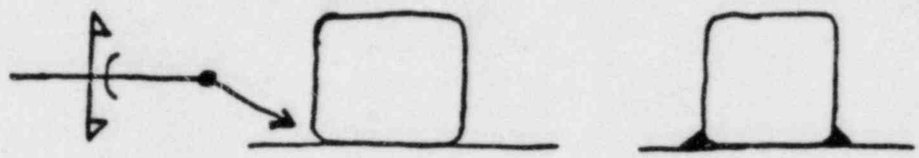
F. Combination Weld Symbols

1. Bevel with Fillet



Desired Weld

2. Flare with Fillet



III Discussion of Misunderstood Procedures

A. Stamping - MP-05

1. Changes to MP-05 to help prevent excessive stamping on Hanger Welds
2. Request that all welders obtain "Nissen" Pipe markers to use for "boxing in" of all stencil marking for welder identification.

ex. $\boxed{\text{SH 19}}$ ← Box In

3. Welders who have stencils with (3) three or (4) four letters are having problems stamping the complete identification marking on plates. New stencils have been ordered and 'll be available to welders. Each stecil will only have one letter or number and therefor should be easier to stamp with.

B. Material Control - MP-03

1. Welders must discontinue the throwing away of good welding electrodes
2. Foremen must start being more accurate on Job description which is placed on WMR. These records are used to maintain welder's certification and must be accurate.

C. Welders should reveiw all MP procedu which are sent to field to be reveiwed. Otherwise, welders will not know about new changes to procedures

D. Weld Procedure Specifications are being issued to welders, when they receive w: rods. Welder should reveiw procedure prior to welding.

IV Conclusion

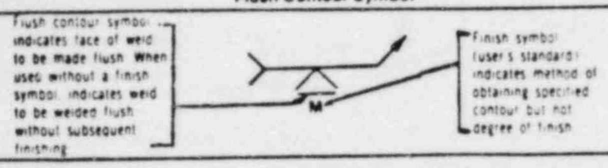
All work performed must be as specifie on drawings. If conflict arrises betwee actual work that can be performed vs. that which is called for, welder shou. contact foreman and he should contact Mechanical or Welding.

Basic Welding Symbols and Their Location Significance

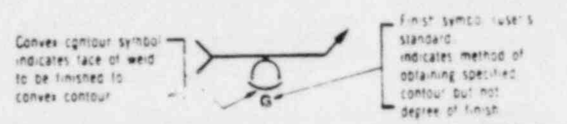
Location Significance	Fillet	Plug or Slot	Spot or Projection	Seam	Back or backing	Surfacing	Flange Edge	Flange Corner
Arrow side					Groove weld symbol			
Other side					Groove weld symbol	Not Used		
Both sides		Not used	Not used	Not used	Not used	Not used	Not used	Not used
No arrow side or other side significance	Not used	Not used			Not used	Not used	Not used	Not used

Supplementary Symbols Used with Welding Symbols

Flush Contour Symbol

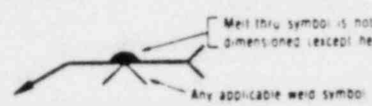


Convex Contour Symbol

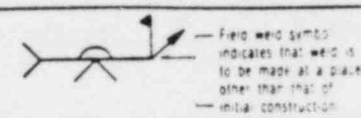


Weld-All-Around Symbol

Melt-Thru Symbol

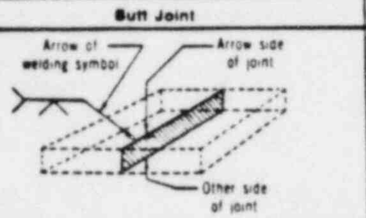


Field Weld Symbol

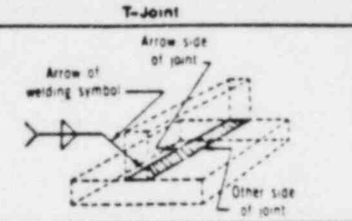


Basic Joints—Identification of Arrow Side and Other Side of Joint

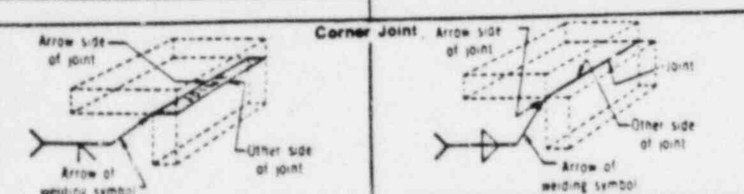
Butt Joint



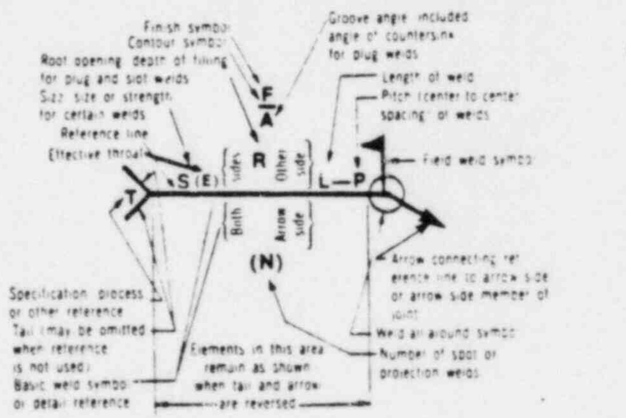
T-Joint



Corner Joint

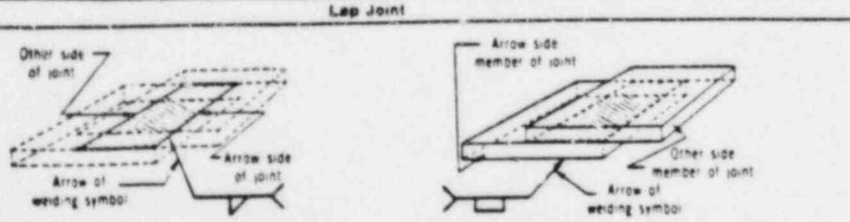


Location of Elements of a Welding Symbol

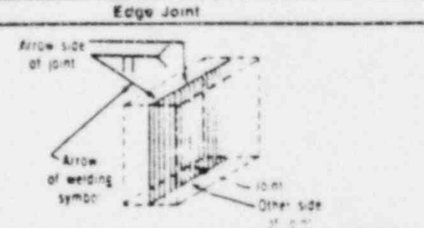


Arrow Side and Other Side Member of Joint

Lap Joint



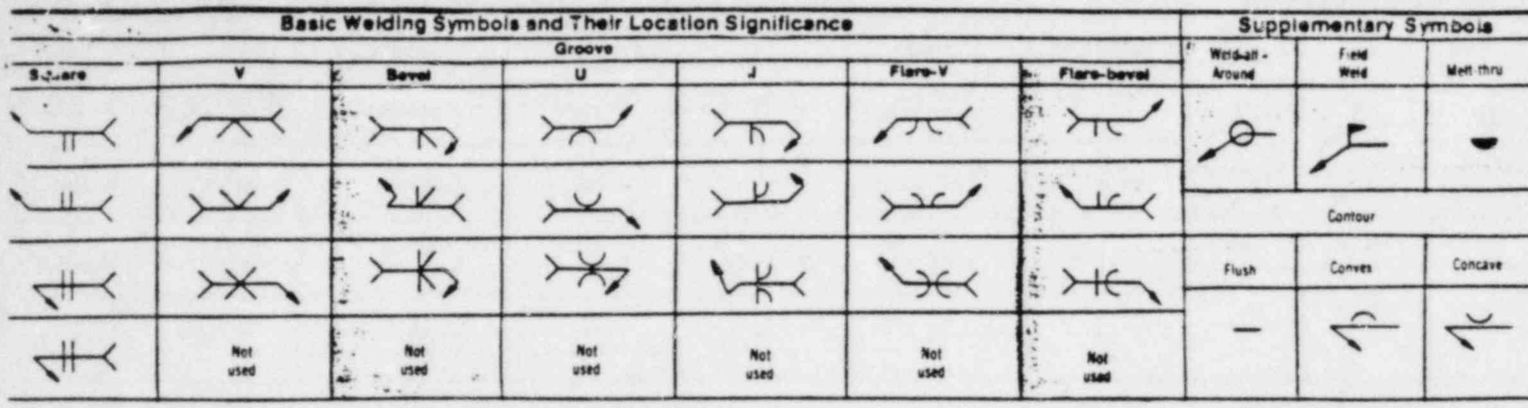
Edge Joint

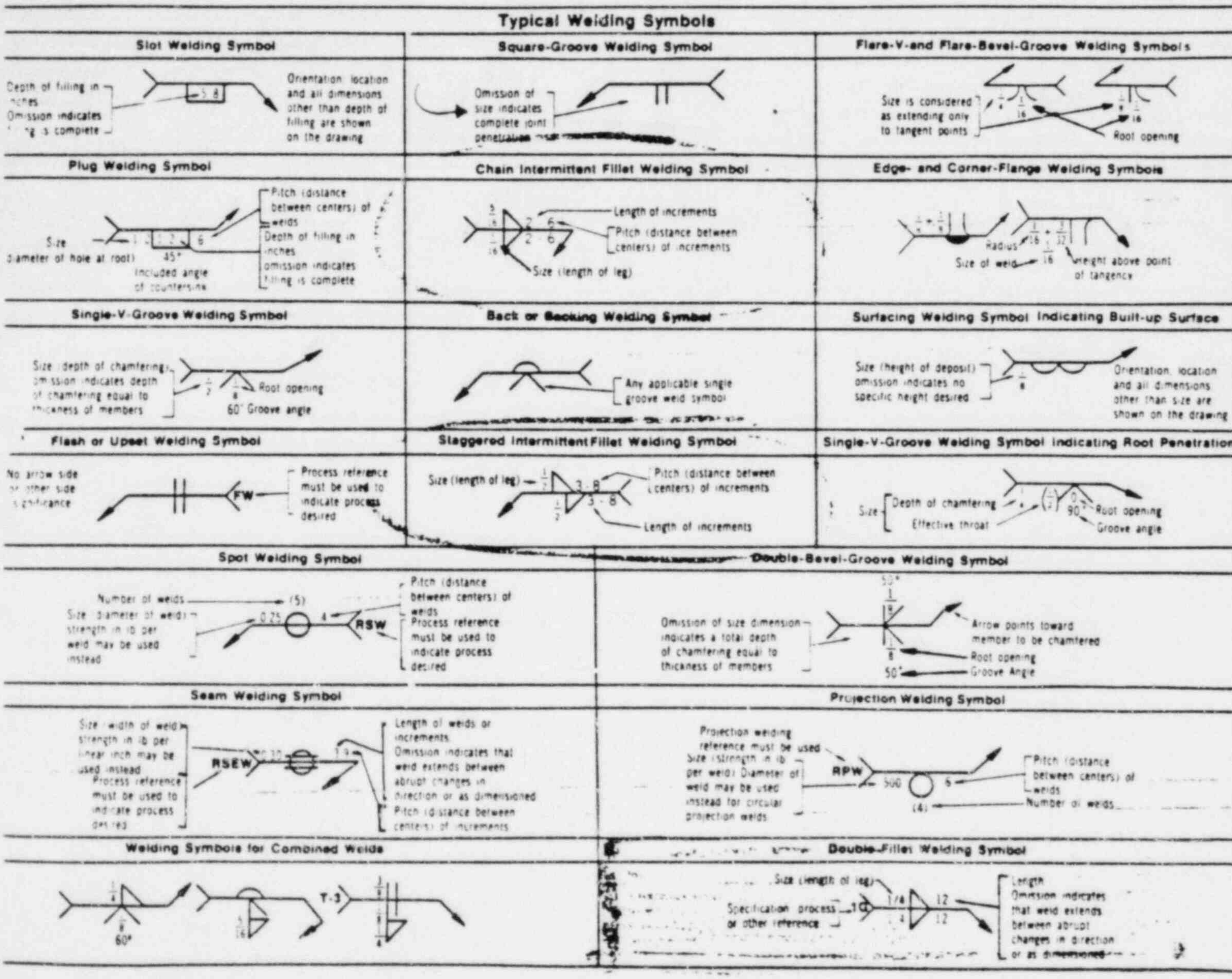


Designation of Welding and Allied Processes by Letters

AAC	air carbon arc cutting	B	brazing	CW	cold welding	ESW	electroslag welding	FOC	chemical flux cutt
AAW	air acetylene welding	BR	block brazing	DB	dip brazing	EXW	explosion welding	FOW	forge we
ABD	adhesive bonding	BMAW	bare metal arc welding	DFB	diffusion brazing	FB	furnace brazing	FRW	friction we
AB	arc brazing	CAC	carbon arc cutting	DFW	diffusion welding	FCAW	flux cored arc welding	FS	furnace solde
AC	arc cutting	CAW	carbon arc welding	DS	dip soldering	FCAW EG	flux cored arc welding—electrogas	FW	flash weld
AHW	atomic hydrogen welding	CAW-G	gas carbon arc welding	EASP	electric arc spraying	FLB	flow brazing	GMAC	gas metal arc cutti
AOC	oxygen arc cutting	CAW S	shielded carbon arc welding	EBC	electron beam cutting	FLOW	flow welding	GMAW	gas metal arc weld
AW	arc welding	CAW T	twin carbon arc welding	EBW	electron beam welding	FLSP	flame spraying	GMAW EG	gas metal arc welding—electrog

g





Designation of Welding and Allied Processes by Letters

'W P	gas metal arc welding—pulsed arc	IB	induction brazing	LOC	oxygen lance cutting	OFC P	oxypropane cutting	PSP	plasma spraying	S	soldering
S	gas metal arc welding—short circuiting arc	INS	iron soldering	MAC	metal arc cutting	OFW	oxyfuel gas welding	RB	resistance brazing	SAW	submerged arc welding
		IRB	infrared brazing	OAW	oxyacetylene welding	OHW	oxyhydrogen welding	RPW	projection welding	SAW S	series submerged arc welding
-C	gas tungsten arc cutting	IRS	infrared soldering	OC	oxygen cutting	PAC	plasma arc cutting	RS	resistance soldering	SMAC	shielded metal arc cutting
'AW	gas tungsten arc welding	IS	induction soldering	OFC	oxyfuel gas cutting	PAW	plasma arc welding	RSEW	resistance seam welding	SMAW	shielded metal arc welding
'AW P	gas tungsten arc welding—pulsed arc	IW	induction welding	OFC A	oxyacetylene cutting	PEW	percussion welding	RSW	resistance spot welding	SSW	solid state welding
'RW	high frequency resistance welding	LBC	laser bream cutting	OFC H	oxyhydrogen cutting	PGW	pressure gas welding	ROW	roll welding	SW	stud arc welding
'PW	hot pressure welding	LBW	laser beam welding	OFC N	oxynatural gas cutting	POC	metal powder cutting	RW	resistance welding	TB	torch brazing

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE 10-17-80 TIME 12:40 LENGTH OF CLASS 2 hour

COURSE & TITLE Welding Symbols Class

INSTRUCTOR Wayne Harris SHIFT 1st

PERSONS IN ATTENDANCE

NAME	BADGE NO.
1. John T. Bell	CP&L 239
2. Bill [illegible]	CP&L 75
3. James Nevill	CP&L 57
4. Steve Mauntcastle	CP&L - 119
5. Al Wade	CPL - 201
6. Pete Tonguin	98/1164
7. J.R. Davis	CP&L 338
8. [illegible]	CP&L 169
9. C.O. Burke	32-4
10. S.W. Bragg	32-558
11. K.W. Davis	32-1418
12. John McLean	CPL 49
13. Dave Miles	32-738
14. William [illegible]	CPL - 196
15. James Root	CPL - 344
16. William Johnson	32-63
17. L. F. Kennegar	32-01
18. C. Fulmore	32-859
19. R. [illegible]	32 588
20. D. Kohler	32 549
21. T. [illegible]	32 - 1428
22. Geo. A. Cooper	32/67
23. J. Inman	32 - 1429
24. D. Sound	32 - 567
25. C. Barnett	32-550
26. R. Ervin	32-782
27. Buddy Landstoff	32-118
28. Roy Dawson	32-456
29. P. Kennedy	32 335
30. W.K. Hilton	32-59

Bill Beaver	32/5497
Karl Sutherland	33/560
Bob Strother CP&L	80
James Ingram	52/1419
Gerald Gwinn	32/44

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE 10-23-80 TIME 10:30 LENGTH OF CLASS 2 hrs.

COURSE & TITLE Welding Symbols Class

INSTRUCTOR Wayne Harris, Charles Duffin SHIFT 1st

PERSONS IN ATTENDANCE

NAME	BADGE NO.
1. Thomas W. [illegible]	66-405
2. Howard H. Jeffers	
3. [illegible]	66-435
4. Michael K. [illegible]	66-409
5. Sam Ellis	66-401
6. C.E. Fisher	32-798
7. [illegible]	32-974
8. Charles Strickland	50-101
9. M.J. [illegible]	32/946
10. James Campbell	32/65
11. Raymond [illegible]	66/412
12. [illegible]	66/1468
13. [illegible]	66/415
14. J.J. Buckner	32/190
15. MARTY JOHNSON	32-714
16. Rand[illegible]	66-1454
17. Walter R. [illegible]	39-514
18. ANDY MAXWELL	32-542
19. Francis [illegible]	32-246
20. [illegible]	32-533
21. Judi McDonnell	CP+L 191
22. J. Alan [illegible]	66/395
23. Raymond Smith	35/438
24. M.J. Williams	66/422
25. [illegible]	35/2026
26. J.H. [illegible]	66/1469
27. Carl Davis	32-490
28. James McFadden	32-493
29. Bruce Giles	CP&L 211
30. [illegible]	CP&L 399
31 - Marty Jackson	66/426
32 - E.C. Lloyd	66/433
[illegible] - 32-11	[illegible] 32/[illegible]

Speed Letter.

To FILE

From DAVID TIMBERLAKE

Subject SKEWED T-FILLET WELD MEASUREMENT CLASS

MESSAGE

Date FEB. 2, 19 82

ON JAN. 21, 1982 I CONDUCTED A TRAINING CLASS ON THE ABOVE SUBJECT. THE CLASS COVERED THE USE OF PARRALEL LINES IN MEASURING SKEWED T FILLETS AS OUTLINED IN AWS D1.1-81 FIGURE 2.7.1. THE ATTACHED LIST SHOWS WHO ATTENDED THE CLASS

C.C. ED. WILLETT
GEORGE FOREHAND

Signed [signature]

REPLY

Date ____ 19 ____

Signed

Wilson Jones Company

RECIPIENT—RETAIN WHITE COPY, RETURN PINK COPY

1-21-82

SKEWED T-FILLET WELD MEASUREMENT CLASS

NAME

Bill Pearl
Richard Moore
Peter Turgin
Moot
Alex Fuller
Rose Brien
Kenneth Douglas
Clay Rhodes.
Jordi McDonnell
T.H. Wait
Chase Thomas
William C Hartley
Pat Chriscoe
Don Samuels
Jim Kirby
Michael Taggart
Gilbert A. DeBarros
Steve Martinette
Reggie Faulkner
Mark E. Tabb
R.W. Howard

Speed Letter.

To TERRY WAIT
ALEX FULLER

From DAVID TIMBERLAKE

Subject SKEWED T-FILLET MEASUREMENT

MESSAGE

Date JAN. 19 1992

I WILL CONDUCT A SHORT CLASS ON THE ABOVE SUBJECT ON THURSDAY JAN. 21, 1992 AT 8:15 AM IN THE LARGE CONFERENCE ROOM. PLEASE HAVE ALL APPROPRIATE PERSONNEL UNDER YOUR SUPERVISION TO ATTEND. THIS SUBJECT WILL ALSO BE COVERED IN THE NEXT WELDER CRAFT TRAINING CLASS.

cc: RAY HANFORD
GEORGE FOREHAND
ED WILLETT
ASHLEIGH LUCAS

Signed David Timberlake

REPLY

Date 19

Signed

W/F

[redacted]

April 14, 1982

TO: Jim Tranmel

FROM: David Timberlake

SUBJECT: "Welding Inspection Training" Classes

One class on the above subject was held on each of the following two days; April 7, 1982 and April 8, 1982. The attached information includes the class outline, class time, instructor, and list of attendees.

David Timberlake

cc; Frank Taylor
Fasih Shaikh
File

WELDING INSPECTION TRAINING CLASS

OUTLINE

I. Visual Inspection of Welds (AWS D1.1-75, Examples of Various Defects)
   A - Proper Profile
      1 - Convexity Formula
      2 - Overlap
      3 - Undercut - no more than 1/32"

   B - Cracks (including crater cracks)
   C - Porosity
   D - Non Fusion
   E - Slag
   F - Arc Strikes
   G - Weld Spatter
   H - Tools of Inspector - Magnifying lens, flashlight, mirror

II. Fillet Weld Symbols
   A - Examples
   B - Leg, effective throat measurement

III. Skewed Tee Fillets
   A - Examples
   B - Leg Measurement (use of parallel lines)

IV. Plug Welds/ Repairs

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE APRIL 7, 1982 TIME 9:00 AM LENGTH OF CLASS 1 1/2 Hours

COURSE & TITLE WELDING INSPECTION TRAINING

INSTRUCTOR DAVID TIMBERLAKE SHIFT 1st

PERSONS IN ATTENDANCE

NAME	BADGE NO.
1. Frank Taylor	220
2. ~~Eugene Martin~~ [illegible] 4/16	~~485~~
3. EUGENE E. VICK	543
4. Michael King	544
5. John Bain	521
6. JIM BROWN	98
7. Steve Mountcastle	119
8. Art Barber	183
9. Edward Mercer	169
10. Gilbert A. DeRamos	466
11. [illegible]	460
12. Richard W. Dowling	126
13. Reginald L. Faulkner	465
14. Wayne D. Martin	525
15. Jack C. Hulett	533
16. James D. Story	527
17. Mark W. Hale	354
18. David F. JARVIS	233
19. THOMAS B. DANIEL	397
20. Jimmy W. West	398
21.	
22.	
23.	
24.	
25.	
26.	
27.	
28.	
29.	
30.	

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE 4-8-82 TIME 9:00 LENGTH OF CLASS 1 1/2 HRS

COURSE & TITLE WELDING INSPECTION TRNG

INSTRUCTOR DAVID TIMBERLAKE SHIFT 1st

PERSONS IN ATTENDANCE

NAME	BADGE NO.
1. Mark D. Tallin	CP&L 277
2. Doug Sudduth	TSL 523
3. Robert Steele	TSL 209
4. William Pore	CP&L 196
5. Kenneth A. Douglas	CP&L 313
6. Tommy Gilbert	CP&L [illegible]
7. Pete Turner	CP&L 371
8. Clay Rhodes	CP&L 370
9. Donald L. Rogers	TSL 352
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Form 244

Carolina Power & Light Company

Company Correspondence

May 20, 1982

MEMO TO: Jim Trammel

FROM: David Timberlake

SUBJECT: "Welding Inspection Training" Class

One class on the above subject was held on May 20, 1982. The attached information includes the class outline, class time, instructor and list of attendees.

David Timberlake

David Timberlake

cc: Brent Firestone - QC
Fasih Shaikh
Frank Taylor - QC
File

DT/c

WELDING INSPECTION TRAINING CLASS

OUTLINE

I. Visual Inspection of Welds (AWS D1.1-75, Examples of Various Defects)
   A - Proper Profile
      1 - Convexity Formula
      2 - Overlap
      3 - Undercut - no more than 1/32"

   B - Cracks (including crater cracks)
   C - Porosity
   D - Non Fusion
   E - Slag
   F - Arc Strikes
   G - Weld Spatter
   H - Tools of Inspector - Magnifying lens, flashlight, mirror

II. Fillet Weld Symbols
   A - Examples
   B - Leg, effective throat measurement

III. Skewed Tee Fillets
   A - Examples
   B - Leg Measurement (use of parallel lines)

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE 5-20-82 TIME 7:30 LENGTH OF CLASS 1 1/2 HRS

COURSE & TITLE [illegible]

INSTRUCTOR D. Timberlake SHIFT [illegible]

PERSONS IN ATTENDANCE

NAME	BADGE NO.
1. Guy Roxbury	625
2. ~~Bob Steele~~	209
3. Eugene Martin	485
4. Kevin M. Kenyon	547
5. ~~[illegible]~~	455
6. ~~Doug Sudduth~~	523
7. ~~Dave Rogers~~	532
8. Douglas M. Brown	546
9. Judi McDonnell	191
10. Arlen Brent [illegible]	559
11. Al Tittle	624
12. Robert Tomlinson	608
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Speed Letter. 44-902 GrayLine

File

To ~~RAY HANFORD~~ / FILE, Speed Letter. From DAVID TIMBERLAKE

Subject TRAINING CLASS FOR HANGER WELDERS

MESSAGE

A one (1) hour training class was held on JUNE 4, 1981 by me as the attached outline and attendance sheet details.

CC: W.D. GOODMAN Date 6-5-81 Signed [signature]

REPLY

Date Signed

Wilson Jones Company
GRAYLINE FORM 44-902 3 PART
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RECIPIENT—RETAIN WHITE COPY, RETURN PINK COPY

SENDER—DETACH AND RETAIN YELLOW COPY. SEND WHITE AND PINK COPIES WITH CARBON INTACT.

PART I WELD QUALITY

9.25 Quality of Welds

9.25.1 Visual Inspection. All welds shall be visually inspected. A weld shall be acceptable by visual inspection if it shows that:

9.25.1.1 The weld has no cracks.

9.25.1.2 Thorough fusion exists between weld metal and base metal.

9.25.1.3 All craters are filled to the full cross section of the weld.

9.25.1.4 Weld profiles are in accordance with 3.6.

9.25.1.5 The frequency of piping porosity in fillet welds shall not exceed one in each 4 in. (102 mm) of length and the maximum diameter shall not exceed 3/32 in. (2.4 mm). Exception: for fillet welds connecting stiffeners to web, the sum of the diameters of piping porosity shall not exceed 3/8 in. (9.5 mm) in any linear inch of weld and shall not exceed 3/4 in. (19.0 mm) in any 12 in. (305 mm) length of weld.

9.25.1.6 A fillet weld in any single continuous weld shall be permitted to underrun the nominal fillet weld size required by 1/16 in. (1.6 mm) without correction, provided that the undersize weld does not exceed 10 percent of the length of the weld. On web-to-flange welds on girders no underrun is permitted at ends for a length equal to twice the width of the flange.

9.25.1.7 Complete joint penetration groove welds in butt joints transverse to the direction of computed tensile
76 stress shall have no piping porosity. For all other groove
77 welds, the frequency of piping porosity shall not exceed one in 4 in. (102 mm) of length and the maximum diameter shall not exceed 3/32 in. (2.4 mm).

9.25.1.8 Visual inspection of welds in all steels may begin immediately after the completed welds have
76 cooled to ambient temperature. Acceptance criteria for ASTM A514 and A517 steels shall be based on visual inspection performed not less than 48 hours after completion of the weld.

3.6 Weld Profiles

3.6.1 The faces of fillet welds may be slightly convex, flat, or slightly concave as shown in Fig. 3.6 A, B, and C, with none of the unacceptable profiles shown in Fig. 3.6D. Except at outside corner joints, the convexity shall not exceed the value of 0.1S plus 0.03 in. where S is the actual size of the fillet weld in inches. (See Fig. 3.6C.)

3.6.2 Groove welds shall preferably be made with slight or minimum reinforcement except as may be otherwise provided. In the case of butt and corner joints, the reinforcement shall not exceed 1/8 in. (3.2 mm) in height and shall have gradual transition to the plane of the base metal surface (Fig. 3.6E). They shall be free of the discontinuities shown for butt joints in Fig. 3.6F.

3.6.3 Surfaces of butt joints required to be flush shall be finished so as not to reduce the thickness of the thinner base metal or weld metal by more than 1/32 in. (0.8 mm) or five percent of the thickness, whichever is smaller, or leave reinforcement that exceeds 1/32 in.

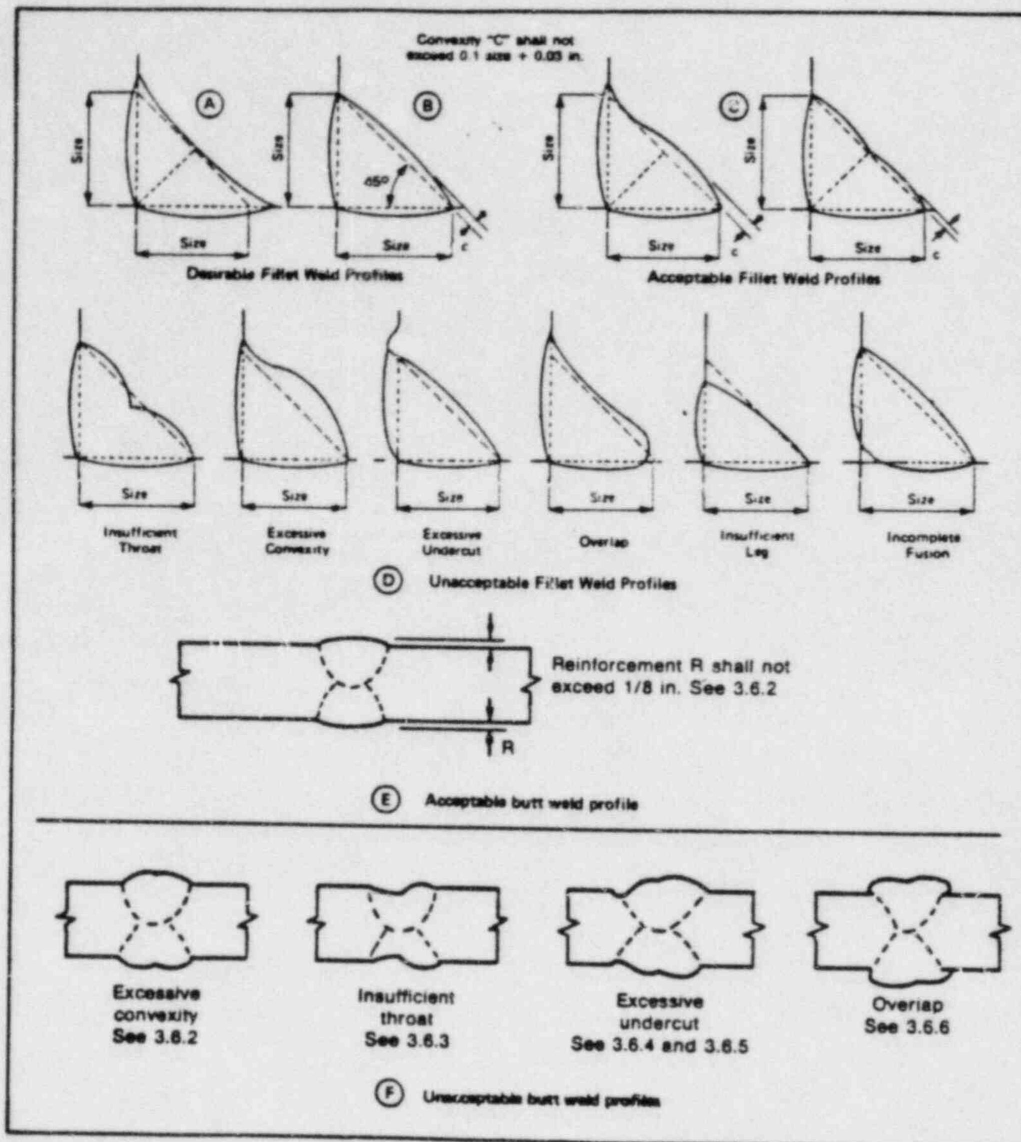


Fig. 3.6—Acceptable and unacceptable weld profiles.

However, all reinforcement must be removed where the weld forms part of a faying or contact surface. Any reinforcement must blend smoothly into the plate surfaces with transition areas free from edge weld undercut. Chipping may be used provided it is followed by grinding. Where surface finishing is required, its roughness value[11] shall not exceed 250 μin. (6.3 μm). Surface finished to values of over 125 μ in. (3.2 μm) through 250μ in. shall be finished parallel to the direction of primary stress. Surfaces finished to values of 125μ in. or less may be finished in any direction.

3.6.3.1 Ends of butt joints required to be flush shall be finished so as not to reduce the width beyond the detailed width or the actual width furnished, whichever is greater, by more than 1/8 in. (3.2 mm) or so as not to leave a reinforcement at each end that exceeds 1/8 in. (3.2 mm). Ends of butt welds shall be faired to adjacent plate or shape edges at a slope not to exceed 1 in 10.

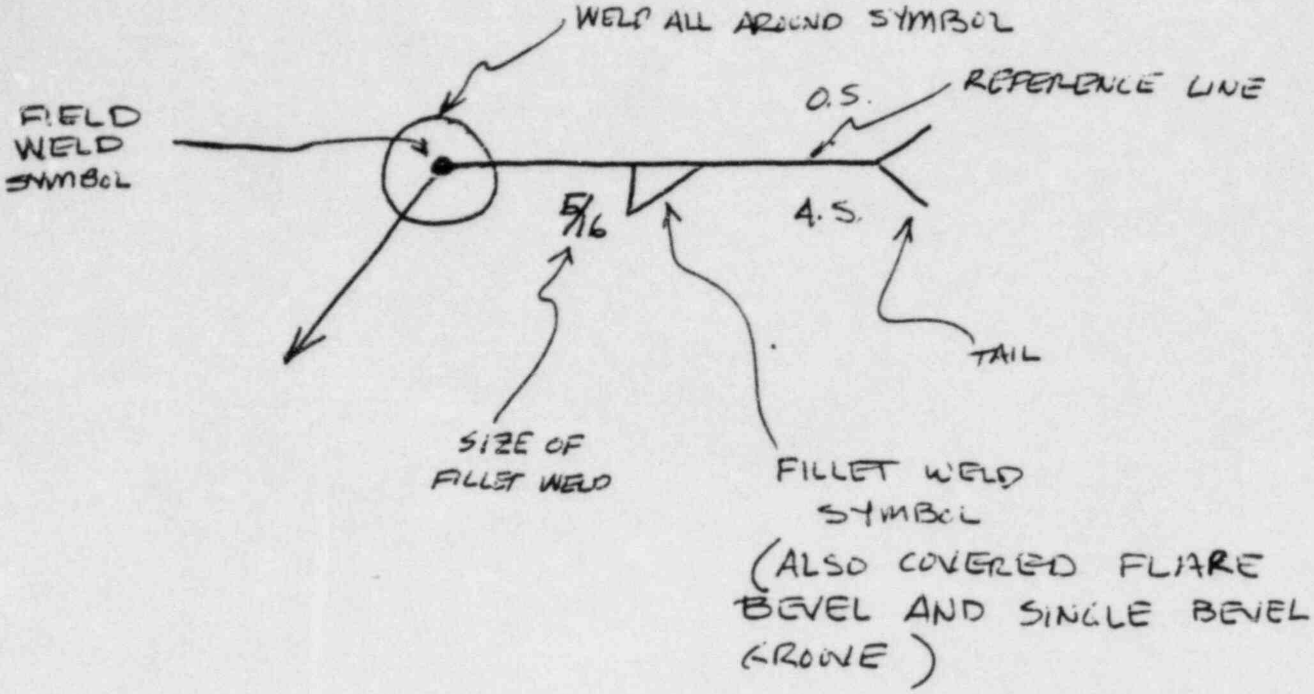
3.6.4 For buildings and tubular structures, undercut shall be no more than 0.01 in. (0.25 mm) deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32 in. (0.8 mm) for all other situations.

3.6.5 For bridges, undercut shall be no more than 0.01 in. (0.25 mm) deep when the weld is transverse to the primary stress in the part that is undercut. Undercut shall be no more than 1/32 in. (0.8 mm) deep when the weld is parallel to the primary stress in the part that is undercut.

3.6.6 Welds shall be free from overlap.

[11] ANSI B46.1 Surface Texture, in microinches (μin.).

PART II WELD SYMBOLS



Class: Hanger Welding -
Weld Quality & Symbols

Instructor: David Timberlake

Attendance List

6-11

Name	Badge No
Allen Martin	98-272
Joe Pendergrass	66 17
J. Reed	QA Welding
[illegible]	QA Welding
B Pone	QA Welding
Steve [illegible]	QA Welding
Ken Douglas	Q.A. Welding
Chase Thomas	CP&L (Mech.)
Alex Fuller	CP&L
C. J. Martin	66-40
Joe Everett	66-518
Charles H Haynes	66/462
W.G. McCarren	66-1538
J. L. [illegible]	32-190
Duane Price	66-368
[illegible]	[illegible]
W.T. Gordin	44-711
Tom [illegible]	66-38
Cecil Crawley	66-170
George T. McGhee	66-688
Chris [illegible]	CP&L
Larry Coble	CP&L
PAT CHRISCOE	CP&L
DARREN DASBURG	CP&L
M. W. Howard	CP&L
Bernie Martin	66/11

(OVER)

CONTROLLED DOCUMENT

ASME
SECTION III

CAROLINA POWER & LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT
ENGINEERING AND CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL SECTION

WELD CONTROL

NUMBER: CQC-19		INITIAL ISSUE DATE: March 16, 1981
RECOMMENDED FOR APPROVAL BY: G.L. Forehand DIRECTOR - SHNPP QA/QC		APPROVED BY: N. J. Chiangi MANAGER - E&C QA/QC

000642

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY CORPORATE QUALITY ASSURANCE DEPARTMENT QA/QC - HARRIS PLANT SECTION	NUMBER	REVISION	DATE
	CQC-19	12	3/19/84

TITLE: WELD CONTROL

REVISION RECORD

The following is a list of the pages and paragraphs affected by this revision. Changes or additions are indicated by a vertical bar in the right-hand margin of the revised page(s). Manual holder is to replace affected pages only. This record is to be retained behind the title page of the procedure until a subsequent revision is issued.

Page(s)	Paragraph(s)
1	2.0; 3.0
2	3.0
3	4.4
5	6.1.2
7	(No content change)
8	6.1.4
9	(No content change)
10	6.1.6
11	6.1.6; 6.1.3
14	6.1.9; 6.1.10
16	6.2
17	6.2.4 - 6.3.4
18	6.3.4 - 6.3.5
19	6.3.6 - 6.4.2
20	6.4.3 - 6.4.7
21	6.4.8 - 6.4.9
22	6.4.10 - 6.4.12

RECOMMENDED FOR APPROVAL BY:

G. L. Forehand

DIRECTOR - QA/QC - HARRIS PLANT

APPROVAL BY:

N. J. Chiangi

MANAGER - QA/QC - HARRIS PLANT

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY CORPORATE QUALITY ASSURANCE DEPARTMENT QA/QC - HARRIS PLANT SECTION	NUMBER	REVISION	DATE
	CQC-19	12	3/19/84

TITLE: WELD CONTROL

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Page(s)	Paragraph(s)
23	6.4.13 - 6.4.14
24	7.0; 8.0 - 8.1.4
25	8.3 - 8.4.1
26	8.4.2

RECOMMENDED FOR APPROVAL BY:

See Page 1 of 2

DIRECTOR - QA/QC - HARRIS PLANT

APPROVAL BY:

See Page 1 of 2

MANAGER - QA/QC - HARRIS PLANT

LIST OF EFFECTIVE PAGES

Page No.	Rev. No.
1	8
2	8
3	8
4	7
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12	6
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15	6
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18	4
19	2
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21	3
22	1
23	1
24	2
25	2
26	2

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY CORPORATE QUALITY ASSURANCE DEPARTMENT QA/QC - HARRIS PLANT SECTION	NUMBER	REVISION
	CQC-19	8

TITLE: WELD CONTROL

1.0 PURPOSE

The purpose of this procedure is to establish measures for the control and documentation of welding activities at a nuclear plant.

2.0 SCOPE

This procedure is applicable to welding activities related to ASME Code, Section III, Classes 1, 2, 3 and MC Items; Categories 4 and 5 Mainsteam and Feedwater Systems; Category 7 Blowdown System; Waste Gas, Waste Liquid, and Secondary Waste Systems in the Radwaste System; Fire Protection System; Fuel Pool Liner; Seismic Class 1; and NNS Category I (Seismically Designed) Items. This is an ASME Section III procedure.

3.0 REFERENCES

1. E&C QA Procedures and Instructions

   a. CQA-1, Personnel Training and Qualifications
   b. CQA-4, QA Records
   c. CQC-1, Tool and Measuring Device Control
   d. CQA-3, Nonconformance Control
   e. CQC-20, Post Weld Heat Treatment Control
   f. CQC-21, Seismic Category I Steel Fabrication
   g. NDEP-10, Training, Qualification & Certification of NDE Personnel
   h. NDEP-601, Visual Examination of Piping System and Component Welds (SHNPP)
   i. NDEP-605, Visual Examination of Seismic I, Structural and Hanger Welds (SHNPP)
   j. NDEP-701, Leak Testing (Vacuum Box)
   k. QCI-19.1, Preparation of WDR, Repair WDR and TFWR
   l. QCI-19.3, Seismic Pipe Hanger Inspection Documentation System
   m. QCI-19.4, Preparation of Seismic I WDR
   n. CQC-12, Inspection of Code Valve Installation, Disassembly and Reassembly
   o. QCI-19.5, Identification and Documentation of Base Metal Deficiencies Outside of the Weld Area of Interest

3.0 (cont.)

p. QCI-19.6, Material Verification
q. QCI-6.4, Material Status Verification

2. SHNPP Construction Procedures

a. MP-03, Welding Material Control
b. MP-05, Stamping of Weldments
c. MP-06, General Welding Procedure for Carbon Steel Weldments
d. MP-07, General Welding Procedure for Stainless Steel Weldments
e. MP-08, General Welding Procedure for Structural Steel and Hangers
f. MP-10, Repair of Base Materials and Weldments
g. MP-12, Control of Welding on Non-Permanent Plant Items
h. MP-13, Welder Qualification for Area of Limited Accessibility
i. MP-14, General Welding Procedure for Stainless Steel Liner Plate
j. MP-24, General Welding Procedure for Installation of Tubing and Instrumentation
k. MP-15, Welding of Bottom Mounted Incore Tubing
l. MP-19, Field Erected Stainless Steel Storage Tanks
m. WP-01, Installation of Cadwelds
n. WP-18, Miscellaneous Steel Fabrication
o. WP-30, Erection of Structural Steel
p. WP-102, Installation of Piping
q. WP-105, Installation of Equipment Safety Related Seismic Class I and NNS
r. WP-110, Installation of Seismic Pipe Hangers and Supports for Seismically Analyzed Pipe
s. WP-203, Installation of Seismically Support Cable Tray and Conduit Boxes and Bus Ducts
t. WP-302, Installation of Supports for Safety and Seismically Related Instruments, Tube Tracking and Tubing
u. WP-304, Installation of Safety Related and Seismic Process Tubing and Instrumentation
v. WP-400, Installation of HVAC Seismic Category I Supports
w. WP-402, Installation of Safety Related Seismic Class I and Non-Nuclear Safety HVAC Ductwork

3.0 (cont.)

3. Site Specifications

a. 030, Field Fabrication and Erection of Power Piping
b. 031, Requirements for Field Welding of Category 1, 2 and 3 and Balance-of-Plant Piping Systems, Seismic and Non-Seismic Structures
c. 033, Structural Welding
d. 034, Non-Destructive Examination Requirements for Class 1, 2 and 3 and Balance-of-Plant Piping Systems, Seismic and Non-Seismic Structures

4.0 RESPONSIBILITY

4.1 Director - QA/QC

The Director - QA/QC has overall responsibility for implementation of this procedure.

4.2 Superintendent - Quality Control

The Superintendent - QC is responsible to the Director - QA/QC for implementation of this procedure.

4.3 Quality Control Sub-Unit Supervisor

Each applicable QC Sub-Unit Supervisor shall be responsible for the implementation of this procedure.

4.4 Quality Assurance/Quality Control Specialist

The QA/QC Specialist shall be responsible for review and verification of data and designated holdpoints on weld records; ensuring that SRIWDR's, WDR's and RWDR's for ASME Code welds are forwarded to the Authorized Nuclear Inspector (ANI); for review and insertion of additional holdpoints; and final acceptance of the welding activity. The Pipe Welding QA/QC Specialist shall supervise the Pipe, Pool Liner Weld Inspectors in the performance of weld inspections and monitoring activities related to welding.

4.4 (cont.)

The Structural Welding QA/QC Specialist shall be responsible for review and verification of data and designated holdpoints on Seismic Weld Records; for review and insertion of additional holdpoints; and final acceptance of the welding activity. The Structural Welding QA/QC Specialist shall supervise the Structural QC Inspectors in the performance of weld inspections and monitoring activities related to welding.

4.5 Quality Control Inspectors

QC Inspectors shall perform welding inspections and monitoring of welding activities as directed by the appropriate QA/QC Specialist.

5.0 PERSONNEL QUALIFICATION

5.1 QC Welding inspection personnel shall be trained and qualified in accordance with Reference 3.1 a and 3.1 g.

5.2 Nondestructive Examination (NDE) personnel shall be trained and qualified in accordance with Reference 3.1 g.

6.0 PROCEDURE

6.1 ASME Code Class 1, 2, 3 & MC and Seismic Class 1 Category 4 & 5 Mainsteam and Feedwater

6.1.1 ASME Code Class 1, 2, 3, MC and Category 4 & 5 Mainsteam and Feedwater welds shall be documented on a Weld Data Report (WDR), QA-28 Form. Instrumentation tubing joints involving welding, for ASME Code Class 1, 2 and 3, shall require a Safety-Related Instrumentation Weld Data Report (SRIWDR) Form QA-40. Class MC and Category 4 & 5 Mainsteam and Feedwater welds shall meet the Code technical requirements but do not require inspection and acceptance by ANI. Other category welds requiring RT/UT or PWHT shall be documented on a WDR.

6.1.2 The QA/QC Specialist, or his designee, shall take the following action, as appropriate, when the WDR is received from Welding Engineering:

a. Ensure mandatory holdpoints have been designated as required by Reference 3.3 d and enter additional holdpoints determined to be necessary.

b. Review technical data and applicable drawings and coordinate with the ANI as necessary. (The ANI will stipulate his holdpoints.)

c. The white copy of the WDR will be transmitted to the Mechanical Engineering Unit. The white copy of the SRIWDR will be transmitted to the Instrumentation Engineering Unit.

d. Technical additions or changes made to the WDR after review by QC and the ANI shall be initialed and dated by Welding Engineering and QC. It shall be resubmitted to the ANI for his initial and date indicating concurrence with the change and for additional holdpoints, if needed.

e. The following changes are considered non-technical and may be corrected by the QC Inspector or QA/QC Specialist:

(1) Changes in weld material heat number, lot number, rod sizes, welder's identification, and revision numbers to procedures.

(2) Changing magnetic particle testing to liquid penetrant testing or vice versa, as necessary, for joint accessibility.

(3) Addition or correction to unit number and turnover numbers.

6.1.2 (cont.)

(4) Addition of and changes to CQC-19 revision numbers.

(5) Addition or changes to revision numbers of isometric (as documented in remarks section of WDR).

(6) Correction to the area and elevation listed in "weld joint record".

f. When applicable, Field Change Request (FCR) number(s) shall be entered, by Welding Engineering, in the remarks section of the WDR/SRIWDR/RWDR prior to issuance/re-issuance to construction except as noted in paragraph 6.1.2.h.

g. FCR's affecting WDR's, SRIWDR's, or Repair WDR's already issued shall be implemented into construction in one of the following methods:

(1) If the FCR does not dictate any rework instructions but does describe inspection requirements, a technical revision to the WDR, SRIWDR, or Repair WDR will not be necessary. However, upon mutual concurrence between Welding Engineering, the QA/QC Specialist, and the ANI, the QC Inspector will be made aware of the inspection criteria and shall have available to him and the ANI, a copy of the FCR for use in performing the inspection. Upon completion of the inspection, the QC Inspector shall enter the FCR number in the remarks section of the WDR (i.e., accepted to FCR-H-1142).

6.1.2 (cont.)

(2) If the FCR requires rework of the weld, or changes instructions already detailed in the WDR, SRIWDR, or Repair WDR, the WDR, SRIWDR, or Repair WDR will be forwarded from construction to Welding Engineering for the necessary revisions to be made and the FCR number(s) added in the remarks section of the WDR.

h. When an FCR addressing an ASME Code case becomes applicable to an inspection being performed by the QC Inspector, he shall, upon acceptable completion of the inspection, reference the number of the ASME Code case being invoked, in the remarks section of the WDR, SRIWDR, or Repair WDR.

6.1.3 The QC Inspector will review the applicable installation drawings, isometrics, Field Change Requests (FCR's), and Design Change Notices (DCN's) to ensure he understands the configuration and weld requirements. Any drawing problems such as missing, wrong, or confusing weld symbols or instructions shall be resolved through construction engineering prior to acceptance of the welds in question.

6.1.4 The QC Inspector shall ensure any changes or additions to the WDR have been properly initialed and dated per Paragraph 6.1.2 d, 6.1.2 e and 6.1.2 g and perform the prescribed visual inspection in accordance with Reference 3.1 h. Where applicable, the following items, in addition to those required by Reference 3.1 h, shall be verified prior to final acceptance:

a. Welded items have been accepted or conditionally accepted.

6.1.4 (cont.)

b. Component identification and National Board Numbers (verify component identification against the isometric and National Board numbers against the component documentation) are entered on the WDR. Heat numbers for stock pipe that is not NPT stamped (verify per Reference 3.1p) are entered on the WDR. Instrumentation components are identified only by heat number on the component. Piece numbers listed on the SRIWDR are verified only against the ISO. Heat numbers for minor permanent attachments need not be entered if the requirements of ASME III NC4435 are met.

c. Cold pull/spring is within specified limits. (Obtain copy of the Cold Pull Record Form, Exhibit 1 to WP-102.)

d. Pipe longitudinal seams offset in accordance with Reference 3.2 c.

e. Pipe ovality in accordance with Reference 3.2 c.

f. Valves are correctly installed in accordance with Reference 3.1 n.

g. ISI weld centerline benchmark is stamped in accordance with Reference 3.2 b.

h. Weld joints requiring volumetric (UT) in-service inspection may have a counterbore less than 2T (pipe joint only, but greater than or equal to T + 1/4"). The actual dimension shall be recorded in the remarks section of the WDR at prefit inspection.

i. Weld joint identification stamping is applied in accordance wtih Reference 3.2 b.

6.1.4 (cont.)

j. The specified welding procedure and welding procedure specification is used, and is being followed.

k. The welder is qualified to the procedure and position (and limited access, where required).

l. Weld filler metal heat/lot number(s) are entered on the QA field copies of the WDR. (Check the WMR in the welder's possession.)

m. Tack welds are applied and incorporated, or removed, in accordance with Reference 3.3 b.

n. No peening is done on the initial layer, root, or final weld layers.

o. No grinding is done within the heat affect zone in the ID of CS, RC or SI system piping after completion of welding.

p. ISI welds requiring Volumetric Examination (UT) shall have their crowns finished and contoured in accordance with Paragraph 3.2 c and d. Other ISI welds requiring surface examination only, (MT or PT) shall be free from sharp surface irregularities such as deep valleys between stringer beads, and a 250 microinch finish shall be established in the examination area.

q. Visual inspection, per Reference 3.1 h and NDE required by Reference 3.3 d is performed after removal of temporary attachments, arc strikes, weld spatter and backing rings.

r. Welder's symbol(s) stamping are applied in accordance with Reference 3.2 b.

s. PWHT inspection is performed in accordance with Reference 3.1 e.

6.1.5 Deficiencies noted during pre-fitup, fitup and in-process inspections which cannot be corrected by routine rework shall be reported as nonconformances in accordance with Reference 3.1 d.

6.1.6 The QC Inspector shall inform the ANI when the holdpoints are reached. When specified NDE holdpoints are reached, the QC Inspector will inspect for appropriate surface preparation and perform the required NDE (if qualified) or initiate the NDE Request (QA-37 Form). (NDE procedure revision numbers are entered on WDR after receiving completed NDE Request and Report.) NDE Requests shall be processed as follows:

a. The QC Inspector shall fill in pertinent information and submit along with the WDR to the QA/QC Specialist, or his designee.

b. The QA/QC Specialist, or his designee, shall review the NDE Request for accuracy; sign and date; and return to the inspector who will forward the original and one copy to NDE. One copy shall be attached to the WDR.

c. The NDE Unit or qualified inspector after performing the specified NDE, shall complete the appropriate NDE Report. The original copy of the NDE Request, appropriately marked "Accept" or "Reject", signed and dated will be forwarded to the QA/QC Specialist.

d. If the NDE is rejected for surfaces not suitable for test, or where the surface is inaccessible for Magnetic Particle Inspection and the QC Inspector or QA/QC Specialist changes the required NDE to Liquid Penetrant Inspection, the QC Inspector shall place an appropriate asterisk (*) by the applicable Visual Inspection holdpoint, and note in the remark section "Reinspection required for surface

6.1.6 (cont.)

preparation" and initial and date. The WDR/SRIWDR shall be returned to the craft foreman for surface preparation. After reinspection and acceptance, the QC Inspector shall list "accept" and initial and date reinspection note in remarks section. If the ANI has a holdpoint on the visual inspection, he shall be notified for reinspection. After reinspection of weld is complete, the QC Inspector shall re-initiate the NDE Request (QA-37) per 6.1.6 a and b.

6.1.7 Holdpoints accepted by the QC Inspector and the ANI will be intialed and dated on the white copy of the WDR or SRIWDR, as applicable.

6.1.8 Unacceptable holdpoints will be checked in the "Reject" column, but will not be signed on the WDR. An "R" shall be listed in the status block for rejects on SRIWDR's. The details of the unacceptable condition for visual inspection will be written in the "Remarks" section of the WDR.

a. If the unacceptable condition is in the weld (including 1/2" of base material for ASME Class 1, measured from the toe of the weld, on both sides of the weld) and is detected by NDE at a required holdpoint, a copy of the NDE Report will be forwarded to the Welding Engineer for disposition. If the unacceptable condition is detected by Magnetic Particle or Liquid Penetrant method, the WDR, SRIWDR, or RWDR may be revised to allow rework excluding weld repair, and QC/ANI holdpoints shall be re-established for reinspection. Weld metal surface defects may be removed by grinding or machining and not repaired by Welding provided:

1. The remaining section thickness is not below the minimum design wall thickness; and

6.1.8 (cont.)

2. The depression, after defect removal, is blended uniformly into the surrounding surface; and
3. Liquid Penetrant (PT) or magnetic particle (MT) examination of the area, after blending indicates the defect was removed or the indication was reduced to an acceptable limit.

When repair by welding is required, a Repair WDR (QA-30 Form) will be initiated in accordance with Reference 3.1 k. The area will be examined as follows:

a. Unacceptable defects shall be removed by mechanical means or by thermal gouging processes. The area prepared for repair shall be examined by the magnetic particle or liquid penetrant method, except for partial penetration welds (i.e., tube to tube sheet welds, fillet welds for attachment of lugs, rings, trunions, shoes, pipe saddles, and brackets), where defect removal essentially removes the full thickness of the weld, in which case, a visual inspection to the satisfction of the ANI to determine suitability for rewelding shall be performed. The NDE (RT, MT, PT, UT) of weld repairs shall be repeated, as required, for the original weld except that repair of defects originally detected by MT or PT methods when the repair cavities do not exceed the lesser of 3/8 or 10% of the thickness, need only be reexamined by the MT or PT methods.

b. Where the repair results in complete removal of the weld and repreped for a new joint, a new WDR or SRIWDR shall be generated in accordance with Reference 3.1 k.

6.1.8 (cont.)

c. Unacceptable conditions detected by visual inspection and consisting of weld defects which occur during the welding process (i.e. slag, porosity, burn through in the root pass or backing ring, or a root weld defect) require in-process rework and reinspection, but will not require handling as a nonconformance or documentation on a Repair WDR.

d. For removal of indications in the base metal outside the area 1/2" from toe of weld that were detected by NDE where removal will not necessitate weld metal deposition, the required QA/ANI holdpoints shall be reestablished on the SRIWDR, WDR, or RWDR, even if weld inspection area is acceptable. If the unacceptable condition has damage to, or a defect in the base material which cannot be corrected by routine rework, it will be handled as a nonconformance in accordance with Reference 3.1 d. The NCR number will be noted in the "Remarks" section of the WDR. <u>ANI concurrence with the proposed repair or rework shall be obtained prior to starting work</u>. Repairs involving the deposition of weld metal will be documented on a Repair WDR. Inspection of the prepared cavity shall be entered as a QC inspection holdpoint on the Repair WDR so that the QC Inspector can measure the excavation. If the excavation exceeds the lesser of 3/8" of 10% of the section thickness, the QC Inspector shall ensure a sketch showing the location, length, width and depth of the excavation is prepared and attached to the Repair WDR. Examinaton of base metal repaired by welding shall be in accordance with Reference 3.3 d.

6.1.8 (cont.)

e. Repairs to weldments and base materials shall be verified to comply with Reference 3.2 f.

6.1.9 If a QC or ANI holdpoint is by-passed, it shall be reported as a nonconformance in accordance with Reference 3.1 d. The pipe foreman will be notified to stop welding until satisfactory dispositioning has been achieved and accepted by the ANI and the QA/QC Specialist.

6.1.10 At designated holdpoints as applicable and during random weld monitoring , the QC Inspector will check the welder's copy of the WMR to verify that the specified type of weld material (backing, consummable inserts, and filler metal) is being used, and that the material that the welder has in his possession is that which is identified on the WMR. When the original copy/copies of the WMR is received by QC Welding, it will be reconciled with the corresponding WDR to ascertain that all appropriate weld material information has been entered correctly on the WDR. The QA/QC Inspector will reconcile the following items on the WMR against the WDR: Weld procedure, size of material, heat number of backing material, consummable insert, and bare electrodes, and heat and lot numbers for coated electrodes, welder symbol, ISO and FW numbers. The WDR and supporting documentation, along with the attached WMR's will then be reviewed by the QA/QC Specialist, or his designee. After the Specialist, or his designee has made his review, and accepted the WDR by signing and dating it, the WDR Package will be transmitted to the Authorized Nuclear Inspector for his review. The WMR's will be filed in a designated storage area for possible future reference.

6.1.11 Inspection and Test Requirements for ASME Section III Code Class 1, 2 and 3 Safety Related Instrumentation Tubing

a. Inspection and testing shall be performed in accordance with References 3.1 h, 3.2 j, and 3.3 d with special emphasis being put on the following for ASME Code Class 1 and 2 butt weld joints.

b. When the Automatic GTAW process is used, ASME Code case N-127 shall be invoked for material thickness less or equal to .200" and tubing nominal size less than or equal to 2 inches.

c. After machine set-up and prior to beginning of production welding, on each given workday (12 hour shift), QC shall be notified to witness and document on a Field Inspection Report, the acceptance of two consecutive sample weld prepared for:

(1) Each welding machine.
(2) Welding procedure specification.
(3) Welding position.
(4) Nominal tube size.
(5) Nominal wall thickness.
(6) P-Number group of material.
(7) In addition, one acceptable sample weld shall be prepared (in the presence of QC) after each four-hour period of production welding.

Acceptance shall be based on complete root penetration and shall be documented by QC on a Field Inspection Report. If the sample weld is found unacceptable, all weld production since the previous acceptable sample weld shall be examined by the radiographic method. The SRIWDR's applicable shall be revised to include RT.

6.1.11 (cont.)

d. In addition to NDEP-601, acceptance criteria, the following shall apply:

(1) Concavity on the outside weld surface shall not exceed 10%, of the nominal wall thickness. Concavity which exceeds 10%, but not more than 20% of the nominal wall thickness may be handled as in-process weld repair using the manual GTAW process; however, SRIWDR must be revised to include the additional welding procedure and RT.

(2) Arc strikes outside the weld zone shall be rejected.

6.2 <u>Fire Protection, Radwaste and Category 7 Blowdown Piping Systems</u>

6.2.1 Fire Protection, Radwaste Piping and Category 7 Blowdown welds shall receive final layer visual inspection in accordance with Reference 3.1 h.

6.2.2 The visual inspection will be documented on the Visual Examination Report (VT-1 Form). Welds shown on a given isometric may be listed on the same VT-1 Form. The QC Inspector will mark-up the appropriate isometric indicating acceptance of the weld joint(s).

6.2.3 If the final weld inspection is rejectable, the QC Inspector will document the rejection on a separate VT-1 Form. The VT-1 Form with a rejection documented on it will be retained in QC files until the weld is reinspected and accepted in accordance with Reference 3.1 h. All reinspections of the rejected weld will be documented on the same QA VT-1 Form.

6.2.4 The QC Inspector shall verify the following prior to closing the VT-1:

a. Installed item is in QA Accept status or a Conditionally Accepted status which does not restrict welding.

b. Welder's symbol(s) and weld identification stampings are on the completed joint in accordance with Reference 3.2 b.

6.3 <u>Fuel Pool Liner Plate</u>

6.3.1 Fuel pool liner welds shall be documented on the fuel pool liner weld maps with the exception of modifications and base metal repairs which wil be documented on Seismic Weld Data Reports (Form QA-34).

6.3.2 Fuel pool liner welds shall be visually inspected in accordance with Reference 3.1 h.

a. Fitup and preheat will be inspected on a random basis.

6.3.3 The QC Inspector will review the applicable installation drawings, Field Change Requests (FCR's), and Design Change Notices (DCN's) to ensure he understands the configuration and weld requirements. Any drawing problems such as missing, wrong or confusing weld symbols or instructions shall be resolved through Construction Engineering prior to acceptance of the welds in question.

6.3.4 Where applicable, the following items shall be verified prior to final acceptance:

a. Welded items have been accepted or conditionally accepted.

6.3.4 (cont.)

b. Weld joint identification is applied in accordance with Reference 3.2 b.

c. The appropriate welding procedure and welding procedure specifications were used.

d. The welder is qualified to the procedure and position.

e. Welder's symbol is applied in accordance with Reference 3.2 b.

6.3.5 When specified NDE holdpoints are reached, the QC Inspector will inspect for appropriate surface preparation and perform the required NDE (if qualified) or initiate the NDE Request (Form QA-37). NDE Requests shall be processed as follows:

a. The QC Inspector shall fill in pertinent information and submit to the QA/QC Specialist, or his designee.

b. The QA/QC Specialist, or his designee, shall review the NDE Request for accuracy; sign and date; and return to the inspector who will forward the original and one copy to NDE.

c. The NDE Unit or qualified inspector after performing the specified NDE, shall complete the appropriate NDE Report. The original copy of the NDE Request, appropriately marked "Accept" or "Reject", signed and dated, and the original and one copy of the NDE Report will be forwarded to the requesting QA/QC Inspector.

6.3.6 For base material repairs or liner modifications, a Seismic I Weld Data Report (Form QA-34) will be initialed by the Discipline Engineer and forwarded to the Welding Engineer. After the Welding Engineer has entered welding requirements, the SWDR will be forwarded to the QA/QC Specialist. The QA/QC Specialist, or his designee, will review the SWDR for all technical data and assignment of mandatory holdpoints and if acceptable shall sign and date to release for welding and forward to the Discipline Engineer for issuance to craft.

6.3.7 The QC Inspector will perform inspections when notified and indicate "Accept" or "Reject" on the SWDR in the appropriate block, initial and date. Required NDE will be handled in accordance with Paragraph 6.3.5.

6.4 <u>Seismic Category I</u>

6.4.1 Seismic I Weld Data Report (QA-34 Form) shall be generated for documentation and control of field welding in the following categories:

a. Fabrication, modification and installation of Seismic Category I hangers, restraints and equipment supports.

b. Fabrication, modification and installation of Seismic Category I structural steel, which includes Electrical, HVAC Ductwork, Cable Tray, Instrumentation Supports and Hangers.

c. Fabrication, modification and installation of structural steel members attached to Seismic Category I reinforcing steel bars.

d. Cadweld repairs by welding in accordance with Reference 3.2 m.

6.4.2 The QA-34 Form may be used to document multiple welds

6.4.2 (cont.)

associated with a given component, hanger or support.

6.4.3 The QA-34 Form is to be initiated by the craft foreman for welding of structural members and cable tray, conduit or HVAC support members with thickness 1-1/2" or less, requiring only fillet or flare bevel welds, provided welds are not made to engineered embedded plates or strip plates with screwed-in studs. All others are initiated by the Discipline Engineer with weld procedures and mandatory holdpoints specified by the Welding Engineer.

Forms, in both cases, are then forwarded to the Welding QA/QC Specialist for review and designation of additional holdpoints, as needed.

6.4.4 The Welding QA/QC Specialist, or his designee, will verify the designated inspection and NDE holdpoints on the QA-34 Form and designate additional holdpoints, as needed.

6.4.5 Mandatory QC holdpoints for structural welds will be designated in accordance with References 3.1 l, 3.1 m, and 3.3 d as applicable.

6.4.6 Technical data changed, or additions made on the SWDR after review by QC, shall be initialed and dated by the craft foreman, or Welding Engineering as appropriate, and QC.

6.4.7 The QC Inspector will review the applicable installation drawings, Field Change Requests (FCR's) and Design Change Notices (DCN's) to ensure he understands the configuration and weld requirements. Any drawing problems such as missing, incorrect or confusing weld symbols shall be resolved through construction engineering prior to acceptance of the welds in question.

6.4.8 The QC Inspector will inspect the item in accordance with the approved drawing and other approved design documents. Acceptance of the welding will be withheld until all deviations from the approved design documents have been resolved through the Discipline Engineer.

6.4.9 The QC Inspector will verify the following during the initial weld inspection or prior to closing the SWDR, for any given hanger, support or structural component:

a. Weld types agree with drawings.

b. Qualification of welder(s) to the procedure and position.

c. Installed items are in a QA Accept status or Conditionally Accepted status. Material status is verified in accordance with Reference 3.1 q except pipe hangers which will be verified in accordance with Reference 3.1 l.

d. Tack welds used for fitup purposes are either removed or incorporated into the final weld.

(Special attention shall be given to the opposite side of the welded pieces.)

Any problems noted with an item will be handled as "in-process" conditions unless it involves a pipe hanger in the final phase of the installation process, as described in Reference 3.2 r, in which case it will be handled as a nonconformance in accordance with Reference 3.1 d.

6.4.10 After final inspection of pipe hanger inspection, the QC Inspector will review all documentation to ensure that filler plate and bridge plate welds were inspected and documented during subsequent inspections. If there is no evidence that the welds were inspected, then the welds will be inspected and documented during the final phase of inspection.

6.4.11 The QC Inspector shall monitor welding activities within his assigned area(s). Activities monitored will include, but not be limited to the following:

a. Fitup of non-full penetration joints (configuration, gap cleanliness). Enter on appropriate QA-34 Form.

b. Correct welding procedure and welding procedure specification is used and is being followed.

c. Qualification of welder to procedure and position.

d. Specified filler metal being used.

e. Preheat technique and temperature satisfactory. (Use temperature indicating crayon or contact pyrometer.)

Deficiencies noted with items b, c or d and any other deficiencies which cannot be corrected by routine rework shall be handled as nonconformances in accordance with Reference 3.1 d.

6.4.12 The QC Inspector shall perform the required visual inspections in accordance with Reference 3.1 i and initiate the NDE Request when the specified NDE holdpoints are reached.

6.4.13 Minor surface defects detected by visual inspection will be identified on the item by marking the defective areas with black marking ink and indicating the nature of the defects. The QC Inspector will check the appropriate "Reject" block on the SWDR (QA-34), but not initial and date. He shall then enter the quantitative data for the rejection in the deficiency/description block of the SWDR; initial and date. These are in-process defects and not reported as nonconformances. After the deficiencies are corrected, and the weld has been reinspected and accepted, the QC Inspector will check the appropriate "Accept" block on the SWDR; initial and date.

6.4.14 When a weld is found to be rejectable by NDE, the QC Inspector will check the appropriate "Reject" block on the SWDR (QA-34), but not initial and date it. He shall then enter in the deficiency/description block of the SWDR "NDE Rejected", the date of the rejection; initial and date. He will forward a copy of the NDE Report to the Welding Engineer.

a. If the defect is in the weldment, rework is considered "in-process" and not reported as a nonconformance.

b. If the defect is noted in the base metal, it shall be handled in accordance with Reference 3.1 o.

When the deficiencies have been corrected by either the use of a Repair SWDR or by the re-establishment of the holdpoints on the original SWDR, the QC Inspector shall check the appropriate "Accept" block on the SWDR; initial and date it.

7.0 INSPECTION AIDS

The QC Inspector will utilize written Visual Welding Inspection Guidelines and visual inspection aids such as gauges, instruments, magnifying glasses (5X should be used; up to 10X may be used for final anomalies) and flashlights for weld inspections. Gauges and instruments shall be examined by the inspector for damage and wear prior to use. Those requiring calibration shall have a current calibration label as required by Reference 3.1 c.

8.0 DOCUMENTATION

8.1 ASME Class 1, 2 and 3

8.1.1 The QC Inspector shall assemble and submit the completed WDR/RWDR, NDE Reports and supporting documents to the Welding QA/QC Specialist.

8.1.2 The Welding QA/QC Specialist, or his designee, shall review the WDR/RWDR package for accuracy, completeness, legibility and identification. If satisfctory, he will sign and date the WDR/RWDR and forward it to the ANI.

8.1.3 The ANI will review the WDR/Repair WDR, sign and date it, if satisfctory, and return it to the Welding QA/QC Specialist.

8.1.4 The Welding QA/QC Specialist, or his designee, will assemble all the documents (i.e. WDR/Repair WDR's, PWHT Charts, NDE Reports and repair sketches) pertinent to the weld into a "WDR Package" mark it for filing and transmit it to QA Records in accordance with Reference 3.1 b.

8.2 Seismic Category I

8.2.1 The QC Inspector shall assemble the documents pertinent to the welds listed on given QA-34 Form (i.e. QA-34 Form; Miscellaneous Steel Fabrication Requests, Exhibit 1 to WP-18; NDE Reports and PWHT Charts) in weld number order and submit to the Welding QA/QC Specialist.

8.2.2 The Welding QA/QC Specialist, or his designee, shall review the package for accuracy, completeness, legibility and identification. If satisfactory, he will sign and date the QA-34 Form, mark the package for filing and transmit it to QA Records in accordance with Reference 3.1 b.

8.3 Fire Protection and Radwaste and Category 7 Blowdown

8.3.1 If the final weld inspection is acceptable in accordance with Reference 3.1. h. The QC Inspector will submit the completed VT-1 Form to the QA/QC Specialist, or his designee. The marked-up isometric drawing will be retained in QC files.

8.3.2 The QA/QC Specialist, or his designee, shall review each QA VT-1 Form as it is presented to him for accuracy, completeness, legibility, and identification and transmit it to QA Records in accordance with Reference 3.1 b.

8.4 Fuel Pool Liner Welds

8.4.1 The QC Inspector shall assemble and submit the weld map, SWDR, NDE Reports and supporting documents to the QA/QC Specialist when the weld map has been completed in full.

8.4.2 The QA/QC Specialist, or his designee, shall review the weld map, SWDR package for accuracy, completeness, legibility and identification. He shall mark it for filing and transmit it to QA Records in accordance with Reference 3.1 b.

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT

VISUAL EXAMINATION OF SEISMIC I, STRUCTURAL AND HANGER WELDS (SHNPP)

NUMBER: NDEP-605	NONDESTRUCTIVE EXAMINATION PROCEDURE	INITIAL ISSUE DATE: October 20, 1982
RECOMMENDED FOR APPROVAL BY: NDE LEVEL III		APPROVED BY: MANAGER - E&C QA/QC

000643

QA-PC-1
Rev. 0
1/81

CAROLINA POWER & LIGHT COMPANY
ENGINEERING & CONSTRUCTION QUALITY
ASSURANCE SECTION

NONDESTRUCTIVE EXAMINATION MANUAL/PROCEDURE DEVIATION NOTICE

Procedure No. NDEP-605 Revision No. 1 Deviation No. 1

Procedure Title VISUAL EXAMINATION OF SEISMIC I, STRUCTURAL & HANGER WELDS (SHNPP)

Affected Paragraphs	Description of Deviation
6.1	Add to end of sentence of paragraph 6.1: or other qualified program
	approved by the Level III.

☐ One time Condition; Deviation Notice to be closed as follows:

☑ Permanent Condition; revision to procedure in process.

The approval of this Procedure Deviation Notice authorizes deviation from the name procedure within the limits described above.

The holder of the affected procedure shall retain this notice with the procedure until incorporated in the next procedure revision or until otherwise closed.

Originator:

John W Langston Jr. 12/20/82
Date

Approved:

[signature] 12/20/82
NDE Level III
Date

Mgr. E & C QA Approval:

☑ Telephone

☐ Memorandum

QA-PC-1
Rev. 1
5/83

CAROLINA POWER & LIGHT COMPANY

CORPORATE NDE UNIT

NONDESTRUCTIVE EXAMINATION MANUAL/PROCEDURE INTERIM CHANGE

Procedure No. NDEP-605 Revision No. 1 Deviation No. 2

Procedure Title VISUAL EXAMINATION OF SEISMIC I, STRUCTURAL & HANGER WELDS (SHNPP)

Affected Paragraph	Description of Deviation
3.7	Change to read: Ebasco design documents A: CAR-SH-BE-04A
	B: CAR 2165 A-003
9.0	Change to read: Evaluation shall be made in accordance with the following
	criteria for welds fabricated in accordance with Reference 3.1, except as
	modified by reference 3.7.B. See paragraph 4.0, Definitions, for specific
	details or discontinuities and acceptance limits except as modified by
	Reference 3.7.B as applicable, in this procedure.

☐ One time Condition; Interim Change to be closed as follows:

[x] Permanent Condition; Revision to procedure in process.

The approval of this Procedure Interim Change authorizes deviaiton from the named procedure within the limits described above.

The holder of the affected procedure shall retain this notice with the procedure until incorporated in the next procedure revision or until otherwise closed.

Originator: Edward [signature] 10/21/83
Signature Date

Mgr. QA/QC Harris Plant Approval: N. J. Chiangi 10/21/83
Signature

☐ Telephone Approval Obtained By:

Signature

Date

Recommended for Approval: Edward [signature] 10/21/83
NDE Level III Date

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT

NUMBER	REVISION
NDEP-605	1

TITLE: VISUAL EXAMINATION OF SEISMIC I, STRUCTURAL AND HANGER WELDS (SHNPP)

1.0 PURPOSE

The purpose of this procedure is to delineate the visual welding examination criteria for Seismic Class I structural weldments such as pipe hangers, restraints, structural steel, HVAC ductwork, equipment, etc., at the Shearon Harris Nuclear Power Plant (SHNPP).

2.0 SCOPE

This procedure applies as applicable to welds fabricated in accordance with AWS D1.1, AWS D1.3 and other welding performed as directed by approved Engineering documents. This procedure may be utilized, when deemed by Engineering as appropriate, for visual examination of welds related to other codes specifications or safety related items. This precedure may be used for receipt inspection activities at SHNPP when required by other site documents or deemed appropriate by Engineering.

3.0 REFERENCES

3.1 AWS D1.1, Structural Welding Code, 1975 Edition.
3.2 AWS D1.3, Specification for Welding Sheet Metal in Structures, 1978 Edition.
3.3 CP&L Corporate QA Department Nondestructive Examination Manual.

3.4 SHNPP MP's

A. MP-04 Procedure for Post Weld Heat Treatment
B. MP-05 Permanent Marking of Site Material and Components
C. MP-08 General Welding Procedure for Structural Steel (Seismic, Non-Seismic) and Hangers
D. MP-10 Repair of Base Material and Weldments
E. MP-17 General Welding Procedure for HVAC Duct System (Seismic, Non-Seismic)
F. MP-21 Repair of Base Materials for HVAC Duct Systems (Siesmic, Non-Seismic

3.5 SHNPP Work Procedures

A. WP-110 Installation of Safety Related (Seismic Class I) Pipe Hangers

3.6 SHNPP TP-04

3.7 Ebasco Specification CAR-SH-BE-04A

3.8 E&C QA/QC Procedures and Instructions

A. CQC-2 Nonconformance Control
B. CQC-6 Receiving Inspection
C. CQC-19 Weld Control
D. QCI-19.1 Preparation and Submittal of Weld Data Report, Repair Weld Data Report, Tank Fabrication Weld Record and Seismic I Weld Data Report
E. QCI-19.2 Visual Inspection of Permanent Impression Stamping

3.9 SHNPP Site Specification

A. 033 Structural Welding for Permanent Plant Construction
B. 034 Nondestructive Examination, Visual Inspection, and Testing Requirements for Code Class 1, 2, 3, MC, Seismic and Non-Seismic Structures for Permanent Plant Construction.
C. 040 Nuclear Safety Related and Seismic Class I Complex Embedded Steel & Related Items Requiring NDE or PWHT for Permanent Plant Construction

3.10 "Arc Strike Evaluation" Instructions

3.11 AWS 3.0 - 80 Welding Terms and Definitions

4.0 DEFINITIONS

The following are definitions of words and terms used in this procedure. Definitions of weld discontinuities are to be used by the Visual Examiner to aid in determining the type of discontinuity and, when applicable, the acceptable limits of discontinuities. They are intended to aid the Visual Examiner in determining acceptable limits of discontinuities as well as establish a unified definition of the discontinuities and other words, as used in this procedure. Definitions found in Reference 3.0 shall also be used.

Site Documents - Drawings, engineering and site specifications, construction and examination procedures/instructions, engineering documents and other approved documents as referenced by these documents, as applicable.

Weld Spatter - The metal particles expelled during welding and which do not form a part of the weld. Weld spatter that resists vigorous wire brushing shall be acceptable provided it is not on a faying surface and/or will not inhibit the performance of required NDE.

Porosity - Cavity type discontinuities formed by gas entrapment during solidification. Acceptable limits are as given in the applicable part of this procedure.

Slag Inclusions or Flux Coatings - Non-metallic inclusion on or embedded in the surface of weldments.

Undercut - Excessive melting of the base metal at or near the toe of the weld.

Overgrind - Excessive grinding that reduces the weld/base metal below the minimum thickness required. Overgrind is unacceptable.

Tungsten Inclusion - Tungsten that is embedded in the weldment due to the tungsten electrode(GTAW Process) contracting the weldment and breaking off. Tungsten inclusions are unacceptable.

Overlap - The protrusion of weld metal beyond the toe, face, or root of the weld. Any overlap is unacceptable.

Arc Strike - A discontinuity consisting of any localized remelted metal, heat affected metal, or change in the surface profile of any part of a weld or base metal resulting from an arc. Arc strikes may be caused by welding electrodes, weld machine ground clamp or magnetic particle prod contacts. Unless otherwise specified by Nuclear Power Construction Department Engineering, no arc strikes are allowed.

5.0 PROCEDURE QUALIFICATION

5.1 Nondestructive Examination Procedure Qualification Record, No. PQR-605 describes the actual qualification activity for this procedure.

6.0 PERSONNEL QUALIFICATION

6.1 Personnel performing visual examinations in accordance with this procedure shall meet qualification requirements as specified in Carolina Power & Light Company Corporate QA Procedure NDEP-10.

7.0 EQUIPMENT

7.1 The following equipment may be used to aid the Visual Examiner in his evaluation of items being examined:

7.1.1 Flashlight or other illuminating device that provides adequate lighting as described in 7.2.

7.1.2 Cambridge Weld Gauge
7.1.3 6" Ruled Scale
7.1.4 Magnifying Glass
7.1.5 Boroscope and Fiber Optics
7.1.6 Fillet Weld Gauges
7.1.7 Mirrors
7.1.8 Optical Comparators
7.1.9 Micrometers
7.1.10 Depth Gauges
7.1.11 Other equipment may be used as necessary, but will be required to meet the conditions of 7.2 and 7.3, if applicable.

7.2 Illumination

Visual examination shall be performed in an area illuminated with flashlight or other auxiliary lighting to attain a minimum of 15 foot candles (160 Lux) for general examination and a minimum of 50 foot candles (540 Lux) for the detection or evaluation of small anomalies, unless otherwise specified.

7.3 Optical Aids

7.3.1 When optical aids such as boroscope, magnifying glass, mirror etc., are used for remote examination, the system shall have a resolution capability equivalent to or better than that obtained by direct observation.

7.3.2 When use of optical aids is specified, optical aids shall have a minimum power of magnification called out in the specification, code or procedure. Lighting and resolution shall be verified either at the examination point or verified prior to the actual examination under simulated conditions.

7.4 Mechanical Aids and Instruments

7.4.1 Mechanical aids used for examinations shall have graduated scales in useable increments that are easily discernable.

7.4.2 Dial depth gauges, micrometers, optical comparators and other precision mechanical measuring devices used for final acceptance examinations shall be calibrated in accordance with Reference 3.6.

7.4.3 Rules, scales, gauges such as cambridge and fillet and other measuring devices used to aid the visual examiners shall be reasonably accurate but do not require calibration.

8.0 EXAMINATION

8.1 General

8.1.1 Visual examinations shall normally be performed without magnification. The examination shall be such that the surface to be examined is within 24" of the eye, and at an angle not less than 30° to the surface to be examined.

8.1.2 Visual examination performed using optical equipment shall be performed only when required by site documents or Engineering using equipment that conforms to 7.3. Magnifiers may be used to aid in the evaluation of discontinuities detected during the visual examination.

8.1.3 When remote visual examination must be performed in lieu of direct visual examination, the visual aid(s) shall be in accordance with Paragraph 7.3.

8.1.4 When using remote visual equipment, the technique used shall be verified for resolution and lighting capabilities prior to use by resolving a 1/32" black line on an 18% neutral gray card. This verification may either be done at the point of examination or under simulated conditions expected to be encountered during the examination.

8.2 Visual Examination

8.2.1 Visual examinations shall be performed when required by site documents or when the appropriate holdpoints are reached on Seismic I Weld Data Reports (SWDRs).

8.2.2 This examination shall also verify the suitability of the surface for subsequent NDE. If the examiner determines that the surface will inhibit the proper interpretation of NDE, he/she will mark the areas for subsequent rework.

8.3 Examination Points

Items to be examined at a particular stage of fabrication when specified by site procedures are listed in Attachment A.

9.0 EVALUATION

9.1 Evaluations shall be made in accordance with the following criteria for welds fabricated in accordance with Reference 3.1. See paragraph 4.0, Definitions, for specific details of discontinuities and their acceptable limits, as applicable, in this procedure.

9.1.1 Prefitup Examination

9.1.1.1 Cleanliness of Joint

a. Surfaces to be welded and surfaces adjacent to a weld (within ¼" of where the toe of the weld will be) shall be free from loose or thick scale, slag, rust, moisture, grease and other foreign material that would prevent proper welding or produce objectionable fumes. Mill scale and rust that can withstand vigorous wire brushing, a thin rust-inhibitive coating (such as deoxaluminate paint), or antispatter compound may remain with the following exception: for girders, all mill scale shall be removed from the surfaces on which flange-to-web welds are to be made by submerged arc welding or by shielded metal arc welding with low hydrogen electrodes.

b. The surfaces of base metal one inch adjacent to the weld joint prior to welding need only be cleaned of those loose materials which may fall into the molten weld metal and coatings which, due to fumes caused by heating or burning, could leave a harmful residue in the weld. Tight adhering rust which has been cleaned with a hand wire brush shall be permissible but all paint, grease, or other coatings with the exception of deoxaluminate should be removed.

c. Deoxaluminate paint can remain on the base metal and the prepped edges and surfaces to be welded. If rust appears where deoxaluminate paint has been applied to the prepped edges and surfaces to be joined by welding, it shall be removed; however, if rusting appears on the base metal within the area one inch from the weld prepped edges, only wire brushing of these areas is necessary to remove any loose particles which could fall into the molten weld metal during welding of the joint. Surfaces on the base metal, due to corrosion, may contain pitting. Wire brushing of these surfaces is adequate to remove loose rust scale without removing tightly adhering rust oxide film from the pits.

9.1.1.2 Joint Weld End Prep

a. Joint weld end prep and dimensional configuration shall be in accordance with applicable site documents.
b. Discontinuities in excess of those outlined in Table 1 of Attachment A shall be repaired as required by Table 1 of Attachment A and/or other appropriate site procedures.
c. Discontinuities in excess of 1" long and 1" deep shall be repaired prior to welding in accordance with Table 1 of Attachment A and/or other appropriate site documents.

9.1.2 Fitup Examination

9.1.2.1 Cleanliness

a. Surfaces shall meet the requirements of Paragraph 9.1.1.1.

9.1.2.2 Joint Dimensions and Tolerances

a. Dimensions (bevel angle(s), root opening, root face, etc.) shall be in accordance with the drawing or applicable Welding Procedure Specification (WPS).
b. Butt welds shall not be offset more than 10% of the thickness of the thinner member being joined or 1/8", whichever is less.
c. Parts may be drawn to a slope of 1/2" in 12" maximum, to correct misalignment.
d. Measurement of offset is from the center line of the parts to be joined.
e. The cross section of groove welded joints shall not exceed the tolerances of Table 2 of Attachment A.

9.1.2.3 Material Identification

a. The filler, base and backing materials (when applicable) shall be examined in accordance with Reference 3.8c.

9.1.2.4 Tack Welds

a. Tack welds shall be free from the same discontinuities as final welds.
b. Multiple pass tack welds shall have cascaded ends.
c. Tack welds for fitup can be left in the as-welded condition, when practical, except that the ends may need to be feathered by grinding to ensure adequate tie-in with subsequent weld passes.

9.1.3 Completed Weld Examination

9.1.3.1 Undercut/Overgrind

a. Undercut in excess of 0.01" deep when the weld is transverse to the primary stress in the part that is undercut shall be unacceptable.

b. Undercut shall not exceed 1/32" deep in a weld that is parallel to the primary stress in the part that is undercut.

c. Overgrind which can result in notch-like grooves shall not exceed 1/32". Grinding should not reduce thickness below acceptable thickness and should be gradual faying or blending with surrounding area.

9.1.3.2 Coatings should be no closer than approximately 1/2" from the toe of the weld. Additional removal of coatings may be required so that NDE examinations and/or visual examinations may be performed.

9.1.4 Weld Profiles

9.1.4.1 Fillet Welds

a. Fillet Welds with profiles in excess of Fig. 1 shall be unacceptable.

9.1.4.2 Groove Welds

a. Groove weld profiles shall be as stated by applicable site documents.

b. Butt and corner joints with groove welds shall have a maximum reinforcement of 1/8".

9.1.4.3 Butt Welds

a. Surfaces of butt welds shall be as required by applicable site documents.

9.1.5 Impression Stamping

9.1.5.1 Impression stamping required by site documents shall be examined in accordance with Reference 3.8e.

9.1.6 Unacceptable Weld Discontinuities

9.1.6.1 Welds shall be examined for freedom from slag, cracks, and incomplete fusion.

9.1.6.2 Craters must be filled to the full cross section of the weld.

9.1.6.3 Welds not meeting the acceptable profiles of Fig. 1 shall be unacceptable.

9.1.6.4 Piping porosity in fillet welds shall not exceed one porosity hole in 4" length of weld nor shall the diameter be larger than 3/32" except for fillet welds connecting stiffeners to webs, the sum of the diameters of piping porosity shall not exceed 3/8" in any linear inch of weld nor 3/4" in any 12" length of weld.

9.1.6.5 Groove welds shall be free of piping porosity. Linear, random scattered and clustered porosity shall be acceptable, independent of the criteria for piping porosity, provided that all pores have a greatest dimension of less than 1/16" and the sum of their greatest dimension does not exceed 3.8" in any linear inch of weld (example: A cluster of porosity with twelve (12) pores each of which has a greatest dimension of 1/32 inch or less would be acceptable 12 x 1/32" = 12/32" = 3/8" provided there was no other porosity linear, random scattered and/or clustered within the one linear inch of weld.).

9.1.6.6 Fillet weld size may be 1/16" less than the nominal size required provided the undersized area does not exceed 10% of the length of the weld.

9.1.6.7 On web-to-flange welds on girders, no underrun in the required fillet weld size is permitted at the ends for a length equal to twice the width of the flange.

9.1.7 Defect removal/repair shall be examined by the Visual Examiner to ensure the following:

1. Defects listed below in welds shall be removed by approved means outlined in applicable site documents.

2. Cracks found in weld or base material shall be removed completely as well as 2" of sound metal beyond each end of the crack prior to rewelding.

3. Incomplete fusion and unacceptable porosity and slag shall be removed completely.

4. Excessive concavity, undercutting, craters and undersized welds shall be suitably prepared and additional weld metal deposited.

5. Overlap and excessive convexity shall be removed to acceptable limits.

9.2 The visual Examiner shall evaluate each required holdpoint in accordance with the following criteria for welds fabricated in accordance with Reference 3.2.

9.2.1 Welds are acceptable if they meet all the following requirements:

a. No cracks are present
b. Square groove, arc spot and arc seam welds must have at least 1/32" reinforcement.
c. Undercut/overgrind does not exceed 10% of the thickness.
d. Faces of fillet welds shall be flat or slightly convex.

10.0 MARKING OF INDICATIONS

10.1 Marking of rejectable indications shall be marked on the weld or base material, as applicable, using site approved marking materials.

11.0 DOCUMENTATION

11.1 Document performance of visual examination on the Seismic I Weld Data Report (Form QA-34). After the inspection items is accepted, check off the appropriate status, initial and date.

11.2 For visual examinations of HVAC hangers, the Visual Examiner shall sign the appropriate slot signifying visual acceptance of the weld.

ATTACHMENT A - EXAMINATION POINTS

	STRUC. JOINTS	SHEET METAL WELDS	
1.0 PRIOR TO FIT-UP	X		
a. Joint Scarf/Bevel Cleanliness (oxides, rust, dirt, etc)	X		
b. Cleanliness of External Surface(s) Adjacent to Weld	X		
c. Cleanliness of Backing Strip	X		
d. Joint End Prep Dimensional Configuration and Finish	X		
e. Freedom from Joint Surface Defects	X		
f. Removal/Repair of Joint Defects	X		
2.0 FIT-UP	X		
a. Joint Cleanliness	X		
b. Fit-Up Dimensions (i.e. root opening, clearance, etc.)	X		
c. Joint Alignment and Offset	X		
d. Component Identification and Heat Numbers	X		
e. Tack Welds	X		
3.0 EXTERNAL SURFACE AFTER COMPLETION OF WELD	X		
a. Weld Profiles	X	X	
b. Undercut or Overgrind	X	X	
c. Suitability of Surface for Required NDT (i.e. removal of weld spatter, arc strikes, etc.)	X		
d. Peening	X		
e. Joint Identification	X		
f. Fillet Size	X	X	
g. Blending Base Metal	X		
h. Freedom from Unacceptable Discontinuities	X	X	
i. Impression Stamping	X		
j. Removal/Repair of Defects	X		

ATTACHMENT A

Table I -Limits on acceptability and the repair of cut-edge discontinuities of plate

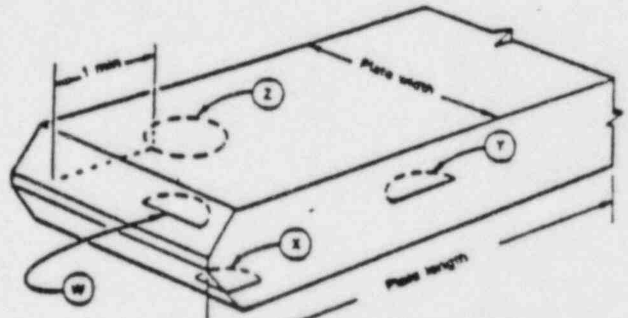
Description of discontinuity	Plate repair required
Any discontinuity 1 in. (25.4 mm) in length or less	None — need not be explored
Any discontinuity over 1 in. (25.4 mm) in length and 1/8 in. (3.2 mm) maximum depth	None, but the depth should be explored[1]
Any discontinuity over 1 in. (25.4 mm) in length with depth over 1/8 in. (3.2 mm) but not greater than 1/4 in. (6.4 mm)	Remove, need not weld
Any discontinuity over 1 in. (25.4 mm) in length with depth over 1/4 in. (6.4 mm) but not greater than 1 in.	Completely remove and weld. Aggregate length of welding shall not exceed 20 percent of the length of the plate edge being repaired
Any discontinuity over 1 in. (25.4 mm) in length with depth greater than 1 in.	See Notes 1 thru 4

[1]A spot check of ten percent of the discontinuities on the oxygen-cut edge in question should be explored by grinding to determine depth. If the depth of any one of the discontinuities explored exceeds 1/8 in. (3.2 mm) then all of the discontinuities remaining on that edge shall be explored by grinding to determine depth. If none of the discontinuities explored in the ten percent spot check have a depth exceeding 1/8 in. (3.2 mm), then the remainder of the discontinuities on that edge need not be explored.

(1) Where discontinuities such as (W), (X), or (Y) in Fig. .2. are observed prior to completing the joint, the size and shape of the discontinuity shall be determined by ultrasonic testing. The area of the discontinuity shall be determined as the area of total loss of back reflection, when tested in accordance with the procedure of ASTM A435.

(2) For acceptance, the area of the discontinuity (or the aggregate area of multiple discontinuities) shall not exceed four percent of the plate area (plate length x plate width) with the following exception: if the length of the discontinuity, or the aggregate width of discontinuities on any transverse section, as measured perpendicular to the plate length, exceeds 20 percent of the plate width, the four percent plate area shall be reduced by the percentage amount of the width exceeding 20 percent. (For example, if a discontinuity is 30 percent of the plate width, the area of discontinuity cannot exceed 3.6 percent of the plate area.) The discontinuity on the cut edge of the plate shall be gouged out to a depth of 1 in. (25.4 mm) beyond its intersection with the surface by chipping, air carbon arc gouging, or grinding, and blocked off by welding with the shielded metal arc process in layers not exceeding 1/8 in. (3.2 mm) in thickness.

(3) If a discontinuity, (Z), not exceeding the allowable area in para. 2 is discovered after the joint has been completed and is determined to be 1 in.



All dimensions in inches.

Table II —*Edge discontinuities in cut plate.*

(25.4 mm) or more away from the face of the weld, as measured on the plate surface, no repair of the discontinuity is required. If the discontinuity (Z) is less than 1 in. away from the face of the weld, it shall be gouged out to a distance of 1 in. from the fusion zone of the weld by chipping, air carbon arc gouging, or grinding. It shall then be blocked off by welding with the shielded metal arc process for at least four layers not exceeding 1/8 in. (3.2 mm) in thickness per layer.

(4) If the area of the discontinuity (W), (X), (Y), or (Z) exceeds the allowable in para. 2 the plate or subcomponent shall be rejected and replaced, or repaired at the discretion of engineering.

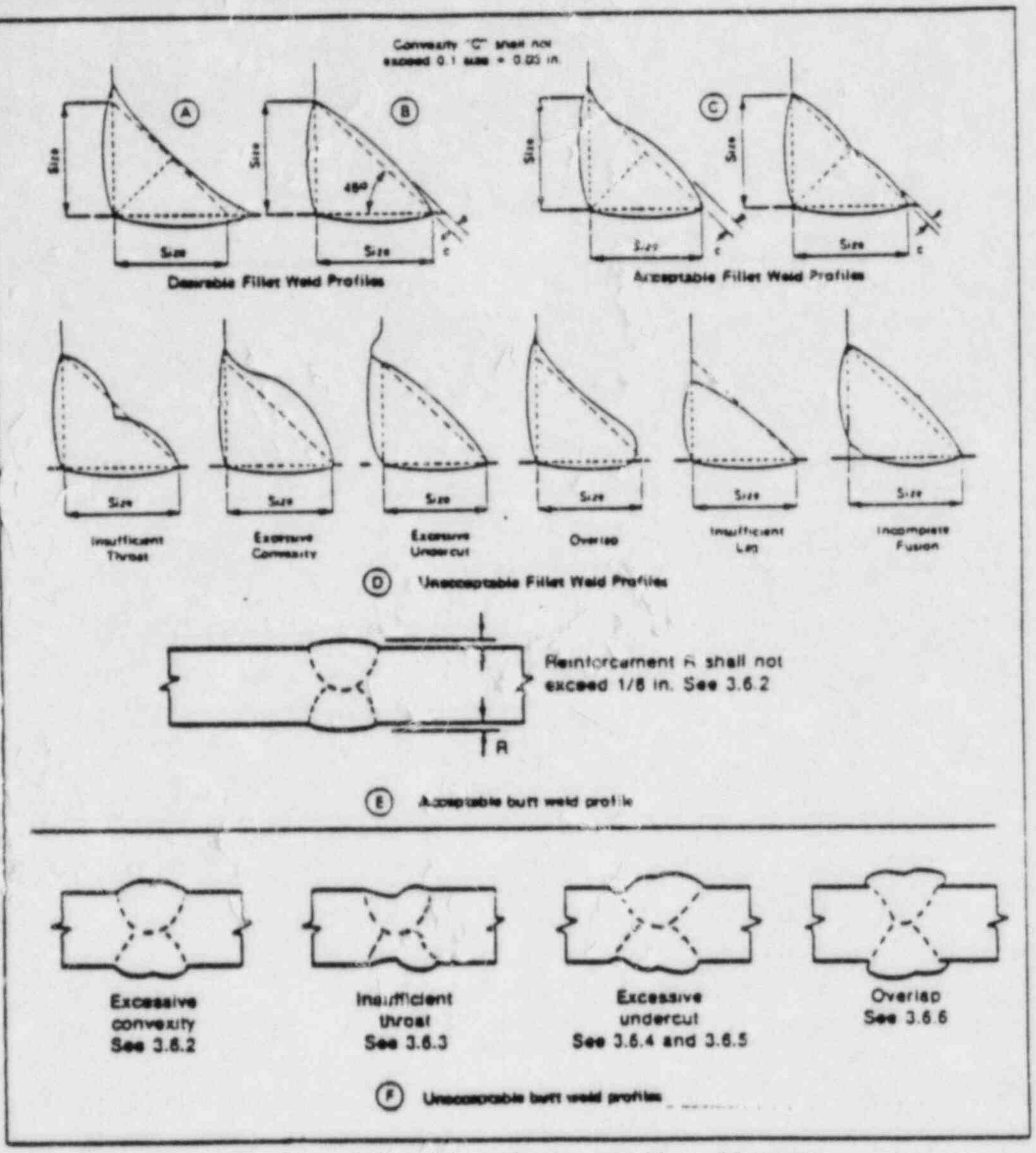


Fig. I —Acceptable and unacceptable weld profiles.

JUSTIFICATION

AWS D1.1 STRUCTURAL WELDMENTS INSPECTION CRITERIA MODIFICATIONS

SCOPE

This is prepared to provide a weld zone visual inspection criteria for structural weldments designed to AISC and AWS D1.1 requirements.

INTRODUCTION

The need for modification of D1.1 weldments workmanship inspection criteria became apparent following realization that industry conventional fabrication methods, when applied according to procedures used since the inception of joining metals by welding, are not capable of meeting requirements. This occurred because the inspection process philosophy has changed from rejection/acceptance decisions based upon experience, to the present literal adherence to AWS D1.1 criteria. This has caused a five fold or even greater increase in the number of repair required defect citations to emanate from the inspection process. There is universal agreement among Materials Specialists that a defects repair effort of this magnitude can cause a new set of workmanship and metallurgical problems. This deleterious-to-service-life possibility may have been recognized by the AWS Committee on Structural Steel Welding, which stated in their 1982 Commentary on AWS D1.1, that "the fundamental premise of the Code is to provide general stipulations applicable to any situation and to leave sufficient latitude for the exercise of engineering judgements". Recourse to this statement is being taken for the ensuing changes, which reflect careful consideration of manually applied fabrication methods, their capability for meeting present inspection acceptance criteria, viz-a-viz their effect on the mechanical properties of material and the intended service conditions.

PROBLEM DEFINITION

A detailed review of the inspection results of fillet welds in various shop fabricated power plant components and the re-inspection results of a 200 unit sample of construction site installed pipe hangers has shown that the majority of those welds requiring rework were found deficient because of (a) incomplete fusion, (b) insufficient weld throat, (c) weld overlap, and (d) weld zone undercut. The significance of these defects for other than aesthetic purposes appears negligible, owing to the short, less than 1/4 inch length for an overwhelming majority. Causes for such weld defects, their impact on service performance and the rationale for development of a reasonable and technically adequate inspection criteria is given in the following sections.

WELD ZONE DEFECTS, THEIR SIGNIFICANCE AND OCCURRENCE PROBABILITY

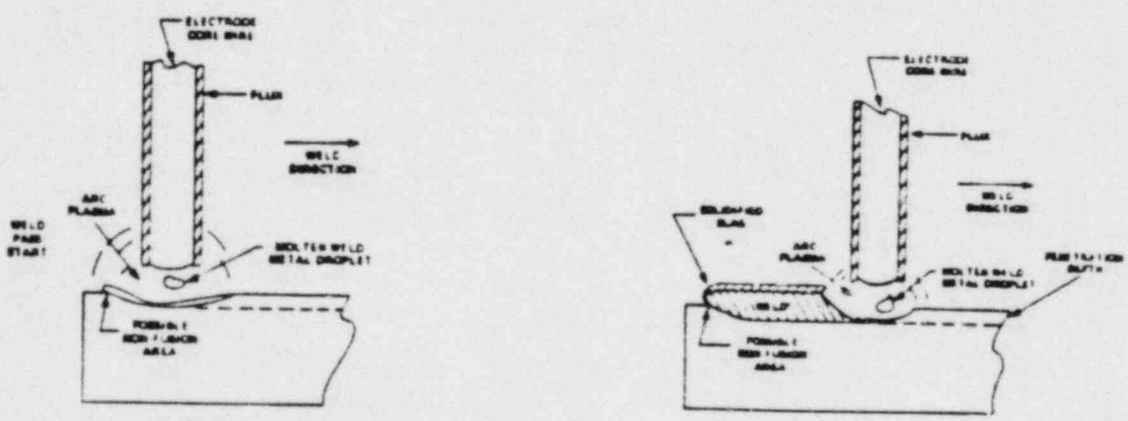
Incomplete Fusion - This term describes a weld zone region within which the desired coalescence of base metal and weld metal did not take place, owing to the absence of complete melting. Areas of non-fusion cannot be ascertained with certainty when evaluating welded components designed to AWS D1.1 because of the visual inspection method used in the judgement process. For this reason a meaningful inspection process must employ circumstantial evidence, such as postulated and actual temperatures at the welding arc, as well as other arc characteristics, weld arc manipulation by the workman and the physical properties of metals.

The single most important practice for properly welded components achievement is the control imposed by D1.1 on the welding procedure, and the performance test which all welders must execute satisfactorily. These are the prime industry accepted safeguards for prevention of incomplete melting. In addition,

WELD ZONE DEFECTS, THEIR SIGNIFICANCE AND OCCURRENCE PROBABILITY (Cont'd)

Incomplete Fusion - (Cont'd)

the energy release at the welding arc, which produces a reported weld zone temperature of 10,000°F, well above the nominal 2700°F melting temperature of steel is another built in safeguard against non-fusion. These temperature differences provide forgiving conditions which allow considerable latitude for welder arc manipulation variations which might otherwise indeed cause weld zone fusion difficulty. Furthermore, the molten weld metal droplets transferring across the weld arc are at steel vapor temperature, 5200°F. It can be seen, that given the above temperatures, the risk of non-fused regions for a weld run length of 1/2 inch or more, is remote. A pictorial example of the onset of a possible non-fused region is shown by the arc reignition condition of Figure A.



A

B

Arc Ignition

Figure A presents conditions which will not assure achievement of

<u>WELD ZONE DEFECTS, THEIR SIGNIFICANCE ETC.</u> (Cont'd)

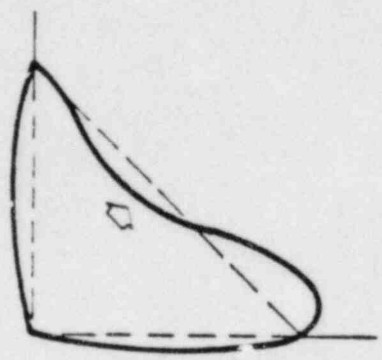
the desired base metal-weld metal coalescence, owing to the considerable thermal quench of the work piece at arc ignition. However, the thermal imbalance occurs for a very short time, because of the extremely high welding arc energy release. Minimal concern has been accorded lack of fusion presence at the weld arc reignition points of components which were constructed of nominally 60,000 psi tensile strength steel.

Figure B, represents conditions which exist along the weld run. Note the absence of risk for non-fused areas, owing to the high welding arc energy release. There are improper techniques which can cause lack of fusion to occur along the weld run shown by Figure B, presented in the ensuing section and identified as weld overlap by the industry.

<u>Weld Overlap</u> - This condition is shown by Figure C, which can occur during arc ignition or when a large single pass fillet weld is deposited in the horizontal position. Unfortunately, the D1.1 exclusion of preheat when single pass welds are employed encourages fabricators to proceed with one pass welds procedures. The avoidance of preheat by application of the single pass 5/16" fillet weld can cause the gravity induced rollover of liquid metal, followed by the occurrence of overlap. It must be noted however, that this happens after base metal/weld metal melting has taken place. It follows that the superheated weld metal in contact with base metal will cause

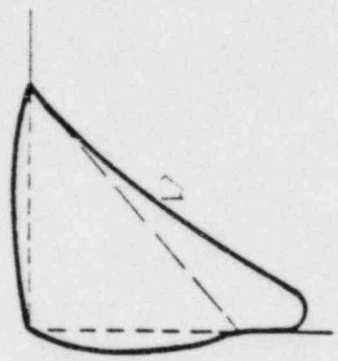
WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

melting and coalescence before the gravity induced rollover takes place. For this reason, overlap such as in Figure C is not considered detrimental, provided the required weld size is achieved. A classic example of another weld overlap condition, produced when the welding methods and parameters specified by D1.1 are not applied, is shown by Figure D, below.



GRAVITY INDUCED OVERLAP

Figure C



CAUSES ARE:

LOW ARC ENERGY
IMPROPER ARC MANIPULATION
DIRTY BASE METAL

Figure D

The condition shown by Figure D can be present along either joint member, thus differing from the gravity induced condition of Figure C. Causes for the Figure D profile are improper weld conditions or base metal uncleanliness. Welds as shown by Figure D are the result of welder inattention or improper training. Such defective weld zone regions, by nature of their cause are never only short segments of a weld run, rather they occur continuously along a major portion of a weld run length. Although

WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

Figure C and D profiles are treated as one by many inspectors, there is a distinct recognizable difference, as shown by the profiles, the important feature being the region of the arrows. These differences are often not included in the inspection process.

Insufficient Weld Throat - Weld throat is the plane which bisects the 90° angle of a fillet weld (Figure E). Fillet weld size is specified by the amount of weld metal attached to each joint member (the fillet weld leg). However, the weld throat dimension, which is about 30% less than the leg size, is the important parameter because the majority of the working stresses on fillet welds are shear mode; along the weld throat plane.

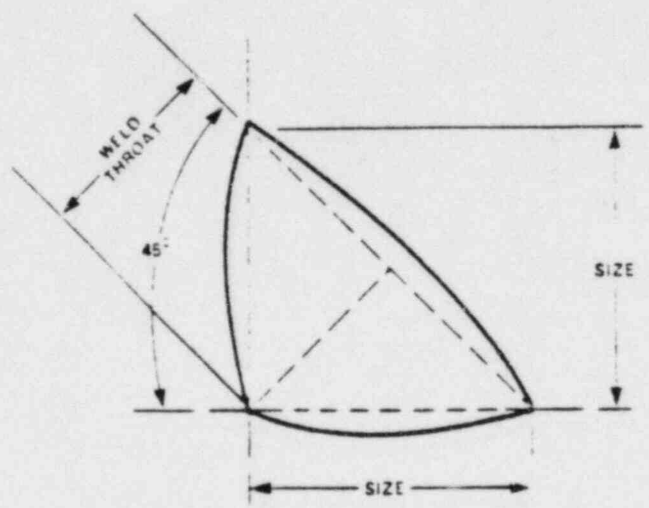


Figure E

A 1/16" undersize fillet reduces the weld size (and the weld throat dimension) by 12.5% for a 1/2" weld and 25% for a 1/4" weld, this change theoretically increasing the stress proportionally.

WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

These values are tabulated in Table 1, below.

Table I

Fillet Weld Size	Throat Dimension Full Weld Leg Size	Throat Dimension 1/16" Undersize Weld	Effective Throat Decrease %	Applied Stress Increase %
1/4"	.177"	.132"	25	33.3
5/16"	.221"	.177"	20	25.0
3/8"	.265"	.221"	16.7	20.0
1/2"	.354"	.309"	12.5	14.3

The two areas of concern in an undersize weld are the increase in stress in the throat of the weld and the increase in stress in transmitting the load through the weld into the base metal. Since weld metal is generally of higher strength than its minimum specified tensile strength, (72,000 psi), rarely only meeting this minimum value, its ability to tolerate a theoretical increase in stress for short lengths is not unreasonable. In like manner the base metal is generally of higher yield strength than the minimum ascribed 36,000 psi, this strength further increased by the thermal cycle imposed on the weld heat-affected zone, so that its ability for tolerating a theoretical increase in stress for short lengths of undersize is also not unreasonable, the overstress expected to be redistributed without danger of failure. The result of a short run undersize weld correction is the risk of component quality degradation, this condition believed to be more deleterious to service performance than a relatively small overstress for short lengths of an overall weld length.

Weld Zone Undercut - This condition is caused by melting away of base metal at the toe of a weld. Undercut is considered harmful

WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

Weld Zone Undercut - (Cont'd)

to weldment service life because its cross sectional geometry is considered to be a "v" - shaped depression, as well as causing a reduction of base metal cross section, this configuration creating a stress raiser.

Stringent inspection attention is accorded to undercut by the fabrication industry. A major reason for this concern is the widespread belief that the root region of the undercut notch will be the origin of cracks, which grow when exposed to service induced fluctuating stresses. This concept for crack propagation has persisted, despite universal agreement among those expert in materials behavior that the degree of sharpness of a notch which can initiate a slowly propagating crack must be several orders of magnitude sharper than the radius at the root of a typical weld undercut caused by arc melting. Although neither sharp nor rounded undercut root radii are desirable weld zone profiles, the rounded root radius, which is a direct result of the weld zone melting process, is the more forgiving and will permit stress redistribution without apparent distress.

This difference in the crack initiation behavior of varying notch-root radii is not given proper consideration during the inspection process. The problem is compounded when strict adherence to described or sketched weld zone profile inspection procedures are used. The result of such inattention is the initiation of extensive weld upgrading efforts. This practice must be given much more attention because the risk for weld zone

WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

deterioration, always present during weld upgrading activity, increases appreciably when a larger-than-normal scale upgrading effort is initiated.

An investigation, designed to examine the shape of severely undercut weld zones and the effect of the notch on uniaxial tensile properties was conducted to provide data concerning the mechanical behavior of steel which contained weld undercut. Details describing test sample preparation, photos and mechanical property test results are presented in the Appendix of this report. Except for two (2) samples which broke at the undercut, the balance failed in the base metal, outside the weld heat-affected zone. One reason for the tensile test results of the undercut samples is that following initial local yielding at the undercut root, this region is constrained from further yielding by surrounding elastic material. Relocation of the energy absorption region for further yielding improves the load carrying capability of the undercut region. It will be noted that the sole conclusion of the evaluation is that weld undercut to nominal 1/16" depth can be present in steel produced to a specified tensile strength of 60,000 psi for relatively short lengths, and that this condition will not be detrimental to service performance.

Porosity - Steel weld metal porosity is almost always caused by inadequate shielding of the welding arc, as will occur when welding is performed in an air draft of 3 to 5 miles/hour. This condition can cause the nitrogen in air to be introduced into the weld arc, causing porosity when sufficient nitrogen is present. Another source of nitrogen is paint. Hydrogen also causes steel

WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

weld metal porosity, this constituent usually introduced by oil and grease, generally present in weld zone regions as a surface film.

It can be seen that only a minor amount of nitrogen or hydrogen can be introduced into the weld arc under ordinary conditions, by nature of the form of the contaminant. It follows that the extent of the porosity, which results because molten steel weld metal solidifies before all the gas has issued from the liquid weld metal, is not as severe as is assumed by pore acceptance criteria, which treats all pores as extending through the entire weld deposit thickness. A modification of the degree of porosity acceptance in structural weldments is warranted per the above.

Unfilled Weld Craters - The reduced throat thickness caused by this condition precludes its acceptance in grooved butt and full or partial penetration Tee welds. For reasons given earlier for insufficient weld throat, a 1/16" deep, smooth surface crater is not considered deleterious in fillet welds.

Cracks - These defects contain sharp edges at extremities. For this reason they must be removed to sound metal and rewelded.

Arc Strikes - This condition is caused by inadvertent arcing between the welding electrode and the base metal, causing a small amount of base metal melting in the arc impingement region. More than ordinary attention is given this region in steel because of its hardness and its reported propensity for cracking. An extensive penetrant evaluation was conducted to examine crack occurrence in the arc strike regions of steel produced to a

WELD ZONE DEFECTS, THEIR SIGNIFICANCE, ETC. (Cont'd)

specified tensile strength of 60,000 psi. No cracks were found, which indicates that the material is sufficiently tough and only moderately hardenable when subjected to the high cooling rates of an arc strike heat affected zone. This study indicates that arc strikes, left inadvertently in steel produced to a specified tensile strength of 60,000 psi can be disregarded.

SUMMARY

A description and causes for the eight (8) most common weld zone defects have been provided for understanding defects formation and occurrence probability, so as to serve as base for visual inspection criteria modification and application.

CRITERIA DEVELOPMENT

Our review of various welded component workmanship rejections has shown that an overwhelming majority were the result of undersize welds and weld zone undercut.

Undersize Weld - This term is considered here as applicable to four reject conditions, incomplete fusion, insufficient weld throat, weld overlap and unfilled weld crater. Since the amount of base metal attachment by weld metal is affected by all, each of these conditions cause the shear strength of a fillet weld to be reduced.

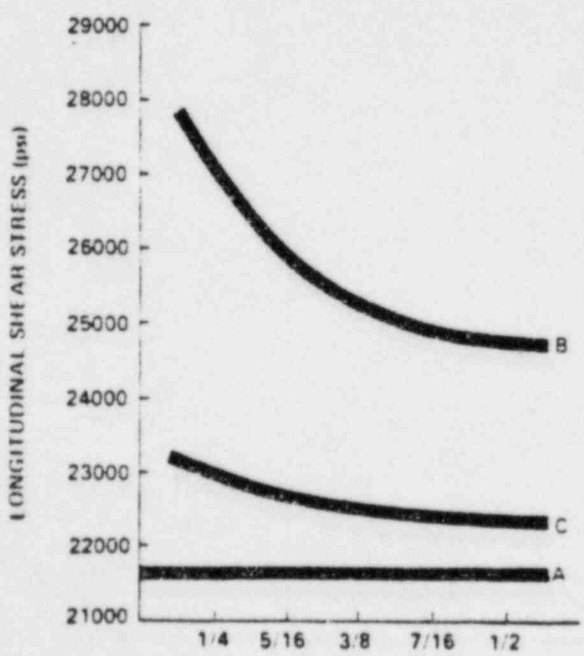
The method by which an undersize weld judgement is made is misleading, because the weld leg size, not the weld throat is used for its determination, even though the weld throat is used

CRITERIA DEVELOPMENT (Cont'd)

Undersize Weld - (Cont'd)

for shear stress calculation. This overemphasizes the loss in shear stress capability of the fillet weld, because the weld throat is smaller than the weld leg by a factor of 30%. Furthermore, the throat dimension change decreases as the fillet weld increases, this behavior also affecting shear stress as shown by the curve presented below:

LONGITUDINAL SHEAR STRESS VS INCREASED FILLET SIZES



A - Shear stress on full size welds when AISC allowable load applied.

B - Shear stress on 1/16 inch undersize welds for full length - AISC allowable load unchanged.

C - Shear stress on 1/16 inch undersize welds for 25% the full weld length. AISC allowable load unchanged.

CRITERIA DEVELOPMENT (Cont'd)

Undersize Weld - (Cont'd)

The effect on shear stress increase of a 1/16 inch undersize weld which extends along 25% of a weld run, when the AISC allowable load is unchanged, is as follows:

1/4" weld - 1383 psi increase	3/8" weld - 928 psi increase
5/16" weld - 1083 psi increase	1/2" weld - 798 psi increase

Recognition should be given to the method used by the AISC in establishing the stress allowable for base metal and weld metal. The base metal allowable shear stress has been set as 0.4 x 36,000 (A36 min yield strength); 14,400 psi for ASTM A36. Weld metal allowable stress is determined by 0.3 min tensile strength - which for E7018 electrodes is 72,000 psi - 0.3 x 72,000; 21,600 psi. This relation may be inappropriate because a common base is not used for weld metal and base metal.

Selecting yield stress for this purpose, the minimum specified yield strength of E7018 weld metal is 60,000 psi. The stress allowable according to the 40% minimum yield stress concept used for base metal would be 0.4 x 60,000; 24,000 psi. This corresponds to a stress allowable difference of 9,600 psi between weld metal and base metal, about 7 times the increased stress of nominal 1,400 psi for welds which are undersize by 1/16 inch over 25% of the full weld length as discussed above.

Recognition of the substantial allowable stress overmatch which has been accorded weld metal, its well known superior ductility and notch toughness mandates the imposition of more realistic workmanship acceptance criteria, such as the proposed acceptance of fillet welds which are 1/16 inch undersize for 25% or less of a weld run length.

CRITERIA DEVELOPMENT (Cont'd)

Undercut - The limited investigation reported in the attached Appendix has shown that weld undercut up to 1/16 inch deep, in steels produced to a maximum specified tensile strength of 60,000 psi, is not deleterious to tensile strength.

The test samples were undercut full length and stressed transverse to weld direction. Undercut depth to 1/16 inch extending over 25% of a weld run length is proposed here in recognition of the satisfactory tensile test results of the more severely undercut and stressed test samples discussed in the Appendix.

The possibility for crack initiation and growth at the undercut root is not given consideration because the vertically positioned fillet joint member which invariably contains the undercut in production welds, exhibits ample root radius owing to the nature of its occurrence in horizontally positioned fillet welds.

ACCEPTABILITY CRITERIA

Oversize Fillet Welds - Either or both fillet weld legs may exceed design size. Welds may be longer than specified.

Undersize Fillet Welds - The size of 5/16 inch or larger fillet welds may be 1/16 inch less than required for a continuous span of 2 inches provided there is no less than a 6 inch separation between each 2 inch long undersize increment. Weld runs less than 8 inches long may contain a continuous undersize span of 25% of the total weld length. Undersize fillet weld spans less than 1/2 inches long shall be disregarded.

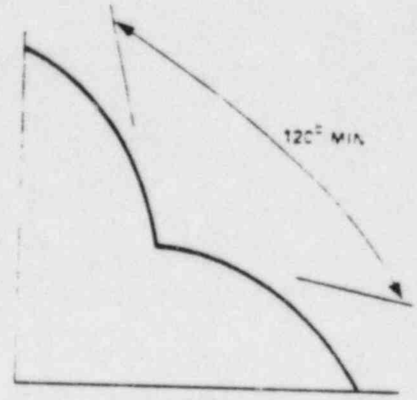
Porosity - Pores between 1/16" and 1/8" diameter shall be acceptable when separated by a minimum of one inch. Pores less

ACCEPTABILITY CRITERIA (Cont'd)

Porosity - (Cont'd)

than 1/16" diameter shall be disregarded. Clustered porosity contained within a 3/8" diameter circle shall also be acceptable.

Weld Profile - Convexity height and butt weld reinforcement may be accepted without limit, however a minimum 120° included angle must be present between weld runs in multipass welds for acceptable profile (shown by adjacent sketch).



Craters - Underfilled craters are not acceptable in continuous groove butt and grooved full or partial penetration Tee welds. For reasons given earlier for insufficient weld throat acceptance, underfilled craters not exceeding 1/16 inch depth are acceptable for fillet welds, provided the underfilled crater has smooth contour, blending gradually with the adjacent weld and base metal.

Undercut - Undercut up to 1/32 inch depth is acceptable in all steels. Undercut in 5/16 inch or thicker steels produced to a specified tensile strength of 60,000 psi, is acceptable to a depth of 1/16 inch, for a continuous span of 2 inches, provided there is no less than a 6 inch separation between each undercut increment. Weld runs less than 8 inches long may contain an undercut span of 25% of the total weld length. Undercut spans less than 1/2 inches long shall be disregarded.

ACCEPTABILITY CRITERIA (Cont'd)

Cracks - Cracks are unacceptable.

Fusion - Incomplete fusion between weld metal and base metal is unacceptable provided evidence such as shown by Figure D on Page 5 is visible. Incomplete fusion is acceptable provided a weld profile such as shown by Figure C on Page 5 is visible.

Arc Strikes - Arc strikes in high-strength low-alloy steels (minimum specified tensile strength greater than 60,000 psi), shall be removed by grinding. The ground area shall be visually inspected to assure complete removal of the arc strike.

For steels produced to a specified 60,000 psi tensile strength, arc strikes shall be visually examined and accepted if no cracking is evident. If cracking is evident, cracked region shall be ground to smooth contour and checked to ensure soundness. Arc strike regions which are not cracked shall not require brushing or grinding before visual examination.

ACKNOWLEDGEMENT:

The assistance, consultation and advice on various structural concepts contained in this paper by R D Steele, Ebasco Consulting Department Civil Engineer, is gratefully acknowledged.

L. M. Petrick

L M Petrick
Chief Materials Engineer
Ebasco Services Inc
New York, N Y

March 9, 1984

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: June 18-21, 1979

SUBJECT COVERED: Training for Visual Weld Examination

INSTRUCTOR: David A Stalt

LENGTH OF CLASS: 8- hours

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. Rhett Hunt
2. George Daniel
3. Robert Cates
4. David Holler
5. DAVID C. WHITEHEAD
6.
7.
8.
9.
10.

FOR INFORMATION ONLY

COMMENTS: AWS D.1.1 WAS UTILIZED AS CODE REFERENCE.

VERIFIED BY: David C Whitehead
David C. Whitehead
QA SPECIALIST

8/13/79
Date

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: August 9, 1979

SUBJECT COVERED: A.W.S. Welding Symbols

INSTRUCTOR: [signature]

LENGTH OF CLASS: 1- hour

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. David Holler
2. Rhett Hunt
3. ~~Walt Leggett~~ did not attend
4. Robert Cotter
5. George Daniel
6. David Whitehead
7.
8.
9.
10.

FOR ... ONLY

COMMENTS: AWS D1.1 WAS USED AS CODE REFERENCE

VERIFIED BY: David C Whitehead 8/13/79
David C. Whitehead
QA SPECIALIST
Date

8108130410

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: 9/11/79

SUBJECT COVERED: PARTIAL PENETRATION & FULL PENETRATION WELD SYMBOLS. WHEN POST WELD HEAT TREATMENT IS REQUIRED FOR EMBED PLATES.

INSTRUCTOR: GEORGE M. DANIEL

LENGTH OF CLASS: 30 MIN.

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. Richard Bu[illegible]
2. Jeffery [illegible] Malo[illegible]
3. M. [illegible] Hallock
4. Robert Li[illegible]
5. [illegible]
6. Robert Cott[illegible]
7. Barbara Howl
8.
9.
10.

COMMENTS:

VERIFIED BY: David C. Whitehead 9/11/79

David C. Whitehead
QA SPECIALIST

Date

SHERRON HARRIS POWER PLANT

QC RECEIVING TRAINING PROGRAM

DATE: 11-16-79

SUBJECT COVERED: PWHT (POST WELD HEAT TREAT) REQUIREMENTS FOR EMBED PLATES WELDED INTO A TEE FULL OR PARTIAL PENETRATION AS DELINEATED IN RCI-W-021 REV. 1

INSTRUCTOR: Jeffrey V.P. Meleg

LENGTH OF CLASS: 20 min

THE FOLLOWING PERSONNEL ATTENDED THE ABOVE DESCRIBED TRAINING:

1. Robert Curtis
2. Barbara Howe
3. Richard Bussey
4. DAVID HOWER
5. [illegible]
6. [illegible]
7.
8.
9.
10.

COMMENTS: CLASS WAS SATISFACTORY AND ALL QUESTIONS WERE ANSWERED. LENGTH OF CLASS WAS 20 MIN.

VERIFIED BY: RR David C Whitehead 11/16/79
David C. Whitehead
QA SPECIALIST
Date

AWS D1.1 STRUCTURAL WELDMENTS INSPECTION CRITERIA
EBASCO MODIFICATIONS

PRELIMINARY

SCOPE

This is prepared to provide an Ebasco weld zone inspection criteria for structural weldments designed to AISC and AWS D1.1 requirements.

INTRODUCTION

The need for modification of the presently used D1.1 weldments workmanship inspection criteria became apparent following realization that industry conventional fabrication methods and techniques are not capable of meeting the criteria specified by AWS D1.1. This conclusion has come about because the examination process philosophy applied by inspectors has changed from reje[illegible] acceptance decisions based upon experience, to the present literal adherence to AWS D1.1 criteria, resulting in a five fold and even greater increase in the number of repair required defect citations. There is universal agreement among Materials Specialists that a defects repair effort of this magnitude can cause new workmanship and metallurgical problems. This deleterious-to-service-life possibility was recognized by the AWS Committee on Structural Steel Welding, which stated in their 1982 AWS Commentary on the Structural Welding Code, that "the fundamental premise of the Code is to provide general stipulations applicable to any situation and to leave sufficient latitude for the exercise of engineering judgements". Recourse to this statement is being taken for the ensuing changes, which reflect careful consideration of the shortcomings of accepted fabrication methods and techniques, the mechanical property and allowable stress factors used for the design, and the intended service conditions.

PROBLEM DEFINITION

A detailed review of receiving inspection results at Shearon Harris, of fillet welds in shop fabricated components and the re-inspection results of a [illegible] unit sample of site installed pipe hangers at Waterford, has shown the majority of unacceptable defects to be (a) incomplete fusion, (b) insufficient weld throat, (c) weld overlap and (d) weld zone undercut. The significance of these defects on component service performance is considered minimal, owing to the short length of an overwhelming majority of the cited defects (less than 1/4 inch), the considerable AISC safety factor employed in the design, and the outstanding service performance experience of similarly fabricated weldments.

For the record, the AISC limits the maximum unit stress which can be applied in the design of weldments within its jurisdiction to 30% the nominal weld metal tensile strength and 60% nominal base metal yield strength. This results, for those structural steel base metal/weld metals combinations most often used for power plant structural framing in a stress allowable for the weld metal and the base metal of 21,000 psi. Utilization of a portion of the considerable safety factor, nominally 50,000 psi for weld metal, is proposed here. This

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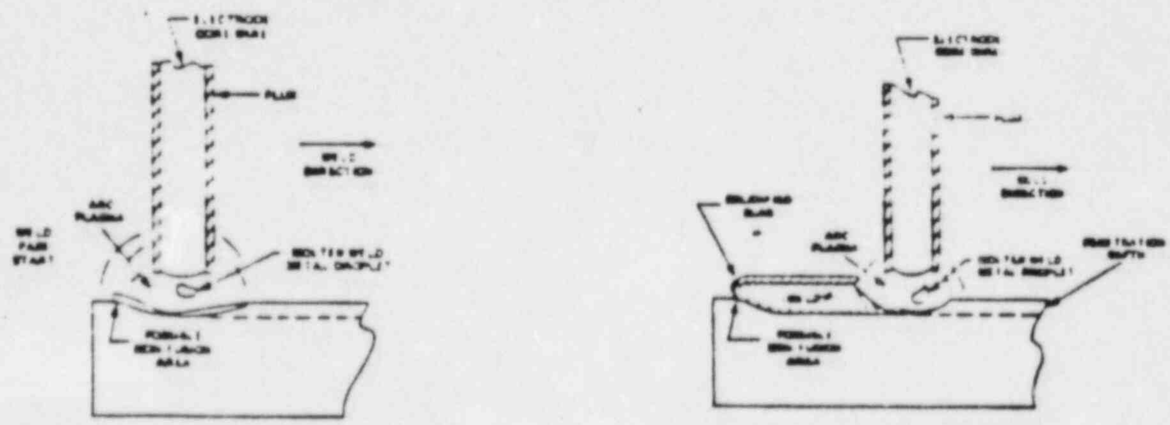
PROBLEM DEFINITION (Cont'd.)

procedure follows accepted practice for engineered components design changes when service conditions to be imposed are, as is the present situation, well known.

WELD ZONE DEFECTS, THEIR SIGNIFICANCE AND OCCURRENCE PROBABILITY

Incomplete Fusion - This term describes a weld zone region within which the desired coalescence of base metal and weld metal did not take place, owing to absence of complete melting in the region. Limits on the welding process selection for structurals fabrication and the welder performance test requirement imposed by AWS D1.1 are industry accepted safeguards for prevention of such incomplete melting. Furthermore, the energy release at the welding arc, which produces a reported weld zone temperature of 10,000°F, well above the nominal 2700°F melting temperature of steel, allows considerable latitude for welder arc manipulation variations, a possible cause for fusion problems when accompanied by inadequate joining process conditions. Furthermore, the molten weld metal droplets transferring across the weld arc are at the steel vapor temperature, 5200°F. It can be seen that, given the above temperatures, the risk of meaningful non-fusion regions for a weld run length of 1/2 inch or more, is remote. A pictorial example of the onset of a possible non-fused region is shown by the arc reignition condition of Sketch A.



The desired base metal-weld metal coalescence may not always be achieved to the fullest possible extent, as shown by the above Sketch A, because of the considerable thermal quench of the work piece at arc ignition. This thermal imbalance occurs for a limited time duration, because of the extremely high welding arc energy release. The fact that an inadequate thermal condition may be present for a very short time, if at all, and the good service performance of structural weldments which had been fabricated according to D1.1 accepted

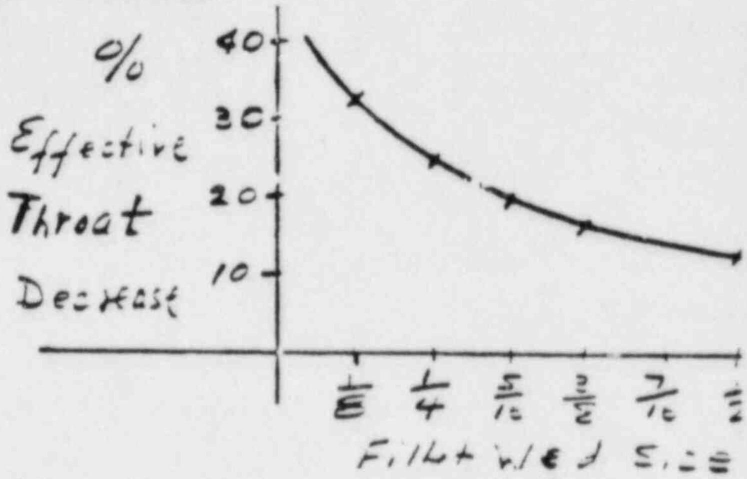
PRELIMINARY

welding procedure/certified welder test precautions are the reasons proposed for reduced concern for lack of fusion at arc restrike regions of a weld run.

Insufficient Weld Throat - Weld throad t is the plane which bisects the 90° angle fillet weld. Fillet weld size is described by the amount of weld metal attached to each joint member (the fillet weld leg). However, the weld throat dimension, which is 30% less than the leg size, is the important parameter because the working stresses on fillet welds are in the shear mode. Furthermore, the percent effective throat reduction decreases as the fillet weld size increases. Advantage of this relation should be taken because it affects weld joint efficiency. The full size/undersize fillet weld throat dimension relationship has been calculated for several popular fillet weld sizes, the results tabulated and plotted below.

Structural Framing Fillet Welds

Fillet Weld Size	Throat Dimension Full Weld Leg Size	Throat Dimension 1/16" Undersize Weld	Effective Throat Decrease %
3/16"	.132"	.088"	33.3
1/4"	.177"	.132"	25.4
5/16"	.221"	.177"	19.9
3/8"	.265"	.221"	16.6
1/2"	.354"	.309"	12.7

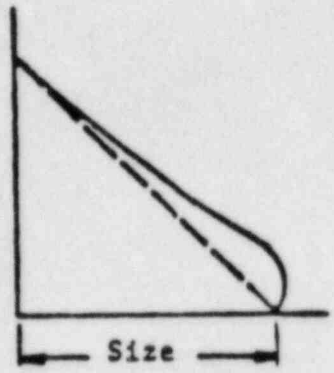


Effect of Undersize Fillet Welds on Throat Size.

A more detailed review of these data and curve indicates that 1/4 inch and larger fillet welds, which are undersized by 1/16 inch for continuous lengths up to 25% of the total weld length will reduce the weld region design safety factor from 70% to 58%. The reduced risk of component quality degradation, because of a reduction in upgrading requirements, to be gained by use of a less conservative design safety factor will significantly enhance the overall service life capability of structural components.

Weld Overlap - This condition may occur in structural weldments when a large single pass fillet weld is deposited in the horizontal position. The overlap, or weld metal rollover, results after base metal/weld metal melting had taken place, one reason for its occurrence being a low solidifying temperature [illegible] system. Because weld joint member melting had taken place before the liquid metal rollover, overlap is not considered detrimental, provided the required weld size, within the guidelines of the earlier insufficient weld throat discussion, is achieved.

classic example of weld overlap, not readily produced with welding methods and parameters used by the industry, is shown below.



gravity induced overlap

low arc energy
improper arc manipulation
induced overlap

Weld Zone Undercut - This condition is caused by melting away of base metal at the toe of a weld. Undercut is considered harmful to weldment service life because the area is often a "U" shaped depression, which reduces the base metal cross section and acts as a stress raiser.

Stringent inspection attention is accorded to undercut by the fabrication industry. A major reason for this concern is the widespread belief that the root region of the undercut notch will be the origin of cracks, which grow when exposed to service induced reversing stresses. This concept for crack propagation has persisted, despite universal agreement among those expert in materials behavior that the degree of sharpness of a notch, necessary for the occurrence of a cyclically stressed, slowly propagating crack, is several orders of magnitude sharper than the radius at the root of a typical weld undercut region. Although neither sharp nor rounded undercut root radii are desirable weld profiles, the rounded root radius which is a direct result of the melting process is the more forgiving.

Difference in the crack initiation behavior of varying notch-root radii is not given proper consideration during the inspection process. The problem is compounded when strict adherence to described or sketched weld zone profile inspection procedures are used. The result of such inattention is the initiation of extensive weld upgrading efforts, the reason for this added work being concerns akin to those for undercut by the aircraft industry. This practise must be given much more attention because the risk for weld zone deterioration, always present during weld upgrading activity, increases appreciably when a larger than normal scale upgrading effort is initiated.

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WELD ZONE DEFECTS, THEIR SIGNIFICANCE AND OCCURRENCE PROBABILITY

An investigation, designed to examine the shape of severely undercut weld zones and the effect of the notch on uniaxial tensile properties was conducted to provide data concerning the mechanical behavior of weld undercut containing steel. Details describing test sample preparation, photos and mechanical property test results are presented in the Appendix of this report. It will be noted that the sole conclusion of the evaluation is that weld undercut to 1/16" depth can be present in steel produced to a minimum specified tensile strength of 60,000 psi and that this condition will not be deleterious to its service performance.

Porosity - Steel weld metal porosity is almost always caused by inadequate shielding of the welding arc, as will occur when welding is performed in an air draft of 3 to 5 miles/hour. This condition can cause nitrogen, an air constituent, to be introduced into the weld arc, causing porosity when sufficient nitrogen is present. Another source of nitrogen is paint. Hydrogen also causes steel weld metal porosity, this constituent usually introduced by oil and grease, generally present as surface films.

It can be seen that only a minor amount of nitrogen or hydrogen can be introduced into the weld arc under ordinary conditions, by nature of the form of the contaminant. It follows that the extent of the porosity, which occurs because molten steel weld metal solidifies before all the gas has issued from the liquid weld metal, is not as severe as is assumed by pore extent acceptance criteria, which treats all pores as extending through the entire weld deposit thickness. A modification of the degree of porosity acceptable in structural weldments seems warranted per the above.

Unfilled Weld Craters - The reduced throat thickness caused by this condition precludes acceptance in grooved butt and full or partial penetration Tee welds.

Cracks - These defects contain sharp edges at extremities. For this reason they must be removed to sound metal and rewelded when the minimum required weld zone thickness is violated.

Arc Strikes - This condition is caused by inadvertent arcing between the welding electrode and the base metal, causing a small amount of base metal melting in the arc impingement region. More than ordinary attention is given this region in steel because of its hardness and its propensity for cracking. An extensive penetrant evaluation was conducted at Waterford to examine crack occurrence in the arc strike regions of steel produced to a minimum specified tensile strength of 60,000 psi. No cracks were found, which indicates that the material is sufficiently tough and only moderately hardenable when subjected to the high cooling rates of an arc strike zone. This study indicates that arc strikes left inadvertently in steel produced to a minimum specified tensile strength of 60,000 psi can be disregarded.

PRELIMINARY

WELD ZONE DEFECTS, THEIR SIGNIFICANCE AND OCCURRENCE PROBABILITY

A description and causes for the eight (8) most common weld zone defects have been provided above for understanding of defects formation and occurrence probability, so that a base for inspection criteria modification can be initiated. The extent of acceptance criteria modification will also be influenced by the design intent of specific structural weldments and the severity of the cyclic service loads which the various plant components may encounter.

CLASSIFICATION OF WELD JOINTS

Category 1 Joints - These joints are part of the main building frame and are expected to carry principle design loads. Severe stress reversing service load conditions are not expected for this category, owing to the damping characteristics of floor concrete.

Category 2 Joints - These joints are not part of the main building frame, but rather provide support/attachment for systems, components, and equipment. Reversing stress conditions are expected to be more severe for this category, however, modifications can be introduced because of notch radii, low vibration amplitudes, the conservative allowable stress used in the design, and the toughness of the steels used in this application.

Category 3 Joints - These joints are not part of the main building frame or support systems, rather they provide framing for components such as instrument racks, ducting, air control dampers, doors, hatch covers, etc. Cyclic service conditions are expected to be minimal, owing to the flexibility of the components materials of construction, the framing under discussion providing a degree of rigidity to the component.

ACCEPTABILITY CRITERIA - CATEGORY 1 JOINTS

Oversize Fillet Welds

Either or both fillet weld legs may exceed design size. Welds may be longer than specified.

Undersize Fillet Welds

The fillet weld leg dimension may not underrun the nominal required size by more than 1/16 inch for a continuous run of up to twenty (20) percent of the total weld length.

Porosity

The weld may contain a maximum of 5 percent by surface area of unaligned, unclustered porosity.

PRELIMINARY

ACCEPTABILITY CRITERIA - CATEGORY 1 JOINTS (Cont'd.)

Weld Profile

Convexity height and butt weld reinforcement may be accepted wtihout limit, however a minimum 120° included angle must be present between weld runs in multipass welds for acceptable profile.

Craters

Underfilled craters are not acceptable in continuous groove butt and grooved full or partial penetration Tee welds. Underfilled craters, not exceeding 1/16 inch depth are acceptable for intermittent welds, provided the underfilled crater has smooth contour, blending gradually with the adjacent weld and base metal and that the underfilled crater extends beyond the specified weld length.

Undercut

Undercut up to 1/32 inch depth is acceptable in all steels. Undercut in steels produced to a minimum specified tensile strength of [illegible],000 psi is acceptable up to 1/16 inch depth for continuous weld run of 20 percent of the total length provided its surface width is equal to or is greater than its depth. Summation of short run undercut regions shall not be considered for acceptance/rejection.

Cracks

Cracks are unacceptable.

Fusion

Incomplete fusion between weld metal and base metal is unacceptable when evidence such as shown by Figure B on Page 2 is visible. Incomplete fusion is acceptable provided a weld profile such as shown by Figure A on Page 2 is visible.

Arc Strikes

Arc strikes in high-strength low-alloy steels (minimum specified tensile strength greater than 60,000 psi), shall be removed by grinding. The ground area shall be visually inspected to assure complete removal of the arc strike.

For minimum specified 60,000 psi tensile steels, arc strikes shall be visually examined and accepted if no cracking is evident. If cracking is evident, the repair shall conform with Section 3.10 of AWS D1.1. Arc strike regions in these lower strength steels shall not require brushing or grinding before visual examination.

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ACCEPTABILITY CRITERIA - CATEGORY 2 JOINGS

Oversize Fillet Welds

Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be used in lieu of intermittent welds.

Undersize Fillet Welds

The fillet weld leg dimension may not underrun the nominal required size by more than 1/16 inch for a continuous run of up to twenty (20) percent total weld length.

Porosity

The weld may contain a maximum of 5 percent by surface area of unaligned unclustered porosity.

Weld Profile

Convexity height and butt weld reinforcement may be accepted without limit, however a minimum 120° included angle must be present between weld runs in multipass welds for acceptable profile.

Craters

Underfilled craters are not acceptable in continuous groove butt and grooved full or partial penetration Tee welds. Intermittent welds may have underfilled craters provided underfill depth does not exceed 1/16 inch, the crater has a smooth contour, blending gradually with the adjacent weld and base metal and that the underfilled crater extend beyond the specified weld length.

Undercut

Undercut up to 1/32 inch depth is acceptable in all steels. Undercut in steels produced to a minimum tensile strength of 60,000 psi is acceptable up to 1/16 depth for a continuous weld run of 20 percent of total weld length, provided its width is equal to or is greater than its depth. Summation of short run undercut regions shall not be considered for acceptance/rejection.

Cracks

Cracks are unacceptable.

Fusion

Incomplete fusion between weld metal and base metal is not acceptable when a condition such as shown by Figure B on Page 2 is visible. Incomplete fusion is acceptable provided a weld profile such as shown by Figure A on Page 2 is visible.

PRELIMINARY

ACCEPTABILITY CRITERIA - CATEGORY 2 JOINTS (Cont'd.)

Arc Strikes

Arc strikes in high-strength low-alloy steels (minimum specified tensile strength greater than 60,000 psi), shall be removed by grinding. The ground area shall be visually inspected to assure complete removal of the arc strike.

For other minimum specified 60,000 psi tensile steels, arc strikes shall be visually examined and accepted if no cracking is evident. If cracking is evident, the repair shall conform with Section 3.10 of AWS D1.1. Arc strike regions in these lower strength steels shall not require power brushing or grinding before visual examination.

ACCEPTABILITY CRITERIA - CATEGORY 3 JOINTS

Oversize Fillet Welds

Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be used in lieu of intermittent welds.

Undersize Fillet Welds

The fillet leg dimension may not underrun the nominal required fillet size by more than 1/16 inch for a continuous run of up to 20 percent of the total weld length.

Porosity

The weld may contain a maximum of 10 percent by surface area of unaligned unclustered por.

Weld Profile

Convexity height and butt weld reinforcement may be accepted without limit.

Craters

Welds may have underfilled craters provided underfill depth does not exceed 1/16 inch and the crater has a smooth contour blending gradually with the adjacent weld and base metal.

Undercut

Undercut up to 1/32 inch depth is acceptable in all steels. Undercut in steels produced to a minimum specified tensile strength of 60,000 psi is acceptable for a continuous run of 20 percent provided its surface width is equal to or greater than its depth. The summation of short run undercut regions shall not be considered for acceptance rejection.

Cracks

Cracks are unacceptable.

L. M. Petrick
August 12, 1983

PRELIMINARY

EFFECT OF WELD UNDERCUT ON THE TENSILE BEHAVIOR OF LOW STRENGTH STEEL

SCOPE

This evaluation was undertaken to examine weld undercut, specifically its shape and depth, produced using conditions most favorable for its occurrence, and its effect on uniaxial mechanical properties. The information to be developed was intended for evidence considered necessary to support an Ebasco structural weldments inspection acceptance criteria modifications effort.

Conclusion

The conclusion drawn from this evaluation is that a weld undercut depth up to 1/16 inch, in steels produced to a minimum specified tensile strength of 60,000 psi is not deleterious to its service performance.

Test Material Preparation

Plate material, 10 inches wide by 12 inches long by 3/8 inch thick ASTM A36 steel was used to produce bead on plate test samples. The test weldments were deposited along the 12 inch direction, employing AWS E7018, 1/8 inch diameter electrodes in the horizontal (2G) position. Weld undercut was additionally enhanced by orienting the welding electrode 10° from the horizontal plane. Three weld test panels were produced per the above electrode orientation at 140 amperes, these conditions selected to produce severe undercut. An additional two test panels were produced using weld conditions which would eliminate or reduce substantially the degree of undercut. These test welds were deposited with 120 amperes.

Test Results

Macro photos at 1X magnification, of the weld zone adjacent to material removed for tensile test specimens are presented below. These photos show the undercut as would be seen by visual inspection. Photos 1, 2 and 3 present welds produced with 140 amperes, photos 4, A and B, of welds produced at 120 amperes. These photos indicate that the undercut, which is most severe in test welds 1, 2 and 3, is not continuous, the edge undulating such that undercut and non-undercut intervals are present along the weld run.

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Test Results (Cont'd.)

Undercut depth of weld zones in the material sectioned for tensile tests was measured at five (5) locations along the 1-1/2 inch reduced section of the tensile bar. The depth, tensile strength and % elongation in 2 inches data are tabulated below:

Undercut Depth, (Inches)

Tensile Specimen No.

	1T1	IT-2	2T-1	2T-2	3T-1	3T-2	4A	4B
1	.035	.020	.020	.030	.026	.022	.003	.021
2	.030	.028	.030	.025	.035	.028	.004	.005
3	.052	.015	.005	.020	.052	.035	.002	.008
4	.036	.030	.027	.053	.033	.040	.005	.009
5	.032	.022	.040	.022	.025	.032	.004	.002
				Tensile Strength				
6	74500	75000	74700	75200	75100	74500	74400	75000
				Elongation in 2"				
7	29.0	32.0	29.0	23.0	29.0	32.5	29.0	31.5

It will be noted that the deepest undercut found was .053 inches. The high arc energy conditions, used to produce test samples 1, 2 and 3 were substantially in excess of the conditions generally employed for 2G position welding. For this reason, the undercut depth in the three (3) panels is believed to be representative of worst condition production welds.

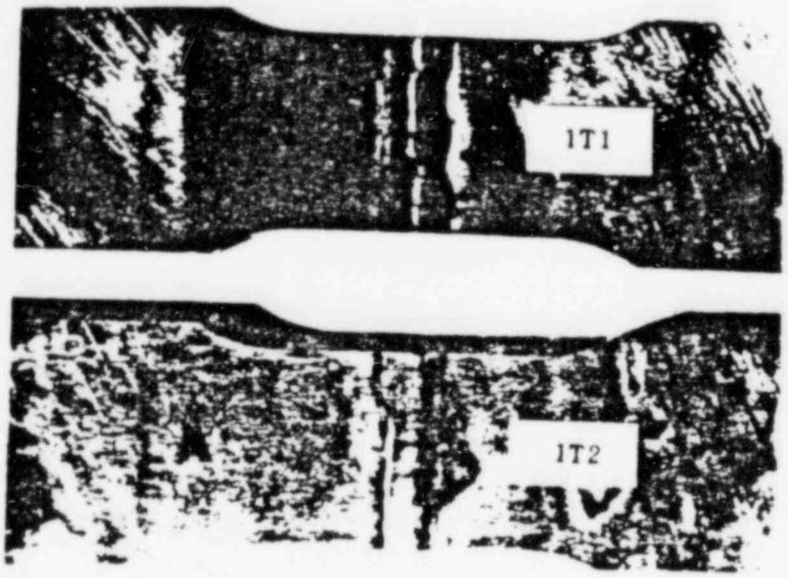
The material was prepared for tensile testing following photography and undercut depth measurement. The weld reinforcement was removed, care taken to assure that the undercut side of the weld pass would not be disturbed. Rupture strength of all undercut specimens varied only slightly, ranging from a maximum of 75,200 to a minimum of 74,400 psi. These data and the elongation indicate that the undercut zone did not experience mechanical property deterioration behavior to be expected of material in the minimum 60,000 psi strength range for specimens which are not sharply notched.

The shape of a typical notch in a severely undercut sample is shown by the cross sections presented below at 1X and at 3X magnification. Attention is directed to the wide span at the surface of the undercut. This condition, noted for all the severely undercut material was expected, owing to the melting action which caused undercut to occur and the position of the test plate during the bead on plate weld deposition.

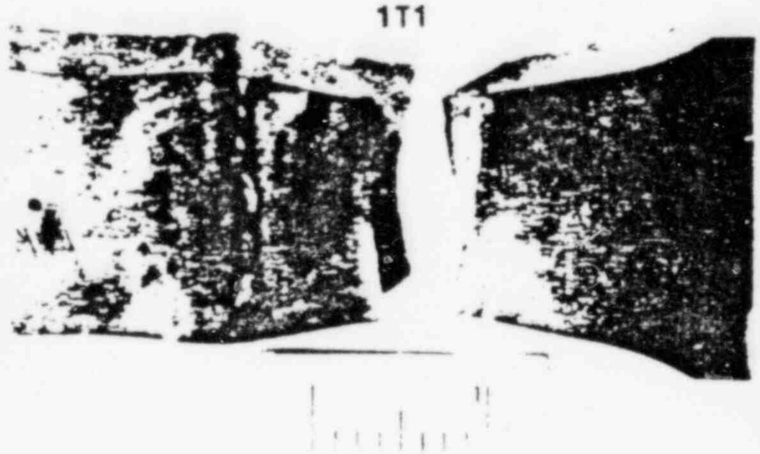
PRELIMINARY

Test Results (Cont'd.)

Several photos of the tensile specimens showing undercut presence before testing and failure locations of ruptured samples are presented below.



1T1



2T1

3T1

Fig. A is presented to show that the undercut portion of the test plate was not disturbed in tensile specimen preparation. The ruptured test material shows that failure had taken place in the undercut region as well as, in the other samples, base metal removed from the undercut zone. Attention is directed to the amount of elongation which occurred in the undercut zone of test samples IT-1 and 3T-1.

PRELIMINARY

Discussion

The absence of sharp notches in the undercut zone of welds deposited in the horizontal (2G) position is expected to be difficult to accept. Also unexpected is the insensitivity of the undercut notched specimens, stressed in tension, to anticipated reduced rupture strengths.

The rounded root present in the undercut, is the result of the plane in which the weld was deposited, simulating that of production fillet welds, and the melting action of the arc. Rupture strength variances insensitivity, as affected by the tensile bar thickness reductions at the undercut, appears to have been caused by its presence in the weld heat affected zone, specifically the rapid cool from welding temperatures. The relatively mild hardenability and toughness of steels generally selected for structural framing applications are the reasons for the tensile behavior reported in this study.

Conclusion

The conclusion drawn from this evaluation is that a weld undercut depth up to 1/16 inch, in steels produced to a minimum specified tensile strength of 60,000 psi is not deleterious to its service performance.

L. M. Petrick
August 12, 1983

APP-001
Rev. 18
2/ .82

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1

FCR/ H-979 Rev 3

ORIGINAL

Type of Request:

- ☐ Permanent Waiver to "use-as-is"
- ☑ Field Change
- ☑ See Recommended Action

- ☑ Non-ASME
- ☐ ASME Section III Division 1
- ☐ ASME Section III Division 2
- ☑ Q ☐ Non-Q

Nonconformance ☑ No ☐ Yes Report No.________

Identification of Area and Item:

Shop and field weld inspection of Bergen-Paterson Pipe Hangers (clarification of design requirements)

Conflict/Condition

Reference Documents or Attachment CAR-SH-M-30 Rev 15

Field and shop welds are not being inspected to the same criteria on B-P pipe hangers.

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②
DEC 15 1982
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Recommended Action:

- ☐ Please Investigate and Resolve
- ☑ Please Resolve as Follows

Allow the visual inspection criteria on sheets 3, 4, and 5 to be used for all field and shop welds on B-P pipe hangers. The general provisions of AWS D1.1 (workmanship, technique, and other NDE criteria) will still be used.

Justification:

This provides a common inspection procedure for both field and shop welds that is in accordance with B-P procedures.

000614

Requested by:		Site Approval:	
[signature]	12/10/82	[signature] for MFT	12-10-82
Discipline Engineer	Date	Senior Resident Engineer	Date

FCR H-979 Rev 3

Design Organization Approval ☐ AE ☐ NSSS ☒ NPED Only ☐ Other

Telephone Resolution ☐ Yes ☐ No

Design Organization Attachments ☐ Yes ☐ No

☐ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed

Comments:

Signature	Title	Date	Signature	Title	Date

CP&L Harris Plant Engineering Approval

HPES Attachments ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

George E White — Discipline Engineer — Date 12/10/82

J Fifeell — MHPE or PE — Date 12/13/82

Site Concurrence: Recommend ☒ Implementation

☐ Alternate Resolution

☐ Rejected

E.E. Willets for MFT 12-13-82 — Senior Resident Engineer — Date

Distribution:
(Original) Document Control
(Copy)
(Copy)

(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer — Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
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VISUAL INSPECTION CRITERIA OF FIELD AND SHOP WELDS

1. The area to be examined shall be sufficiently free from foreign matter to allow for examination of the weld area. Shop welds may be inspected through paint.

2. Surfaces and edges to be welded shall be smooth, uniform and free from fins, tears, cracks, and other discontinuities which would adversly affect the quality or strength of the weld.

3. Check to assure the weld has no cracks.

4. Check to assure that complete fusion exists between weld and base metal and adjacent layers of weld metal. Indications of apparent lack of fusion which do not exceed 1/4" in length shall be considered acceptable. Total length of such indications shall not exceed 1/4" in any six inches of continous wel

5. Check to assure that all crators are filled to the full cross section of the weld.

6. Confirm the weld profiles are in accordance with the illustrations outlined on figure #1.

7. A fillet weld in any single continous weld shall be permitted to underrun the nominal fillet weld size required by 1/16" without correction, provided that the cumulative length of undersized weld does not exceed 10% of the length of the weld. On web-to-flange welds on girders no underrun is permitted at the ends for a length equal to twice the width of the flange.

8. Check to assure that any conditions of undercut do not exceed 1/32" in depth.

9. Surface porosity shall be less than 1/16" in size of greatest dimension. The sum of the greatest dimensions of porosity shall not exceed 3/8" in any linear inch of weld. Piping porosity in fillet welds shall not exceed one in four inches of weld length and the maximum diameter shall not exceed 3/32" in size.

10. Skewed tee fillets and flare bevel groove welds shall be measured in accordance with the outlined illustration in figure #2.

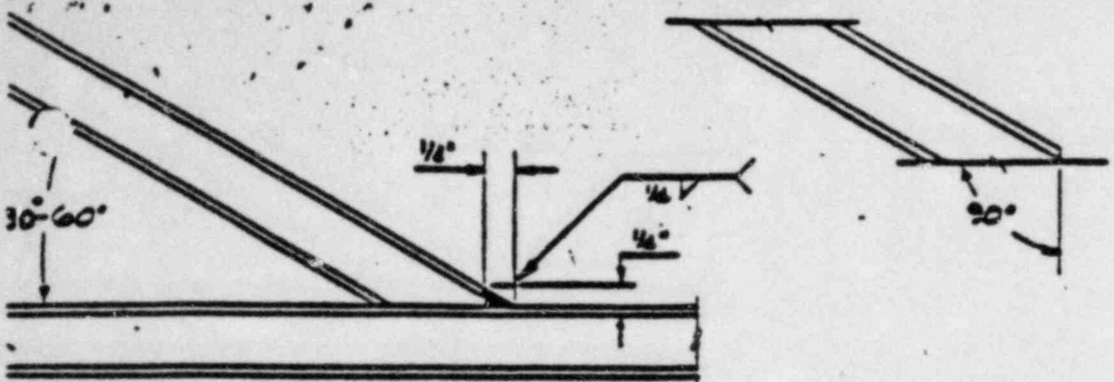
11. When the toe of a fillet extends into the radius of a tube steel member and that leg is determined to be undersized, a check shall be made to confirm that the undersized leg is equal to the theoretical effective throat. The entire profile of the weld shall be equal to or greater than the theoretical effective throat. (see figure #3)

12. Tight adhering weld spatter is acceptable.

13. Arc strikes 1/16" or less shall be considered acceptable provided the base metal or deposited metal is not cracked and there is no bimetallic inclusion (copper, stainless steel filler metal).

14. Non-structural and cap welds shall meet the above acceptance criteria except that indications less than 3/16" in length per one inch of weld length shall be considered non-revelant.

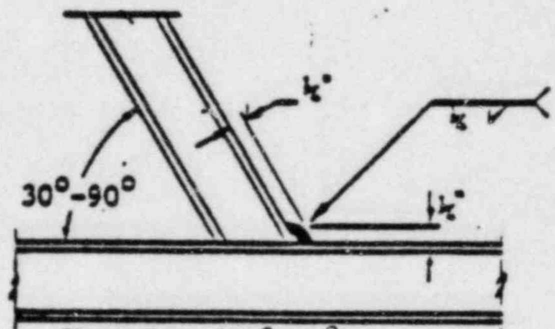
Figure 2



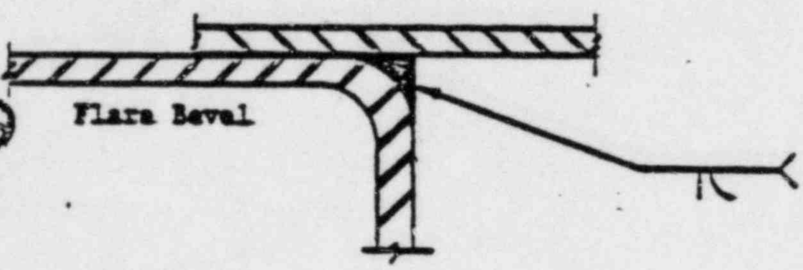
Skew-Tee (30° - 60°)

Optional End Prep

See above option for 30°-60° welds



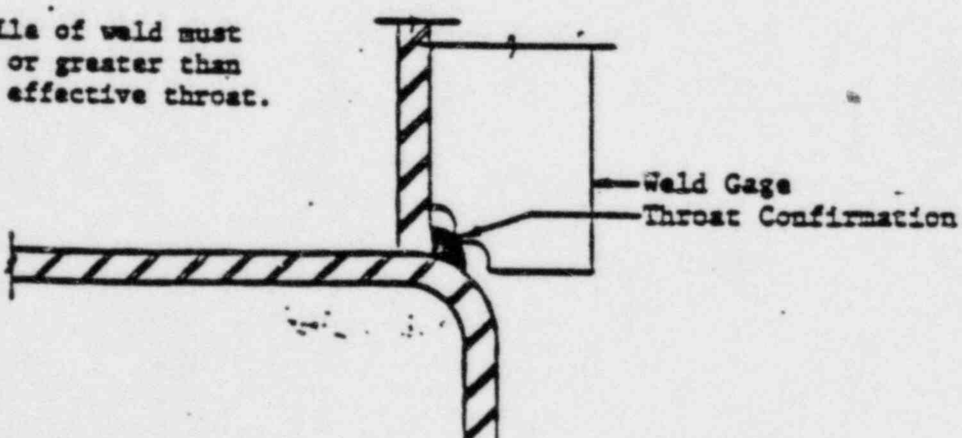
Skew-Tee (30°-90°)



Flare Beval

Figure 3

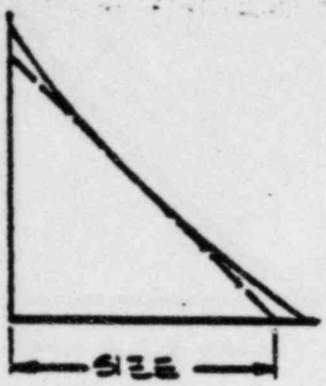
Entire profile of weld must be equal to or greater than theoretical effective throat.

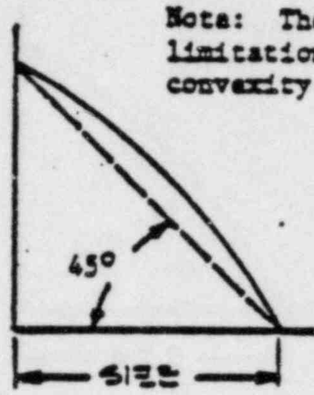


ILLUSTRATIONS OF WELD PROFILES

Sheet 4 of 5
FCR-H-979 Rev-3

Note: There is no limitation on excessiv convexity





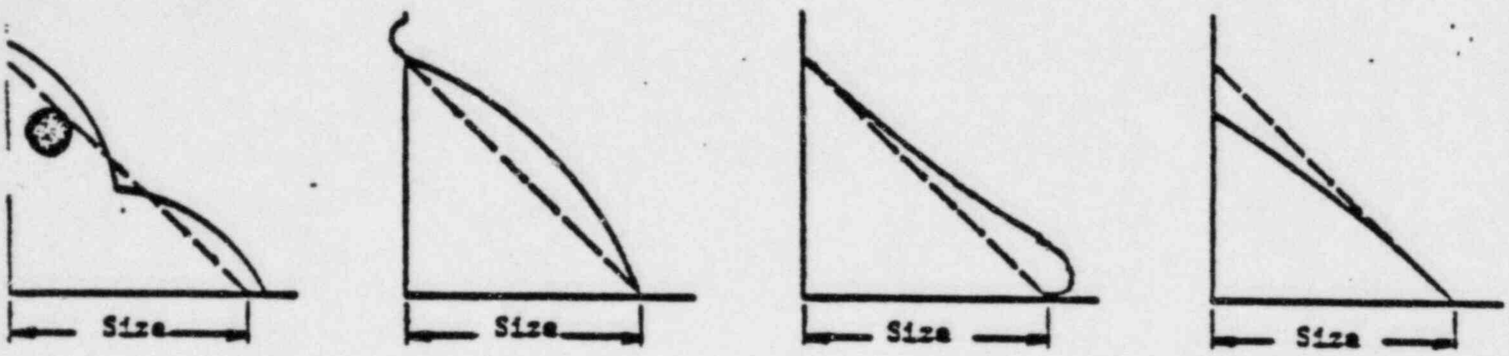
Desirable Fillet Weld Profile

Insufficient Throat

Undercut

Overlap without fusion

Insufficient Leg

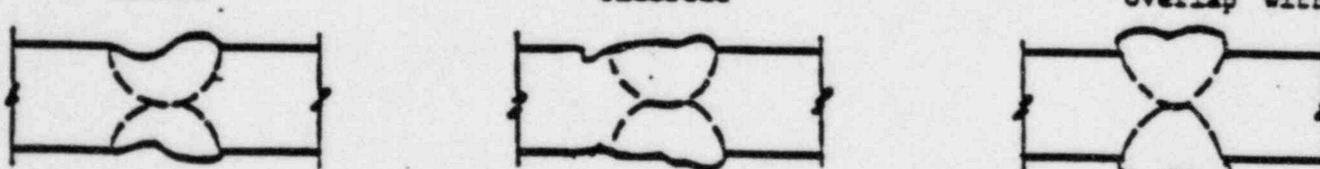


Unacceptable Fillet Weld Profiles

Insufficient Throat

Excessive Undercut

Overlap without fusion



Unacceptable Butt Weld Profiles

Weld Inspection Criteria 2163-G-003 R/4

1.0 SCOPE

The intent of this design document is to provide the CP&L QA program with acceptance criteria that satisfies the design requirements and thereby allowing clarification from strict code interpretation during receipt inspection, reinspection, and field welding inspection. This criteria is applicable to both primary (first inspection, uncoated) and secondary inspections (receipt inspection included with quality release or reinspection, coated) for structural weldments designed to AWS D1.1 requirements. Secondary inspections may be performed through coatings. Primary inspections shall not be allowed through coatings unless allowed by the engineer. Any item not specifically covered in this criteria shall refer back to AWS D1.1.

This criteria covers joints which provide framing for components, such as cable tray, HVAC, conduit supports, instrument racks, ducting air control dampers, doors, hatch covers, pipe supports, etc. This is to include any item welded to AWS D1.1 standards.

This criteria is applicable to any weld joint where these imperfections are to be visually inspected per AWS D1.1.

As per AWS D1.1, welds with acceptable imperfections in combination shall be acceptable.

Based on the QA programs for acceptance prior to vendor release (or acceptance of field welds), any defects not identified during primary inspection and subsequently covered by coatings are not considered significant.

Visual inspection of welds shall be in accordance with AWS D1.1 except as modified below:

All visual inspection shall be performed at an eye-to-examination surface distance of no more than 24 inches, the inspector position within an angular region of 30 to 90 of the examination surface by personnel possessing 20/20 visual acuity. Visual aids which do not enhance 1X capability, such as mirrors, may be used. Visual inspection shall be used unless otherwise noted on design documents.

2.0 ACCEPTABILITY CRITERIA

2.1 Oversize Fillet Welds

Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be used in lieu of intermittent welds.

2.2 Undersize Fillet Welds

The leg of 1/4" and larger fillet welds may be 1/16" less than the required weld size for a continuous span of 2", provided there is no less than a 6" separation between each undersize increment. For welds less than 8" long, a continuous undersize span of 25% of the total weld run length will also apply. All 1/16" undersize increments less than 1/2" in length will be acceptable. For intermittent welds, 1/16" less than that required size will be accepted provided the undersize condition is no more than 40% of the weld length.

The leg of 3/16" fillet welds may be 1/32" less than the required according to the above provisions or 1/16" less for 10% of the length.

It is to be understood that the thickness of coatings on secondary inspections are not considered detrimental and the weld size criteria shall not be adjusted. Any unique application of coatings (excessive thickness, putty) shall be brought to the attention of QA management for resolution.

2.3 Porosity

Pores between 1/16" and 1/8" diameter shall be acceptable when separated by a minimum of one inch. Isolated pores less than 1/16" diameter shall be disregarded. Clustered porosity including all sizes to 0.030" contained within up to a 3/8" diameter circle shall be acceptable. Linear, in-line pores shall be considered as clustered porosity. It is to be understood that porosity not visible through coatings on secondary inspection are not considered significant.

2.4 Weld Profile

Fillet and butt weld convexity can be accepted without limit.

2.5 Craters

Welds may have underfilled craters provided underfill depth does not exceed 1/16" and the crater has a smooth contour blending gradually with the adjacent weld and base metal with no evidence of cracking.

2.6 Undercut

Steels 5/16" or thicker which were produced to a maximum specified tensile strength of 60,000 psi may contain weld undercut up to 1/16" in depth for a continuous span of 2" provided its surface width is less than 0.100" and there is no less than a 6" separation between each undercut increment.

Weld runs less than 8" long may contain a continuous undercut span of 25% of the total weld length. All undercut less than 1/2" in length will be accepted provided the above width limit is adhered to. Undercut up to 1/32" depth is acceptable in all steels and all thicknesses.

2.7 Cracks

Cracks are unacceptable. It is to be understood that secondary inspections are intended to identify cracks that result from shipping damage or stress relief and, if relevant, would appear through the coating.

2.8 Arc Strikes

Arc strikes in high-strength, low-alloy steels (minimum specified tensile strength greater than 60,000 psi), shall be removed by grinding. The ground area shall be visually inspected to assure complete removal of the arc strike.

For other maximum specified 60,000 psi tensile steels, arc strikes shall be visually examined and accepted if no cracking is evident. If cracking is evident, the repair shall conform with Section 3.10 of AWS D1.1. Arc strike regions in these lower strength steels shall not require power brushing or grinding before visual examination. It is to be understood that cracks in arc strikes not visible through coatings on secondary inspections are not considered significant.

2.9 Fusion

Lack of fusion which does not exceed 1/4" in length when measured transverse or along the weld and each increment separated by 6" is acceptable.

Criteria for lack of fusion in transverse direction is applicable only in start/stop location.

Criteria for lack of fusion shall apply to overlap also. It is to be understood that lack of fusion not visible through coatings on secondary inspections is not considered significant. Any unique application of coatings (excessive thickness, putty) shall be brought to the attention of QA management for resolution.

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PROCEDURE CHANGE NOTICE

Procedure No. WP-139   Revision No. 0   Change No. 2

Procedure Title Pipe Hanger Work Package Preparation

Applicable - FCR's: ______   DCN's: ______

Affected Paragraphs	Description of Change
4.5.1.1	the designated joints. (Add) Nonstructural Endcaps attaching to tube steel do not require "Joint Mapping" since the welds or endcap do not require inspection. Note: See section 4.5.1.3 ...

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APR 04 1984
SHEARON HARRIS N. P. P.

The approval of this Procedure Change Notice authorizes deviation from the named procedure to the extent described above.

The holder of the affected procedure shall retain this notice with the procedure until the next procedure revision is in effect.

APPROVALS		DATE
ORIGINATOR	[signature]	3-28-84
QA/QC REVIEW	[signature]	3/30/84
CP&L	[signature] for MFT	4/2/84

00619

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

PROCEDURE CHANGE NOTICE

Procedure No. WP-139 Revision No. 0 Change No. 1

Procedure Title Pipe Hanger Work Package Preparation

DOCUMENT CONTROL
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FEB 1 7 1984
SHEARON HARRIS N. P. P.

Applicable - FCR's: ______ DCN's: ______

Affected Paragraphs	Description of Change
4.5.1.3	(Revise to Read)
	SWDR-WPG Engineer will .....(site) welded joints.
	Shopwelded .... listed on the SWDR.
	Note: The Main Steam B-Wall Supports as
	designated by Appendix H of WP-110 do not
	require the shop welded joints to be identified
	on the controlled copy of the hanger sketch,
	there fore shop welded joints will not be listed
	on the SWDR.
	Field welded joints .... under joint I.D.

The approval of this Procedure Change Notice authorizes deviation from the named procedure to the extent described above.

The holder of the affected procedure shall retain this notice with the procedure until the next procedure revision is in effect.

APPROVALS		DATE
ORIGINATOR	Randy [signature]	2-14-84
QA/QC REVIEW	[signature]	2/15/84
CP&L	[signature] for MFT	2/16/84

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

WORK PROCEDURE

WP-139

DOCUMENT CONTROL
RECEIVED
DEC 5 1983
SHEARON HARRIS N. P. P.
Rev. 0

* * REVIEWED BY QA/QC FOR COMPLIANCE WITH THE APPLICABLE QA AND CODE REQUIREMENTS.

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3100 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
0	Issued For Use.	ORIGINATOR	Robt C Dunn	12/2/83
		CONSTRUCTOR	W. D. Goodwin	12-02-
		QA/QC REVIEW * *	M. M. Pugh	12/2/8
		CP&L	[illegible] for MFT	12/2/8
		DES. ENG. *	N/A [illegible] for MFT	12/2/8
		ORIGINATOR		
		CONSTRUCTOR		
		QA/QC REVIEW * *		
		CP&L		
		DES. ENG. *		
		ORIGINATOR		
		CONSTRUCTOR		
		QA/QC REVIEW * *		
		CP&L		
		DES. ENG. *		

1.0 **SCOPE**

1.1 The purpose of this procedure is to delineate the functions of the Work Package Group (WPG) and describe the steps to be taken in the preparation and control of a pipe hanger work package.

Note: Due to the major changes to present practices, detailed in this procedure, all packages issued for construction shall be in compliance with this procedure within ninety (90) days after procedure issuance from Document Control. No hanger packages shall be Final Accepted by CI and QC unless in compliance with this procedure and WP-110.

2.0 **REFERENCES**

2.1 WP-110, Installation of Seismic Hangers and Supports for Seismically Analyzed Pipe

2.2 WP-140, QA Records Review

2.3 WP-33, Installation of Wedge Expansion Bolt Anchors

2.4 AP-XIII-08, Material Issue

2.5 QCI-19.3, Seismic Pipe Hanger Construction Documentation System

2.6 WP-42, Installation of Maxi-Bolts, Undercut Expansion Anchors

3.0 **GENERAL**

3.1 This section outlines the phases of the work package preparation and the actions taken during each phase.

1. The end result of the operations described below is to assure that the work package, issued to construction, is free from apparent problems. The operations will include, but are not limited to, the following:

3.2 Computer Control (CC) will create a computerized record of supports listing all pertinent data relative to the supports and will track their progress through the entire installation and review process.

3.3 An Initial Review (IR) is to be performed on each support detail drawing to be sure that there are no obvious problems with the detail drawing or with its ancillary attachment points.

3.4 A Material Verification (MV) will also be performed to determine that the necessary material is available for construction and meets the minimum requirement for the design installation.

3.5 A Hanger Installation Checkout (HIC), will be conducted in the field to identify interferences and/or construction errors that would prevent the support from being installed as designed.

3.6 Final Package Preparation (PP) will include the assembly of required quality documents and necessary instructions into the Work Package to be issued for construction and inspection.

3.7 An Internal Package Control (PC) will be responsible for maintaining an orderly document file and to provide a controlled issuance of the Work Packages.

4.0 **PROCEDURE**

4.1 Computer Control Functions

1. New drawing issues from Document Control
    1. Create new record, enter all available data.
    2. Create hanger folder and transmit to Package Control.
    3. Issue a "Screen Print" to engineer as notification that the hanger is available for review (Exhibit 2).
2. Drawing Revision from Document Control
    1. Update records with new or changed data.
    2. Issue recall notices (1) Package Control, (1) Hanger Superintendent, (1) CC File (Exhibit 3).
    3. Issue a "screen print" to engineer as notification to work.
3. Provide on request, lists of supports available for review, supports available for issue and supports in field being worked. Other lists may be requested depending upon the subject under investigation.
4. Maintain a continual status and location update.

5. Monitor outstanding documents and their resolution.

4.2 The Initial Review will consist of:

1. For Original Issue
   1. A cursory review of the support detail drawing for legibility of dimensions, weld symbols and presence of sufficient information for erection.
   2. Investigate the status of ancillary attachment points (other supports, framing steel, etc.) as depicted on detail drawing.
   3. Issue drawings that have no apparent problems to the HIC for field survey.
2. For Subsequent Revisions
   1. Review for legibility and definition of revision.
   2. Determine possible impact on construction.
   3. Establish necessary routing of revision (HIC, Material Verification, etc.)

4.3 The Hanger Installation Checkout will include:

1. A detailed dimensional check and calculations required to verify or provide dimensions necessary to the layout and future installation of the support.
2. Establishing control points using existing monuments and reference marks and the attachment of location stickers.
3. Use the established control points, check for potential interferences, misplaced embeds and conditions that would prevent the installation of the support in accordance with the detail drawing.
4. Deficiencies, resulting from the above checkout, will be the subject of a MOD or PHP depending upon the severity of the problem. (Appendix A) (Appendix B)
5. Support detail drawing utilizing anchor plates will require an anchor plate layout and the preparation of a sketch which will be transmitted to Harris Plant Engineering Section (HPES) for review and base plate design.

6. Upon receipt of the base plate design an Anchor Placement Record (APR) is prepared and issued for base plate installation. (Appendix C)

   Note: Completed and accepted APR's are returned to the WPG as notification that the work package can be issued to construction.

7. Supports that attach to embedded engineered plates will require investigation by the Area Engineer as to the thickness of the embedded plate. This information is to be entered on the support traveler for use by the Weld Engineer to determine preheat requirements.

4.4 Material Verification will consist of the following:

1. The WPG Office Engineer will:
   1. Review the C.C. screen to determine the revision level of the material received and that nonconformances have been closed out.
   2. Review the Warehouse Material Received screen to verify that all items have actually been received.
   3. Prepare the Construction Material Request (CMR) for supports ready to be issued to construction (Appendix F).
2. The WPG Warehouse Engineer will:
   1. Upon receipt of a Support Material Receiving Report (MRR), create a record of the material received by support number, bill of material item number and description. This record will be updated to reflect material changes, additions and deletions as future drawing revisions dictate (Exhibit 4).
   2. Investigate CMR's for material replacement or field supplied material (for design revisions) using "Surplus" seismic parts to ascertain that the source as stated actually exists and has a Certificate of Conformance. The CMR should be stamped "Source Accepted", initialed and dated.

3. Fill out the Material Verification Form to document the material issued to construction (Appendix E).

4.5 Work Package Preparation:

1. Work packages having no apparent problems or outstanding documents will have the following sheets prepared and/or assembled and inserted into the Work Package prior to issuance:

   1. Support Drawing- Verify that the latest revision is in the package and that all documents reflect that same revision. The engineer will perform a "Joint Mapping" operation on the support drawing. All joints will be assigned an alpha-numeric number with a leader indicating the designated joint.

      Note: See section 4.5.1.3 for the weld designations and SWDR application.

   2. Traveler- WPG Engineer will enter applicable portion of heading and data (Appendix G).

   3. SWDR- WPG Engineer will enter applicable portion of the heading and itemized weld joint description for field (site) welded joints.

      Shop welded joints will be identified as SJ-1, SJ-2, etc. on the controlled copy of the hanger sketch but will not be listed on the SWDR.

      Field welded joints will be identified as FJ-1, FJ-2, etc., on the controlled copy of the hanger sketch and listed on the SWDR under joint I.D.

      All field joints requiring complete cut-out and rewelding will have a letter suffix designation beginning with "A" to the joint number and will continue in ascending sequence for subsequent cut-outs. (i.e. FJ1A indicates that field joint

No. 1 has been completely cut-out and rewelded one time. FJ3 B indicates that field joint No. 3 has been completely cut-out and rewelded twice.)

Shop welded joints completely cut-out and rewelded will be redesignated as field joints and listed on the SWDR. Both shop welded joints and field welded joints that require rework by welding, will have a suffix designation of "RW" to the joint number and a numerical identification in ascending sequence (i.e., FJ1RW1 indicates that field joint No. has been reworked once after initial QC acceptance. SJ3RW2 indicates that shop joint No. 3 has been reworked, on site, twice after initial QC acceptance.)

Note: The suffix designations and changing of shop joints to field joints will only show work activity after initial itemized joint identification on the hanger sketch and SWDR.

4. Work Directive- WPG Engineer will prepare the Work Directive giving detailed installation instructions. (Appendix "H")
5. Material Verification - See Paragraph 4.4.2.3.
6. Anchor Placement Record - The completed and approved APR is to be in the package to verify that the anchor plate has been installed.
7. Modification Sheet - White copy is to be included to show installation deviations and to permit construction to proceed.

2. Other documents pertinent to the hanger drawing will be retained in the PC files until the Work Package is ready for WPG-Final Review.

4.6 The completed Work Package will then be transmitted to the Welding Engineer (WE) for a detailed weld check and for the annotation of the weld procedure, filler metal, weld instructions and signature on the SWDR.

4.7 Quality Control (QC) will review the package and insert desired hold points on the SWDR and signs to release.

4.8 Upon completion of the WE and QC review, the WPG will perform a final review of the Work Package to assure that all necessary documents are present and complete.

4.9 The work package is to be transmitted to construction.

4.10 Package Control

1. The primary purpose of the Package Control (PC) section is to provide a central location for the assembly and storage of the Work Packages and to establish a control and record of their issuance.
2. PC will create and maintain a file of Work Packages and a manual card file for tracking the location of those issued for work. (Exhibit 5).
3. PC will also be involved in operations such as filing, up-dating Work Packages, distribution of packages and revisions and other tasks pertinent to the operation of the WPG.

5.0 <u>EXHIBITS AND APPENDICES</u>

5.1 Exhibit 1 - Work Package Group Flow Chart (Rev. 0-12/83)

5.2 Exhibit 2 - Computer Control Format Page 1 of 2 (Rev. 0-12/83)

5.3 Exhibit 2 - Directions for Computer Control Format Data Input Page 2 of 2 (Rev. 0-12/83)

5.4 Exhibit 3 - Recall Notice (Rev. 0-12/83)

5.5 Exhibit 4 - Warehouse Material Status (Rev. 0-12/83)

5.6 Exhibit 5 - Package Control Card (Rev. 0-12/83)

5.7 Appendix A - Field Modification (Rev. 0-12/83)

5.8 Appendix B - PHP Transmittal Sheet, Page 1 of 2 (Rev. 0-12/83)

5.9 Appendix B - PHP Transmittal Preparation Sheet, Page 2 of 2 (Rev. 0-12/83)

5.10 Appendix C - Anchor Placement Report, Page 1 of 2 (Rev. 0-12/83)

5.11 Appendix C - Anchor Placement Report Preparation, Page 2 of 2 (Rev. 0-12/83)

5.12 Appendix D - Seismic Weld Data Report, Page 1 of 2 (Rev. 0-12/83)

5.13 Appendix D - Seismic Weld Data Report Preparation, Page 2 of 2 (Rev. 0-12/83)

5.14 Appendix E - Material Verification (Rev. 0-12/83)

5.15 Appendix F - Construction Material Requisition (Rev. 0-12/83)

5.16 Appendix G - Seismic Hanger Installation Traveler, Page 1 of 2 (Rev. 0-12/83)

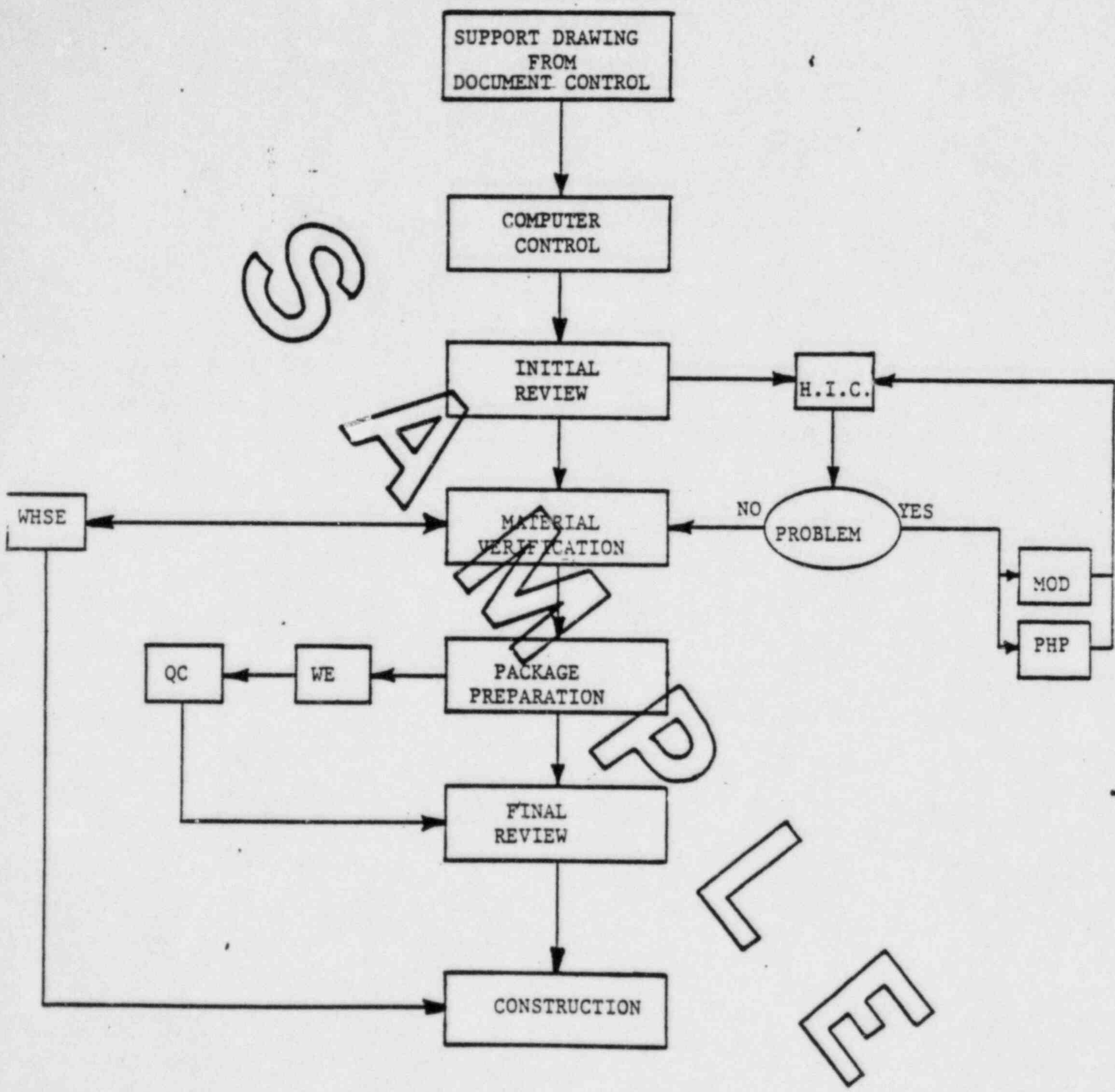
5.17 Appendix G - Seismic Hanger Installation Traveler Preparation, Page 2 of 2 (Rev. 0-12/83)

5.18 Appendix H - Work Directive, Page 1 of 2 (Rev. 0-12/83)

5.19 Appendix H - Work Directive Preparation, Page 2 of 2 (Rev. 0-12/83)

Note: These appendices are shown for reference only and will not be revised in this procedure. For the latest revision of the appendices shown that are exhibits in other approved procedures, see the applicable procedures.

WORK PACKAGE GROUP FLOW CHART



COMPUTER CONTROL FORMAT

R # 1

		14 TYPE	17 HOLDS	HGR STATUS 32
T. REV. 2	INST. REV. 12	___ SNUB.	___ DWG	
W REV. 3	PHASE 13	___ RIGID	___ MAT'L	
NL DATE 4		___ BOX	___ HPES	18 HIC CHECKOUT
RESS 5		___ ANCH	___ NPCD	19 PIPE CHECKOUT
NE 6		___ SPRING	___ FIELD	20 ENG. O.R.
E 7		___ W/WPA	___ QC	
E RPT 8			___ RECALL	21 CI COMPLETE
M RPT 9		WPA 15		22 COMPLETE
		16 INSTALLED		

SMIC 10

TSTANDING DOCUMENTS		TURNOVER	TRANSMITTAL	
11	ADD	25 COLD HYDRO	23	ADD
		26 HOT FUNCT.		LOCATION 24

AS-BUILTS	
	29 CWRA
27 APPROVED	30 REINSPECT.
28 SUBMITTED	

SAMPLE

OMMENTS
31

Rev. 0
12/83

DIRECTIONS FOR COMPUTER CONTROL FORMAT DATA INPUT

ITEM	ENTER BY	
1	WPG-CC	FROM INFO BLOCK ON DWG.
2	WPG-CC	FROM WHSE BILL OF LADING.
3	WPG-CC	FROM INFO BLOCK ON DWG.
4	DAN'L COST	(BASED ON REPORT BY CONSTRUCTION)
5	WPG-CC	FROM INFO BLOCK ON DWG.
6	WPG-CC	FROM INFO BLOCK ON DWG.
7	WPG-CC	FROM INFO BLOCK ON DWG.
8	CPL S/U	DIRECT INPUT
9	CPL S/U	DIRECT INPUT
10	WPG-CC	FROM INFO BLOCK ON DWG.
11	WPG-CC	FROM LOGS, TRANSMITTALS AND DOCUMENTS
12	WPG-CC	FROM COMPLETED TRAVELER
13	DAN'L COST	DIRECT INPUT (W/ITEM 4)
14	WPG-CC	FROM WPG. IR REVIEW
15	PIPE DEPT.	DIRECT INPUT (WPA #__)
16	PIPE DEPT	DIRECT INPUT (BY WPG-CC IF NO # IN 15)
17	AUTO & WPG-CC	FROM WPG ENG, FIELD ENG, & QC (ALSO AUTO PER ITEM 11)
18	WPG-CC	DATE FROM HIC TRANSMITTAL
19	WPG-CC	DATE FROM PIPE DEPT. OR FIELD ENG.
20	WPG-CC	DATE FROM WPG & FIELD ENG.
21	WPG-CC	DATE FROM COMPLETED TRAVELER.
22	WPG-CC	DATE FROM COMPLETED TRAVELER.
23	WPG-CC	LOCATION CODE AND DATE FROM TRANSMITTALS.
24	AUTO	BASED ON ITEM 23
25	WPG-CC	DATA FROM HPES (ESSENTIAL HGRS FOR TEST)
26	WPG-CC	DATA FROM HPES (ESSENTIAL HGRS FOR TEST)
27	WPG-CC	DATA FROM FIELD ENG.
28	WPG-CC	DATA FROM FIELD ENG.
29	WPG-CC	DATE FROM FIELD ENG.
30	WPG-CC	DATE FROM FIELD ENG.
31	WPG-CC	INFO. FROM NOTES BY WPG & FIELD ENG.
32	AUTO	BASED ON ITEM 23 & 17

RECALL NOTICE

Date ______________

TO: ______________________

FROM: Mechanical Work Package Group

SUBJECT: Revised Hanger Drawings

The following hanger drawing revisions have been received in the Mechanical Office. Therefore, nor further work should be done to the old revision currently in the field.

Please return the work packages noted below to the Mechanical Office so the proper revision can be inserted.

Hanger Drawing	RFT	Revision

Rev. 0 | Exhibit 4
12/83 | WP-139

Rev. 0
12/83

Exhibit 4
WP-139

WAREHOUSE MATERIAL STATUS

HGR # ________________

REV. #	MRR #	B/M ITEM	QTY.	DESCRIPTION	MAT'L SPEC.	A. D.	STOR AREA
0/A	1234	1	1	T-5 3'x3'x.250'x2'-6" LG	A500GRB		3B
0/A	1234	2	1	L 2'x2'x3/16"x0'-G" LG	SA36	D	3B
1/B	5678	3	1	T-S. 2'x2'x.250'x0'-6" LG	A500GRB	A	3B

DDR/CAR		OS&D		MRR
	O C	4321	ITEM 3 SHORT	B765

The above shows:

1. Rev. 0/A Mat'l received on MRR#1234 and is stored in area 3B.
2. Rev. 1/B Mat'l received on MRR#5678. That item 3 was added (A) and replaces item 2 item 2 which was deleted (D) and can be put into the surplus area.
3. That any DDR is open (O) or closed-out (C).
4. That an OS&D exists, what is short and the MRR that the item was finally received under.

PACKAGE CONTROL CARD

HGR# ______________________ REV. ________________

ISSUED TO/REV/DATE	RETURN/REV/DATE

Rev. Q
12/83

Appendix A
WP-139

☐ SEISMIC

☐ NON-SEISMIC

FM ______

SH ___ OF ___

(Exhibit -1
WP-110)

FIELD MODIFICATION

CONDITION: ____________________

____

____

____

____

____

____

ENGINEER   DATE

WHITE ORIGINAL IS GOOD FOR 10 DAYS AND IS SUPERCEDED BY A BLUE CONTROLLED COPY.

SAMPLE

BOM

PE HANGER NO	REVISION	MODIFICATION

PROBLEM

Rev. 0
12/83

Appendix B
WP-139
Sheet 1 of 2

CAROLINA POWER & LIGHT COMPANY
PHP TRANSMITAL SHEET

RFT. ______________________

CAT. ______________________

PRIORITY [ ] 1.

ATTENTION : GEORGE WHITE

PHP NO. [ ] 2.

HANGER NO. [ ] - [ ] - [ ] - [ ] - [ ] - H - [ ] 3.

☐ SEISMIC ☐ NON-SEISMIC 4.

REV. [ ] 3.

PROBLEM TYPE 5. ______________________

PROBLEM DESCRIPTION 6. ______________________

7.

SAMPLE

PROBLEM REPORTED BY: 8. DATE

PHP TRANSMITTAL SHEET PREPARATION

ITEM	ENTERED BY	
1	WPG-HIC	INFO FROM SYSTEM ENG.
2	WPG-HIC	ISSUED BY WPG-CC
3	WPG-HIC	FROM DWG TITLE BLOCK
4	WPG-HIC	FROM DWG TITLE BLOCK
5	WPG-HIC	FROM DWG TITLE BLOCK
6	WPG-HIC	BRIEF ACCURATE DESCRIPTION OF PROBLEM
7	WPG-HIC	LEGIBLE SKETCH OF PROBLEM AND/OR RESOLUTION
8	WPG-HIC	ORIGINATOR SIGN AND DATE
9	SUPERV.	INITIAL FOR APPROVAL

Note: Items 1-8 may also be entered by Field or Systems Engineer when pertaining to construction problems.

Category I — Permanent Waiver request to "use as is" the construction or tested configuration.

Category II
- a. A request to correct a design error which "cannot be constructed" or "cannot be operated."
- b. Changes which are minor in nature and enhance construction, operation, and/or testing of the plant while creating little or no design, construction, or operation impact.

Category III, Any design change request not falling in Category I or Category II.

Rev. 0
12/83

Appendix C
WP-139
Sheet 1 of 2

F m No. 80038

Exhibit 1
WP-33

CP&L
SHNPP

ANCHOR PLACEMENT REPORT

1. FILE

2. PLACEMENT NUMBER

IS BEARING GROUT REQUIRED UNDER FIXTURE (3.) YES ☐ NO ☐

SAMPLE

SECTION A (PRELIMINARY APPROVAL)

LOCATION (BUILDING, ELEVATION, DISTANCE FROM COLUMN LINES) (4.)	DATE: (5.)
BOLT (DIAMETER, LENGTH & QUANTITY) (PRELIMINARY) (6.) / ANCHOR TYPE: MAXI-BOLT ☐ PHILLIPS ☐ (7.)	PRIMARY DWG. NO., DCN NO., FCR/PW/PHP NO, ETC. (NEEDED FOR HOLE LOCATION) (8.)
	CONCRETE DESIGN STRENGTH (9.) / RFT NO. (10)
UNIT OF WORK (EQUIP SETTING, STRIP PLATES, ELECTRICAL CONDUIT ETC.) (11)	NAME/TITLE PERSON SUBMITTING THE ABOVE BY: TITLE: (12) DATE:
CONSTRUCTOR SIGNOFF (CRAFT SUPT.) TIME: DATE:	A.E. CHECK FOR EMBEDED PIPES OR CONDUITS COMPLETED MECHANICAL INITIAL: ELECTRICAL INITIAL: CIVIL INITIAL:
FIELD ENGINEER (LOCATION) SIGNOFF TO ASSURE ADEQUATE REFERENCE POINTS ARE PROVIDED TIME: __________ DATE: __________	CONSTRUCTION INSPECTION SIGNOFF DATE: TIME:

REMARKS. (ATTACH RELEVANT REPORTS: IN CASE OF RUNS (IE. CONDUIT & PIPING) PROVIDE SKETCH SHOWING ORIGIN & TERMINATION OF RUN. ONLY ONE RUN PER ANCHOR PLACEMENT REPORT.

(13)

SECTION B (FINAL APPROVAL)

IS CONCRETE PLACEMENT AT LEAST 28 DAYS OLD YES ☐ NO ☐	QUANTITY, LENGTH, DIAMETER OF ANCHORS.
PW/FCR NO __________ RCI NO __________ LIST ALL DOCUMENTS NEEDED FOR ANCHOR INSTALLATION	CONSTRUCTION INSPECTION APPROVAL. TIME: DATE:
DESIGN APPROVAL (AREA ENGINEER) TIME: DATE:	WERE UNUSED HOLES REPAIRED AS REQUIRED ☐ YES ☐ NO

SECTION C (IMPLEMENTATION)

CONSTRUCTION SIGNOFF (CRAFT SUPT.) NAME: __________ DATE: __________	CONSTRUCTION INSPECTOR SIGNOFF NAME: __________ DATE: __________
	INSPECTION SUPERVISOR NAME: __________ DATE: __________

ANCHOR PLACEMENT REPORT PREPARATION

ITEM	ENTER BY	
1	-	LEAVE BLANK
2	WPG-HIC	NUMBER ISSUED BY APR GROUP
3	WPG-HIC	DATA FROM DWG.
4	WPG-HIC	DATA FROM DWG.
5	WPG-HIC	DATA FROM DWG.
6	WPG-HIC	DATA FROM DWG (AND BOLT CHART)
7	WPG-HIC	DATA FROM DWG (AND BOLT CHART)
8	WPG-HIC	ENTER PHP NO.
9	WPG-HIC	DATA FROM CONCRETE CHART
10	WPG-HIC	DATA FROM WORK PACKAGE
11	WPG-HIC	DATA FROM WORK PACKAGE
12	WPG-HIC	DATA FROM WORK PACKAGE
13	WPG-HIC	DATA FROM WORK PACKAGE

Rev. 0
12/83

SEISMIC WELD DATA REPORT
(PROCEDURE CQC-19)

WP-139
Sheet 1 of 2
PAGE ______ OF ______

1. UNIT	2. BUILDING	3. ELEV.	4. LOCATION	5. COMPONENT/HANGER ID.	6. DRAWING, SHT. NO. & CONTRACT NO.	7. WELD PROC.	9. WELD INSTRUCTIONS
1.	2.	3.	4.	5.	6.	9.	11.
DISCIPLINE ENG. 8.		DATE	WELDING ENG./FOREMAN 12.	DATE		8. WELD MTL. TY. 10.	REQUIRED NDE - A-MT/B-PT/C-RT/D-UT PLACE APPROPRIATE LETTER IN REQ. BLK.
RELEASE FOR WELDING QA/QC SPECIALIST: 14			DATE:	NCR / DDR NO.	CLOSED ☐	MAT'L STATUS A ☐ R ☐	INSP INIT. DATE:

JOINT ID. OR * DESCRIPTION & QUANTITY OF WELDS	REVISION		WLDR SYM(S)	10. PREHEAT 13.						11. FIT UP					ROOT EXAMINATION 12. VISUAL					13. NDE						FINAL EXAMINATION 14. VISUAL					15. NDE						16. PWHT					DEFICIENCY ** DESCRIPTION
	DWG	WPS		TEMP	H	A	R	INSP	DATE	H	A	R	INSP	DATE	H	A	R	INSP	DATE	REQ	H	A	R	INSP	DATE	H	A	R	INSP	DATE	REQ	H	A	R	INSP	DATE	H	A	R	INSP	DATE	
7.																																										

SAMPLE

* USE QA-34A TO LIST ADDITIONAL WELDS

** QUANTITATIVE DATA MUST BE LISTED FOR ALL REJECTS

LEGEND: H - HOLDPOINT ✓ IN H COLUMN MEANS HOLD FOR QC.
A - ACCEPT
R - REJECT

REMARKS:

15.

QA/QC SPECIALIST ____________ DATE ____________

SEISMIC WELD DATA REPORT PREPARATION

<u>ITEM</u>

1 Items 1 thru 6 will be filled out by WPG-Eng.

2 Data is obtained from information blocks on detail drawing.

3 Data is obtained from information blocks on detail drawing.

4 Data is obtained from information blocks on detail drawing.

5 Data is obtained from information blocks on detail drawing.

6 Data is obtained from information blocks on detail drawing.

7 WPG-ENG will enter detailed description of all field welds shown on detail dwg. See 4.5.1.3

8 Signature and date by initiating WPG-ENG

9 Requirements entered by Weld. Eng.

10 Requirements entered by Weld. Eng.

11 Requirements entered by Weld. Eng.

12 Signature and date by Weld. Eng.

13 Mandatory hold points entered by Weld. Eng

Desired "Hold" points entered by QA/QC.

14 Signature and date by QA/QC Specialist after Initial Review

15 Signature and date by QA/QC Specialist after Final Review

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

MATERIAL VERIFICATION

Exhibit 4
WP-110

HANGER NO. ________

ITEM # **REV. #**

WAREHOUSE ISSUE VERIFICATION

____ ____ ____ ____ ____
____ ____ ____ ____ ____
____ ____ ____ ____ ____
____ ____ ____ ____ ____

1. These items were part of the as received as issued steel for this hanger.
Warehouse Engr. ________________________ Date __________

FIELD MATERIAL VERIFICATION

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

2. These items were part of the as received-as issued steel for this hanger. This was verified by comparing the as-received and issued revision against the as-constructed revision.

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

3. These items were substituted/added and there is documentation to record the source of the material. The source has been investigated and found to be legitimate with a C of C.

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

4. These items have been stamped for material identification and the material grade conforms with the requirements of the Bill of Materials.

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

5. These items have been etched for material identification and the material grade conforms with the requirement of the Bill of Materials.

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

6. These items are catalog parts.

____ ____ ____ ____
____ ____ ____ ____
____ ____ ____ ____

7. Per sampling program, there is reasonable assurance that the material conforms to the ASTM material grade requirements of the Bill of Materials.

HANGER ENGINEER ____________________________ DATE ____________

REV. __________

B = bolt - list with 4 or 7
N = nut - list with 4 or 7
L = load pin - list with 5 - no sampling is permissible
S = shim - list with 4, 5, or 7

Appendix F
WP-139

CAROLINA POWER & LIGHT CO.

CONSTRUCTION MATERIAL REQUISITION

Exhibit 1
AP-XIII-08

SHNPP

Material Requisition No. 82063

Requisitioner: ______

Craft/Crew No. ______

Need Date: ______

:. at Warehouse ______ Time: ______ Rec'd By ______

:ed and Tagged By: ______

:. at Staging ______ Time: ______ Rec'd By ______

:pped ______ Time: ______ Rec'd By ______

ESCRIPTION OF MATERIAL & TAG NUMBER	P.O. #	Q/C

SAMPLE

AUTHORITY ISSUED

BADGE NO. FOREMAN OR SUPT. WAREHOUSEMAN

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12/83

CAROLINA POWER & LIGHT COMPANY
S.H.N.P.P.
SEISMIC HANGER INSTALLATION TRAVELER

Appendix G
WP-139
Sheet 1 of 2

1. ________ HANGER NO.

2. ________ STRESS NO.

3. ________ REF. NO.

4. ________ LINE NO.

		ITEM TO ENGR. PL. (TYPE)	THK
FCR/PW/DCN			
RCI	7.	5.	6.
WD			
MAT. REQ			
APR NO.			

	PROCEDURE	INITIAL	DATE	ITEMS TACKED WITH GAPS	COMMENTS
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				
	QC:				
REV:	FIELD: FITUP				
	CI:				
PHASE:	FIELD: WELDOUT				

SAMPLE

SEISMIC HANGER INSTALLATION TRAVELER PREPARATION

ITEM	ENTER BY	
1	WPG-PP	DATA FROM DWG TITLE BLOCK
2	WPG-PP	DATA FROM DWG TITLE BLOCK
3	WPG-PP	FROM WORK PACKAGE
4	WPG-PP	FROM FACE OF DWG.
5	AREA ENGR	
6	AREA ENGR	
7	ORIGINATOR	FROM WPG-CC SCREEN OR LOGS

WD — ①

WORK DIRECTIVE

PIPE HANGER No. ② REV. ②

③

④		④		④	
COMPLETED (HANGER FOREMAN)	DATE	ACKNOWLEDGED (C.I.)	DATE	ACKNOWLEDGED (Q.C.)	DATE

④	
ACKNOWLEDGED (WELDING SUPV. FOR NON-Q)	DATE

WORK DIRECTIVE PREPARATION

ITEM	ENTER BY	
1	WPG-PP	NUMBER ASSIGNED BY WPG-CC
2	WPG-PP	FROM DWG TITLE BLOCK
3	WPG-PP	DETAILED DESCRIPTION OF WORK TO PERFORM AND INSPECT
4	AS REQ'D	SIGNATURES OF THOSE REQUESTED ON FORM

Note: Items 1-3 may also be entered by Field or Systems Engineers as applicable.

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY

CORPORATE QUALITY ASSURANCE DEPARTMENT

ENGINEERING AND CONSTRUCTION QUALITY ASSURANCE/QUALITY CONTROL SECTION

SEISMIC PIPE HANGER INSPECTION DOCUMENTATION SYSTEM

NUMBER: QCI-19.3		INITIAL ISSUE DATE: September 13, 1982
RECOMMENDED FOR APPROVAL BY: AB Fuestone for F. Taylor QA/QC SUPERVISOR		APPROVED BY: G L [illegible] DIRECTOR - QA/QC

000320.

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT
QA/QC - HARRIS PLANT SECTION

NUMBER	REVISION
QCI-19.3	8

TITLE: SEISMIC PIPE HANGER INSTALLATION DOCUMENTATION SYSTEM

REVISION RECORD

Changes and additions are indicated by a vertical bar in the right-hand margin of the revised page(s). Manual holder is to replace affected pages only. This record is to be retained behind the title page of the instruction.

Rev.	Description	Signatures	Date
2	MAJOR REWRITE *ALL PAGES HAVE BEEN REVISED DUE TO SECTION NAME CHANGE.	Prepared By: O. D. [illegible]	3/21/83
		Approved By: G. L. Forehand	3/21/83
3	*ALL PAGES HAVE BEEN REVISED DUE TO FORMAT CHANGE WITH THE EXCEPTION OF THE EXHIBITS.	Prepared By: Ward Mever	8/31/83
		Approved By: G. L. Forehand	8/31/83
4	Para. 6.8 (Add) Para. 4.1.4	Prepared By: Ward Mever	9/22/83
		Approved By: A. McGaw	9-22-83
5	Para. 6.8	Prepared By: Ward Mever	10/5/83
		Approved By: G. L. Forehand	10/5/83
6	Paragraphs 3.5; 5.1.7	Prepared By: Ward Mever	10/26/83
		Approved By: A. McGaw	10-26-83
7	Paras. 5.1.3; 5.1.7; 6.3	Prepared By: Ward Mever	12/12/83
		Approved By: A. McGaw	12-12-83
8	MAJOR REWRITE; ALL PAGES HAVE BEEN REVISED WITH EXCEPTION OF ATT. 2, 2A, 3, 3A (deleted)	Prepared By: Ward Mever	2-17-84
		Approved By: A. McGaw	2-17-84
		Prepared By:	
		Approved By:	

LIST OF EFFECTIVE PAGES

Page No.	Rev. No.
1	5
2	5
3	4
4	5
5	6
6	5
7	Delete
Attachment 1	1
Attachment 2	Delete
Attachment 2A	Delete
Attachment 3	Delete
Attachment 3A	Delete

CONTROLLED DOCUMENT

CAROLINA POWER & LIGHT COMPANY CORPORATE QUALITY ASSURANCE DEPARTMENT QA/QC - HARRIS PLANT SECTION	NUMBER QCI-19.3	REVISION 5

TITLE: SEISMIC PIPE HANGER INSPECTION DOCUMENTATION SYSTEM

1.0 PURPOSE

To provide guidelines for the completion of the Seismic Weld Data Report, ensure consistency in the documentation of pipe hanger weld inspections and identify weld inspection criteria.

2.0 SCOPE

This instruction applies to weld inspections and reinspections of Seismic I pipe hanger field welds.

3.0 REFERENCES

3.1 Procedure CQC-19, Weld Control
3.2 Procedure WP-110, Installation of Safety Related Seismic Class I Pipe Hangers
3.3 Procedure MP-08, General Welding Procedure for Structural Steel (Seismic and Non-Seismic) and Pipe Hangers
3.4 Instruction QCI-19.4, Preparation and Submittal of Seismic I Weld Data Reports
3.5 CAR-2165-A-003, Weld Inspection Criteria
3.6 Procedure NDEP-605, Visual Inspection of Seismic I, Structural and Hanger Welds (SHNPP)
3.7 Procedure WP-139, Pipe Hanger Work Package Preparation
3.8 Procedure WP-140, Final Engineering Review of Documentation for Seismic Pipe Hangers and Supports
3.9 Procedure CQA-3, Nonconformance Control

4.0 INSTRUCTION

4.1 Initiation of SWDR

4.1.1 Welding QC will receive the Seismic Weld Data Report (SWDR) from Welding Engineering.

4.1.2 The QA/QC Specialist/designee shall review the SWDR for accuracy and completeness, ensure the correct weld procedure and filler material hve been specified, enter additional holdpoints as required, sign and date in the "Release for Welding" block.

Note: The drawing revision including any applied modifications shall be entered next to the signature in the "Release for Welding" block.

4.1.3 All copies of the SWDR will be routed back to the Work Package Group after review.

4.1.4 A new SWDR shall be used for reinspections except as clarified in Para. 5.1. Attach the original SWDR and other documentation needed to substantiate previous weld inspection (i.e. preheat, fitup, root, final inspections, etc.).

4.2 Field Inspection

4.2.1 The QC Inspector shall verify the preheat, fitup and root NDE holdpoints, as applicable, when notified by the craft. All field welds which have not been inspected will be inspected to the latest revision of the drawing in the hanger package. Acceptance criteria will be in accordance with Reference 3.5.

4.2.2 The QC Inspector shall verify increase in fillet weld sizes due to fitup gaps, as applicable, in accordance with Reference 3.2.

Note: CI was not required to document fitups prior to issuance of Reference 3.2, Revision 6, dated 12/4/81. When encountering hangers welded before that date, the gap shall be considered less than 1/16" unless there is visual evidence that the gap is equal to or greater than 1/16", in which case an increase in the fillet weld size shall be in accordance with Reference 3.5.

4.2.3 All field weld inspections will be documented on the SWDR for individual inspections performed in accordance with Reference 3.7.

4.2.4 During final inspection, the QC Inspector will ensure that all field welds have been inspected. Any welds that have not been inspected and accepted will be inspected and documented at this time. Prior to signing off on the SWDR for acceptable welds, the QC Inspector shall verify the status of surplus stock used on the hanger, in accordance with Reference 3.2, Appendix J. Ensure any other document sign-offs required by Reference 3.2 and 3.7 have been signed. After inspection has been completed the hanger package will be reviewed in accordance with Paragraph 7.0.

5.0 INSTRUCTIONS FOR MAKING ENTRIES ON FORMS

5.1 Upon completion of each individual inspection, if the weld is acceptable, the QC Inspector shall check "Accept" in the appropriate block on the SWDR, initial and date. If the weld is unacceptable, he shall check "Reject" in the appropriate block on the SWDR, but not initial and date. He shall then document the quantitative data of the rejection in the deficiency/description block using the defect code chart (Attachment 1), initial and date. After the deficiencies are corrected and the weld has been reinspected and accepted, the QC Inspector will check the appropriate "Accept" block on the SWDR, initial and date.

5.2 NCR numbers are to be recorded in the appropriate section of the SWDR, as applicable.

5.3 The QC Inspector shall enter in the appropriate block on the SWDR the revision of the drawing (including field modification numbers) to which he performed each inspection.

6.0 SEISMIC HANGER INSTALLATION AND INSPECTION TRAVELER

6.1 The QC Inspector shall ensure required sign-off blocks are completed prior to his sign-off in accordance with Reference 3.2.

7.0 QA RECORDS FINAL REVIEW PROCESS

7.1 The engineering package will be reviewed by QC after final inspection. Documentation making up the QC portion of the engineering package will consist of the following:

a. Seismic Weld Data Report(s) (QA-34)
b. NDE Request and Report (when applicable)

7.2 During the final review process, all previous SWDR's in the hanger work package will be checked to ensure inspections performed prior to 6/26/82 have been reinspected and accepted. Any hangers found that have not been reinspected should be brought to the attention of the QA/QC Specialist and subsequently reinspected.

7.3 The closure of any NCR or DDR referenced on the SWDR will be verified prior to the QA/QC Specialist, or his designee, signing off the SWDR as complete.

7.4 Verification of material status on added members from surplus hangers/stock steel will be accomplished as outlined in Reference 3.2 if not previously accomplished in the field. The results will be documented in the material status block on the SWDR.

7.5 The QA/QC Specialist, or his designee, will perform a technical review of the SWDR to ensure the requirements of Paragraph 4.0 and 5.0 of this instruction have been performed.

7.5 (cont.)

When he is satisfied that all of the documents are in order, the QA/QC Specialist, or his designee, will sign and date the bottom of the SWDR*. The entire engineering package will then be transmitted to the Work Package Group.

*Note: Signature does not imply verification of shop welds. Inspection records of shop welds are maintained in the QA/QC Records Vault.

8.0 ADDITIONAL GUIDELINES

8.1 Inspectors shall not sign-off an inspection if a holdpoint is by-passed. Nonconformances shall be identified in accordance with Reference 3.9.

8.2 The QC Inspector shall acknowledge any work directive, as required by Reference 3.2.

8.3 At the completion of a visual inspection, if subsequent NDE is to be performed, the inspector will ensure that the surface is adequately prepared, in conjunction with Reference 3.6.

8.4 The QC Inspector shall verify the qualification of all welders listed on the SWDR. Qualification will be verified on the latest Qualification Status Report available.

8.5 For shims, shank welds and spacer plates, a Field Modification Form (Exhibit 1, WP-110) will be used to identify installation instructions, including weld symbols and assignment of field joint numbers.

8.6 When installation of one hanger member to another hanger member will hide identification markings (i.e. A36 stamp or material grade), and relocation of markings is not possible, or impractical, the QC Inspector will verify the presence of the markings on the material and document the verification in the "Remarks" section of the SWDR.

8.7 Periodically, on a random basis, the QC Inspector will check material status on vendor supplied hanger material by reviewing receiving documentation in the QA Records Vault.

9.0 ATTACHMENTS

Attachment 1 - Defect Code Chart

DEFECT CODE CHART

AS - Arc Strike

CR - Crack

CT - Crater

EC - Excessive Concavity

IF - Incomplete Fusion

IT - Insufficient Throat

MT - Melt Thru

NW - Not Welded

PO - Porosity

SI - Slag Inclusion

SP - Spatter

SS - Surface Slag

UC - Undercut

US - Undersize

FORM NO. 2001
7/81

CP&L
Carolina Power & Light Company

DATE ______________
PAGE ______ OF ______

PURPOSE
- ☐ SKETCH
- ☐ CALCULATION
- ☒ COMMENT
- ☐ DATA
- ☐ OTHER ______________

USER:
- ☐ FPPED
- ☐ CNSS
- ☐ CONST
- ☐ MAINT
- ☐ PPED
- ☐ OTHER ______________

FILE NO. ______________
PM NO. ______________
WR & A NO. ______________
LCO NO ______________
CS NO. ______________
JR NO. ______________
PT/MI NO. ______________
LER NO. ______________
OTHER ______________

ORIGINATOR George O. White (NAME)
CHECKED BY [signature] (NAME)

FCR-H-979 Rev 3 – Justification

FCR-H-979 was written to provide inspection criteria for shop welds of B-P hangers. Since B-P is not working to AWS D1.1, the AWS criteria for inspection are more restrictive than the criteria used by the B-P shop. (Procedure BP-9-5, Supp F) Rev 1 was issued to clarify the criteria, as to weld size, type & profile. Rev 2 was written to incorporate revised criteria from B-P (Procedure BP-9-5, Supp G) and to allow the criteria to be used for field welds instead of AWS D1.1.

Rev 3 to this FCR changes the acceptance criteria for "lack of fusion" type indications. This was done because the B-P welding procedures use a process (~~drop wise~~ globular transfer rather than spray transfer) which produces the appearance of fusion type discontinuities, and unless inspectors have experience with this process, they will unnecessarily reject a number of welds. For welding at site, we have little problem with rejections for "lack of fusion".

The criteria is compatible with design because; NF (Winter '73 addendum used for reference) does not specifically address "lack of fusion" for visual inspection. Cracks or "linear discontinuities" exceeding 1/16" in length are rejectable, however there is no provision for rejection based on cumulative length of discontinuities. AWS D1.1 is not clear on such discontinuities under "Visual Inspection", but does allow discontinuities up to 1/2" for

FOR UT/RT

large welds, and also allows up to 3/8" total discontinuity per inch of weld. We allow only 1/4" of "fusion type" discontinuity per 6" of weld, and in addition, we limit porosity to a max of 3/8" cummulative, per inch of weld. (Porosity is not rejectable per NF)

See also B-P/Ebasco info, attached, for additional justification.

*Note: AWS D1.1, para 2.1.5, says "special inspection requirements shall be noted on the drawings or in the specifications."

000613

BERGEN-PATERSON
PIPE SUPPORT CORPORATION

FILE COPY

NONCONFORMANCE REPORT

CUSTOMER: EBASCO, INC. REPORT NO: 12

CUSTOMER P.O. NO: 3301-1 JOB NO: 2291

PROJECT: Shearon Harris Nuclear Power Plant PAGE 1 OF 1

ITEM/DOCUMENT IDENTIFICATION:
(1) Disposition Tags: A-3, A-4, A-5, A-6, A-9, A-10, A-18, A-19, A-20, A-21, A-26, A-27, A-13.

COPY TO: NAME	DATE

NONCONFORMANCE DESCRIPTION:
(2) Lack of fusion on standard parts
Insufficient leg on standard part (weld leg)
Undercut on standard part (excessive)

BY: Charles Grant for Ebasco (QC) DATE: 10/27/82 ___ AGREE xx DISAGREE BY: Paul Gagne (Q.C. BPPC) (MFG)

RECOMMENDED DISPOSITION: [xx] USE-AS-IS [ ] REPAIR [ ] REWORK
(3) [ ] SCRAP [ ] REJECT/RETURN TO VENDOR

COMMENTS: (provide technical justification, repair proced. etc. as applicable)

Please provide answers as to whether the parts are acceptable per Bergen-Paterson standard practice.

BY: (Eng. Mfg.) 11/23/82 ✓ AGREE ___ DISAGREE BY: (QC Mgr.) for Paul Gagne

CONCURRENCE BY: ______________________________ ______________
Authorized Nuclear Inspector Date

G. Sicorto — Customer Rep. (signature) — Maths Applications Eng. — Title — 11/23/82 — Date

DISPOSITION VERIFIED BY: — NA — (QC) DATE: ______________

MATERIAL REVIEW BOARD ACTION: (including cause of nonconformance):
(4) It is the decision of the M.R.B. that the conditions described are non-relevant. A review of the weld stresses show conservatism of actual to Code Allowables. Parts with the described deficiencies were tested with results confirming the engineering evaluation. REF: WHTL Test Report # TRNHTL 1082-321A.

(Mgr of Mfg) 11/23/82 — (Product Mgr) 11/23/82 — Robert H. (QA Mgr) — 11/23/82 Date

DISTRIBUTION:

BE EN-PATERSON PIPESUPPORT CORF NO. A-3

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 V4 BOX # 6909 QTY. 1 SIZE 1.5

PART NO. 2001 DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: LACK of FUSION ON PADDLE AT AREA Marked

HG AS-236-1-CH-H-140 Repaired

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ________________

QC USE

OC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-4

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 V4 BOX 6909 QTY. 1 SIZE 1.5

PART NO. 2001 DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: LACK OF FUSION ON PADDLE AT AREA Marked

HGR # A1-216-1-SI-H-330 Repaired

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ________________

QC USE

OC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-5

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 V4 BOX # 6909 QTY. 1 SIZE 1.5

PART NO. 2001 DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: LACK OF FUSION ON PADDLE AT AREA MARKED

HGR # A2-261-1-CH-H-1495 Repaired

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ________________

QC USE

OC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-6

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/4 Box # 6651 QTY. 1 SIZE 3

PART NO. 2105 DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: LACK OF FUSION ON PADDLE AT AREA MARKED

HGR # T1-286-1-AS-H-400

☐REWORK ☐SCRAP ______ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ______

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-9

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 Box # 6731 QTY. 1 SIZE 20

PART NO. 2001 DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: LACK OF FUSION ON PADDLE END where Marked

HGR # A3-261-1-MS-H-89

☐REWORK ☐SCRAP ______ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ______

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-10

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 Box # 6768 QTY. 1 SIZE 1.5

PART NO. 2003 DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: LACK OF FUSION ON END ATTACH AT AREA Marked

HGR C1-221-1-SI-H-474

☐REWORK ☐SCRAP ______ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ______

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-13

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 BOX # 6768 QTY. 1 SIZE N/A

PART NO. STRUT DEPT. SHIPPING INITIATED BY C Heart

DISCREPANCY: LACK OF FUSION ON STRUT

HGR # AS-236-1-SW-H-1649 re-made

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ____________

QC USE

QC CHIEF EXAM. GEN. FOREMAN

QC7-80

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-18

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 BOX # 6867 QTY. 1 SIZE 1.5

PART NO. 2002 DEPT. Shipping INITIATED BY C Heart

DISCREPANCY: LACK of FUSION ON PADDLE AT Area Marked

HGR # C1-236-1-PD-H-3004 ✓ repaired

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ____________

QC USE

QC CHIEF EXAM. GEN. FOREMAN

QC7-80

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-19

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 BOX # 6844 QTY. 1 SIZE 1.5

PART NO. 2001 DEPT. Shipping INITIATED BY C Heart

DISCREPANCY: EXCESSIVE UNDERCUT ON PADDLE AT Area Marked

HGR # A6-236-1-CS-H-2759 ✓ [illegible]

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

HGR #

DISPOSITION COMPLETED ____________

QC USE

QC CHIEF EXAM. GEN. FOREMAN

QC7-80

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-20

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 BOX #6844 QTY. 1 SIZE 1.5

PART NO. 2002 DEPT. Shipping INITIATED BY C. Grant

DISCREPANCY: INSUFFICIENT leg on weld Bead Marked

HGR # A4-236-1-DW-H-426 reject

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ____________

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-21

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 BOX #6844 QTY. 1 SIZE 1.5

PART NO. 2001 DEPT. Shipping INITIATED BY C. Grant

DISCREPANCY: LACK OF FUSION ON PADDLE AT AREA marked

HGR # A3-236-1-DW-H-386 Reject

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ____________

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-26

DISPOSITION TAG DATE 10-26-82

JOB/LOT NO. 2291 1/2 BOX #6720 QTY. 1 SIZE 1.5

PART NO. STRUT DEPT. SHIPPING INITIATED BY C. Grant

DISCREPANCY: Lack of Fusion on weld Areas Marked

HGR # C1-221-1-FP-H-1663 reject

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ______

COMMENTS:

DISPOSITION COMPLETED ____________

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

BERGEN-PATERSON PIPESUPPORT CORP. NO. A-27

DISPOSITION TAG DATE 10-26-83

JOB / LOT NO. 2291 ½ BOX # 6770 QTY. 1 SIZE 1.5

PART NO. STRUT DEPT. SHIPPING INITIATED BY C. Hrant

DISCREPANCY: LACK of FUSION ON weld Areas Marked

HGR # C1-236-1-CS-H-2862 Sepach

☐REWORK ☐SCRAP ________ FURTHER ACTION REQUIRED ________

COMMENTS:

DISPOSITION COMPLETED ________________

QC USE

QC7-80 QC CHIEF EXAM. GEN. FOREMAN

LOAD RATING REPORT

FOR

Parts 2001-15, 2003-15, 72249-15

FOR

BERGEN-PATERSON JOB # 2291

No Comments

11/30/82

TEST REPORT

NEW HAMPSHIRE
TESTING LABORATORIES
34 Moulton Street · Laconia, NH 03246
Telephone (603) 524-1990

REPORT NO. TRNHTL-1082-321A

OUR JOB NO. NHTL-0055

YOUR P.O. NO. N/A

PAGE 1 of 31 PAGE REPORT

DATE November 18, 1982

Bergen-Paterson Pipesupport Corp.
34 Moulton Street
Laconia, NH 03246

DATE OF TEST: September 30, 1982

PERFORMED AT: New Hampshire Testing Laboratories
34 Moulton Street
Laconia, New Hampshire 03246

TEST SPECIFICATIONS: Load Rating Test Procedure for NF Qualification
Procedure No. BP-11-6
Dated August 1, 1980

PREPARED BY: Michael E. Tucker DATE: 10-22-82

REVIEWED BY: [signature] DATE: 11-19-82

APPROVED BY: [signature] DATE: 11/22/82

STATE OF NEW HAMPSHIRE }
COUNTY OF BELKNAP } ss.

_______________ _______________, being duly sworn deposes and says: The information contained in this report is the result of complete and carefully conducted tests and is to the best of his knowledge true and correct in all respects.

____

SUBSCRIBED and sworn to before me this ____ day of ________, 19____

Notary Public in and for the State of New Hampshire at large.

My Commission expires ______________, 19____

TEST BY _______________

NHTL Q.A. Robert H. Stephens 11/22/82

TABLE OF CONTENTS

1.0 PURPOSE:

1.1 The purpose of this test report is to present the test methods used and the test results obtained during the load rating tests of Bergen-Paterson Pipesupport Corp. Parts 2001-1.5, 2003-1.5, and 72249-1.5 for Shearon Harris Nuclear Power Plant, Bergen-Paterson Job Number 2291.

2.0 REFERENCES:

2.1 Load Rating Test Procedure for NF Qualification, Procedure Number BP-11-6, dated August 1, 1980.

3.0 DEFINITIONS:

3.1 LOAD RATING: Maximum load limit for a specified service limit as determined in ASME Boiler and Pressure Vessel Code Section III, NF-3262.4.

3.2 LEVEL A SERVICE LIMITS: As defined in ASME Section III, NCA 2142.2, are those loadings to which the component support may be subjected in the performance of its specified service function.

3.3 LEVEL D SERVICE LIMITS: As defined in ASME Section III NCA 2142.2 are those loadings to which the component support may be subjected one time only. Gross general deformations are permitted with some consequent loss of dimensional stability and damage requiring repair, which may require removal of the component support from service.

3.4 TEST LOAD: A support load equal to or less than the load under which the component support fails to perform its specified support function.

3.5 COMPONENT SUPPORTS: Structural elements whose function include carrying the weight of components or providing them with structural stability.

4.0 TEST SPECIMEN DESCRIPTION:

4.1 All drawings and revision levels used to manufacture the test specimen were recorded. The documents needed to trace all material used in the test specimen were secured.

5.0 MOUNTING REQUIREMENTS:

5.1 The parts 2003-1.5 were welded to four bolt fixture plates as shown in the photograph on page # 16 .

5.2 The parts 2001-1.5 and 72249-1.5 were load rated using a part 100-1.5 welded to a four bolt test fixture plate as shown in the photograph on page # 9 and 23.

6.0 SUMMARY:

6.1 The test specimens were all load rated in accordance with Procedure Number BP-11-6 Revision 0.

7.0 TEST CONDITIONS AND EQUIPMENT:

7.1 Ambient Conditions

7.1.1 All measurement and tests were performed at ambient conditions. Ambient Conditions are:

Temperature: 75° ± 10%

Relative Humidity: 90% or less

Atmospheric Pressure: 20 - 32 Inches of Mercury

7.2 Measurements and Tolerances

7.2.1 The maximum allowable tolerance of test measurements unless otherwise stated was:

Temperature: ± 10%

Time: ± 5% - 0

Displacement: ± 5%

Force: ± 10% - 0

7.3 Instrumentation Equipment Sheet

7.3.1 The Instrumentation Equipment Sheet was maintained for each piece of equipment that participated in the test. A calibration sticker indicating the last calibration, the next calibration due date, and by whom calibrated was affixed to the equipment whenever possible.

7.3.2 All equipment calibration was performed with and traceable to U.S. National Bureau of Standards.

7.4 System Calibration

7.4.1 Instrumentation system calibration was accomplished immediately prior to testing. Equipment calibration intervals were at least once per year. Actual system tolerances for all static performance measurements were better than ± 5%. The recording accuracies for tests were better than ± 5%.

7.5 Test Fixtures and Set-up

7.5.1 The test system was designed and maintained to insure compliance with the testing parameters defined in this specification.

7.5.2 The test fixtures and each test set-up was verified and inspected prior to the performance of each test by a Bergen-Paterson representative or his authorized designate.

7.5.3 A photograph of a typical test set-up was taken for documentation purposes.

7.6 Test Data Documentation

7.6.1 Test Data Sheets

7.6.1.1 All test data was recorded on Test Data Sheets. See Appendices I thru III.

7.6.2 Log Sheets

7.6.2.1 A Log Sheet was maintained throughout test. See Appendix IV.

7.6.3 Notice of Anomaly

7.6.3.1 A Notice of Anomaly (NOA) shall be generated within 24 hours for an out-of-specification occurrence to a specimen and testing halted until disposition of NOA is decided on. No NOA's were generated during the testing of these parts.

7.6.4 Photographs

7.6.4.1 A photograph of each test specimen was taken after the competion of testing.

8.0 TEST REQUIREMENTS AND PROCEDURES

8.1 Requirements

8.1.1 All parts were tested in tension. The required measurements were permanent set deflections at Level A and at Level D loads. The final test load and mode of failure were also required for load rating calculations.

8.2 Procedure

8.2.1 Dial indicators were placed so as to measure deflection over the entire length of the specimen. Test sequence for each specimen was as follows.

8.2.2 Level A Service Limits (Design Load)

8.2.2.1 An initial load of 10% or 100 lbs., whichever was greater, was applied to the speimen. Load was then increased gradually noting deflection readings at a minimum of five different points. Load was applied until (1.1) x Level A Service Limit was achieved.. This load was held for 60 seconds and released to the initial load. The deflection reading at this point was noted as Level A permanent set. Failure criteria was a maximum of 0.005" permanent set.

8.2.3 Level D Service Limits (Faulted Load)

8.2.3.1 Again, load was increased gradually noting deflection reading at various points. Load was applied until (1.1) x Level D Service Limit was achieved. This load was held for 60 seconds, the deflection noted, and load was released to the initial load. The deflection was noted as Level D permanent set. Failure criteria was amaximum of 0.063" permanent set.

8.2.4 Final Test Load

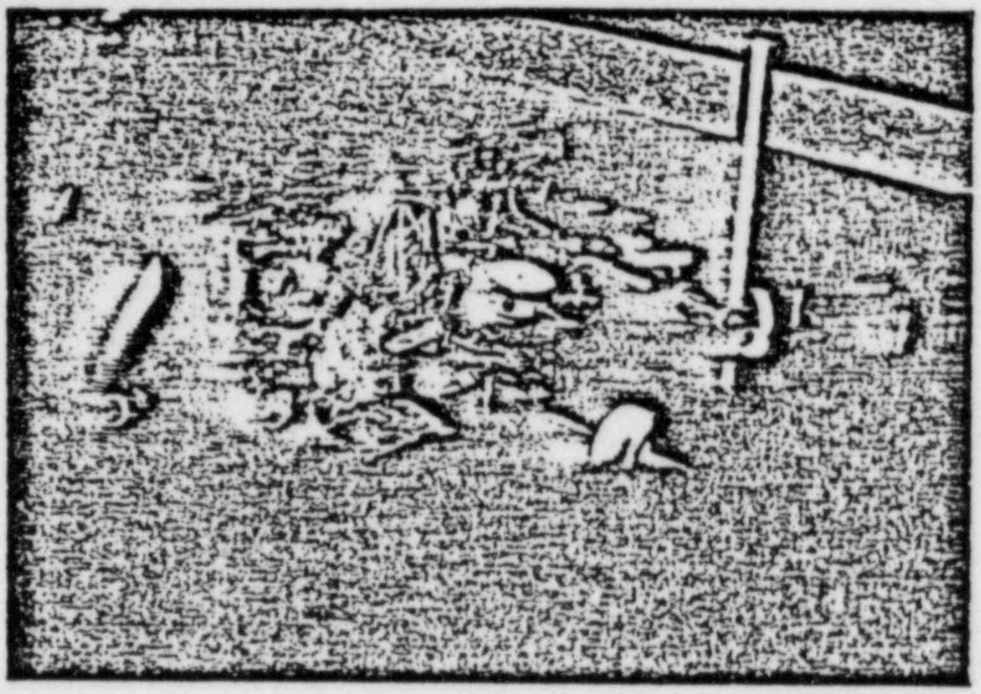
8.2.4.1 Load was gradually increased one more time, until the specimens would no longer hold load. Given the final load achieved, the mode of failure, and the material which failed, the maximum load rating of the component support may be calculated.

9.0 CONCLUSIONS

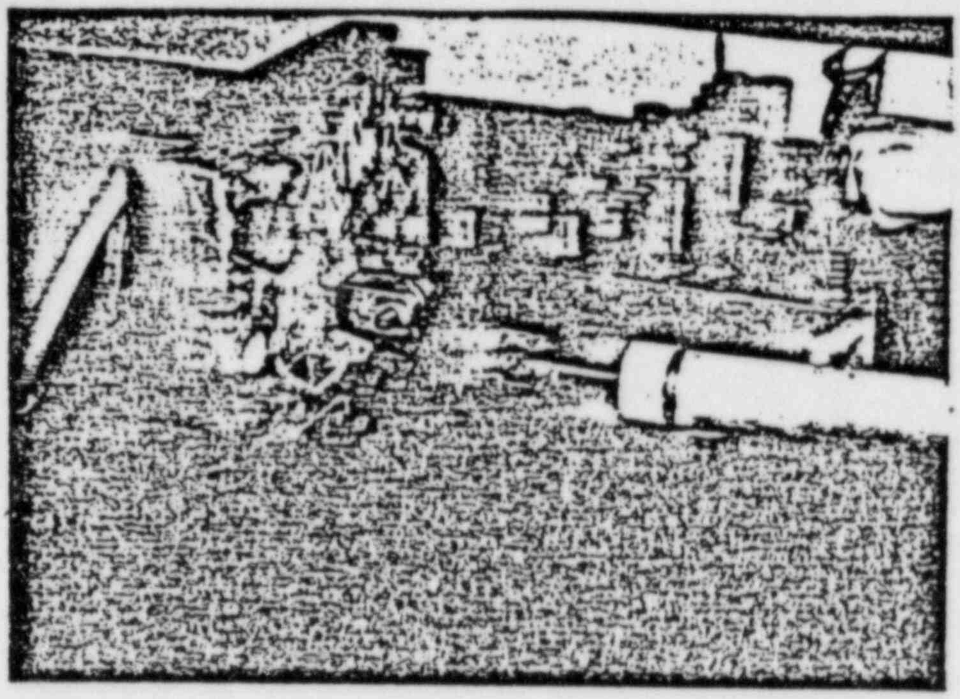
9.1 All the specimens tested withstood the Level A loads within a maximum of 0.005" permanent set, and Level D loads within a maximum permanent set of 0.063". The specimens also reached sufficient final test loads to verify rated loads.

APPENDIX I

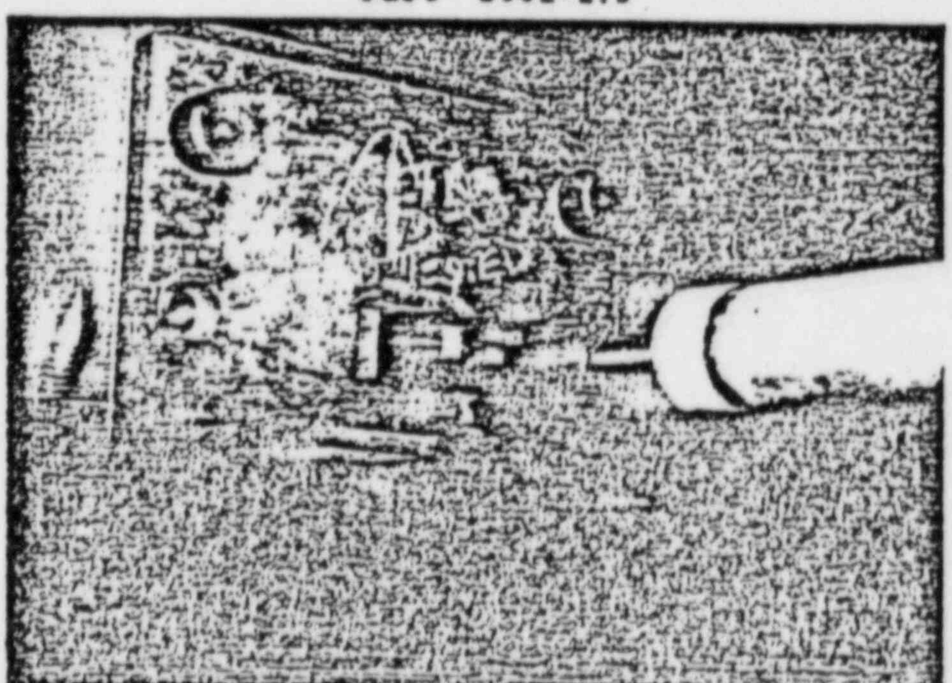
Part 2001-1.5 TEST DATA



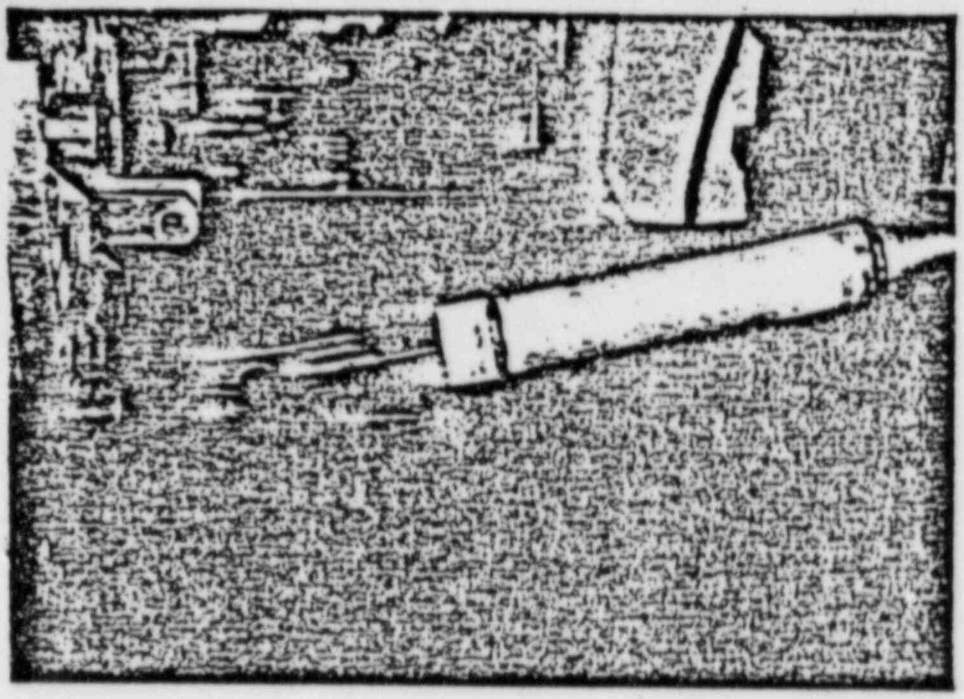
TYPICAL SET-UP, PART 2001-1.5



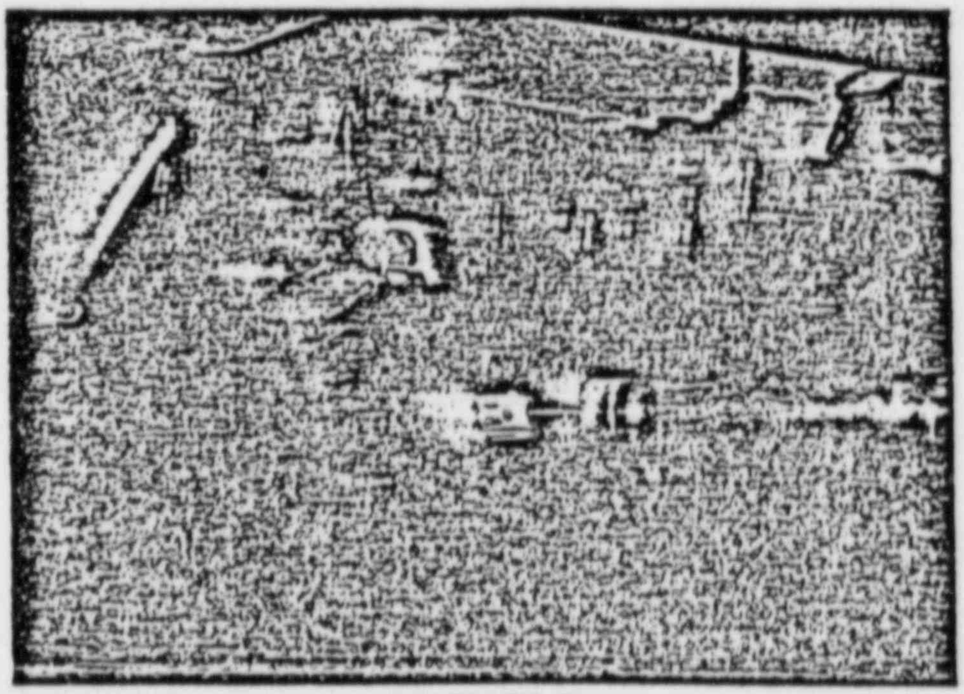
SPECIMEN A
Part 2001-1.5



SPECIMEN B
Part 2001-1.5



SPECIMEN C
Part 2001-1.5



SPECIMEN D
Part 2001-1.5

DATA SHEET

Customer Bergen-Paterson

Specimen Strut End

Part No. 2001-1.5 | Amb. Temp. 70° F | Job No. 0055

Spec. BP-11-6 | Photo Yes | Report No. N/A

Para. | Specimen Temp. Ambient | Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
150	0.000	
300	0.000	
600	0.001	
900	0.002	
1200	0.0025	
1500	0.0025	
1650	0.003	1.1 x Level A
150	0.001	
300	0.001	
900	0.002	
1200	0.0025	
1500	0.0025	
2000	0.003	
2525	0.0035	1.1 x Level D
150	0.001	
	Ultimate test load of 20,000 lbs. when	
	paddle broke on both sides just in front	
	of welds.	

Specimen Failed

Specimen Passed

NOA Written

Tested By Raymond R. Lozano Date: 9/30/82

Witness Albert H. Hyten Date: 9/30/82

Sheet No. of

Approved Peter B. Ellis

New Hampshire TESTING LABORATORIES

REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer Bergen-Paterson

Specimen Strut End

Part No. 2001-1.5 | Amb. Temp. 70° F | Job No. 0055

Spec. BP-11-6 | Photo Yes | Report No. N/A

Para. | Specimen Temp. Ambient | Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
150	0.000	
300	0.000	
600	0.0005	
900	0.001	
1200	0.001	
1500	0.0015	
1650	0.0015	1.1 x Level A
150	0.000	
300	0.000	
900	0.0005	
1200	0.001	
1500	0.0015	
2000	0.0015	
2525	0.0015	1.1 x Level D
150	0.0005	

Ultimate test load of 19,800 lbs. when paddle split at end.

Specimen Failed

Specimen Passed

NOA Written

Tested By Raymond P. Lowe Date: 9/30/82

Witness Robert H. Ziegler Date: 9/30/82

Sheet No. of

Approved Peter B. Ellis

New Hampshire
TESTING LABORATORIES

PAGE NO. 13
REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer Bergen-Paterson
Specimen Strut End
Part No. 2001-1.5
Spec. BP-11-6
Para.

Amb. Temp. 70° F
Photo Yes
Specimen Temp. Ambient

Job No. 0055
Report No. N/A
Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
150	0.000	
300	0.000	
600	0.000	
900	0.000	
1200	0.000	
1500	0.000	
1650	0.000	1.1 x Level A
150	0.000	
300	0.000	
900	0.000	
1200	0.000	
1500	0.000	
2000	0.000	
2525	0.000	1.1 x Level D
150	0.000	

Ultimate test load of 20,600 lbs. when paddle split at end.

Specimen Failed
Specimen Passed
NOA Written

Tested By [signature] Date: 9/30/82
Witness [signature] Date: 9/30/82
Sheet No. of
Approved [signature]

New Hampshire TESTING LABORATORIES

REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer Bergen-Paterson

Specimen Strut End

Part No. 2001-1.5 | Amb. Temp. 70° F | Job No. 0055

Spec. BP-11-6 | Photo Yes | Report No. N/A

Para. | Specimen Temp. Ambient | Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
150	0.000	
300	0.000	
600	0.000	
900	0.000	
1200	0.000	
1500	0.000	
1650	0.000	1.1 x Level A
150	0.000	
300	0.000	
900	0.000	
1200	0.000	
1500	0.000	
2000	0.000	
2525	0.0005	1.1 x Level D
150	0.0005	
	Ultimate test load of 20,500 lbs. when	
	paddle split both sides just outside weld.	

Specimen Failed

Specimen Passed

NOA Written

Tested By [signature] Date: 9/30/82

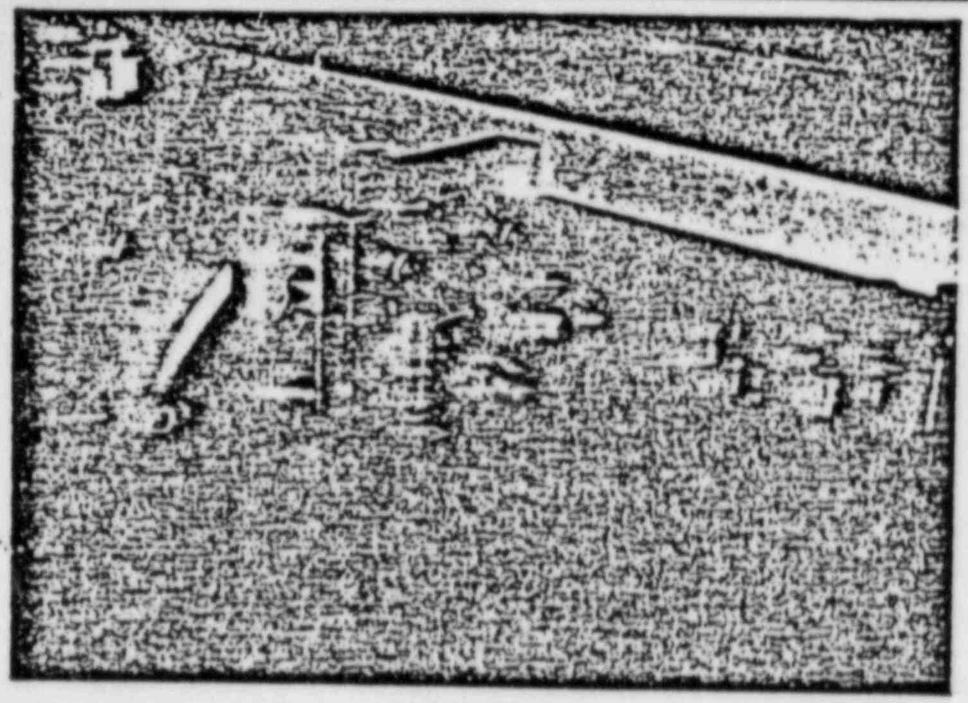
Witness [signature] Date: 9/30/82

Sheet No. of

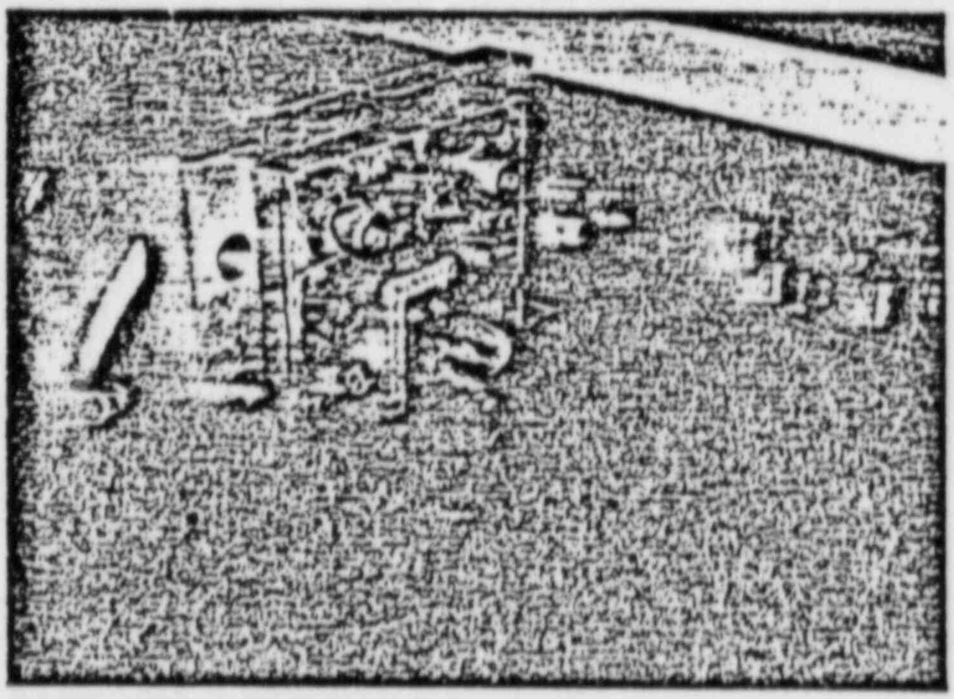
Approved [signature]

APPENDIX II

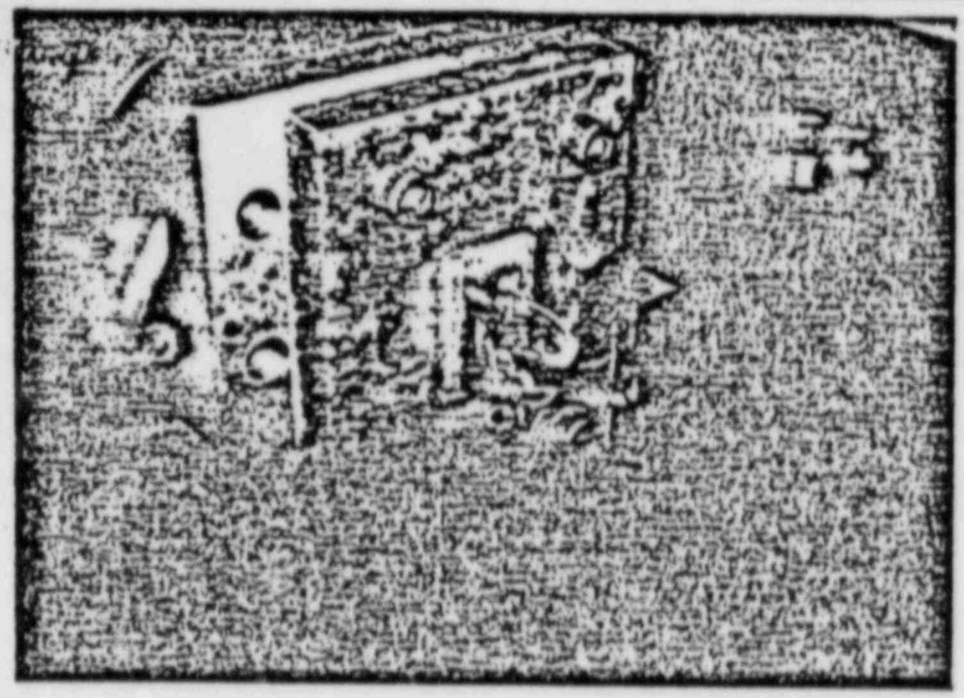
Part 2003-1.5 TEST DATA



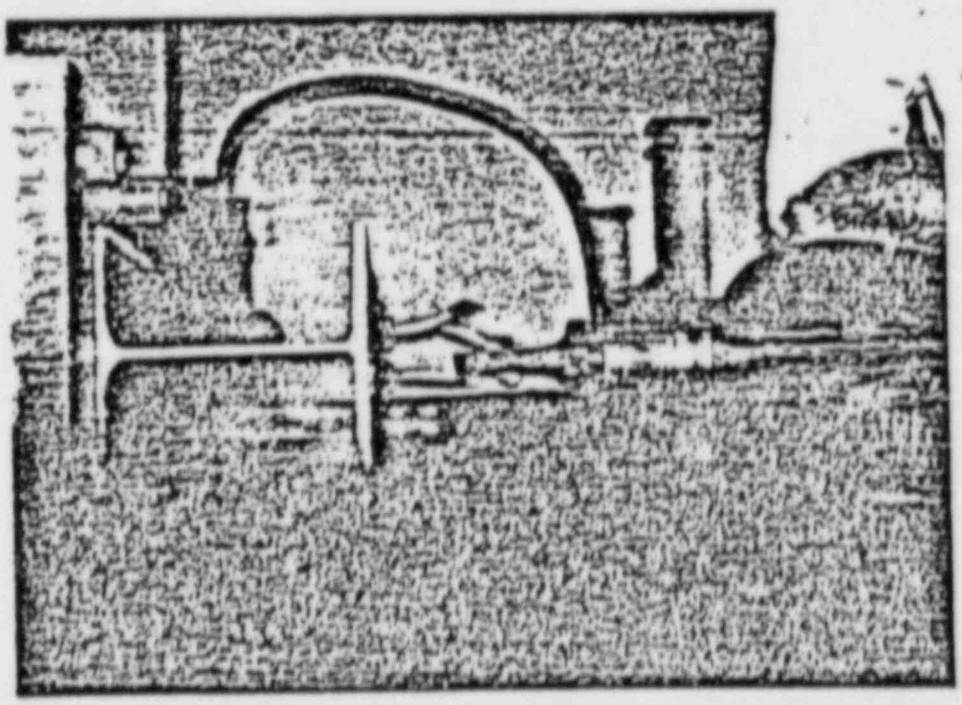
SPECIMEN A
Part 2003-1.5



SPECIMEN B
Part 2003-1.5



SPECIMEN C
Part 2003-1.5



SPECIMEN D
Part 2003-1.5

New Hampshire TESTING LABORATORIES

PAGE NO. 18
REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer: Bergen-Paterson
Specimen: End Attachment
Part No.: 2003-1.5
Spec.: BP-11-6
Para.:

Amb. Temp.: 70° F
Photo: Yes
Specimen Temp.: Ambient

Job No.: NHTL-005
Report No.: N/A
Start Date: 9/30/82

Test Title: Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.000	
1000	0.000	
1500	0.000	
2000	0.000	
2500	0.000	
2750	0.000	1.1 x Level A
250	0.000	
500	0.000	
1000	0.000	
2000	0.000	
3000	0.000	
4000	0.000	
4840	0.000	1.1 x Level D
250	0.000	

Ultimate test load of 28,200 lbs. when pin pulled out spliting one ear at the end and bending the other outwards.

Specimen Failed:
Specimen Passed:
NOA Written:

Tested By: Raymond P. Lazzaro Date: 9/30/82
Witness: Albert H. [illegible] Date: 9/30/82
Sheet No. of
Approved: Peter O. Ellis

DATA SHEET

Customer Bergen-Paterson
Specimen End Attachment
Part No. 20C3-1.5 Amb. Temp. 70° F Job No. NHTL-005
Spec. BP-11-6 Photo Yes Report No. N/A
Para. Specimen Temp. Ambient Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.000	
1000	0.000	
1500	0.000	
2000	0.0005	
2500	0.0005	
2750	0.0005	1.1 x Level A
250	0.000	
500	0.000	
1000	0.000	
2000	0.000	
3000	0.001	
4000	0.001	
4840	0.0015	1.1 x Level D
250	0.0005	
	Ultimate test load of 27,800 lbs. when pin	
	pulled out splittng one ear at end and	
	bending the other outwards.	

Specimen Failed
Specimen Passed
NOA Written

Tested By [signature] Date: 9/30/82
Witness [signature] Date: 9/30/82
Sheet No. of
Approved [signature]

DATA SHEET

Customer Bergen-Paterson
Specimen End Attachment
Part No. 2003-1.5 | Amb. Temp. 70°F | Job No. NHTL - 0055
Spec. BP-11-6 | Photo Yes | Report No. N/A
Para. | Specimen Temp. Ambient | Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.000	
1000	0.000	
1500	0.000	
2000	0.000	
2500	0.000	
2750	0.0005	1.1 x Level A
250	0.0005	
500	0.0005	
1000	0.0005	
2000	0.0005	
3000	0.0005	
4000	0.0005	
4840	0.001	1.1 x Level D
250	0.0005	
	Ultimate test load of 29,000 lbs. when	
	the pin pulled spliting one ear at the	
	end and bending the other outwards.	

Specimen Failed
Specimen Passed
NOA Written

Tested By Raymond [signature] Date 9/30/82
Witness [signature] Date 9/30/82
Sheet No. of
Approved [signature]

New Hampshire TESTING LABORATORIES

REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer: Bergen-Paterson
Specimen: End Attachment
Part No.: 2003-1.5
Spec.: BP-11-6
Para.:

Amb. Temp.: 70° F
Photo: Yes
Specimen Temp.: Ambient

Job No.: NHTL-0C55
Report No.: N/A
Start Date: 9/30/82

Test Title: Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.001	
1000	0.001	
1500	0.001	
2000	0.001	
2500	0.001	
2750	0.0015	1.1 x Level A
250	0.000	
500	0.000	
1000	0.0005	
2000	0.001	
3000	0.001	
4000	0.002	
4840	0.002	1.1 x Level D
250	0.000	

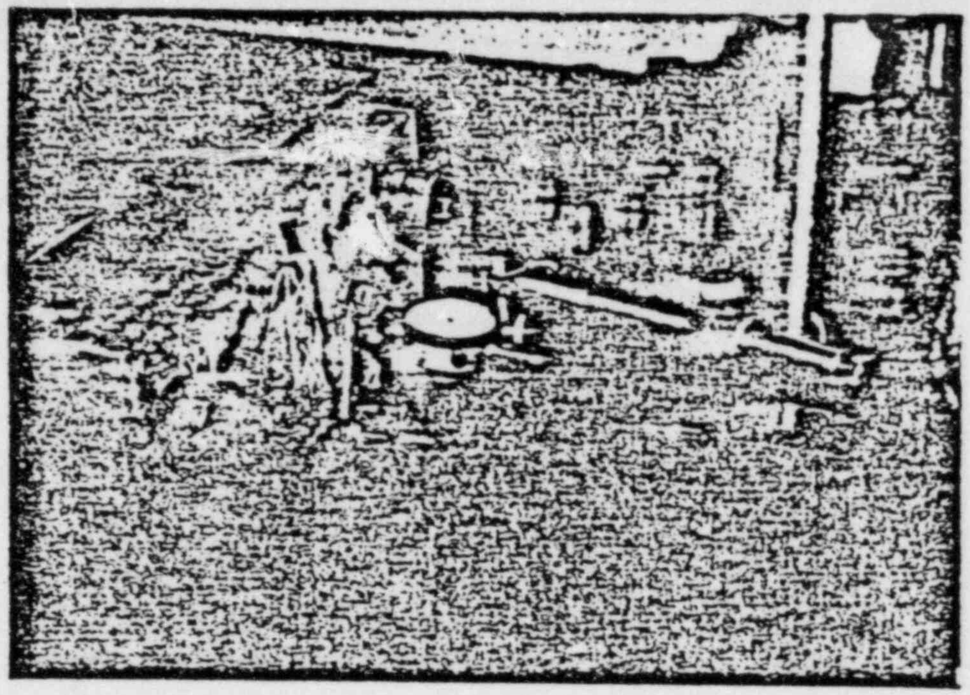
Ultimate test load of 28,000 lbs. when pin pulled out spliting one eat at the end and bending the other outwards.

Specimen Failed
Specimen Passed
NOA Written

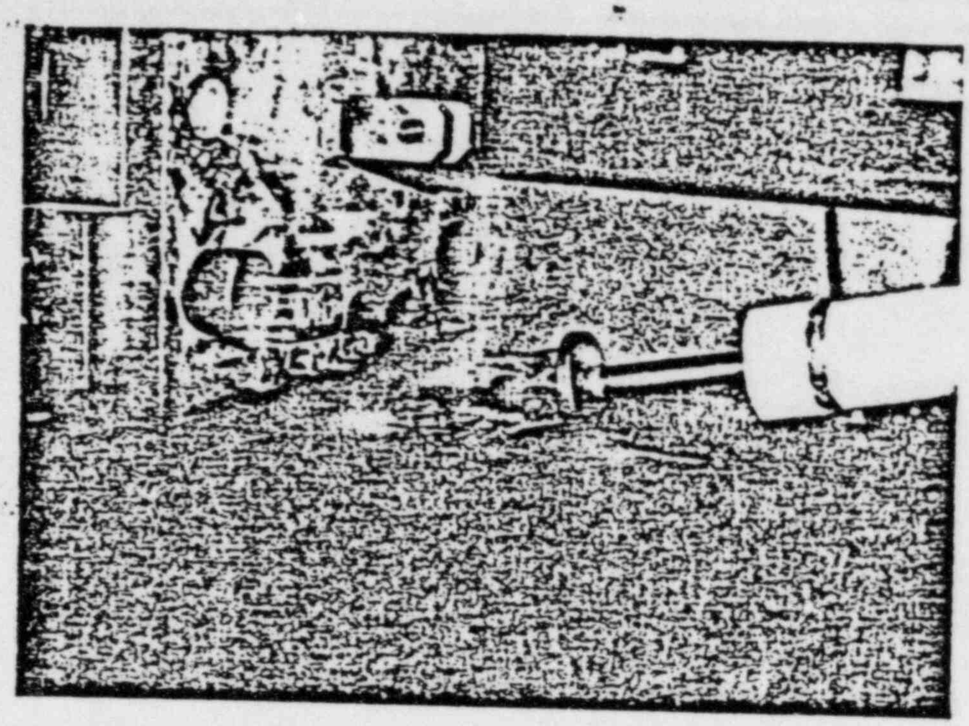
Tested By: Raymond R. Lynn (signature) Date: 9/30/82
Witness: (signature) Date: 9/30/82
Sheet No. of
Approved: Peter B. Ell (signature)

APPENDIX III

Part 72249-2.5 TEST DATA

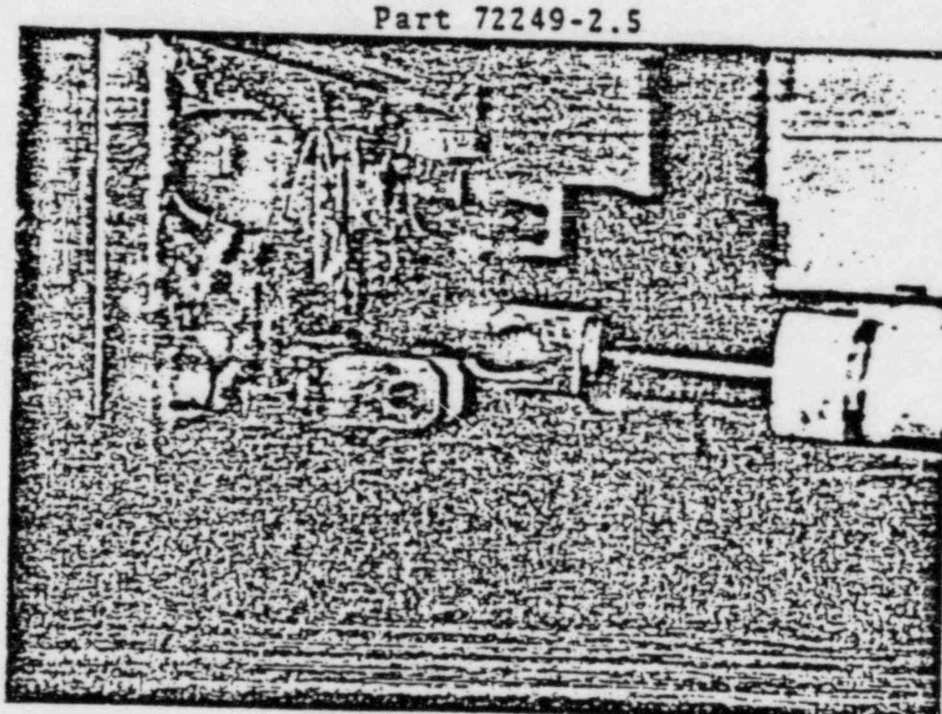


TYPICAL SET-UP PART 72249-2.5



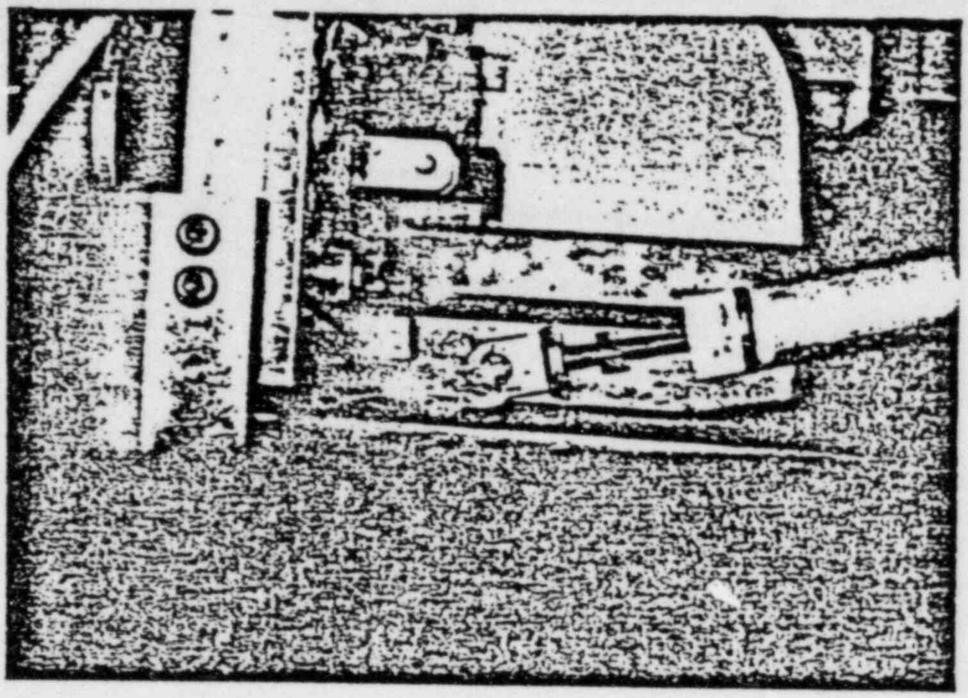
SPECIMEN A

Part 72249-2.5



SPECIMEN B

Part 72249-2.5



SPECIMEN C
Part 72249-2.5

New Hampshire TESTING LABORATORIES

DATA SHEET

Customer: Bergen-Paterson
Specimen: Strut End
Part No.: 72249-2.5
Spec.: BP-11-6
Para.:

Amb. Temp.: 70° F
Photo: Yes
Specimen Temp.: Ambient

Job No.: NHTL-0055
Report No.: N/A
Start Date: 9/30/82

Test Title: Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.0005	
1000	0.001	
1500	0.001	
2000	0.0015	
2500	0.002	
2750	0.002	1.1 x Level A
250	0.001	
500	0.001	
1000	0.0015	
2000	0.0015	
3000	0.002	
4000	0.0025	
4620	0.0035	1.1 x Level D
250	0.001	

Ultimate test load of 24,200 lbs. when paddle split at end.

Specimen Failed:
Specimen Passed:
NOA Written:

Tested By: Raymond P. Lemaire Date: 9/30/82
Witness: Robert Stephens Date: 9/30/82
Sheet No. of
Approved: Peter W. Ellis

New Hampshire TESTING LABORATORIES

PAGE NO. 27
REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer Bergen-Paterson
Specimen Strut End
Part No. 72249-2.5 | Amb. Temp. 70° F | Job No. NHTL-0055
Spec. BP-11-6 | Photo Yes | Report No. N/A
Para. | Specimen Temp. Ambient | Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.000	
1000	0.000	
1500	0.0005	
2000	0.0005	
2500	0.0005	
2750	0.0005	1.1 x Level A
250	0.000	
500	0.000	
1000	0.000	
2000	0.0005	
3000	0.001	
4000	0.001	
4620	0.001	1.1 x Level D
250	0.000	
	Ultimate test load of 27,200 lbs. when	
	paddle split at end.	

Specimen Failed
Specimen Passed
NOA Written

Tested By Raymond [signature] Date: 9/30/82
Witness [signature] Date: 9/30/82
Sheet No. of
Approved Peter B. Ellis

New Hampshire TESTING LABORATORIES

REPORT NO. TRNHTL-1082-321A

DATA SHEET

Customer Bergen-Paterson

Specimen Strut End

Part No. 72249-2.5 Amb. Temp. 70° F Job No. NHTL-0055

Spec. BP-11-6 Photo Yes Report No. N/A

Para. Specimen Temp. Ambient Start Date 9/30/82

Test Title Load Rating Test

LOAD	DEFLECTIONS	
250	0.000	
500	0.0005	
1000	0.0015	
1500	0.002	
2000	0.003	
2500	0.003	
2750	0.003	1.1 x Level A
250	0.0025	
500	0.0025	
1000	0.0025	
2000	0.003	
3000	0.0035	
4000	0.004	
4620	0.005	1.1 x Level D
250	0.0025	
	Ultimate test load of 25,000 lbs. when the	
	paddle split at end.	

Specimen Failed ______ Tested By Raymond [illegible] Date: 9/30/82

Specimen Passed ______ Witness Robert [illegible] Date: 9/30/82

NOA Written ______ Sheet No. ______ of ______

Approved Peter [illegible]

APPENDIX IV

EQUIPMENT LIST AND TEST LOG

New Hampshire TESTING LABORATORIES

INSTRUMENTATION EQUIPMENT SHEET

Date 9/30/82 Job No. NHTL-0055 Test Area 25000 Test Stand

Technician R.A. Moore Customer Shearon Harris Type Test Load Rate

No.	Instrument	Manufacturer	Model No.	Serial No.	NHTL or Gov't No.	Range	Accuracy	Calibration	
								On	Due
	Dial Indicator	Starrett, Inc.	25-441J	N/A	704	0"-1"/ .001	± 1grad for first	7/14/82	10/14/82
	Transducer Load Cell	Transducer, Inc.	V4Z-200K 10P1	24279	721	0-200lbs	± .03% of F/S	4/18/82	10/18/82
	Strain Gage Conditioner/Indic	Daytronics, Inc.	3270	2177	639	± 5V	± .05% of F/S	9/1/82	3/1/82
	Light Beam Recorder	Soltec Corp.	SL32	8080288	719	0-100V .08-200	± 2% per ∓ 50mm	9/1/82	3/1/82

Instrument Test Engineer Peter S. Ellis

Checked & Received By Raymond P. [illegible]

PAGE NO. 31

REPORT NO. TR.NHTL-1082-321A

NEW HAMPSHIRE TESTING LABORATORIES
34 Moulton Street · Laconia, NH 03246

LOG SHEET

JOB NO. NHTL-0055

LOG PAGE NO.

CUSTOMER Shearon Harris Nuclear Power Plant

TEST ENGINEER R.A. Moore

DATE	TIME	REMARKS (Include Run Number, Part Changes, Shift Changes and all other pertinent data)
9/30/82	12:30 PM	Specimen A 2003-1.5 Lot Coded EH
	12:45 "	Specimen B 2003-1.5 Lot Coded EH
	1:00 "	Specimen C 2003-1.5 Lot Coded EH
	1:15 "	Specimen D 2003-1.5 Lot Coded EH
	1:45 "	Specimen A 2001-1.5 Lot Coded CS
	2:00 "	Specimen B 2001-1.5 Lot Coded CS
	2:15 "	Specimen C 2001-1.5 Lot Coded CS
	2:30 "	Specimen D 2001-1.5 Lot Coded CR
	3:00 "	Specimen A 72249-1.5 Lot Coded AEA
	3:15 "	Specimen B 72249-1.5 Lot Coded AEA
	3:30 "	Specimen C 72249-1.5 Lot Coded AEA

BERGE. TERSON
PIPESUPPOR. TION
48 WINNISQUAM AVENUE
LACONIA, NEW HAMPSHIRE 03246

J. Newell
Ebasco Services In-- d

Penetrant inspect nd Welds for P.O. NY435283.

Penetrant examinat erformed on eight (8) different hangers after the areas h ound to remove apparent lack of fusion, areas were also e th a 5X glass.

All areas were cl apparent lack of fusion, one (1) area showed a porosit /32" diameter. (Acceptable under B/P Procedure 9-5 Su .

The following ha examined by Penetrant:

HANGER N	HANGER NUMBER
A1-305-1-PL	A1-216-1-SW-H-2790
A2-236-1-S	C1-236-1-SI-H-370
A5-261-1-C	A3-261-1-MS-H-548
A1-216-1-S	C1-236-1-CS-H-1405

L. Hinthorne
Ebasco VQAR

Please send to N.Y.
RH

P. O. Box 101, New Hill, N. C. 27562
March 21, 1984

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-196

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986 - 900,000 KW - UNIT 1
SHOP WELDING DEFICIENCIES IN SEISMIC I PIPE HANGERS
SUPPLIED BY BERGEN-PATERSON, ITEM 95
UNDERSIZE SKEWED TEE FILLET WELDS ON SEISMIC I
PIPE HANGERS, ITEM 72

Dear Mr. O'Reilly:

Attached is our third interim report on the subject items which were deemed reportable per the provisions of 10CFR50.55(e) and 10CFR, Part 21, on August 13, 1982 (Item 95) and November 5, 1982 (Item 72). The purpose of this report is to inform you of changes which have occurred since our second interim report dated October 3, 1983. Carolina Power and Light Company is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by December 1, 1984.

Thank you for your consideration in this matter.

Yours very truly,

R. M. Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

000592

11-22

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

INTERIM REPORT NO. 3

SHOP WELDING DEFICIENCIES IN SEISMIC I
PIPE HANGERS SUPPLIED BY BERGEN-PATERSON
ITEM 95

UNDERSIZE SKEWED TEE FILLET WELDS ON
SEISMIC I PIPE HANGERS
ITEM 72

MARCH 21, 1984

REPORTABLE UNDER 10CFR50.55(e)
REPORTABLE UNDER 10CFR21

SUBJECT: Deficient shop welds on pipe hangers previously accepted by Bergen-Paterson (B-P) and Ebasco Welding Inspectors.

ITEM: Seismic Pipe Hangers

SUPPLIED BY: Bergen-Paterson Pipe Support Corporation, Laconia, New Hampshire

NATURE OF DEFICIENCY:

1. Missing and undersized welds
2. Cosmetic weld defects
3. Undersized skewed tee welds
4. Deficient welds accepted by B-P inspectors and Ebasco Vendor Quality Assurance (VQA) inspectors

DATE PROBLEM OCCURRED: Prior to October 1, 1982

DATE PROBLEM REPORTED: On August 13, 1982 CP&L (Mr. N. J. Chiangi) notified the NRC (Mr. A. Hardin) that this item (Item 95) was reportable under 10CFR50.55(e) and 10CFR, Part 21. In our November 5, 1982 letter, CP&L (Mr. R. M. Parsons) notified the NRC (Mr. J. P. O'Reilly) that this item (Item 72) was reportable under 10CFR50.55(e) and 10CFR, Part 21.

SCOPE OF PROBLEM: Seismic Category I pipe hangers which were inspected at the source of fabrication prior to October 1, 1982.

SAFETY IMPLICATIONS: Deficient welds could cause a safety-related pipe hanger to fail under seismic conditions. As a result, if not corrected, they could adversely affect the safe operation of this facility. However, no hangers evaluated to date with the above type deficiencies have been found to adversely affect the safe operation of this facility.

REASON THE DEFICIENCY IS REPORTABLE: The conditions reported in Item 95 and Item 72 represent breakdowns in B-P and Ebasco QA programs which allowed supports to be shipped with welds which were not in accordance with design criteria. This incident was identified as reportable under 10CFR50.55(e) and 10CFR, Part 21, due to the extensive evaluation required and the breakdown in the QA programs.

CORRECTIVE ACTION:

1. Hangers with shop weld deficiencies were identified during the following processes:

   A. Receipt Inspection.

   B. Inspection in the warehouse prior to hanger issuance to the field.

   C. Inspection in the field of installed hangers which had not been previously inspected by CP&L for shop weld deficiencies (does not include those hangers that were in Reinspection - See D).

PREVENTIVE MEASURES TAKEN TO AVOID FURTHER NONCOMPLIANCE:

1. Field Change Request (FCR) H-979 was developed and issued to provide weld inspection acceptance criteria for both field and shop welds based on the AWS D1.1 code and B-P design criteria.

2. Ebasco VQA began performing in-process inspections and 100% inspection of hanger welds on October 1, 1982. This is to be performed throughout the remainder of the B-P purchase order.

3. Ebasco VQA management regularly visits the B-P Laconia facility to confer with the Ebasco VQA representative and to witness the VQA inspector's activities.

4. B-P welders and inspectors and Ebasco VQA inspectors have received additional training in weld acceptance criteria.

5. 100% shop weld inspections will continue until all shop welds are inspected by our quality control organization.

FINAL REPORT:

Corrective action has been completed on all active hangers. Those hangers on engineering hold will be reinspected and reworked when they become active again, or they will be cancelled if they are voided. For this reason, we cannot close this item until December 1, 1984.

CP&L

Carolina Power & Light Company

P. O. Box 101, New Hill, N. C. 27562
March 5, 1984

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-191

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986 - 900,000 KW - UNIT 1
ENGINEERING REVIEW OF COMPLETED PHASE II PIPE HANGERS, ITEM 148

Dear Mr. O'Reilly:

On September 30, 1983, Mr. N. J. Chiangi notified the NRC (Mr. A. Hardin) of a potentially reportable item per the provisions of 10CFR50.55(e). The NRC was informed that of 235 pipe hangers which have been completed and accepted through Phase II, an engineering review of 99 of the pipe hangers completed indicates that various quality characteristics are indeterminate.

As a result of the engineering review, the hanger program has been revised to prevent similar reoccurrences.

The 99 hangers have been reinspected, however the determination for reportability has not been completed. Due to the extensive amount of evaluation involved, we will require until May 7, 1984 for submitting a final report on the reportability of this item.

Thank you for your consideration in this matter.

Yours very truly,

R M Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/dh

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

000596

[redacted]

P. O. Box 101, New Hill, N. C. 27562
March 9, 1984

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-189

Dear Mr. O'Reilly:

In reference to your letter of February 13, 1984, referring to RII: WPK 50-400/84-03, the attached is Carolina Power and Light Company's reply to the violation identified in Appendix A.

It is considered that the corrective action taken is satisfactory for resolution of the item.

Thank you for your consideration in this matter.

Yours very truly,

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. B. C. Buckley (NRC)

000391

41-11

Attachment to CP&L Letter of Response to NRC Report RII: WPK 50-400/84-03

Reported Violation:

10 CFR 50 Appendix B, Criterion V as implemented by PSAR Section 1.8.5.5 requires activities affecting quality be prescribed by documented procedures and instructions.

Contrary to the above, activities affecting quality were not adequately prescribed by documented procedures in that procedural inadequacies permitted an incorrect heat number to be reported on Weld Data Report for Weld Joint 1-SI-150-FW-536.

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

Denial or Admission and Reason for the Violation:

The violation is correct as stated.

The pipe weld inspector verified the heat number at the prefit inspection point and entered same on the WDR. When the craft raised the spool piece into position, they turned it around and fitted the opposite end for welding. At the fit-up inspection point, the inspector reverified the piece number but not the heat number. The correct spool 1-RC-341-1 was joined; however, the heat number on the WDR was for the opposite end of the spool piece. This caused a problem with documentation only and did not affect the quality of the items being joined or the weld joint.

Corrective Steps Taken and Results Achieved:

Documentation for 1-SI-150-FW-536 was changed to show the correct heat number (M 2945) for the end of spool 1-RC-134-1 which had been welded. This was verified prior to changing the WDR.

Corrective Steps Taken to Avoid Further Noncompliance:

QCI-19.1 was changed to require that the pipe weld inspector shall "reverify that heat numbers being joined reconcile with the heat numbers listed on the WDR" during fit-up inspection. Inspectors were instructed by the QA/QC specialist on this requirement.

Date When Full Compliance Was Achieved:

Full compliance was achieved on January 27, 1984.

FORM 22

CP&L

Carolina Power & Light Company

COPY

REPLY REQUESTED BY 10/10/83

New Hill, North Carolina
September 23, 1983

CAROLINA POWER & LIGHT CO
QA/QC HARRIS PLANT

ROUTE TO	INITIALS	DATE
FS		9/26/83
MP		9/2
SB		9/26
LM		
TH		9/26
KUH		

FILE: SH M-2/1

MQAH 83-264

MEMORANDUM TO: Mr. R. M. Parsons

FROM: N. J. Chiangi

SUBJECT: Pipe Support Installation Program

In the last few months several problems in our hanger installation program have come to light and while individually many of these represent areas not necessarily of great concern, together they indicate the need to seriously evaluate the direction we are heading and perhaps upgrade our system. Please find attached a synopsis of the most significant areas which I feel warrant corrective measures.

While it is recognized that historically pipe supports represent a complex task, we should strive to simplify our program to eliminate as many areas for mistakes as possible.

I feel in all cases we have not accomplished this end result. Implementation of the attached recommendations should help us better control the pipe hanger process.

It is requested that you evaluate the recommendations and respond to this office by October 10, 1983, of your intended action to implement these recommendations.

Original Signed By
N. J. Chiangi

NJC/mt
Attachment

cc: Mr. H. R. Banks W/A
Mr. G. L. Forehand W/A
Mr. P. Foscolo W/A
Mr. L. I. Loflin W/A
Mr. G. Simpson W/A
Mr. M. F. Thompson, Jr. W/A
Mr. M. D. Vernon W/A
Mr. R. A. Watson W/A
Mr. J. L. Willis W/A
File W/A✓

41-22

000583

PIPE SUPPORT CONCERNS AND RECOMMENDATIONS

1. The hanger work package does not provide clear instructions on what work needs to be performed and subsequently inspected. This is especially true when there have been revisions to design and additional field work to the Bergen-Paterson portion of the shop work is required (e.g., addition of structural members, replacement of material, additional welding, etc.). The current method of conveying the necessary information is to include in the package copies of the revised drawing(s) with the changes highlighted. It is then left up to the craft to determine how to implement these changes and to the inspector to determine what the craft actually did and what should have been done to complete the work. (It should be noted that by the use of generic FCR's the latest drawing will not represent a true picture of our as-constructed condition. For example, the generic FCR-H-341 which allows shop welds to be made in the field, and FCR-H-564 that allows for the deletion of the inside welds within the pipe window.) Misapplication of both of these has resulted in recent nonconformances.

   The following is offered as a suggested resolution. Hanger work packages should be prepared to clearly state exactly what work is necessary so that both craft and inspection personnel are apprised of the work to be performed in the field. This would eliminate confusion in determining what had already been inspected (i.e., receipt inspection). Any required changes should be incorporated into the drawing prior to work being performed (i.e., changes from shop welds to field welds, addition or deletion of welds, substitution of material by different part number or different size of material). This approach would provide a quality product as subjectivity and interpretation would be eliminated from the craft and inspection personnel. Responsibility for interpretation of requirements and direction would be that of construction engineering.

   In conjunction with the work package, additional construction engineering support to craft is needed. Many times when the craft have a question regarding design or procedural requirements, they will go to the most available person which many times turns out to be a CI or QC inspector. Higher visibility in the field by construction engineers would reduce this and provide better input as to what work or material is necessary. Also, increased construction engineering input into work package preparation is needed. Presently, work packages are generated by a clerical staff who have little or no awareness of the technical aspects of the hanger installation. Each package should be reviewed for constructability and accuracy prior to issuance to the field for work.

2. It is felt that some effort should be placed on reviewing the governing work procedure, WP-110, "Installation of Seismic Pipe Hangers and Supports for Seismically Analyzed Pipe", with the intent towards simplifying its requirements. Emphasis should be in the area of geometric tolerances, clearances and building attachment criteria. As previously stated, the use of generic FCR's should be eliminated or at least reduced with construction engineering providing guidance in the work package as to the exact requirements. As previously stated, we recognize that pipe support installation is a complex issue, every effort should be taken to simplify instructions to reduce the possibility of errors.

3. Structural components (not catalog parts) are received from Bergen-Paterson and certified as being fabricated to specified revision level of the design document. Reanalysis in some cases necessitates changes in the welding design for the support which must be implemented either by Bergen-Paterson prior to shipment or by CP&L at the site. Therefore, it is necessary from CP&L's standpoint that we know exactly what revision level the support received on site has been fabricated to so that we can make the necessary changes to comply with the final design. This information is currently presented on the Certificate of Compliance received with each hanger; however, evidence exists which indicates that the Bergen-Paterson program for control of their fabrication is weak in this area. (Note the problems identified on DDR-1794 wherein fillet welds were provided in lieu of the required bevel-flare bevel welds.) It is recommended that HPES strengthen the B-P program in this area.

4. In the area of material control, it is felt that a stronger position needs to be developed to alleviate problems arising in the future. Our commitment on Reg. Guide 1.29 stated that ". . . lineage traceability of materials is not required . . ." This does not, however, circumvent the need for material control to assure that acceptable material is used in the proper application. While Deviation Notice No. 4 to Rev. 8 of WP-110 outlines methods to provide proper control from now on, material issued prior to this causes a problem. Presently, inspection groups are required to bring questionable material to the attention of construction engineering for resolution and disposition; please consider that the methods used to determine the acceptability of the material (i.e., color of the coating or size of material if uncoated) should be further supported with an additional technical basis, such as chemical analysis on a sample basis to confirm the actual type of material.

   Another area of weakness is in the area of fasteners, particularly bolting and load pins. On bolting, steps should be added to assure that proper bolting, as supplied by Bergen-Paterson or by CP&L, has been used. At present, bolting from Bergen-Paterson contains no identification markings. Load pins represent a situation where they are provided with identification markings but discrepancies exist in the Bergen-Paterson identification references.

5. <u>General</u>

   The recent inspection by construction engineering personnel of supports that had been final inspected revealed evidence to support some of the previous issues raised. Our efforts should be to correct these problems and to develop a program such that when we final accept a hanger installation, it is indeed correct and complete as designed.

   In this light, we should strive to develop a clear concise program of installation and inspection and should not overlap or combine any of our required inspection with those required by IE Bulletin 79-14. Our construction program should assure compliance with design analysis and our 79-14 effort simply a reconfirmation of these facts and to uncover any construction damage or tampering.

Carolina Power & Light Company

December 15, 1983 MS-12211

MEMORANDUM TO: Mr. N. J. Chiangi

FROM: Mr. R. M. Parsons

SUBJECT: Shearon Harris Nuclear Power Plant
Pipe Support Installation Program

The Hanger Program has undergone major changes in order to eliminate as many areas for error as possible. I feel that we have resolved all the concerns addressed in your letter: SH M-2/1; MQAH 83-264.

I appreciate your recommendations and hope you agree that the changes (attached) are a positive step towards achieving a quality program.

RM Parsons

PWH/bk

Attachment

cc: Mr. H. R. Banks W/A
Mr. G. L. Forehand W/A
Mr. P. F. Foscolo W/A
Mr. L. I. Loflin W/A
Mr. G. Simpson W/A
Mr. M. F. Thompson, Jr. W/A
Mr. M. D. Vernon W/A
Mr. R. A. Watson W/A
Mr. J. L. Willis W/A
Mr. A. H. Rager W/A

1. All hanger work packages will be accompanied by instructions detailing the work activities for the craft.

   Required drawing changes will be resolved via Field Mods prior to the work being performed.

   Hangers will be installed in accordance with a Field Mod or design drawing. The use of generic FCRs to justify a design deviation is discouraged unless the FCR information has been incorporated into the work procedure. (On . exception to this would be FCR-H-286 which allows oversized and extra weld.)

   The Hanger Section has been reorganized to provide a Field Engineering Group whose sole task will be to support the craft in the installation of supports. In addition, a Work Package Group has been set up to review the technical requirements of the Work Package. This review will ensure constructibility and accuracy of the design document prior to issuance to the field for work.

2. WP-110 has been revised to simplify the installation requirements. Special emphasis has been given to the areas of tolerances, clearances, building attachment criteria, and material conformance.

3. Although there have been isolated cases in which the Bergen-Paterson Certificate of Compliance identified the wrong revision, the only case in which the problem has been significant involved bevel-flare-bevel Welds. HPES discussed this with both the Ebasco VQA personnel and the Bergen-Paterson shop QA personnel, and the program has been strengthened. HPES reviews the Receiving Inspection Reports and will take additional steps to correct problems as they arise.

4. Reference MS-11995 for Pipe Hanger Material Control. Note that Exhibit 4 of WP-110 was modified in its final form.

   As for fasteners, load pins are electro-etched for permanent material grade identification. High strength bolts/nuts, such as 193GR B-7, 194GR 2-H, and A-325, will display the required ASTM markings. Low strength bolts, such as A-307 GR B, will display the vendor markings as requried by ASTM.

5. WP-110, WP-139, WP-140, and TP-34 were written and/or revised to revitalize and enhance the Hanger Program. (WP-140 is still preliminary.)

   These procedures detail the activities for package preparation, hanger installation and inspection, and final review of the completed package and paperwork.

FORM 22

CP&L

Carolina Power & Light Company

COPY

New Hill, North Carolina
October 24, 1983

FILE: SH M-2/1 MQAH 83-321

MEMORANDUM TO: Mr. R. M. Parsons

FROM: N. J. Chiangi

SUBJECT: Pipe Support Installation Program

My memorandum, MQAH 83-264 dated September 23, 1983, noted several areas in our pipe hanger installation program which require corrective measures. One of the main issues surfacing from these concerns pointed to the quality of the installations currently in progress (basic workmanship). Please find attached Surveillance Report No. QASC-83-860 which outlines deficiencies detected in hanger installations prior to being presented for inspections. As you will notice, the reject rate is high (72%). I am sure you will agree that the greater the number of problems that exist in an installation being presented for inspection, the higher the probability that the inspection program will not detect all errors. Workmanship is an important aspect of quality that is not always detectable and must be assumed in order to generate a certain degree of confidence in the total process.

It is therefore recommended that a more stringent program to improve the quality of workmanship be implemented. Enforcement of this program would alleviate the need for the crafts to rely on QC/CI to detect and point out errors that should be obvious and corrected prior to releasing work for inspection. In addition, this program should eliminate in many instances the need for rework, reinspection and documentation which in turn will assist in meeting project schedules and derive economic benefits to CP&L.

Original Signed By
N J Chiangi

NJC/mt
Attachment

cc: Mr. H. R. Banks W/A
Mr. G. L. Forehand W/A
Mr. R. A. Watson W/A
File W/A

000593

41-1

[redacted]

P. O. Box 101, New Hill, N. C. 27562

Date: 10-14-83

MEMORANDUM TO: AL RAGER

FROM: D. C. Whitehead

SUBJECT: SURVEILLANCE REPORT NO. QASC-83-860

The QA Surveillance Sub-Unit has recently completed a QA Surveillance of activities within your area of responsibility.

The attached surveillance report is being submitted to you to assist you in evaluating the results of the surveillance.

If you have any questions regarding this surveillance, do please contact me.

DCW:jp

Attachment

cc: Mr. G. L. Forehand, W/A via Mr. D. A. McGaw
Mr. K. V. Hate', W/A
MR. RANDY HANEY, W/A
MR. GEORGE SIMPSON, W/A
MR. BILL LANGLOIS, W/A
MR. CHAN VAN DAVIS, WA

QA-64
REV. 1
4/27/83

CAROLINA POWER AND LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT

QA SURVEILLANCE REPORT

QASC/~~QASS~~ NO: 83

DATES PERFORMED: 9-26-83 → 10-7-

RVEILLANCE ACTIVITY/AREA/LOCATION/ELEVATION: Pipe Hanger Installation (Preliminary)

EM ID NO.: See Summary

SCRIPTION: See Summary

ALITY CLASS: Seismic Cat 1

REFERENCE DOCUMENTS:
CQA-28 R/4
WP-110 R/8
TP-34 R/8

PERSONNEL CONTACTED:
Randy Haney (C

PHASE (CIRCLE ONE) ☐ N/A

RE-INSTALLATION	INSTALLATION		INSPECTION	
	WITNESS	PST-INS	WITNESS	PST-INS

MMARY: A survey was conducted 9-26-83 thru 10-7- concerning the adequacy of the existing pipe hanger installation program. During this survey 18 pipe hangers that had not undergone CI preliminary installation inspection were randomly selected and were examined for proper: identification, locatio orientation, elevation, geometry, fit-up, embed and base plate tolerances. The subject pipe hangers were "tacked up" into position and were ready for preliminary inspection as determin by the craft "sign off" on the pipe hanger installation travelers ie., exhibit #3 of WP. 110.

Of the 18 pipe hangers selected, 13 were rejectable and 5 were acceptable per the installation tolerances/requirements specified in W.P. 110 Rev 8. 73% of the hangers checked were improperly installed.

PERFORMED BY: [signature] DATE 10-7-83
Clay Rhodes DATE 10-7-83
DATE

QA- 65
REV. 0
2/21/83

CAROLINA POWER AND LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT

QASC/~~QACS~~ NO. 83-

QA SURVEILLANCE REPORT
CONTINUATION SHEET

THE FOLLOWING PIPE HANGERS WERE DETERMINED TO BE INSTALLED CORRECTLY - 1-SW-H 3447 R/0A, 1-CC-H-1465 R/2C, 1-SW-H 3477 R/0A, 1-IA-H-200 R/31 1-CX-H-2290 R/0S1

THE FOLLOWING PIPE HANGERS WERE DETERMINED TO BE INCORRECTLY INSTALLED: (PRELIMINARY INSTALLATION

1-EA-H-59 R/0S1 HANGER WINDOW IS 3/16" TOO SMALL

*1-SI-H 1231 R/0A GAP BETWEEN ITEM #5 & EMBEDED PLATE EXCEEDS 3/16". ITEM #5 IS NOT LEVEL ITEM #5 LAP AT EMBED IS 1/8" SHORT
DESIGN RADIUS IS 47'-2 3/16
AS BUILT RADIUS IS 47'-3 1/2"

1-FP-H-3170 R/3D NO VENT HOLES IN 4"x4"x1/2" TUBE ST. AS REQUIRE PER HANGER SKETCH

1-CS-H-736 R/2S1 WELDED BEAM ATTACHMENT IS TURN 90° FROM DESIGNED ORIENTATION

1-SF-H-1224 R/0S1 THE GAP BETWEEN ITEM #1 & EXISTING EXCEEDS 3/16"

* 1-FP-H 2307 R/0A ORIENTATION OF ITEM #3 IS APPROX OFF SET

* 1-FP-H 2307 R/0A INSUFFICIENT LAP ITEM #3 TO BEAM IS 1/4" TOO SHORT

1-RH-H 119 R/3B INCORRECT WELD PREP FOR BRACE ITEM #2 SHOULD BE BEVELED FOR FULL PEN. HANGER IS 1 7/8" OFF OF DESIGN LOC.

QA- 65
REV. 0
2/21/83

CAROLINA POWER AND LIGHT COMPANY
CORPORATE QUALITY ASSURANCE DEPARTMENT

QA SURVEILLANCE REPORT
CONTINUATION SHEET

* 1-SW-H 2082 R/2C — INSUFFICIENT LAP ITEM #1 TO ITEM #2 IS 1/2" SHORT

* 1-SW-H 2082 R/2C — ITEM #2 IS APPROX. 5° OUT OF PLUM

* 1-SI-H 1231 R/0A — IDENTIFICATION NUMBER HAS BEEN GROUND OFF OF ITEM #5

1-SW-H-378 R/7E — TEMPORARY STEEL IS WELDED TO ITEM #4 NO VENT HOLES IN TUBE STEEL ITEM # 4 ; # 8

1-AF-H 245 R/0A — AS INSTALLED ITEM #1 DIRECTLY INTERFERES - WITH ~~WITH~~ THE HAND WHEEL ON VALVE # 3AFV-89-SB-1

DUE TO THE SHORT PERIOD OF TIME BETWEEN THE INSTALLATION AND THE PRELIMINARY INSPECTION OF THE ABOVE PIPE HANGERS THIS SURVEY WAS CONDUCTE BY ASSISTING PIPE-HANGER CONSTRUCTION INSPECTO IN PERFORMING THE PRELIMINARY INSPECTIONS

THE SURVEILLANCE BY QA OF PRELIMINARY INSTALLATIONS RESULTED IN A REJECTION RATE IN ~~AX~~ EXCESS OF 72% AND THIS IS CORROBORATED BY THE INSPECTION/REJECTION RATES FROM C.I. AS FOLLOWS:

		ACCEPT	REJECT	AS BUILT REJECTION	%
MAY 83	PHASE I	424	273	43	[illegible]
	PHASE II	89	106	0	[illegible]
JUNE 83	PHASE I	325	235	27	[illegible]
	PHASE II	132	138	0	[illegible]
JULY 83	PHASE I	289	311	15	
	PHASE II	86	117	0	
AUGUST 83	PHASE I	198	263	32	
	PHASE II	0	0	0	

QA SURVEILLANCE REPORT
CONTINUATION SHEET

		ACCEPT	REJECT	AS BUILT REJECT	% REJ
SEPTEMBER	(PRELIMINARY) PHASE I	261	177	22	43%
	PHASE II (FINAL)	0	0	0	0

NOTE: DURING THE MONTHS OF AUGUST AND SEPTEMBER OF 1983 NO PHASE II/FINAL INSPECTIONS WERE PERFORMED BY C.I.

CP&L

Carolina Power & Light Company

P. O. Box 101, New Hill, N. C. 27562
November 18, 1983

NRC-145
Serial LAP-83-535

Mr. James P. O'Reilly, Regional Administrator
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NOS. 1 AND 2
DOCKET NOS. 50-400 AND 50-401
IE INSPECTION REPORT NOS. 50-400/83-25 AND 50-401/83-25

Dear Mr. O'Reilly:

Carolina Power & Light Company (CP&L) has received Mr. R. C. Lewis' letter dated October 19, 1983 which documents the results of the special Regional Construction Assessment Team inspection conducted by Mr. P. R. Bemis on August 15-26, 1983.

We consider this inspection to be one of the most thorough reviews conducted of our Harris Project Activities, and appreciated the professionalism and high degree of expertise with which it was conducted. The findings and observations noted in the above report, and discussed at the exit critique, are being given management attention as we continue our internal evaluations of program improvements. In addition to the items covered in your letter, we would like to take notice of a number of strengths found by your assessment team and discussed at the critique:

1. Project management meetings, such as the project review meeting, are oriented towards the resolution of problems. The meetings focus on the identification of the problems and the agreement of how to attack and resolve the problems. The responsibility to handle the tasks is clearly defined when problems emerge.

2. The warehouse storage program is well developed, and the use of operations personnel to insure that operations equipment has adequate preventive maintenance while in storage is a very positive aspect.

3. There is an on-site engineering group - Harris Plant Engineering Section - which provides design self-sufficiency.

4. There is a mechanism to incorporate industry experience feedback into the nuclear power plant design.

5. The technical audits conducted by CP&L of the Architect Engineer (Ebasco) are of substance and are over and above the required programmatic audits.

000524

6. The electrical construction inspectors are considered to be very knowledgeable and conscientious in their work areas.

7. Management is actively involved in getting problems associated with concrete placement addressed and corrected.

8. Engineers are extremely responsive in addressing concerns raised by the NRC.

In addition to the strengths noted above, we acknowledge the seven violations that were identified. We herewith submit (Attachment) our responses to violations in accordance with the provisions of 10 CFR 2.201.

We consider that the corrective actions taken are satisfactory for the resolution of the items.

Thank you for the consideration in this matter.

Yours very truly,

R M Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. B. C. Buckley (NRC)

ATTACHMENT

Responses to Violation Identified During the Inspection Conducted on August 15-26, 1983 (IE Inspection Report Nos. 50/400/401/83-25)

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation A

Reported Violation:

10 CFR 50, Appendix B, Criterion X, as implemented by the Carolina Power & Light PSAR Section 1.8.5.10, requires that inspection of activities affecting quality shall be executed to verify conformance with the documented instructions. Construction procedures TP-28 and WP-105 are the Harris site instructions that are used in the installation inspection of safety-related equipment.

Contrary to the above instructions, the installation inspection, which was performed for Motor Control Centers (MCCs) 1A35-SA and 1B35-SB was inadequate in its execution in that inspection failed to identify the following:

1. The MCC hold-down fasteners were not tightened.

2. The MCC elevation checks were not adequately performed.

3. The welding of the MCC mounting sill to embedded plates differed from the requirements on the vendor plan which was referenced on the welding instruction.

This is a Severity Level IV Violation (Supplement II), and is applicable to Unit 1 only.

Denial or Admission and Reason for the Violation:

The violation is correct as stated.

1. The fasteners were loose because either they were not checked closely enough or they were loosened by others who may have performed work on the MCCs after the inspection by CI.

2. Elevations were checked indirectly by CI inspector by verifying previous sign off of pad elevation by Civil CI when pad/embeds were installed.

3. The QC Structural Welding inspector inspected the weldments in question as per the vendor drawings minimum weld size 1/4" x 1/4" x 3". Using the 1A4 welding process and a 1/8" E-7018 electrode, an acceptable 1/4" fillet weld was not attained. Therefore, to reach the required weld size, multiple passes were performed. The QC Inspector should have requested clarification before performing the final inspection.

Corrective Steps Taken and Results Achieved:

1. All fasteners in MCCs under the scope of Regulatory Guide 1.29 have been reinspected under TP-28. Discrepancies were noted and are being resolved.

2. Procedural steps under WP-105 and TP-28 have been initiated to recheck the elevation of all MCCs under the scope of Regulatory Guide 1.29 against vendor, Ebasco, or CP&L approved design documents. This recheck is expected to be complete by December 1, 1983.

3. Motor Control Center mounting sill weldments were evaluated by Harris Plant Engineering Section and were found to be structurally sound. FCR-AS-3914 (approved October 27, 1983) was issued to allow for multiple weld passes to attain the required weld size.

Corrective Steps Taken to Avoid Further Noncompliance:

1. (a) Additional training of inspection personnel involved in inspection of MCCs was conducted by the lead inspector on October 28, 1983 emphasizing closer inspection of MCC fasteners for correct tightness under TP-28.

   (b) Exhibit 12, WP-105, is now being used to have CI check the results of work performed on equipment that has been disassembled. Exhibit 12, WP-105, is used for special assembly of equipment. This exhibit will be required to be initiated if equipment has to be disassembled to facilitate installation and has to be reassembled after installation.

2. Inspection personnel involved with inspection of MCCs received training by the lead inspector on October 28, 1983 on the requirements for elevation checks against vendor, Ebasco, or CP&L approved design documents.

3. QC structural welding inspection personnel have been instructed to follow applicable inspection criteria (i.e., FCR's, DCN's, FW's, Vendor and Engineering related drawings). If conflicts arise, inspectors will request clarification of information prior to performing inspection.

Date When Full Compliance Will Be Achieved:

1. & 2. Full compliance will be achieved on December 1, 1983.

3. Full compliance was achieved on October 28, 1983.

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation B

Reported Violation:

10 CFR 50, Appendix B, Criterion V, as implemented by Carolina Power & Light Company PSAR, Section 1.8.5.5, requires that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings and shall be accomplished in accordance with these instructions, procedures, and drawings.

1. Pipe support drawing SW-H-456, Revision 4/D, required two piece 1's, 4 x 4 tubing, to be welded to a steel tube of support SW-H-366 with a 1/4" fillet welded all around both piece 1's.

2. Pipe support drawing SW-H-456, Revision 4/D, required a 1/16" clearance between the support and the top and both sides of its pipe.

3. WP-110, Revision 8, paragraph 3.4, requires documentation of pipe support stock substitutions. The strut for support SW-H-946 was required to be welded to support SW-H-944.

4. Procedure MP-05, Revision 18, paragraph 4.6, required welders to identify their work at the time of fit-ups or before fit-up begins.

Contrary to the above,

1. One of the support SW-H-456 piece 1's was not welded on one of its four sides.

2. There was less than 1/32" clearance between support SW-H-456 and the top of the pipe it supported.

3. The strut for support SW-H-943 was used in support SW-H-946 and welded to support SW-H-944. The strut for support SW-H-942 was used in support SW-H-943. The strut for support SW-H-946 was used in support SW-H-942. The licensee was unable to provide documentation authorizing the above noted material substitutions.

4. There was no discernible evidence that the welder(s) had stamped their stencils on field welds C1-255-M-22-FW3, C1-236-1-SI-244-FW-601, and FW-597-598, 599, 600 (tack welds on code plate of SI penetration).

This is a Severity Level V Violation (Supplement II), and is applicable to Unit 1 only.

Denial or Admission and Reason for the Violation:

The violation is correct as stated, with the following clarifications:

1. Pipe hanger SW-H-456 is a box frame hanger attached to a large existing Service Water pipe hanger. It was to have all around 1/4" fillet welds connecting two items #1 (4 x 4 tube steel) to an existing 6 x 6 tube steel member of SW-H-366. The welds were only performed on three sides leaving off the inside welds.

   It appears the inspector accepted the joint knowing the welds were deleted, per FCR-H-564. The FCR allows the deletion of the inside window welds for box frame hangers on 12" and smaller pipe when the members require all around fillet welds. Due to the configuration of this hanger, the inspector thought that the FCR was applicable. In the case of the reported joints, the FCR is not applicable.

2. Hanger SW-H-456, Rev. 4/D, was inspected to Phase II by the C.I. Inspector (Hanger Q.C. Inspector). It appears that during this inspector's review, he inadvertently failed to detect the specified design clearance requirement violation. It appears that an error occurred in reading or recording the dimension. Therefore, the reason for the violation is considered to be a physical inspection error.

3. For hangers SW-H-942, 943 & 946, although a material substitution violation is acknowledged, the violation, as stated, is misleading. The violation stated that "the strut" was substituted in each case without the proper documentation when, in fact, it was not the strut but rather the pipe clamp which was substituted.

   WP-110, Rev. 8, paragraph 3.4, requires documentation of pipe support stock substitutions. Apparently, due to the fact that all three (3) hangers (SW-H-942, 943, and 946) require the same type and size pipe clamp, the inspector failed to realize a violation of site procedure had been made. The records suggest that the inspector made a document review error as opposed to a physical inspection error.

4. In reference to the NRC reported violation that on weld joints C1-255-M-22-FW3; C1-236-1-SI-244 FW 601; and the tack welds on the code plate of containment penetration #M-22 reported as FW597, 598, 599, 600, the welder(s) had not stamped their welds; a further investigation into the details has been performed by Welding Engineering.

   1SI-244 FW 597, 598, 599, 600, which are socket welds identified on isometric 1SI244, were not welded at the time of the NRC audit and were mistakenly identified by the NRC report as the four (4) tack welds attaching a Code data plate to the containment penetration #M-22. This Code data plate was moved to a new location on the penetration in 1981 for which a WDR was generated which is presently in the Q.A. Records Vault.

   On August 26, 1983, Welding Engineering was notified of the NRC Inspector's reported violations on containment penetration weld joint #C1-255-M-22-FW3, 3" diameter pipe weld joint #C1-236-1-SI-244-FW601, and the four (4) tack welds connecting the Code data plate to the containment penetration #M-22. The Senior Engineer, Metallurgy/Welding, immediately requested a CP&L Q. C. Lead Technician and a Welding Engineering Supervisor to accompany him and assist in investigating the details. Upon arrival at the weld joints, the Welding Engineering Supervisor and the Q.C. Technician located the stencils which had been stamped at the penetration weld joint #C1-255-M-22 FW3 (stencils #B-79, #C-79) and the stencil which had been stamped at the penetration code plate tack welds (stencils #F-16). It was, however, verified that welder #C-79 had forgotten to stamp pipe weld joint #C1-236-1-SI-244-FW601; as required by site procedure MP-05. It should be noted, however, that it is not a Code violation.

Corrective Steps Taken and Results Achieved:

1. After the violation was discovered, the hanger was placed on DDR #1919, Deficiency Report. It was then evaluated by Harris Plant Engineering and the joint was found to be acceptable "as is". The hanger design drawing was revised to reflect the as-built condition.

2. The condition was identified and reported for hanger SW-H-456, Rev. 4/D, and documented on DR No. H-273.

   Hanger SW-H-456, Rev. 4/D, will be reworked to correct the improper pipe to support member clearance.

3. Due to the fact that all three (3) hangers involved (SW-H-942, 943, and 946) required by design the identical type and size clamps and the clamps are all standard catalogue parts, the interchange is acceptable "as is".

4. DDR 1933 was generated on August 26, 1983 to document the failure of C-79 to stencil pipe weld joint #1SI244 FW601. Working to the Corrective Action Report of the DDR, the pipe weld joint was stamped as required by MP-05.

Corrective Steps Taken to Avoid Further Noncompliance:

1. WP-110 shall be revised to discourage the use of generic FCR's (i.e., FCR-H-564) by the craft or the inspector for installation and inspection.

2. For hanger SW-H-456, Rev. 4/D, the C.I. Inspector ceased employment in the Pipe Hanger C.I. Unit (unrelated to this incident) and transferred to a different C.I. discipline. Due to the relatively short time frame from the issuance of the noncompliance report to the inspector's transfer, only a verbal reemphasis of procedures was performed. If the inspector had remained in the group, he would have undergone a documented and formal retraining relative to the noncompliance. Site policy has been reemphasized to all Pipe Hanger C.I. Inspectors to assure that they understand Phase II Inspection procedures and criteria.

3. The use of catalog parts shall be in accordance with design. This shall be verified at the point of installation. WP-110 and TP-34 shall be revised to clearly state these requirements.

4. Welder C-79 was issued a written reprimand and reoriented to MP-05 by his supervisor.

Date When Full Compliance Will Be Achieved:

1 - 3. Full compliance will be achieved on December 15, 1983.

4. Full compliance was achieved on September 2, 1983.

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation C

Reported Violation

10 CFR 50, Appendix B, Criterion V, requires that procedures written for activities affecting quality be followed, FSAR, Section 1.8, commits to Regulatory Guide 1.28 which endorses ANSI Standard N45.2. Section VI of the standard defines the same requirements as Criterion V. Quality procedures AP-XIII-05, Appendix A, requires that the Senior Lead Engineer will, for each shipment, check for storage requirements from the vendor.

Contrary to the above, as of August 24, 1983, quality procedures were not followed in that the Senior Lead Engineer had not checked the vendor storage requirements for HEPA filters designated for use in safety-related HVAC filtration units. These filters were not stored in accordance with vendor instructions.

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

Denial or Admission and Reason for the Violation:

The violation is correct as stated. The vendor storage requirements were not on site.

Corrective Steps Taken and Results Achieved:

The HEPA filters have been inspected to insure that no damage occurred because of the previous improper storage. None was found. The filters were restacked to comply with the requirements of ANSI N509-1976. The vendor requirements for storage are not on site, but at the time of the discovery of the violation, the NRC Inspector called the vendor. The vendor said his storage requirements were the same as ANSI N509-1976.

Corrective Steps Taken to Avoid Further Noncompliance:

The material storage procedure AP-XII-05 was revised to include the specific storage requirements for HEPA filters as described in ANSI N509-1976.

Date When Full Compliance Will Be Achieved:

Full compliance was achieved on November 10, 1983.

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation D

Reported Violation:

10 CFR 50, Appendix B, Criterion V, requires activities affecting quality shall be accomplished in accordance with procedures, drawings, etc. Carolina Power & Light Company procedure CQA-4, Revision 5, QA Records, Attachment 1, identifies radiographs as QA records. Paragraph 7.7.2 requires special process records such as radiographs and microfilms to be packaged and stored to prevent damage due to temperature, humidity, light, etc.

Contrary to the above, radiographic film had been stored in the Superintendent's QA office, outside the vault, for approximately two weeks.

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

Denial or Admission and Reason for the Violation:

The violation is correct as stated. The volume of radiographs received on site in a limited period of time exceeded available storage in the QA Records Vault. Timely rearrangement of vault storage was not taken.

Corrective Steps Taken and Results Achieved:

Radiographs were transferred to the vault on October 14, 1983. (The vault rearrangement was completed the same day.) The radiographs were removed from the sealed packing crates and placed in the radiograph storage cabinets the next two days and are now stored according to requirements.

Corrective Steps Taken to Avoid Further Noncompliance:

Any future receipts of radiographs which exceed QA Records' storage capacity will be stored in the Harris Plant Document Control vault which is the permanent QA Records' storage facility for the plant.

Date When Full Compliance Will Be Achieved:

Full compliance was achieved on October 14, 1983.

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation E

Reported Violation:

10 CFR 50, Appendix B, Criterion XVI, requires that measures be established to assure that conditions adverse to quality, such as deficiencies, deviations, and nonconformances are promptly identified and corrected.

Contrary to the above, the Shearon Harris Plant Engineering Organization did not have a procedure for identifying and correcting deficiencies, deviations, and nonconformances. In addition, during re-performance of calculations for pipe support CH-H-1030, the designer noted a violation of AISC requirements in the original calculations. The support was redesigned but the violation was not identified to the original designer (A/E-contractor), nor evaluated for potential generic significance.

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

Denial or Admission and Reason for the Violation:

The violation is correct as stated. The Harris Plant Engineering Sections uses departmental and Corporate procedures for identifying and correcting deficiencies, deviations, and nonconformances. NPED procedures, and the procedures applicable to specific design efforts such as on-site hanger design, incorporate the design control requirements of ANSI N45.2-11. NPED procedures for evaluating nonconformances under 10 CFR 50.55(e) and 10 CFR 21 are part of the mandatory training for all design personnel. Criterion XVI, 10 CFR 50, Appendix B, requires that significant conditions adverse to quality be documented and reported, and the NPED procedures reflect this requirement. Also, please note that the specific design question concerning a pipe support, which was identified during this audit, was neither "significant" nor "adverse to quality". If the design had not been revised, the support would have performed the design function.

Corrective Steps Taken and Results Achieved:

Each applicable HPES employee has been reminded of our procedural commitments (NPED 3.9); however, due to the nature of the specifically identified concern (e.g., not significant), no further specific action for the particular item is deemed appropriate.

Corrective Steps Taken to Avoid Further Noncompliance:

A Section Instruction is scheduled for issuance by November 30, 1983. The purpose of this Instruction is to more clearly define specific actions to be taken by HPES personnel when nonconformances are identified.

Date When Full Compliance Will Be Achieved:

Full compliance will be achieved on November 30, 1983.

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation F

Reported Violation:

10 CFR 50, Appendix B, Criterion V, requires that activities affecting quality be prescribed by and performed in accordance with instructions, procedures, or drawings.

1. FSAR, Section 1.8, page 50, commits to compliance with NRC Regulatory Guide 1.38 and ANSI N45.2.2-1972. AP-XIII-05, Revision 12, requires the reactor internals to be stored in accordance with the manufacturer's instructions. The NSSS Component Receiving and Storage Criteria, dated March 1976, states that storage criteria was in accordance with ANSI N45.2.2-1972. During inspection of the storage condition for the upper reactor internals stored in the reactor vessel and an inspection of storage areas in the auxiliary building, the following items were noted:

   a. ANSI N45.2.2-1982, paragraph 6.2.1, required access control to storage areas.

   b. ANSI N45.2.2-1972, paragraph 6.2.2, required storage areas to be cleaned to avoid accumulation of trash, discarded packaging materials, and other detrimental soil.

   c. ANSI N45.2.2-1972, paragraph 6.3.3, prohibits the storage of hazardous chemicals in close proximity to important nuclear items.

   Contrary to the above:

   a. (1) On July 23, 1983, and twice on July 25, 1983, the materials storage area in the auxiliary building was found unlocked and without an attendant.

      (2) The storage area for the reactor internals was not posted as a controlled area and unrestricted access to the storage area was observed.

   b. Underneath the reactor upper internals cover and on the upper internals, over six wads of used tape, two rolls of tape, and cleaning cloth were observed. In addition, the RV flange was not protected and numerous cigarette butts were observed on the RV flange grooves.

   c. A can of cutting fluid was observed to be stored on top of the upper reactor internals and underneath its canvas protective cover.

2. On August 25, 1983, a craftsman working on the upper internals lifting rig informed the inspector that he had taped over the spray nozzle holes of the upper internals because he was concerned about dropping something into the holes while working above them. He further stated that he determined how deep the holes were by dropping a nut tied to a string into the holes.

Contrary to the above, the craftsman did not have a procedure for determining the depth of the holes and for taping the holes.

This is a Severity Level V Violation (Supplement II), and is applicable to Unit 1 only.

Denial or Admission and Reason for the Violation:

The violation is correct as stated with the following exception:

The lower internals cannot be interpreted as being in a stored area with respect to access control. Permanent plant locations are considered storage locations by site policy with the exception of access control. Access control for materials and equipment in its permanent plant location is controlled by procedure on a case-by-case basis. The violation occurred because of failure to implement the policy and the inflexibility of the procedure.

Corrective Steps Taken and Results Achieved:

Valve storage areas and the reactor vessel internals storage area are being locked during non-working hours and during times when access to the areas is not required.

Valve storage areas have signs posted at the entrance allowing authorized personnel only to enter the area as well as forbidding the use of tobacco, food or beverages.

The reactor vessel internals have been cleaned of subject debris, and stored in the reactor vessel which is in a relatively isolated area. Polyethylene has been used to seal the internals inside the vessel and a barricade was installed with a lockable door to restrict access. A sign was placed at the entrance designating the area as Zone 4.

The work being done on the vessel internals by the craftsman without a procedure will be eliminated by the new access control for the area. Also, management has reemphasized placing covers over accesses to equipment, piping systems, etc. where the entrance of foreign objects could cause potential problems.

Corrective Steps Taken to Avoid Further Noncompliance:

Procedure AP-X-02 has been reviewed and found to be compatible with ANSI standards governing housekeeping requirements. Management has emphasized the importance of compliance with this procedure to all personnel.

Date When Full Compliance Will Be Achieved:

Full compliance was achieved on November 10, 1983.

Carolina Power & Light Company
Shearon Harris Nuclear Power Plant
IE Inspection Report 50-400/401/83-25
Violation G

Reported Violation:

10 CFR 50, Appendix B, Criterion V, as implemented by Carolina Power & Light Company, PSAR, Section 1.8.5.5, requires in part that activities affecting quality shall be prescribed by documented instructions and procedures of a type appropriate to the circumstances. Contrary to this requirement, the following civil procedure instructions were not appropriate for the circumstances as described below:

1. Procedure TP-32, Structural Steel Inspection, requires that extra flat washers be used on oversize holes, but does not provide for instructions or documentation for inspectors to inspect and document oversize holes.

2. Procedure WP-28 does not adequately prescribe instructions for the hand methods being used to mix grout in that it does not stress the importance of blending cement and sand before adding water and it prescribes that grout be mixed in a truck or paddle mixer.

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

Denial or Admission and Reason for the Violation:

The violation is correct as stated.

1. The requirement to inspect for oversize holes was inadvertently omitted from the procedure (TP-32).

2. The paragraph of WP-29 which is in question, 3.10.2, concerns dry pack grout, and states grout will be mixed by mixer or by hand. For actual mixing instructions, it references paragraph 3.12.2 which covers controlled shrinkage grout. Paragraph 3.12.2, however, states mixing shall be by paddle mixer or by truck, which contradicts paragraph 3.10.2.

   Detailed instructions for hand mixing were not included in 3.10.2 except to require thorough mixing of the ingredients - cement, sand, and water.

Corrective Steps Taken and Results Achieved:

1. Deviation Notice No. 2 was written to TP-32, Rev. 5, establishing procedural requirements for inspection and documentation of bolt holes sizes on August 26, 1983 and is now being used by field inspection personnel. DR-AS-300 was written on September 1, 1983 addressing the possibility that high strength bolts may have been installed in oversized holes without the required hardened washers over the holes. FW-AS-3624 was approved on September 1, 1983 resolving this discrepancy.

2. Procedure WP-29 was revised by Procedure Deviation Notice No. 6 on August 23, 1983 to delete requirement for mixing dry pack grout with a paddle mixer. Deviation Notice No. 7 was approved on August 25, 1983 adding the requirement for thoroughly blending the sand and cement before water is added.

Corrective Steps Taken to Avoid Further Noncompliance:

1. TP-32, Rev. 6, approved on November 4, 1983, includes inspection for oversized holes in the erection phase and a check during the bolting phase for oversized holes which may result from reaming and drilling.

2. Work Procedure revisions. (See Corrective Steps Taken and Results Achieved.)

Date When Full Compliance Will Be Achieved:

Full Compliance was achieved on November 4, 1983.

(8515PSA cfr)

P. O. Box 101, New Hill, N. C. 27562
February 24, 1984

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 2900)
Atlanta, Georgia 30303

NRC-186

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986 - 900,000 KW - UNIT 1
SHOP WELDING DEFICIENCIES ON SEISMIC CLASS I CABLE TRAY, CONDUIT, AND HVAC HANGERS, ITEM 77

Dear Mr. O'Reilly:

Attached is our fourth interim report on the subject item which was deemed reportable per 10CFR50.55(e) and 10CFR, Part 21, on August 2, 1982. CP&L is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by July 1, 1984.

Thank you for your consideration in this matter.

Yours very truly,

R M Parsons

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

Attachment

cc: Messrs. G. Maxwell/R. Prevatte (NRC-SHNPP)
Mr. R. C. DeYoung (NRC)

00059?

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

INTERIM REPORT NO. 4

SHOP WELDING DEFICIENCIES IN SEISMIC CLASS I
CABLE TRAY, CONDUIT AND HVAC HANGERS

ITEM 77

FEBRUARY 22, 1984

REPORTABLE UNDER 10CFR50.55(e) AND 10CFR, PART 21

SUBJECT: Shearon Harris Nuclear Power Plant/Units No. 1 and 2, 10CFR50.55(e) and 10CFR, Part 21, Reportable Deficiency. Shop welding deficiencies in Seismic Class I cable tray, conduit and HVAC hangers.

ITEM: Shop welding on cable tray, conduit and HVAC hangers is not in accordance with Codes and Standards to which they were procured.

SUPPLIED BY: Peden Steel Company, Raleigh, N. C.

NATURE OF DEFICIENCY: Shop welds on cable tray, conduit, and HVAC hangers do not meet AWS D1.1 code requirements. Undersize welds, overlap, porosity are examples of the types of deficiencies.

DATE PROBLEM WAS CONFIRMED TO EXIST: March 19, 1982

DATE PROBLEM REPORTED: On April 2, 1982, Mr. L. E. Jones notified the NRC, Region II (Mr. C. Julian), that the item was potentially reportable. On August 2, 1982, Mr. L. E. Jones notified the NRC, Region II (Mr. A. Hardin), that this item was reportable per the provisions of 10CFR50.55(e).

SCOPE OF PROBLEM: A large number of cable tray, conduit and HVAC hangers have been installed and accepted by QA/QC personnel. Cable tray, HVAC duct and conduit have been installed in the hangers. Inspection of shop welds is in progress in the containment, reactor auxiliary and reactor auxiliary - common buildings as well as in the warehouse laydown yards. Deficiencies are being found and repaired.

SAFETY IMPLICATIONS: Cable tray, conduit, and HVAC duct are supported by these hangers. Hangers having unacceptable welding could possibly fail in normal operation or during a seismic event. This in turn could lead to the failure of the items the hangers were supporting. To date, the reinspection has not revealed any problems this severe.

REASON DEFICIENCY IS REPORTABLE:

Reportable due to the Quality Assurance Program breakdowns at Peden Steel Company and during Ebasco Vendor QA surveillance activities.

CORRECTIVE ACTION:

Since May 14, 1982, all material fabricated by Peden Steel on A/E purchase orders has been receiving a 100 percent primary welding inspection by CP&L Welding QC personnel prior to shipment. A complete reinspection of all cable tray, conduit and HVAC hangers furnished by Peden Steel is in progress. The total number of hangers concerned is approximately 5,200. To date, all but 671 have been found to be acceptable "as-is" or have been repaired and accepted. Of the remaining 671, 664 have portions with welds which are inaccessible for inspection. These 664 hangers have been reported to Engineering on Permanent Waivers (PW's) and approximately 400 of the 664 have been accepted based on engineering evaluation. Engineering is continuing to evaluate the remaining 264 frames. Seven remain to be located.

FINAL REPORT:

A final report will be issued when the evaluations, reinspections and subsequent rework have been completed. The date currently projected for submittal of the final report is July 1, 1984.

CONSTRUCTION PROCEDURES MANUAL SHNPP	Procedure No. MP-10	Date As Approved
GENERAL WELDING PROCEDURE	Revision	11
DESCRIPTION REPAIR OF BASE MATERIALS AND WELDMENTS	Page 1	of 31

DEC 2 1981 Rev. 7
JUN 5 1981 Rev. 6
DEC 1 8 1980 Rev. 5
MAR 8 1980 Rev 4
APR 1 1979 Rev 3
APR 9 Rev. 2
AUG 2 9 1978 REV-1

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

GENERAL WELDING PROCEDURE

MP-10

DOCUMENT CONTROL
RECEIVED
APR 2 8 1978
SHEARON HARRIS N. P. P.

FEB 1 6 1984 Rev. 11
SEP 2 1 1983 Rev. 10
DEC 3 0 1982 Rev. 9
JUN 2 1 1982 Rev. 8

* Reviewed by Daniel for Constructability Only

Rev.	Description	Approvals		Date
0	Issued for Use	Originator	Malcolm E Rouse	4/28/78
		Constructor *	W. D. Goodman	4-28-78
		CP&L	A M Lucas	4-28-78
1	Revised as noted. Revised Exhibit 1. Added Exhibit 3.	Originator	Malcolm E Rouse	8/29/78
		Constructor *	W. D. Goodman	8/29/78
		CP&L	A M Lucas	8/29/78
2	Revised as Noted.	Originator	Malcolm E Rouse	4/6/79
		Constructor *	W. D. Goodman	4-6-79
		CP&L	A M Lucas	4-7-79
3	Revised as Noted.	Originator	Ray Hanford	4/11/79
		Constructor *		
		CP&L	A M Lucas	4-11-79
4	Revised as Noted.	Originator	R. Hanford	3/4/80
		Constructor *	W. D. Goodman	3-5-80
		CP&L	A M Lucas	3-8-80

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

GENERAL WELDING PROCEDURE

MP-10

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
5	Adopted New Title and Authorization Sheet. Added Para. 3.6. Incorporated Deviation Notice 1.	ORIGINATOR	R. Hanford	12/11/80
		CONSTRUCTOR	W.D. Goodman	12/16/80
		E&C Q.A.	N/A RM	
		CP&L	R.M. Lucas	12/12/80
		DES. ENG. *	N/A RM	
6	Revised Paragraph 3.4.	ORIGINATOR	R. Hanford	6/1/81
		CONSTRUCTOR	W.D. Goodman	6-1-81
		E&C Q.A.	N/A RM	
		CP&L	R.M. Lucas	6-5-81
		DES. ENG. *	N/A RM	
7	Revised As Noted.	ORIGINATOR	R. Hanford	11/24/81
		CONSTRUCTOR	W.D. Goodman	11-25-81
		E&C Q.A.	N/A RM	
		CP&L	R.M. Lucas	12-1-81
		DES. ENG. *	N/A RM	

FORM NO. 1784-A

CONSTRUCTION PROCEDURES MANUAL SHNPP	PROCEDURE NO. MP-10	DATE As Approved
GENERAL WELDING PROCEDURE	REVISION 11	
DESCRIPTION REPAIR OF BASE MATERIALS AND WELDMENTS	PAGE 3 OF 31	

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

FEB 16 1984 Rev. 11

GENERAL WELDING PROCEDURE

SEP 21 1983 Rev. 10

MP-10

DEC 30 1982 Rev. 9

DOCUMENT CONTROL
RECEIVED
JUN 21 1982
SHEARON HARRIS N. P. P.

Rev. 8

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
8	Revised As Noted. Incorporated Deviation Notices 1, 2, and 3. Revised Exhibit 1.	ORIGINATOR	R. Hanford	6/10/82
		CONSTRUCTOR	W. D. Goodwin	6-15-82
		E&C Q.A.	NA	6/17/82
		CP&L	R. Hanford FOR A. M. Lucas	6/17/82
		DES. ENG. *	N/A	6/17/82
9	Revised As Noted. Incorporated Deviation Notice 2.	ORIGINATOR	R. Hanford	12/21/82
		CONSTRUCTOR	W. D. Goodwin	12-22-82
		E&C Q.A.	N/A	12/22/82
		CP&L	R. Hanford FOR M.F. THOMPSON JR	12/23/82
		DES. ENG. *	N/A	12/23/82
		ORIGINATOR		
		CONSTRUCTOR		
		E&C Q.A.		
		CP&L		
		DES. ENG. *		

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

GENERAL WELDING PROCEDURE

MP-10

* * REVIEWED BY QA/QC FOR COMPLIANCE WITH THE APPLICABLE QA AND CODE REQUIREMENTS.

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3100 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
10	Revised As Noted. Incorporated Deviation Notice 2 and 3 As Applicable. Deviation Notice 1 voided. Deleted Exhibit 1-3. Changed Exhibits 2 and 3 to 1 and 2 respectively. Added New Exhibit 3.	ORIGINATOR	R. Hanford	9/14/83
		CONSTRUCTOR	W. A. Hordeman	9.15.83
		QA/QC REVIEW * *	M. M. Kraft	9/16/83
		CP&L	R. Hanford FOR: M.F. THOMPSON JR	9/16/83
		DES. ENG. *	N/A	9/16/83
11	Revised As Noted. Incorporated Procedure Change Notice 1.	ORIGINATOR	R. Hanford	2/14/84
		CONSTRUCTOR	W. A. Hordeman	2.14.84
		QA/QC REVIEW * *	W T Holm	2/15/84
		CP&L	R. Hanford FOR: M.F. THOMPSON JR.	2/15/84
		DES. ENG. *	N/A	2/10/84
		ORIGINATOR		
		CONSTRUCTOR		
		QA/QC REVIEW * *		
		CP&L		
		DES. ENG. *		

1.0 SCOPE

1.1 This specification provides a procedure to be followed for the repair of defects in base material and field welds of components, piping, and structures at the SHNPP Site.

1.2 ASME "Code" Classes 1, 2, and 3 are also addressed as Categories 1, 2, and 3, respectively, in this procedure.

1.3 This is an ASME Section III Procedure.

2.0 REFERENCES

2.1 "ASME Boiler and Pressure Code", Section III, Division I, 1976 Winter Addenda, 1974 Edition

2.2 ANSI B31.1 Power Piping Code - 1973 Edition, Summer 1973 Addenda

2.3 MP-01, Procedure for Qualifying Welding Procedures

2.4 MP-02, Procedure for Qualifying Welders

2.5 MP-04, Procedure for Heat Treatment

2.6 MP-06, General Welding Procedure for Carbon Steel Weldments

2.7 MP-07, General Welding Procedure for Stainless Steel Weldments

2.8 "ASME Boiler & Pressure Code" Section III, Division 2, 1974 Edition Winter 1975 Addenda.

2.9 Site Specification 030, 031, 032, 033 - Field Erection Specifications

2.10 AWS D1.1 Structural Welding Code, 1975 Edition

2.11 MP-08, General Welding Procedure For Structural Steel (Seismic and Non-seismic) and Hangers

3.0 GENERAL

3.1 Only qualified welding materials and welders using qualified procedures shall perform repair welds with References 2.1, 2.2, 2.3 and 2.10, as appropriate. R11

3.2 Repair weld data reports (RWDR) are required on Code Class 1, 2, 3, MC and seismic 1 items for the following:

1. Weld repairs (repair by welding) on completed weld joints for indications detected by NDE.

2. Weld repairs to base metal.

3.3 RWDRs are not required on Code Class 1, 2, 3, MC and seismic 1 items for the following:

1. <u>In-Process Repairs</u>
During the welding of pipe joints, it is considered in-process welding for any repairs until welding is complete. This includes any weld defects that are detected visually or by information derived from NDE prior to the completion of welding. R11

2. Weld Cut-Out
A new Weld Data Report (WDR) shall be written for a pipe weld joint repair which results in cutting the completed weld joint out and reprepping for a new weld. A comment shall be entered in the "Remarks" that "previous weld joint cut and reprepped for welding". The original WDR shall be marked "Superseded" and shall be attached to the back of the new WDR. For seismic Class 1 structural items and safety related tubing (instrumentation), it shall not be necessary to generate a new WDR and mark the old WDR "Superseded" since weld joint number(s) and hold points may be re-established on the original seismic WDR and/or safety related instrumentation WDR for weld cut-outs. R11 R11

3. For the removal of indications in the completed weld joint or adjacent base metal that were detected by NDE, where removal will not necessitate a weld repair. In this case, the required QC/ANI NDE holdpoints shall be re-established on the original WDR. If it is later determined that removal of these indications has resulted in a violation of minimum wall thickness, a repair WDR shall be generated to facilitate the weld repair.

3.4 A weld repair or a repair to base metal that requires a RWDR shall be reported by the welding inspector personnel to the SHNPP Discipline Engineer-Metallurgy/Welding, or his designee, and Quality Assurance who will coordinate the repair procedure with the Discipline Engineer-Metallurgy/Welding, or his designee. It is the responsibility of the

(3.4 cont.)

Discipline Engineer-Metallurgy/Welding, or his designee, to effect a resolution of the repair or replacement. The ANI shall be notified by the Director-QA/QC of weld repairs or repair to base metal that requires a RWDR prior to initiation of such repairs. The ANI may establish hold points as deemed necessary. If a RWDR is in progress and a reject occurs due to an inspection hold point necessitating additional grinding, buffing, or welding on the same location, a new RWDR is not required. Additional QC/ANI hold points, as necessary, should be added to repeat inspections until an acceptable inspection is completed. A new RWDR should only be necessary under the following conditions:

1. A different repair method is required.
2. A repair is required at a new location on an item in an area not previously identified on the discrepancy report and the new repair will be handled as a separate repair.
3. If an additional weld repair is at the same location which was previously repaired and has been completed, inspected, and the documentation is completed, the new RWDR would be Number 2, 3, etc. | R11

3.5 After the repair is completed the repaired area shall be examined by the same method used to detect the original defect and by any additional NDE as required. For Code Class 1, 2, and 3 base metal repairs, the QA Welding Inspector will prepare a sketch of the repaired area for QA records showing the location and size of the prepared cavity, the welding material identification, the welding procedure, the heat treatment and the examination results of repair welds exceeding in depth the lesser of 3/8 inch or 10% of the section thickness. The RWDR will be maintained as QA records.

3.6 The Discipline Engineer-Metallurgy/Welding shall have the authority to assign or remove welders at his discretion.

3.7 Welders chosen to perform field welds should be chosen based on the qualification to weld the full thickness of the field joint. The Discipline | R11

(3.7 cont.)

Engineer-Metallurgy/Welding must be notified to evaluate any situations where this may not be possible to ensure that the actual thickness welded by each welder does not exceed his/her qualification thickness range and permit documentation when deemed necessary.

3.8 A welding QC specialist, or his designee, shall be notified by the craft foreman when a QC/ANI holdpoint is reached on the WDR/RWDR. Work shall not progress beyond a designated hold point until that hold point has been inspected and signed off. QC/ANI, as applicable, shall be notified in the event work regresses during in-process repair or rework of a fabrication which supersedes a previous hold point which has been signed off by QC/ANI. This will permit the assigning of a new hold point to allow reinspection/reverification of the previous hold point.

3.9 When a RWDR is required by this procedure, the RWDR (QA-30, latest revision) shall be used for pipe (Code Class 1, 2, 3 & MC) components and a Seismic Weld Data Report (SWDR) (QA-34, latest revision) shall be used for structural components. When a SWDR is used for repairs, the word "Repair" shall be added to the SWDR.

4.0 PROCEDURE

4.1 Base metal repairs not requiring welding on pressure retaining equipment Category 1-3.

1. Plate

1. Unacceptable surface defects shall be removed by grinding or machining, provided:

1. The remaining thickness of the section is not reduced below that required by the design.

2. The depression, after defect elimination, is blended uniformly into the surrounding surface.

3. After defect elimination the area is reexamined by the magnetic particle method or the liquid penetrant method to assure that the defect has been removed or the indication reduced to an acceptable size.

(4.1.1.1 cont.)

4. Areas ground to remove oxide scale or other mechanically caused impressions for appearance, or to facilitate proper ultrasonic testing, need not be examined by the magnetic particle or liquid penetrant test method.

2. When the elimination of the defect reduces the thickness of the section below the minimum required by the design, the product shall be repaired in accordance with 4.2.1.

2. <u>Forgings and Bar</u>

Same as Section 4.1.1.

3. <u>Wrought Seamless Welded Tubular Products and Fittings (Without Filler Metal)</u>

1. Unacceptable surface defects shall be removed by grinding or machining, provided:

1. The remaining thickness of the section is not reduced below that required by the design.

2. The depression, after defect elimination, is blended uniformly into the surrounding surface.

3. After defect elimination the area is examined by the method which originally disclosed the defect to assure that the defect has been removed or the indication reduced to an acceptable size.

2. If the elimination of the defect reduces the thickness of the section below the minimum required by the design, the product may be repaired in accordance with 4.2.3.

4. <u>Tubular Products and Fittings (With Filler Metal)</u>

1. Unacceptable surface defects shall be removed by grinding or machining and, in addition, the requirements of (1), (2), and (3) (below) shall be met.

1. The remaining thickness of the section shall not be reduced below that required by the design.

(4.1.4.1 cont.)

2. The depression, after defect elimination, shall be blended uniformly into the surrounding surface.

3. After defect elimination the area shall be re-examined by the magnetic particle method or the liquid penetrant method to ensure that the defect has been removed or reduced to an acceptable size. If the area of the defect elimination is in the weld seam, the acceptance standards shall be in accordance with NB-5340 or NB-5350, whichever is applicable.

2. If the elimination of the defect reduces the thickness of the section below the minimum required by the design, the product may be repaired in accordance to 4.2.4.

5. Statically and Centrifugally Cast Products

Same as Section 4.1.1.

4.2 Base Metal Repairs Requiring Welding on Category 1-3:

1. Plate

Repair by welding may be performed on material from which defects have been removed, provided requirements of the following sub-paragraphs are met.

1. The cavity shall be prepared by chipping, grinding, or gouging to sound clean metal. If gouging is used for metal removal, 1/16 inch of the gouged surface shall be removed prior to rewelding. (Whenever thermal cutting methods are used, consideration shall be given to preheat requirements.) The cavity shall be sufficiently wide to permit complete fusion and allow adequate manipulation of the electrode. The cavity must be liquid penetrant or magnetic particle inspected before welding (to ensure removal of unacceptable indications) as given on the RWDR.

2. The manner of depositing the repair weld metal must be in accordance with the original welding procedure specified by the Discipline Engineer-Metallurgy/Welding, or his designee,

(4.2.1.2 cont.)

which has been approved. All welding shall be done by qualified welders. Original purge requirements must apply if the remaining weld thickness is less than 3/16 inch.

3. After repair the surface shall be blended uniformly into the surrounding surface.

4. Examination of Weld Repairs

   Each repair weld for Category 1 and 2 shall be examined by the magnetic particle method or by the liquid penetrant method. In addition, repair cavities, the depth of which exceeds the lesser of 3/8" or 10% of the section thickness, shall be radiographed after repair. Each repair weld for Category 3 shall be examined by the magnetic particle method or by the liquid penetrant method. In addition, repair cavities, the depth of which exceeds the lesser of 3/8" or 10% of the section, shall be radiographed after repair. However, radiography is not required for weld repairs in material used in components, provided that the welds joining materials are not required to be radiographed and the surface area of the repaired area does not exceed 10 square inches. The penetrometer and the acceptance standards for radiographic examination of repair welds shall be based on the section thickness at the repair area.

5. Any post weld heat treatment will be in accordance to MP-04.

2. Forgings and Bar

   Weld repairs should be done in accordance to 4.2.1, with the following exception. For ferritic steel forgings, the completed repair may be examined by the ultrasonic method in lieu of radiography.

3. Seamless and Welded (Without Filler Metal) Tubular Products and Fittings

   Weld repairs shall be done in accordance to 4.2.1.

(4.2 cont.) 4. Tubular Products and Fittings Welded With Filler Metal

Repair welding of base material defects shall be in accordance with 4.2.1. Repair welding of weld seam defects shall be in accordance with 4.4.

5. Statically and Centrifugually Cast Products

Repair of castings, by welding, may be performed after all unacceptable defects are removed by suitable mechanical cutting or thermal gouging methods to sound metal, or until any defect remaining is within the acceptance standards, provided the cavity is prepared for welding and the following subparagraphs are satisfactorily followed:

1. Qualification of Welding Procedures and Welders

   The welding procedure and welders or welding operators shall be qualified in accordance to References 2.3 and 2.4.

2. Blending of Repaired Areas

   After welding the surface shall be blended uniformly into the surrounding surface.

3. Examination of Repair Welds

   1. Each repair weld for Category 1 and 2 shall be examined by the magnetic particle method or by the liquid penetrant method. In addition, repair cavities, the depth of which exceeds the lesser of 3/8" or 10% of the section thickness, shall be radiographed after repair. Each repair weld for Category 3 shall be examined by the magnetic particle method or by the liquid penetrant method. In addition, repair cavities, the depth of which exceeds the lesser of 3/8" or 10% of the section, shall be radiographed after repair. However, radiography is not required for weld repairs in material used in components, provided that the welds joining materials are not required to be radiographed and the surface area of the repaired area

(4.2.5.3.1 cont.)

does not exceed 10 square inches. The penetrometer and the acceptance standards for radiographic examination of repair welds shall be based on the section thickness at the repair area.

2. Examination of repair welds in P-No. 1 and P-No. 8 on Category 2 and 3 material is not required for pumps and valves with inlet piping connections over 2 inches, up to and including 4 inches, nominal pipe size when a quality factor of 0.70 is applied to the pressure rating of the valve and to the allowable stress values used in the design of the pumps.

3. Examination of repair welds in P-No. 1 and P-No. 8 material is not required for pumps and valves with inlet piping connections 2 inches nominal pipe size and less.

4. Post Weld Heat Treatment After Repairs

All PWHT shall be in accordance to MP-04 except that the heating and cooling limitations of paragraph 3.11.1 of MP-04 do not apply.

4.3 Repair of Weld Metal Defects

1. Elimination of Surface Defects on Category 1-3

Weld metal surface defects may be removed by grinding or machining and not repaired by welding, provided that the requirements of (1), (2), and (3) are met.

1. The remaining thickness of the section is not reduced below that required by the design.
2. The depression, after defect elimination, is blended uniformly into the surrounding surface.
3. The area is examined, after blending by a magnetic particle or liquid penetrant method meeting the requirements of Articles 6 and 7 of Section V, to ensure that the defect has been removed or the indication reduced to an acceptable limit.

2. Defect Removal on Category 1-3

Unacceptable defects shall be removed by mechanical means or by thermal gouging processes. The area prepared for repair shall be magnetic particle or liquid penetrant inspected before welding to ensure removal of unacceptable indications except where the full thickness of the weld is removed and where the backside of the weld joint assembly is not accessible for removal of examination materials. In such cases, ASME Code Case N275 (Exhibit 3) may be invoked. For those welds where Code Case N275 is invoked, it shall be so noted on the RWDR. Partial penetration welds (fillet), such as tube-to-tube sheet welds and those where defect removal essentially removes the full thickness of the weld, need only be examined visually to the satisfaction of the inspector to determine suitability of re-welding. Where purge gas is required by the welding process and the excavation removes metal to a depth where the metal remaining is less than two weld passes or 3/16 inches thick, back purge gas will be used during the weld repair until the required minimum root thickness has been re-established. R11

3. The weld repair shall be made by qualified welders using qualified procedures.

4. Repair welds on Category 4-8 materials shall be made in accordance with the same procedure used for original welds or by another welding process if it is a part of a qualified procedure, recognizing that the cavity to be repaired may differ in contour and dimensions from the original joint.

5. After repair the surface shall be blended uniformly into the surrounding surface.

6. Examination of Weld Repairs on Category 1-3

   1. The examination of weld repairs shall be repeated as required for the original weld except that repair of defects originally detected by magnetic particle or liquid penetrant

(4.3.6.1 cont.) methods need only be reexamined by a magnetic particle or liquid penetrant method when the repair cavities do not exceed the lesser of 3/8 inch or 10% of the thickness. R11

2. When repairs to weld joining P-No. 1 and P-No. 3 materials require examination by radiography as required in (1) above, but construction assembly prevents meaningful radiographic examination, ultrasonic examination may be substituted provided:
    1. The weld had been previously radiographed and met the applicable acceptance standards.
    2. The ultrasonic examination is performed using a procedure in accordance with Article 5 of Section V to the acceptance standards of NB-5330.
    3. The substitution is limited to Category A and B welds in vessels and similar type welds in other items (see Exhibit 1). The absence of suitable radiographic equipment is not justification for the substitution.

7. The types, extent and method of examination and limits of imperfections of repair welds shall be the same as for the original welds on Category 4-8 materials.

8. The area shall be heat treated in accordance to MP-04 and the applicable welding procedure specifications.

9. <u>Weld Repairs Without Required Postweld Heat Treatment</u>
   Limited weld repairs to P-1 and P-3 materials and A-1 or A-2 (in addition, A-10 and A-11 for Category 3) weld filler metal (Table QW-442 of Section IX) may be made without PWHT, provided the requirements of the following subparagraphs are met.
    1. Before repair, the area shall be examined by either magnetic particle or liquid penetrant methods to ensure elimination of unacceptable indications.
    2. The depth of the repair shall not be greater than 3/8 inch or 10% of the base thickness for Category 1 material and 1/2

(4.3.9.2 cont.)

inch or 50% of base thickness or weld thickness, whichever is less, for Category 2 and 3, and the individual area shall not be greater than 10 square inches.

3. The welding procedure and welder qualification shall meet all of the requirements of References 2.3 and 2.4 and the additional requirements of this article. The Welding Procedure Specification shall include the requirements of (1) through (8) below.

   1. The area to be repaired shall be suitably prepared for welding in accordance with a written procedure.

   2. The weld metal shall be deposited by the manual shielded metal arc process using low-hydrogen type electrode. The maximum bead width shall be four times the electrode core diameter.

   3. The low-hydrogen covered electrodes shall be baked and otherwise cared for as required by (1) and (2) below.

      1. When using this repair procedure, bake all covered electrodes before use at a temperature of 800°F (+ 25°F) for 30 minutes to one hour. The temperature of the oven shall not exceed 300°F when the electrodes are placed in the oven for baking. During the baking cycle, the temperature shall not be raised more than 300°F/hr. when oven temperatures are above 500°F and the total time above 500°F, including the holding time, shall not exceed five hours. After baking and before the electrodes are allowed to cool below 150°F, they shall be transferred to holding ovens operating in temperature ranges of 225° to 300°F.

(4.3.9.3.3 cont.)

2. Suitable heated portable containers shall be used at 225-300°F. Electrodes turned in after exposure shall be returned to the holding ovens and held at temperatures given in (1) above for a period of not less than eight hours before reissue. Electrodes shall not be rebaked more than once, except if tests establish that the electrodes, after multiple rebakings, meet all specification requirements.

4. The weld area shall be preheated and maintained at a minimum temperature of 350°F during welding. The maximum interpass temperature shall be 450°F.

5. The initial layer of weld metal shall be deposited over the entire area with 1/8 inch maximum diameter electrode. Approximately one-half the thickness of this layer shall be removed by grinding before depositing subsequent layers. Subsequent layers shall be deposited with a 5/32 inch maximum diameter electrode in a manner to ensure tempering of the prior heads and their heat affected zones.

6. Heat input shall be controlled within a specified range of welding current and voltage.

7. The weld area shall be maintained at a temperature of 400-500°F for a minimum period of 2 hours after completion of the weld repair.

8. The performance of the repair welding shall be witnessed by the ANI if he wishes.

9. The qualification test plate shall be the minimum thickness of base metal at the area to be repaired but need not be greater than 4 inches (102 mm) thick and shall be of the same nominal composition as the material to be repaired. The qualification test plate

(4.3.9.3.9 cont.)

assembly shall be prepared and tested in accordance to NB-4642 4-1.

4. The completed welds shall have the weld reinforcement, including the final layer, removed substantially flush with the surface prior to performing the required nondestructive examination. The nondestructive examination shall be performed after the completed weld has been at ambient temperature for a minimum period of 48 hours to determine the presence of possible delayed cracking of the weldments. The nondestructive examination of the repair welded region shall include both ultrasonic examination and a surface examination.

5. SHNPP Quality Assurance group shall maintain records including dimensions and location of the weld repairs.

10. <u>Repair Welds to Cladding After Final Post Weld Heat Treatment</u>

Non-post weld heat treated weld repairs may be made to P-8 or P-43 cladding of P-1 and P-3 material after final PWHT, provided it is impossible or impractical to PWHT the area after repair, and provided the requirements of the following subparagraphs are met.

1. <u>Maximum Extent of Repair</u>

The base metal shall not be exposed to a depth greater than 3/32 inch or 10% of the base metal thickness, whichever is the lesser, nor to any individual area greater than 10 square inches.

2. <u>Repair Welding Procedure</u>

The welding procedure and welder qualifications shall meet all of the requirements of ASME Code Section IX and the additional requirements of 1 through 6 below.

1. The repairs shall be made using A-No. 8 weld metal (QW-442 of ASME Code Section IX) for P-No. 8 cladding or F-No. 43 weld metal (QW-432 of ASME Code Section IX) for either P-No. 8 or P-No. 43 cladding.

(4.3.10.2 cont.)

2. The manual shielded metal arc process shall be used for welding with a bead width not to exceed four times the electrode core diameter.

3. The weld area shall be preheated and maintained at a minimum temperature of 350°F during welding. The maximum interpass temperature shall be 450°F.

4. All areas of the base material on which weld metal is to be deposited shall be covered with a single layer of weld deposit using 3/32 inch diameter electrodes, followed by a minimum of one layer of weld deposit using 1/8 inch diameter electrodes. Part of the first layer shall be removed by grinding and any removal of weld metal between layers shall be described and duplicated in the procedure qualification.

5. The heat input shall be controlled within a specified range of welding current, voltage, and speed of travel.

6. After completion of welding, the weld area shall be maintained at a temperature of 400-500°F for a period of one hour minimum.

3. Qualification Test Assembly

The qualification test assembly shall consist of a 3 inch minimum thickness plate of the same nominal composition as the base material that is to be clad. The qualification test plate assembly shall be prepared and tested in accordance with the requirements of Section IX.

4. Examination of Repair Welds

The completed weld shall be nondestructively examined in accordance with paragraph 4.3.1.6 of this procedure.

5. Records of Repair Welds

Appropriate records and actual dimensions of weld repairs shall be documented and made a part of the Manufacturer's Data Report form.

4.4 Arc strikes which are considered defects shall be removed by grinding and visually inspected with 5X magnification to ensure complete removal and soundness of metal in affected area. In addition, the area shall also be examined by MT or PT on all Category 1 and 2 piping and Category 4 and 5 mainsteam/feedwater piping.

4.5 <u>Field Repair to Piping Butt Joint End Preparation</u>

Existing piping butt joint end preparations shall not be remachined, filed, ground, or otherwise changed without prior approval of the Discipline Welding Engineer or his designee, except as follows:

1. Light grinding of the groove face is permitted during interpass bead cleaning of weld metal deposited in field welds.
2. Grinding as required to restore groove faces after removal of fitup spacer blocks.
3. Local spot repair of weld end preparation by welding, grinding or filing to restore the end prep to the required design configuration (whether due to damage that occurred at the site or prior to delivery) provided such welding repair is made in accordance with a procedure approved by the Discipline Welding Engineer or his designee.
4. End preps with sharp roughness (feels tacky to finger rub) shall be smoothed with emery cloth or sanding disks. Such roughness is a frequent cause of porosity due to cutting oil trapped in the rough lay of the machined surface.

4.6 Repairs to be made on Category 4-8 items shall be in accordance to the following:

1. <u>Weld Defect Repairs</u>
    1. All defects in welds requiring repair shall be removed by flame or arc gouging, chipping or machining.
    2. Repair welds shall be made in accordance with the same procedure used for original welds or by another welding process if it is a part of a qualified procedure, recognizing that the cavity to be repaired may differ in contour and

(4.6.1.2 cont.) dimensions from the original joint. The types, extent and method of examination and limits of imperfections of repair welds shall be the same as for the original weld.

3. Preheating may be required for flame-gouging or arc-gougng on certain alloy materials of the air hardening type in order to prevent surface checking or cracking adjacent to the flame or arc-gouged surface.

4. Any cracks, blowholes or other defects that appear on the surface of the weld beads shall be removed by chipping or grinding before the next covering weld bead is deposited. Stagger all stops and starts. Stops and starts shall be examined by the welder and all defects removed before continuing to weld. Repairs shall be checked per the original NDE.

2. Arc strikes produced by welding electrodes or magnetic particle inspection shall not be purposely made on base metal surfaces outside of the weld groove area or other areas not to be covered by weld metal. Where inadvertent arc strikes on the base metal surface occur outside the weld area or on the final weld leaves a defect condition, the surface shall be ground to the bottom of the depression and inspected visually. (For Category 4 and 5 mainstream and feedwater piping the ground depression shall be liquid penetrant inspected.) If the design material thickness has been violated the arc strike shall be repair welded. | R11

3. Repair of Base Material Defects

1. Approval is required from the Discipline Engineer-Metallurgy/Welding, or designee, for repair of base material defects after final heat treatment or hydrotest. Repair welding of defects in base material shall be accomplished in accordance with the applicable code(s).

2. The shape of the excavated repair area shall be adequate for access of the welding arc. The ends of the cavity shall fair

(4.6.3.2 cont.) neatly into the existing weld or base metal without abrupt offsets or pockets.

3. Repair welding of defects in base material (piping, castings, plates) shall be accomplished in accordance with the applicable ASME-SA, ASTM-A specifications, except that welding procedures, qualifications and welder performance qualifications shall be in accordance with MP-01 and MP-02 respectively. | R11

4.7 Repairs made on seismic Class I structures shall be made in accordance to the following:

1. Repair Welding of Base Metal Defects

Documented evidence shall be provided showing that the joint preparation has been visually inspected and is acceptable in accordance to the following sub-paragraphs:

1. Surfaces and edges to be welded shall be smooth, uniform, and free from fins, tears, cracks, and other discontinuities which would adversely affect the quality or strength of the weld. Surfaces to be welded and surfaces adjacent to a weld shall also be free from loose or thick scale, slag, rust, moisture, grease and other foreign material that would prevent proper welding or produce objectionable fumes. Mill scale that can withstand vigorous wire brushing, a thin rust-inhibitive coating, or anti-spatter compound may remain with the following exception. For girders, all mill scale shall be removed from the surfaces on which flange-to-web welds are to be made by submerged arc welding or by shielded metal arc welding with low hydrogen electrodes.

2. In all oxygen cutting, the cutting flame shall be so adjusted and manipulated as to avoid cutting beyond (inside) the prescribed lines. The roughness of oxygen cut surfaces shall be no greater than that defined by the American National Standards Institute - a surface roughness value of 1000u

(4.7.1.2 cont.) inches (25 um) for material up to 4 inches (102 mm) thick and 2000u inches (50 um) for material 4 inches to 8 inches (203 mm) thick, with the following exception. The ends of members not subject to calculated stress at the ends shall meet the surface roughness value of 2000u inches. Roughness exceeding these values and occasional notches or gouges no more than 3/16 inch (4.8 mm) deep, on otherwise satisfactory surfaces, shall be removed by machining or grinding. Cut surfaces and edges shall be left free of slag. Correction of discontinuities shall be faired to the oxygen cut surfaces with a slope not exceeding one in ten. In oxygen cut edges, occasional notches or gouges less than 7/16 inch (11.1 mm) deep in material up to 4 inches thick, or less than 5/8 inch (15.9 mm) deep in material over 4 inches thick may, with the approval of the Engineer, be repaired by welding. Other discontinuities in oxygen cut shall not be repaired by welding. Any approved weld repairs shall be made by (1) suitably preparing the discontinuity, (2) welding with low hydrogen electrodes not exceeding 5/32 inch 4.0 mm) diameter, (3) observing the applicable requirements of this Code and (4) grinding the completed weld smooth and flush with the adjacent surface to produce a workmanlike finish.

3. Visual Inspection and Repair of Plate Cut Edges

   1. In the repair and determination of limits of internal discontinuities visually observed on sheared or oxygen cut edges and caused by entrapped slag or refractory inclusions, deoxidation products, gas pockets, or blow holes, the amount of metal removed shall be the minimum necessary to remove the discontinuity or to determine that the permissible limit is not exceeded. Plate edges may exist at any angle with respect to the

(4.7.3.1 cont.)

rolling direction. All repairs of discontinuities by welding shall conform to the applicable provisions of this code.

2. The limits of acceptability and the repair of visually observed edge discontinuities shall be in accordance with Table A, in which the length of discontinuity is the visible long dimension on the plate cut edge and the depth is the distance that the discontinuity extends into the plate from the cut edge.

3. For discontinuities over 1 inch (25.4 mm) in length with depth greater than 1 inch, discovered by visual inspection of plate cut edges before welding or during examination of welded joints by radiographic or ultrasonic testing, the following procedures should be followed.

4. Where discontinuities such as (W), (X), or (Y) in Exhibit 2 are observed prior to completing the joint, the size and shape of the discontinuity shall be determined by ultrasonic testing. The area of the discontinuity shall be determined as the area of total loss of back reflection, when tested in accordance with the procedure of ASTM A435.

5. For acceptance, the area of the discontinuity (or the aggregate area of multiple discontinuities) shall not exceed 4% of the plate area (plate length x plate width) with the following exception. If the length of the discontinuity, or the aggregate width of discontinuities on any transverse section, as measured perpendicular to the plate length, exceeds 20% of the plate width, the 4% plate area shall be reduced by the percentage amount of the width exceeding 20%. (For example, if a discontinuity is 30% of the plate width,

(4.7.3.5 cont.)

the area of discontinuity cannot exceed 3.6% of the plate area.) The discontinuity on the cut edge of the plate shall be gouged out to a depth of 1 inch (25.4 mm) beyond its intersection with the surface by chipping, air carbon arc gouging, or grinding, and blocked off by welding with the shielded metal arc process in layers not exceeding 1/8 inch (3.2 mm) in thickness.

6. If a discontinuity (Z) not exceeding the allowable area in 4.7.1.3.3.2 is discovered after the joint has been completed and it is determined to be 1 inch (25.4 mm) or more away from the face of the weld as measured on the plate surface, no repair of the discontinuity is required. If the discontinuity (Z) is less than 1 inch away from the face of the weld, it shall be gouged out to a distance of 1 inch from the fusion zone of the weld by chipping, air carbon arc gouging, or grinding. It shall then be blocked off by welding with the shielded metal arc process for at least four layers, not exceeding 1/8 inch (3.2 mm) in thickness per layer. Submerged arc or other welding process may be used for the remaining layers.

7. If the area of the discontinuity (W), (X), (Y), or (Z) exceeds the allowable in 4.7.3.3.2, the plate or subcomponent shall be rejected and replaced or repaired at the discretion of the engineer.

8. The aggregate length of weld repair shall not exceed 20% of the length of the plate edge without approval of the Engineer.

(4.7.3 cont.)

9. All repairs shall be in accordance with this code. Gouging of the discontinuity may be done from either plate surface or edge.

10. Reentrant corners, except for the corners of weld access cope holes adjacent to a flange, shall be filleted to a radius of no less than 1/2 inch (12.7 mm) for buildings and tubular structures and 3/4 inch (19.0 mm) for bridges. The fillet and its adjacent cuts shall meet without offset or cutting past the point of tangency.

11. Machining, air carbon arc cutting, oxygen cutting, oxygen gouging, chipping, or grinding may be used for joint preparation, back gouging, or the removal of unacceptable work or metal except that oxygen gouging shall not be used on quenched and tempered steel.

12. Edges of built-up beam and girder webs shall be cut to the prescribed camber with suitable allowance for shrinkage due to cutting and welding. However, moderate variation from the specified camber tolerance may be corrected by a carefully supervised application of heat.

13. Corrections of errors in camber of quenched and tempered steel must be given prior approval by the engineer.

TABLE A

Limits on Acceptability and the Repair of
Cut-Edge Discontinuities of Plate

Description of Discontinuity	Plate Repair Required
Any discontinuity 1 in. (25.4 mm) in length or less	None—need not be explored
Any discontinuity over 1 in.(25.4 mm) in length and 1/8 in. (3.2 mm) maximum depth	None, but the depth should be explored
Any discontinuity over 1 in. (25.4 mm) in length with depth over 1/8 in. (3.2 mm) but not greater than 1/4 in. (6.4 mm)	Remove, need not weld
Any discontinuity over 1 in. (25.4 mm) in length with depth over 1/4 in. (6.4 mm) but not greater than 1 in.	Completely remove and weld. Aggregate length of welding shall not exceed 20 percent of the length of the plate edge being repaired
Any discontinuity over 1 in. (25.4 mm) in length with depth greater than 1 in.	See 4.7.1.3.3

A spot check of ten percent of the discontinuities on the oxygen-cut edge in question should be explored by grinding to determine depth. If the depth of any one of the discontinuities explored exceeds 1/8 in. (3.2 mm) then all of the discontinuities remaining on that edge shall be explored by grinding to determine depth. If none of the discontinuities explored in the ten percent spot check have a depth exceeding 1/8 in. (3.2 mm) then the remainder of the discontinuities on that edge need not be explored.

2. Repair of Weld Metal Defects

Repair of weld shall be made in accordance with the following requirements:

1. If after an unacceptable weld has been made, work is performed which has rendered that weld inaccessible, or has created new conditions that make correction of the unacceptable weld dangerous or ineffectual, then the original conditions shall be restored by removing welds or

(4.7.2 cont.)

members, or both, before the corrections are made. If this is not done the deficiency shall be compensated for by additional work performed according to an approved revised design.

2. The removal of weld metal or portions of the base metal may be done by machining, grinding, chipping, oxygen gouging, or air carbon arc gouging. It shall be done in such a manner that the remaining weld metal or base metal is not nicked or undercut. Oxygen gouging shall not be used in quenched and tempered steel. Unacceptable portions of the weld shall be removed without substantial removal of the base metal. Additional weld metal to compensate for any deficiency in size shall be deposited using an electrode preferably smaller than that used for making the original weld, and preferably not more than 5/32 inch (4.0 mm) in diameter. The surfaces shall be cleaned thoroughly before welding.

3. The contractor has the option of either repairing an unacceptable weld or removing and replacing the entire weld. The repaired or replaced weld shall be retested by the method originally used and the same technique and quality acceptance criteria shall be applied. If the contractor elects to repair the weld it shall be corrected as follows:

   1. Overlap or Excessive Convexity
      Remove excess weld metal.
   2. Excessive Concavity of Weld or Crater, Undersize Welds, Undercutting
      Prepare surfaces and deposit additional weld metal.
   3. Excessive Weld Porosity, Excessive Slag Inclusions, Incomplete Fusion
      Remove unacceptable portions and reweld.
   4. Cracks in Weld or Base Metal

(4.7.2 cont.)

Ascertain the extent of the crack by use of acid etching, magnetic particle inspection, or other equally positive means. Remove the crack and sound metal 2 inches (50.8 mm) beyond each end of the crack and reweld.

5. Members distorted by welding shall be straightened by mechanical means or by carefully supervised application of a limited amount of localized heat. Any material listed in AWS D1.1 may be heated to a temperature in the heated areas, as measured by approved methods, to a temperature which shall not exceed 1100°F (590°C) for quenched and tempered steel nor 1200°F (650°C) (a dull red color) for other steels. Any material not listed in AWS D1.1 shall not be heated for straightening unless instructed in writing by the design specification or Welding Engineering. The part to be heated for straightening shall be substantially free of stress and from external forces, except those stesses resulting from the mechanical straightening method used in conjunction with the application of heat.

6. Approval shall be obtained for such corrections as repairs to base metal (other than those required by 4.7.1), repair of delayed cracks, straightening of members distorted by welding, or for a revised design to compensate for deficiencies.

7. The engineer shall be notified before improperly fitted and welded members are cut apart.

3. Arc Strikes

Arc strikes produced by welding electrodes of magnetic particle inspection shall not be purposely made on base metal surfaces outside of the weld groove area or other areas not to be covered by weld metal. For Seismic Class I structures where inadvertent

(4.7.2.3 cont.) arc strikes on the base metal surface occur outside the weld area or on the final weld, the surface shall be ground to the bottom of the depression and visually inspected.

4. <u>Defects</u>

Any cracks, blowholes or other defects that appear on the surface of the weld beads shall be removed by chipping or grinding before the next covering weld bead is deposited. Stagger all stops and starts. Stops and starts shall be examined by the welder and all defects removed.

5. <u>Welding of Drilled Holes</u>

When welding to fill drilled holes in plate or structural shapes it will not be necessary to perform a visual inspection of the hole prior to welding. Drilled holes whose diameter is in excess of 5/16" shall be welded with the use of a backing plate or bar of material compatible with the base material. These welds will be accomplished with the use of Seismic I Weld Data Reports (for Seismic I items) originated by the Discipline Engineer and signed by the Metallurgy/Welding Engineer or his designee. If required by the Discipline Engineer, the backing shall be removed.

4.8 Deviations

1. The requirements of this specification shall be complied with during field welding except that waivers on specific sections of this document can be granted only in writing by the SHNPP Discipline Engineer-Metallurgy/Welding and then only when such waivers do not violate ASME "Code" or requirements of Reference 2.9.
2. In the situation where the requirements of this procedure and the "Code" conflict, the "Code" requirement shall be complied with.
3. Any conflicts or needs for changes during the course of welding a joint using this specification shall be resolved by the Discipline Engineer-Metallurgy/Welding or his designee.

5.0 EXHIBITS AND APPENDICES

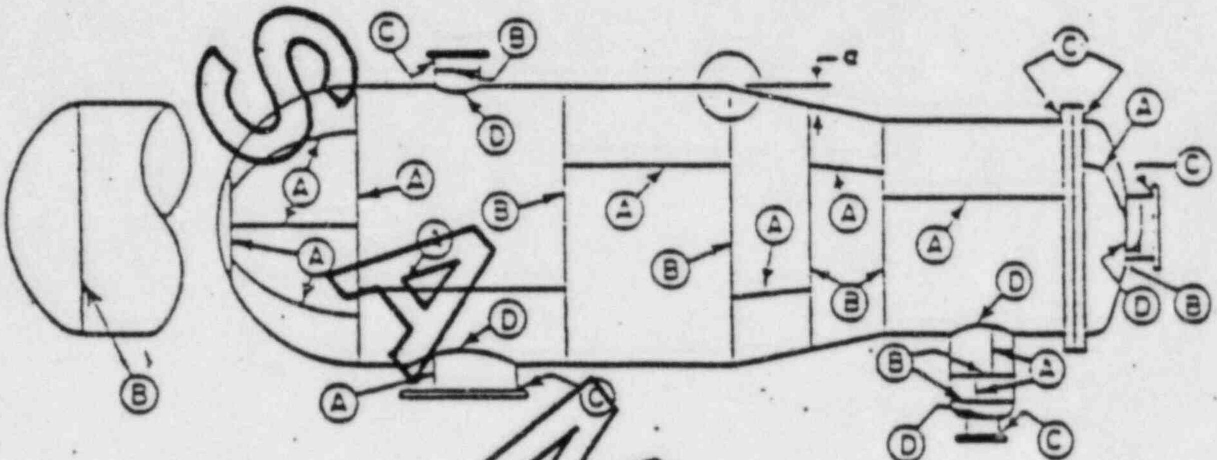
5.1 Exhibit 1 - Illustration of Welded Joint Locations Typical of Categories A, B, C, and D (Rev. 3-7/83)

5.2 Exhibit 2 - Edge Discontinuities in Cut Plate (Rev. 3-7/83)

5.3 Exhibit 3 - ASME Code Case N-275 (Rev. 0-7/83)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

ILLUSTRATION OF WELDED JOINT LOCATIONS TYPICAL OF CATEGORIES A, B, C, AND D

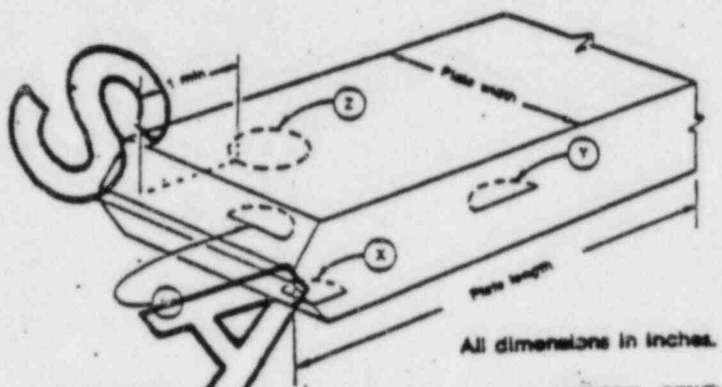


Rev. 3
7/83

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

Exhibit 2
MP-10

EDGE DISCONTINUITIES IN CUT PLATE



CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

ASME CODE CASE N-275

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Meeting of March 7, 1980
Approved by Council, May 15, 1980

Case N-275
Repair of Welds
Section III, Division 1

Inquiry: What alternative rules may be used for the examination of the area prepared for repair of welds in lieu of the requirements of NB/NC/ND/NE/NF/NG-4453 for Section III, Division 1 construction where the full thickness of the weld is removed and where the back side of the weld joint assembly is not accessible for removal of examination materials?

Reply: It is the opinion of the Committee that the following rules for the examination of the area prepared for repair of welds may be used in lieu of the requirements of NB/NC/ND/NE/NF/NG-4453 for Section III, Division 1 construction:

1. Unacceptable indications shall be removed by mechanical means or by thermal gouging methods.

2. The area prepared for repair shall be examined by the liquid penetrant or magnetic particle method in accordance with NB/NC/ND/NE/NF/NG-5110 and shall meet the acceptance standards of NB/NC/ND/NE/NF/NG-5300 except that the examination is not required where the full thickness of the weld is removed and where the back side of the weld joint assembly is not accessible for removal of examination materials.

3. The completed weld repair shall be examined in accordance with NB/NC/ND/NE/NF/NG-4453.4.

WELDER EVALUATION REPORT
CP&L - SHNPP
METALLURGY / WELDING UNIT

NAME Carney SYMBOL SK-58 CRAFT 66
WORK ASSIGNMENT Non Seismic Hangers AREA Waste Process
FOREMAN Eveters WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G			*			
FLARE BEVEL GROOVE			*			
AUTO STUD WELDING						✓
SKEWED T JOINTS						✓
RESTRICTED ACCESS						✓
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE				✓		

WELDERS COMMENTS: Welder has no comment!

WELDING SUPERVISORS COMMENTS: * Flare bevel welding has locked up, but has not worked any out yet. He has his fillet gauges. Final evaluation was no. M-ce hangers. Did a good job welding, cleaning and hanging

WELDING SUPERVISORS SIGNATURE E. N. Hunkan
DATE 8-1-83

000645

WELDER EVALUATION REPORT
CP& L - SHNPP
METALLURGY / WELDING UNIT

NAME K B Carney SYMBOL SK58 CRAFT Pipe/66
WORK ASSIGNMENT Hangers AREA Turbine
FOREMAN Edmonds WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F		✓				
3G - 3F		✓				
4G - 4F		✓				
5G - 6G						
FLARE BEVEL GROOVE						
AUTO STUD WELDING						✓
SKEWED T JOINTS						✓
RESTRICTED ACCESS						✓
CLEAN UP OF WELDS		✓				✓
FOLLOWS PROCEDURE		✓				
PERFORMANCE VS CAPABILITY		✓				
ATTITUDE		✓				

WELDERS COMMENTS: No comments

WELDING SUPERVISORS COMMENTS:
No problems at this time with this welder.

WELDING SUPERVISORS SIGNATURE Barry Hafcock
DATE 12-16-83

000643

WELDER EVALUATION REPORT

CP&L · SHNPP

METALLURGY / WELDING UNIT

NAME Ellis SYMBOL R-25 CRAFT 66

WORK ASSIGNMENT Pipe HANGERS AREA RAB

FOREMAN WARD WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						✓
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G						✓
FLARE BEVEL GROOVE			✓			
AUTO STUD WELDING						? ✓
SKEWED T JOINTS			✓			
RESTRICTED ACCESS			✓			
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE				✓		

WELDERS COMMENTS:

WELDING SUPERVISORS COMMENTS: Welds of Good Quality in all positions. Ellis is also certified on 1B1 + 8B2

WELDING SUPERVISORS SIGNATURE L. F. McAlister

DATE 11-2-82

000647

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME J R Fisher SYMBOL E-2 CRAFT 44 Pipe

WORK ASSIGNMENT Pipe Hangers AREA Cont #1

FOREMAN Mc Graves WPS NO. 1A3 + 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F						
3G - 3F				✓		
4G - 4F				✓		
5G - 6G				✓		
FLARE BEVEL GROOVE						
AUTO STUD WELDING				✓		
SKEWED T JOINTS						✓
RESTRICTED ACCESS				✓		
CLEAN UP OF WELDS				✓		
FOLLOWS PROCEDURE				✓		
PERFORMANCE VS CAPABILITY				✓		
ATTITUDE				✓		
				✓		

WELDERS COMMENTS: No comments

WELDING SUPERVISORS COMMENTS:
after and inspections of Pipe Hanger RCH - 32 which required a full seam weld. The Effort that this welder put into His work should be combined a good welder

WELDING SUPERVISORS SIGNATURE Barry Hofsauf

DATE 3/14/83

000643

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURCY / WELDING UNIT

NAME Jim Fisher SYMBOL E2 CRAFT Pipefitter

WORK ASSIGNMENT Hgr. welder AREA ALL

FOREMAN Paul Stone WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)			✓			
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G						✓
FLARE BEVEL GROOVE			✓			
AUTO STUD WELDING						✓
SKEWED T JOINTS			✓			
RESTRICTED ACCESS						✓
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE		✓				

WELDERS COMMENTS:

WELDING SUPERVISORS COMMENTS: Good welder

WELDING SUPERVISORS SIGNATURE John Freeman

DATE 1-3-84

000649

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME Jones SYMBOL SJ-5[illegible] CRAFT [illegible]

WORK ASSIGNMENT [illegible] AREA

FOREMAN Johnson WPS NO. [illegible]

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F						
3G - 3F			✓			
4G - 4F			✓			
5G - 6G			✓			
FLARE BEVEL GROOVE						
AUTO STUD WELDING						
SKEWED T JOINTS						✓
RESTRICTED ACCESS			✓			
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			
				✓		

WELDERS COMMENTS: Welder has no comment

WELDING SUPERVISORS COMMENTS: Foreman has not [illegible] with welder performance. He has not [illegible]

WELDING SUPERVISORS SIGNATURE [illegible]

DATE [illegible]

000850

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME Jones SYMBOL SJ-5C CRAFT 66

WORK ASSIGNMENT Seismic Hanger AREA RAB

FOREMAN Johnson WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G						
FLARE BEVEL GROOVE			✓			
AUTO STUD WELDING						
SKEWED T JOINTS						✓
RESTRICTED ACCESS			✓			
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			
				✓		

WELDERS COMMENTS: Welder has no comment.

WELDING SUPERVISORS COMMENTS: Welder has his fillet gauges

WELDING SUPERVISORS SIGNATURE L V Dunbar

DATE 7-8-83

000851

WELDER EVALUATION REPORT
CP&L - SHNPP
METALLURGY / WELDING UNIT

NAME Jones SYMBOL SJ-56 CRAFT 66
WORK ASSIGNMENT Seismic Hanger AREA RAB
FOREMAN Carr WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G						
FLARE BEVEL GROOVE			✓			
AUTO STUD WELDING						✓
SKEWED T JOINTS			✓			
RESTRICTED ACCESS		✓				
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE				✓		

WELDERS COMMENTS: Welder has no comment

WELDING SUPERVISORS COMMENTS: Welder has his fillet gauges

WELDING SUPERVISORS SIGNATURE L W Durham
DATE 11-4-83

000652

WELDER EVALUATION REPORT
CP&L - SHNPP
METALLURGY / WELDING UNIT

NAME B. Mills SYMBOL C 80 CRAFT 66
WORK ASSIGNMENT S/S Liner Plate AREA FHB
FOREMAN Clark WPS NO. 8B2

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F						
3G - 3F						
4G - 4F						
5G - 6G						
FLARE BEVEL GROOVE						
AUTO STUD WELDING						
SKEWED T JOINTS						
RESTRICTED ACCESS						
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			

WELDERS COMMENTS:

WELDING SUPERVISORS COMMENTS:

Welder preforms duties Satisfactory

WELDING SUPERVISORS SIGNATURE [signature]
DATE 7-20-82

000653

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME R. Mills SYMBOL C-RC CRAFT 66

WORK ASSIGNMENT Pipe welder AREA RAB 261

FOREMAN N. HAll WPS NO. 1R1

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F						NA
3G - 3F			✓			
4G - 4F						NA
5G - 6G			✓			NA
FLARE BEVEL GROOVE						
AUTO STUD WELDING						NA
SKEWED T JOINTS						NA
RESTRICTED ACCESS						NA
CLEAN UP OF WELDS						NA
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			
			✓			

WELDERS COMMENTS: No comments.

WELDING SUPERVISORS COMMENTS: Foreman has no problems with welder. Good Attitude toward his work.

WELDING SUPERVISORS SIGNATURE John A. Bright

DATE 6-16-83

000651

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME [redacted] Olwlus SYMBOL SB-73 CRAFT 66

WORK ASSIGNMENT Seismic Hanger AREA Fuel Handling

FOREMAN Sykes WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G						
FLARE BEVEL GROOVE			✓			
AUTO STUD WELDING						✓
SKEWED T JOINTS			✓			
RESTRICTED ACCESS			✓			
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			

WELDERS COMMENTS: HOBART 7018

The restarts are more difficult.
and the metal does [redacted] not flow as smooth.

WELDING SUPERVISORS COMMENTS:

Forman Has no problems with
Welder. One of his best welders
Has Fillet weld gages

WELDING SUPERVISORS SIGNATURE R. N. Dunbar

DATE 7-8-82

000655

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME J. A. Owens SYMBOL 5B73 CRAFT 66

WORK ASSIGNMENT Seismic Hangers AREA RA3

FOREMAN Sykes WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F						
3G - 3F				✓		
4G - 4F				✓		
5G 6G				✓		
FLARE BEVEL GROOVE						
AUTO STUD WELDING				✓		
SKEWED T JOINTS						✓
RESTRICTED ACCESS				✓		
CLEAN UP OF WELDS				✓		
FOLLOWS PROCEDURE				✓ ✓		
PERFORMANCE VS CAPABILITY						
ATTITUDE				✓		
				✓		

WELDERS COMMENTS: Welder has no comment

WELDING SUPERVISORS COMMENTS: Forman has no problems with Welders performance. Welder has his filled gauges

WELDING SUPERVISORS SIGNATURE L. N. Durham

DATE 10-28-92

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME J. D. PRICE SYMBOL A-92 CRAFT 66

WORK ASSIGNMENT PENT, FW, MS AREA CONTAINMENT

FOREMAN J. MARTIN WPS NO. 1-BA-5

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						N/A
2G - 2F			✓			
3G - 3F						N/A
4G - 4F						N/A
5G - 6G			✓			
FLARE BEVEL GROOVE						N/A
AUTO STUD WELDING						N/A
SKEWED T JOINTS						N/A
RESTRICTED ACCESS			✓			
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			

WELDERS COMMENTS:

NONE

WELDING SUPERVISORS COMMENTS: MAN HAS GOOD KNOLEDGE OF WELDING AND TAKES PRIDE IN HIS WORK, VERY DEPENDABLE.

WELDING SUPERVISORS SIGNATURE H. Yault

DATE 7-26-82

000657

WELDER EVALUATION REPORT

CP&L - SHNPP

METALLURGY / WELDING UNIT

NAME E. Zorn SYMBOL SJ-30 CRAFT 32

WORK ASSIGNMENT Platform AREA RAB

FOREMAN M Rossi WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F			✓			
3G - 3F			✓			
4G - 4F			✓			
5G - 6G						
FLARE BEVEL GROOVE			✓			
AUTO STUD WELDING						
SKEWED T JOINTS						✓
RESTRICTED ACCESS						✓
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE			✓			
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE				✓		

WELDERS COMMENTS: Welder has no Comment

WELDING SUPERVISORS COMMENTS: Forman has no problems with welders performance. welder has his fillet gauges

WELDING SUPERVISORS SIGNATURE R.N. Durham

DATE 8-3-81

000858

WELDER EVALUATION REPORT

CP&L · SHNPP

METALLURGY / WELDING UNIT

NAME ZORN SYMBOL SJ30 CRAFT 32

WORK ASSIGNMENT Peden Weld Repairs AREA RAB-Common

FOREMAN Parks WPS NO. 1A4

PERFORMANCE ON	UN SAT.	SAT.	GOOD	EXC	OUT STANDING	UN KNOWN
1G - 1F (CIRCLE POSITION(S) BEING EVALUATED)						
2G - 2F						✓
3G - 3F			✓			
4G - 4F			✓			
5G - 6G			✓			
FLARE BEVEL GROOVE						✓
AUTO STUD WELDING						✓
SKEWED T JOINTS						✓
RESTRICTED ACCESS						✓
CLEAN UP OF WELDS			✓			
FOLLOWS PROCEDURE						
PERFORMANCE VS CAPABILITY			✓			
ATTITUDE			✓			
			✓			

WELDERS COMMENTS:

WELDING SUPERVISORS COMMENTS: Welds are of good Quality in all Positions. Welds with restricted accessibility are done without difficulty except when restrictions are very severe.

WELDING SUPERVISORS SIGNATURE L. A. McAlister Jr.

DATE 3-21-83

000659

FORM NO. 1/84-A

CONSTRUCTION PROCEDURES MANUAL SHNPP	PROCEDURE NO. MP-08	DATE As Approved
GENERAL WELDING PROCEDURE GENERAL WELDING PROCEDURE FOR STRUCTURAL STEEL (SEISMIC, NON-SEISMIC) AND HANGERS	REVISION 8	
DESCRIPTION	PAGE 1 OF 26	

APR 27 1984 Rev. 8
JAN 30 1984 Rev. 7
AUG 09 1983 Rev. 6

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

GENERAL WELDING PROCEDURE

MP-08

DOCUMENT CONTROL
RECEIVED
NOV 9 1979 Rev. 0
SHEARON HARRIS N. P. P.

UNCONTROLLED FOR INFORMATION ONLY

APR 22 1982 Rev. 5
JUL 28 1981 - Rev. 4
MAR 31 1981 - Rev. 3
FEB 10 1981 - Rev. 2
AUG 26 1980 - Rev. 1

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
0	Issued for Use.	ORIGINATOR	R. Hanford	11/6/79
		CONSTRUCTOR	W. D. Goodman	11-9-79
		E&C Q.A.	N/A RMH	
		CP&L	RM Lucas	11-9-79
		DES. ENG. *	N/A RMH	
1	Revised as Noted. Incorporated Deviation No. 1 and 2. Added Exhibit 2.	ORIGINATOR	R. Hanford	8/25/80
		CONSTRUCTOR	[illegible] for WDG	8-25-80
		E&C Q.A.	N/A RMH	
		CP&L	RM Lucas	8-26-80
		DES. ENG. *	N/A RMH	
2	Revised as Noted. Incorporated Deviation No.'s 4 and 5. Deviation No.s 1-3 were Voided.	ORIGINATOR	R. Hanford	2/5/81
		CONSTRUCTOR	W. D. Goodman	2-06-81
		E&C Q.A.	N/A RMH	
		CP&L	RM Lucas	2-9-81
		DES. ENG. *	N/A RMH	

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

GENERAL WELDING PROCEDURE

MP-08

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
3	Revised As Noted. Incorporated Deviation No. 1.	ORIGINATOR	R. Hanford	3/23/81
		CONSTRUCTOR	[illegible]	3-27-81
		E&C Q.A.	N/A [illegible]	
		CP&L	[illegible]	3-31-81
		DES. ENG. *	N/A [illegible]	
4	Revised As Noted.	ORIGINATOR	R. Hanford by F. Shaill	7/23/81
		CONSTRUCTOR	[illegible]	[illegible]
		E&C Q.A.	N/A [illegible]	
		CP&L	[illegible]	7-27-81
		DES. ENG. *	N/A [illegible]	
5	Revised As Noted. Incorporated Deviation Notices 1, 2, and 3.	ORIGINATOR	R. Hanford	4/16/82
		CONSTRUCTOR	[illegible]	[illegible]
		E&C Q.A.	N/A WES for AMH	4/21/82
		CP&L	R. Hanford for A. Lucas	4/16/82
		DES. ENG. *	N/A WES for AMH	4/21/82

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

WELDING PROCEDURE

MP-08

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3300 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
6	Revised As Noted. Incorporated Deviation Notices 2, 3, 4, & 5. Added Appendices A and B and Exhibits 3, 4, & 5.	ORIGINATOR	R. Hanford	8/5/83
		CONSTRUCTOR	W.D. Goodman	8.3.83
		E&C Q.A.	N/A RH	8/5/83
		CP&L	R. Hanford FOR: M F THOMPSON JR	8/5/83
		DES. ENG. *	N/A RH	8/5/83
		ORIGINATOR		
		CONSTRUCTOR		
		E&C Q.A.		
		CP&L		
		DES. ENG. *		
		ORIGINATOR		
		CONSTRUCTOR		
		E&C Q.A.		
		CP&L		
		DES. ENG. *		

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

WELDING PROCEDURE

MP-08

* * REVIEWED BY QA/QC FOR COMPLIANCE WITH THE APPLICABLE QA AND CODE REQUIREMENTS.

* REVIEWED AND APPROVED BY EBASCO SERVICES, INC., FOR CONFORMANCE TO THE REQUIREMENTS OF PARAGRAPH CA-3310 OF ARTICLE CA-3100 OF ASME/ACI 359, SECTION III, DIV. 2, WINTER 1975 ADDENDA.

REV.	DESCRIPTION	APPROVALS		DATE
7	Revised As Noted. Incorporated Procedure Change Notices 2, 3, and 4. Revised Table B. Added Exhibits 6 and 7.	ORIGINATOR	R. Hanford	1/19/84
		CONSTRUCTOR	W. H. Goodman	1-20-84
		QA/QC REVIEW * *	W. M. Pugh	1/25/84
		CP&L	R. Hanford	1/26/84
		DES. ENG. *	N/A RH	1/26/84
8	Added Paragraph 4.5.3.8.5. Incorporated PCN-1.	ORIGINATOR	R. Hanford	4/18/84
		CONSTRUCTOR	W. H. Goodman	4/19/84
		QA/QC REVIEW * *	W. M. Pugh	4/20/84
		CP&L	R. Hanford For: M. F. Thompson Jr.	4/23/84
		DES. ENG. *	N/A RH	4/23/84
		ORIGINATOR		
		CONSTRUCTOR		
		QA/QC REVIEW * *		
		CP&L		
		DES. ENG. *		

1.0 SCOPE

The purpose of this procedure is to define general welding requirements for welding of structural steel (seismic and non-seismic), hangers, and other steel construction. It does not apply to attachment welds to pressure containing components under the jurisdiction of ASME or ANSI codes.

2.0 REFERENCES

2.1 Site Specification 033, Structural Welding for Permanent Plant Construction, Latest Revision

2.2 Site Specification 034, NDE, Visual Inspection and Testing Requirements for Code Class 1, 2, 3, BOP Piping Systems and Nonseismic Structures for Permanent Plant Construction, Latest Revision

2.3 MP-01, Qualification of Welding Procedures

2.4 MP-02, Procedure for Qualifying Welders and Welding Operators

2.5 MP-03, Welding Material Control

2.6 MP-05, Procedure for Stamping of Weldments

2.7 MP-09, Procedure for Welding Equipment Control

2.8 Site Specification 021, Purchasing of Welding Materials

2.9 MP-10, Procedure for Repair of Base Metal and Weldments

2.10 WP-18, Miscellaneous Steel Fabrication

2.11 MP-04, Procedure for Heat Treatment

2.12 WP-30, Erection of Structural Steel, Latest Revision

2.13 WP-110, Installation of Safety Related or Seismic Class I Pipe Hangers

2.14 WP-203, Installation of Seismic Class I Electrical Cable Tray, Tray Supports, Conduit and Conduit Supports

2.15 WP-105, Installation and Inspection of Equipment (Safety-Related Seismic Class I and NNS)

3.0 GENERAL

3.1 All welders shall be qualified in accordance with Reference 2.4.

3.2 All welding procedures shall be qualified in accordance with References 2.3 and 2.1. Welders and welding procedures shall either be qualified to ASME Section IX or AWS D1.1, as applicable.

3.3 Welds shall be stamped in accordance with Reference 2.6.

3.4 Welding materials shall be controlled in accordance with Reference 2.5.

3.5 Welding equipment shall be controlled in accordance with Reference 2.7.

3.6 All weld repairs and base metal repair shall be performed in accordance with References 2.1 and 2.9.

3.7 In case of conflict between this procedure and the AWS Code, the ASME or AWS Code, as applicable, shall govern. Any conflict shall be brought to the attention of the Discipline Engineer-Metallurgy/Welding.

3.8 When a QA or Welding Inspector hold point is reached, the Welding QA Specialist, or his designee, or the Metallurgy/Welding Engineering representative shall be notified.

3.9 The Discipline Engineer-Metallurgy/Welding shall have the authority to assign or remove welders and welding operators at his discretion.

3.10 The choice of welders to perform field welds should be based on the qualification to weld the full thickness of the field joint. The Discipline Engineer-Metallurgy/Welding must be notified to evaluate any situations where this may not be possible to ensure that the actual thickness welded by each welder does not exceed his/her qualification thickness range and permit documentation when deemed necessary. R7

4.0 PROCEDURE

4.1 Weld Joint Preparation

1. Weld joint configuration shall be as specified on the design drawing and/or the welding procedure specification. For prequalified weld joints for full penetration and partial penetration joints, the joint design shall be as detailed in AWS D1.1 in Figures 2.9.1 and 2.10.1, along with the legend in Table A. R7

2. Weld joint preparations for welding against a backing bar shall be in accordance with the welding procedure specification. For joints requiring metallic backing, the root opening should be 3/16 inch optimum. Root openings less than 3/16 inch or greater than R7

(4.1.2. cont'd.)

1/2 inch are not permitted (unless allowed by WPS) without written approval from Metallurgy/Welding Engineering.

4.2 Weld joint preparation of the base metals shall be accomplished by machining, grinding, oxygen-fuel cutting or air-arc cutting. Thermal processes shall be followed by grinding or machining of at least 1/16 inch.

1. Surfaces to be welded and surfaces adjacent to a weld (within 1/4 inch of where the toe of the weld will be) shall be free from loose or thick scale, slag, rust, moisture, grease and other foreign material that would prevent proper welding or produce objectionable fumes. Mill scale that can withstand vigorous wire brushing, a thin rust-inhibitive coating (such as deoxaluminate paint), or anti-spatter compound may remain with the following exception. For girders, all mill scale shall be removed from the surfaces on which flange-to-web welds are to be made by submerged arc welding or by shielded metal arc welding with low hydrogen electrodes.

2. The surface of base metal approximately one inch adjacent to the weld joint, in the plane of welding, need only be cleaned of those loose materials which may fall into the molten weld metal and coatings which, due to fumes caused by heating or burning, could leave a harmful residue in the weld. Tightly adhering rust which has been cleaned with a hand wire brush shall be permissible. R7

3. Deoxaluminate paint can remain on the base metal and the prepped edges and surfaces to be welded. If rust appears where deoxaluminate paint has been applied to the prepped edges and surfaces to be joined by welding, it should be removed; however, if rusting appears on the base metal within the area one inch from the weld prepped edges, only wire brushing of these areas is necessary to remove any loose particles which could fall into the molten weld metal during welding of the joint. Due to corrosion, surfaces on the base metal may contain pitting. Wire brushing of R7

(4.2.3. cont'd.)

these surfaces is adequate to remove loose rust scale without removing tightly adhering rust oxide film from the pits.

4. The cleaning shall be done by wire brushing, grinding, abrasive blasting using angular aluminum or silicon carbon grit, or the use of an approved solvent. All grinding shall be done using only rubber or resin bonded aluminum oxide or silicon carbide grinding wheels or tungsten carbide burrs. Tools used for grinding or cleaning carbon steel shall not be used on stainless steel or nickel base material.

5. Prior to weld joint inspection, any coatings that will prevent visual or non-destructive inspection of the weld and heat-affected zone shall be removed (approximately 1/2 inch from the toe of the weld, where accessible). R7

4.3 Weld Joint Tolerances and Fit-Up

The parts to be joined shall be placed into as close contact as practical. When a gap exists between the parts to be welded, the gap shall not exceed the tolerances as follows:

1. Fillet Fit-Up

If the weld gap is 1/16 inch or greater, up to a maximum of 3/16 inch, the leg of the fillet weld shall be increased in increments of 1/16 inch, 1/8 inch or 3/16 inch such that the increase in leg size is equal to or greater than the actual fit-up gap. (Example: Fillet weld fit-up gap is 3/32 inch and the drawing calls for a 1/4 inch fillet weld - the actual weld should be a 3/8 inch fillet weld.) A total of 5/16 inch is allowed when a backing or seal weld is used to prevent melt-thru and the thickness of the sections is three inches or greater.

2. Partial Penetration Groove Welds Tolerance

The weld gap shall not exceed 3/16 inch maximum; however, a maximum of 5/16 inch gap is allowed in cases involving rolled shapes or plates 3 inches or greater in thickness, provided a backing or seal weld is used to prevent melt-thru and the final

(4.3.2. cont'd.)

weld meets the requirement for effective throat as described below. Partial joint penetration groove welds made by shielded metal arc welding, gas metal arc welding (except short circuiting transfer), or flux cored arc welding in butt, corner, and T-joints which may be used without performing the joint welding procedure qualification tests, are subject to the limitations specified in 4.3.2.3.

1. Definition

   Groove welds without steel backing, welded from one side, and groove welds welded from both sides but without back gouging, are considered partial joint penetration groove welds.

2. All partial joint penetration groove welds made by short circuiting transfer gas metal arc welding (see Appendix D) shall be qualified by the joint welding procedure qualification test.

3. Dimensional Tolerance

   Dimensions of groove welds specified on design or detailed drawings may vary from the dimensions shown in AWS D1.1 Figure 2.10.1, only within the following limits: R7

   1. The groove angle is minimum. It may be detailed to exceed the dimensions shown by no more than 10 degrees.
   2. The radius of the J-grooves and U-grooves is minimum. It may be detailed to exceed the dimensions shown by no more than 1/8 inch (3 mm). U-grooves may be prepared before or after fit-up.
   3. Double-groove welds may have grooves of unequal depth, providing the weld deposit on each side of the joint conforms to the limitations of Figure 2.10.1.
   4. The minimum root face of the joints shall be 1/8 inch (3mm), except that the minimum root face for joints

(4.3.2.3.4. cont'd.)

to be welded by submerged arc welding shall be 1/4 inch (6mm).

4. The effective throat of partial joint penetration square-, single- or double-V-, bevel-, j-, and U-groove welds shall be as shown in Table 2.10.3. Shop or working drawings shall specifiy the groove depths (S) applicable for the effective throat (E) required for the welding process and position of welding to be used.

5. Groove preparations detailed for prequalified shielded metal arc welded joints may be used for prequalified gas metal arc or flux cored arc welding.

6. Corner Joints
For corner joints the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive melting.

TABLE 2.10.3
Minimum Effective Throat for Partial Joint Penetration Groove Welds

Base Metal Thickness of Thicker Part Joined (Inch (mm))	Minimum Effective Throat** Inch	mm
To 1/4 (6.4) incl.	1/8*	3 Over
1/4 (6.4) to 1/2 (12.7) incl.	3/16	5
Over 1/2 (12.7) to 3/4 (19.0) incl.	1/4	6
Over 3/4 (19.0) to 11/2 (38.1) incl.	5/16	8
Over 1-1/2 (38.1) to 2-1/4 (57.1) incl.	3/8	10
Over 2-1/4 (57.1) to 6 (152) incl.	1/2	13
Over 6 (152)	5/8	16

*Minimum size for bridge applications is 3/16 inch.
**Except the effective throat need not exceed the thickness of the thinner part.

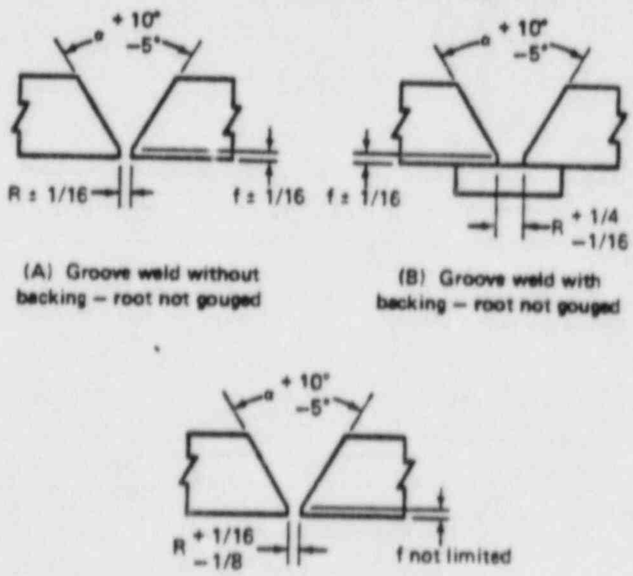
(4.3.)

3. Butt Weld, Full Penetration

1. With the exception of 4.3.3.2 for root openings in excess of those permitted in the table below and illustrated in Figure 3.3.4, the dimensions of the cross section of the groove-welded joints which vary from those shown on the detail drawings by more than the following tolerances shall be referred to the Welding Engineer for approval or correction.

		Root Not Gouged*		Root Gouged	
		Inch	mm	Inch	mm
(1)	Root face of joint	±1/16	1.6	Not limited	
(2)	Root opening of joints without steel backing	±1/16	1.6	+1/16 -1/8	1.6 3.2
	Root opening of joints with steel backing	+1/6 -1/16	6.4 1.6	Not Applicable Not Applicable	
(3)	Groove angle of joint	+10 deg. -5 deg.		+10 deg. -5 deg.	

*See 10.13.1.1 (3) for tolerances for complete joint penetration tubular groove welds made from one side without backing in AWS D1.1.



(A) Groove weld without backing – root not gouged

(B) Groove weld with backing – root not gouged

(C) Groove weld without backing – root gouged

Notes:

1. α - groove angle
2. R - root opening
3. f - root face
4. The groove configurations shown are for illustration only.

Fig. 3.3.4—Workmanship tolerances in assembly of groove welded butt joints

(4.3.3. cont'd.)

2. Root openings wider than those permitted in 4.3.3.1, but not greater than twice the thickness of the thinner part or 3/4 inch (19 mm), whichever is less, may be corrected by welding to acceptable dimensions prior to joining the parts by welding. Root openings larger than the above may be corrected by welding only with the approval of the Welding Engineer.

3. Fillet welding in the transverse direction across a gap between two embed plates in concrete during erection of a structural member or across a hole in the embed is acceptable, provided the gap or hole does not exceed 3/16 inch. Where the gap or hole diameter exceeds 3/16 inch, but not in excess of 5/16 inch, the fillet weld leg size shall be increased by 1/8 inch minimum over the length of the weld with the gap appearing at any location along the length. Where the weld length is in excess of six inches, the increased leg size may be limited to a maximum of six inches of length closest to the gap location. Where a hole in the embed plate exists, an acceptable alternate is to plug weld the hole prior to making the fillet weld across it.

4.4 Weld Cleaning

1. Any cracks, blowholes, coarse ripples, grooves, overlaps, abrupt ridges or valleys, or other defects that appear on the surface of the weld beads, shall be removed by chipping or grinding before depositing the next successive bead of welding. Defects in stops and starts shall be removed by grinding. All slag or flux remaining on any bead or pass of welding shall be removed before placing the next successive bead or pass. The finished pass shall be cleaned thoroughly of all flux by first lightly chipping and then wire brushing the weld for final cleaning. Excessive porosity, entrapped slag, or crater cracks shall be ground out and blended

(4.4.1. cont'd.)

into the weld pass. Additional weld metal shall be added when necessary to restore the weld pass configuration, using the same welding procedure as used for depositing the weld pass.

2. Grinding

All grinding shall be done using only approved rubber or resin bonded aluminum oxide or silicone carbide grinding wheels. Tungsten carbide deburring may be performed. Care shall be exercised not to remove excessive amounts of base metal. Concerns about the removal of excessive base metal shall be brought to the attention of the Discipline Engineer-Metallurgy/Welding, or his designee.

4.5 Welding

1. Welding is prohibited where the weld joints and adjacent surfaces are wet or damp. When necessary to prevent condensation, the weld joint areas shall be preheated until it is warm to hand touch.
2. Tack welds used to secure alignment shall be removed completely when they have served their purpose or shall be prepared by grinding or other suitable means so that they may be satisfactorily incorporated into the root pass weld. Tack welds shall be made by qualified welders using qualified welding procedures. Tack welds shall be visually examined when they are to become part of the finished weld and defective tack welds shall be removed or repaired.
3. Welding of temporary attachments and clips shall be welded in accordance with the procedure applicable to the assembly and as outlined below.
    1. Welding is prohibited where the weld joints and adjacent surfaces are wet or damp. When necessary to prevent condensation, the weld joint areas shall be preheated until it is warm to hand touch.
    2. Tack welds used to secure alignment shall be removed completely when they have served their purpose or shall be

(4.5.3.2. cont'd.)

prepared by grinding or other suitable means so that they may be satisfactorily incorporated into the root pass weld. Tack welds shall be made by qualified welders using qualified welding procedures. Tack welds shall be visually examined when they are to become part of the finished weld and defective tack welds shall be removed or repaired.

3. Welding of temporary attachments and clips shall be welded in accordance with the procedure applicable to the assembly and as outlined below.
   1. The material must be suitable for welding and be compatible with the component material to which it is attached, but need not be certified material.
   2. Weld material must be compatible with the base material and certified in accordance with Reference 2.8.
   3. The welder and the procedure shall be qualified in accordance with References 2.4 and 2.3, respectively.
   4. The temporary attachment, when required, shall be removed by cutting, grinding, or air-arc gouging and the area shall be ground and blended into base metal. Care shall be exercised not to remove excessive base material. Temporary attachments shall not be removed by hammer blows.
   5. "After removing temporary attachments from seismic and non-seismic structural components, craft personnel shall request, in writing, using Exhibit 6, that Metallurgy/Welding personnel examine the area to determine that the surface has been made flush with the original surface as required by AWS D1.1, paragraph 9.24. The area of removal of permanent plant structural items due to design changes, mislocations, etc., shall be subjected to the same R7

(4.5.3.3. cont'd.)

inspection criteria as temporary attachments and shall be handled as noted above. If additional examination (such as a D-Meter) or a base metal weld repair is required, a Welding Engineering Hold Tag (see Exhibit 7) shall be placed on the area of concern until such examination and/or repairs are initiated. Base metal repairs shall be handled in accordance with Reference 2.9." R7

6. Backing Strips

Backing strips, or spacer blocks, where permitted, shall be compatible with the base materials for similar base material welds. For dissimilar metal welds the higher alloy material shall be used. Groove welds with backing shall conform to AWS D1.1, Figures 2.9.1 or 2.10.1, or applicable WPS. R7

7. Tack Welds

All tack welds shall be made in accordance with an approved welding procedure by a qualified welder. Cracked or broken tack welding shall be removed. Tack welds shall blend smoothly at both ends and shall be even in size with no abrupt change in contour thus allowing proper inclusion into the weld. Multiple-pass tack welds shall have cascaded ends.

8. For the purpose of welding at SHNPP, "weave bead method" is defined as a transverse oscillation width of not more than four times the electrode core wire diameter, or 5/8 inch, whichever is less, for carbon steel material. For stainless steel, weave bead width shall not be more than three times the electrode diameter, or 1/2 inch, whichever is less. The deposited weld bead width due to weave shall not exceed the limits of Appendix A for carbon steel and Appendix B for stainless steel.

(4.5.3.)

4. Controlled peening may be performed to minimize distortion when allowed by the WPS. However, peening shall not be used on the initial layer or root of the weld metal nor on the final layer in order to eliminate cracking.

5. Before applying weld metal to the second side to be welded, the root of double welded joints shall be prepared by suitable methods, such as chipping, grinding or thermal gouging, except for those processes of welding by which proper fusion and penetration are otherwise obtained and demonstrated to be satisfactory by welding procedure qualification.

6. Welded surfaces are permitted. However, the surface of welds shall be sufficiently free from coarse ripples, grooves, overlaps, and abrupt ridges and valleys to meet the following requirements. The surface condition of the finished weld shall be suitable for the proper interpretation of radiographic and other required nondestructive examinations of the welds. In those cases where there is a question regarding the surface condition on the interpretation of a radiographic film, the film shall be compared to the actual weld surface for interpretation and determination of acceptability.

7. <u>Groove Weld Termination</u>

   Extension bars, or run-off plates, shall be removed upon completion and cooling of the weld, and the ends of the welds shall be made smooth and flush with the edges of the abutting parts. | R7

8. <u>Welding Procedure Specification (WPS) for Site Welding</u>

   1. Prequalified WPS for Carbon and Low Alloy Steels

      A prequalified WPS listed in Table B may be used for fillet and butt welds, provided the weld joint detail meets the design details of one of those listed in AWS D1.1, Figures | R7

(4.5.3.8.1. cont'd.)

2.9.1 or 2.10.1 (attached), and the material is ASTM A36 or a Group II (AWS D1-1) as listed below:

GROUP II

ASTM A36		ASTM A570	All Grades
ASTM A53	Grade B	ASTM A572	Grades 42,45,50
ASTM A106	Grades A,B,C,	ASTM A573	Grade 65
ASTM A131	Grades A,B,C,	ASTM A588	
	CS,D,E	ASTM A595	Grades A,B,C
	AH 32 & 36	ASTM A606	
	DH 32 & 36	ASTM A607	Grades 45,50,55
	EH 32 & 36	*ASTM A618	
ASTM A139	Grade B	ASTM A633	Grades A,B
*ASTM A242			Grades C,D
ASTM A381	Grade Y35	ASTM A709	Grades 36,50,50W
ASTM A441		API 5L	Grade B
ASTM A500	Grade A	API 5LX	Grade 42
	Grade B	API Spec, 2H	
ASTM A501		ABS	Grades AH 32 & 36
ASTM A516	Grades 55 & 60		DH 32 & 36
	65 & 70		EH 32 & 36
ASTM A524	Grades I & II	ABS	Grades A,B,D
ASTM A529			CS, DS
ASTM A537	Classes 1 & 2		Grade E

*Do not weld without Welding Engineering's permission because of special AWS D1.1 requirements.

(4.5.3.8. cont'd.)

2. Qualified WPS for Carbon, Low Alloy Steels and Stainless Steels
A qualified WPS must be used when the material or prequalification requirements are not met as required by 4.5.8.1. For materials in Table C (attached), the welding of the joints shall be in accordance with a WPS listed in Table B. Also for dissimilar weld joints between P-1 materials and 304 stainless steel (P-8), the WPS shall be as listed in Table B.

3. WPS (Qualified) Assigned by Metallurgy/Welding (Seismic Class I)
Seismic Class 1 structural steel and hangers of P-1 material, such as ASTM A-36 requiring weld joints which are butt (partial and full penetration) or fillet welds of two components in which the thickest member (measured at the weld joint) is over 1-1/2" thick, shall not be welded without written instructions on welding and required hold points from the Discipline Engineer, Metallurgy/Welding. The written instructions shall be on drawings issued in accordance with Reference 2.12 or a WDR in accordance with References 2.13 or 2.14. These instructions shall contain the WPS, filler metal, preheat, post weld heat treatment, and required NDE hold points, as applicable. The written instructions and the WDR shall be approved by the Discipline Engineer, Metallurgy/Welding.

4. WPS assigned by Metallurgy/Welding for balance of plant (BOP) shall be by Exhibit 2 when deemed necessary by the Welding Engineer or Area Engineer.

5. For completed structural components which have been field welded but for which the SWDR is not available, the following shall apply:
    1. A notation shall be made on the "recreated" SWDR for the WPS and filler metal for fillet welds that the welds were welded "In accordance with (IAW) MP-08". This is based on the fact that site welding requirements for structural welding are performed in accordance with MP-08 and the guidelines for WPS and filler metal selection are per Table B. Filler metal for field use is controlled in accordance with MP-03. R8
    2. For groove welds contact Metallurgy/Welding Engineering.

9. When welding on seismic structures, the welder or his supervisor shall be responsible for recording the welder's symbol and the WPS revision number on the Seismic 1 Weld Data Report. Each welder performing welds to the WDR shall have his or her symbol written on the Seismic 1 Weld Data Report.

10. Welding of equipment (Reference 2.15) shall be in accordance with the requirements of this procedure and the following.

    1. Fillet welds and plug welds for joining switchgear (ASTM A569 and/or AISI 1015 to 1020) and/or motor control centers (A-36) to embedded steel (A-36) shall be accomplished using WPS 1A4, latest revision.
    2. Welds not covered in paragraph 4.5.10.1 (including groove welds) shall be brought to the attention of the Mechanical Engineer and the Welding Engineer prior to the initiation of field welding.

11. <u>Plug Welds</u>

    The technique used to make plug welds when using shielded metal arc welding, gas metal arc welding (except short circuiting transfer), and flux cored arc welding processes shall be as follows.

    1. For welds to be made in the flat position, each bead shall be deposited around the root of the joint and then deposited along a spiral path to the center of the hole, fusing and depositing a layer of weld metal in the root and bottom of the joint. The arc is then carried to the periphery of the hole and the procedure repeated, fusing and depositing a layer of weld metal in the root and bottom of the joint. The arc is then carried to the periphery of the hole and the procedure repeated, fusing and depositing successive layers to fill the hole to the required depth. The slag covering the weld metal should be kept molten until the weld is finished. If the arc is broken or the slag is allowed to cool, the slag must be completely removed before restarting the weld.
    2. For welds to be made in the vertical position, the arc is started at the root of the joint at the lower side of the hole

(4.5.3.11.2. cont'd.)

and is carried upward, fusing into the face of the inner plate and to the side of the hole. The arc is stopped at the top of the hole, the slag is cleaned off, and the process is repeated on the opposite side of the hole. After cleaning slag from the weld, other layers should be similarly deposited to fill the hole to the required depth.

3. For welds to be made in the overhead position, the procedure is the same as for the flat position, except that the slag should be allowed to cool and should be completely removed after depositing each successive bead until the hole is filled to the required depth.

12. <u>Slot Welds</u>

Slot welds shall be made using techniques similar to those specified in 4.5.11 for plug welds, except that if the length of the slot exceeds three times the width, or if the slot extends to the edge of the part, the technique requirements of 4.5.11.3 shall apply.

4.6 <u>Weld Profiles</u>

1. Weld profiles shall be in accordance with the following.

    1. Size of fillets and partial penetration welds shall be in accordance with drawing, symbols and dimensions.

    2. The faces of fillet welds may be slightly convex, flat or slightly concave as shown in Exhibit 1, A, B, and C, with none of the acceptable profiles shown in Exhibit 1D. Except at outside corner joints, the convexity shall not exceed the value of 0.1S plus 0.03 inch where S is the actual size of the fillet weld in inches (see Exhibit 1C). When the fillet weld gap between parts to be jointed equals or exceeds 1/16 inch, up to 3/16 inch maximum, the leg of the fillet weld shall be increased, as a minimum, by the total amount of the gap. A total of 5/16 inch is allowed when a backing strip is used and the thickness of the sections is 3 inches or greater.

(4.6.1. cont'd)

3. Groove welds shall preferably be made with slight or minimum reinforcement except as may be otherwise provided. In the case of butt and corner joints, the reinforcement shall not exceed 1/8 inch (3.2 mm) in height and shall have gradual transition to the plane of the base metal surface (Exhibit 1E). They shall be free of discontinuities shown for butt joints in Exhibit 1F.

4. Surfaces of butt joints required to be flush shall be finished so as not to reduce the thickness of the thinner base metal or weld metal by more than 1/32 inch (0.8 mm) or five percent of the thickness, whichever is smaller, or leave reinforcement that exceeds 1/32 inch. However, all reinforcement must be removed where the weld forms part of a faying or contact surface. Any reinforcement must blend smoothly into the plate surfaces with transition areas free from edge weld undercut. Chipping may be used provided it is followed by grinding.

5. Undercut shall be no more than 0.01 inch (0.25 mm) deep when the weld is transverse to the primary stress in the part that is undercut. Undercut shall be not more than 1/32 inch (0.8 mm) deep when the weld is parallel to the primary stress in the part that is undercut.

6. Welds shall be free from overlap.

7. Care shall be exercised to avoid arc-strike on the base metal outside of the joint groove. The arc-strikes shall be removed by grinding and shall be visually inspected.

2. Pipe hanger field and shop weld profiles (seismic and non-seismic) shall be in accordance with the following.

   1. The area to be examined shall be sufficiently free from foreign matter to allow for examination of the weld area.

(4.6. cont'd)

2. Surfaces and edges to be welded shall be smooth, uniform, and free from fins, tears, cracks, and other discontinuities which would adversely affect the quality or strength of the weld.
3. Check to assure the weld has no cracks.
4. Check to assure that complete fusion exists between weld and base metal and adjacent layers of weld metal. Incomplete (lack of) fusion shall be considered acceptable if 1/16 inch or less in length.
5. Check to assure that all craters are filled to the full cross section of the weld.
6. Confirm the weld profiles are in accordance with the illustrations outlined on Exhibit 3.
7. A fillet weld in any single continuous weld shall be permitted to underrun the nominal fillet weld size required by 1/16 inch without correction, provided that the cumulative length of undersize weld does not exceed 10% of the length of the weld. On web-to-flange welds on girders, no underrun is permitted at the ends for a length equal to twice the width of the flange.
8. Check to assure that any conditions of undercut do not exceed 1/32 inch in depth.
9. Surface porosity shall be less than 1/16 inch in size of greatest dimension. The sum of the greatest dimensions of porosity shall not exceed 3/8 inch in any linear inch of weld. Piping porosity in fillet welds shall not exceed one in four inches of weld length and the maximum diameter shall not exceed 3/32 inch in size.
10. Skewed tee fillets and flare bevel groove welds shall be measured in accordance with the outlined illustration in Exhibit 4.

(4.6.2. cont'd)

11. When the toe of a fillet extends into the radius of a tube steel member and that leg is determined to be undersized, a check shall be made to confirm that the undersized leg is equal to the theoretical effective throat. The entire profile of the weld shall be equal to or greater than the theoretical effective throat (see Exhibit 5).
12. Tightly adhering weld spatter is acceptable.
13. Arc strikes 1/16 inch or less shall be considered acceptable provided the base metal or deposited metal is not cracked and there is no bimetallic inclusion (copper, stainless steel filler metal).
14. Non-structural end cap welds shall meet the above acceptance criteria except that indications less than 3/16 inch in length, per one inch of weld length, shall be considered non-relevant.

4.7 Shielding

The shielding gas and flow rate shall be as specified by the assigned WPS. The shielding gas shall be welding grade argon (99.95%), helium, mixture of argon and carbon dioxide, or argon and helium.

4.8 Control of Preheat and Interpass Temperature

Preheating techniques and preheat and interpass temperature measurement shall be such as to ensure that the full thickness of the weld joint preparation and adjacent base metal is at the specified temperatures required by AWS D1.1 of Table 4.2, or applicable WPS. When flame heating is used, only a neutral flame shall be employed. Temperature shall be determined by either contact pyrometers, thermocouples or temperature indicating crayons.

4.9 Dissimilar Butt Weld and Fillet Weld Joints

1. Any carbon or low alloy steel weld prep requiring post weld heat treatment (PWHT) which is to be welded to stainless steel (dissimilar joint) shall be buttered with type Ni-Cr-Fe (F No. 43) R7

(4.9.1. cont'd)

filler metal and post weld heat treated after buttering. The minimum thickness of the buttered area after end preparation shall be sufficient to keep the temperature of the carbon or low alloy steel below its critical temperature during welding. The joint shall then be welded with Ni-Cr-Fe (F No. 43) material. The completed joint shall not be subjected to PWHT.

2. Dissimilar butt joints made of carbon/low alloy steels that do not require PWHT may be welded, without buttering, using type 309 (F6 or F5) or Ni-Cr-Fe (F No. 43) filler metal for the entire joint. The completed joint shall not be post weld heat treated.

4.10 Deviations

1. The requirements of this specification shall be complied with during field welding except that waivers on specific sections of this document can be granted, only in writing, by the SHNPP Discipline Engineer-Metallurgy/Welding and then only when such waivers do not violate AWS Code or the requirements of References 2.1 thru 2.4.
2. In the situation where the requirements of this procedure and the Code conflict, the Code requirement shall be complied with.
3. Any conflicts or needs for changes during the course of welding a joint using this specification shall be resolved by the Discipline Engineer-Metallurgy/Welding, or his designee.

4.11 Post Weld Heat Treatment

1. When required by field construction drawings, or specifications, PWHT will be accomplished in accordance with the requirements of Reference 2.11 for welded steel greater than 1-1/2 inches in thickness at the welded joint. A sufficient number of thermocouples shall be provided to assure an adequate temperature history. Stress relief of welded assemblies shall be performed when an assembly is under restraint during welding, when high shrinkage stresses are a result of welding, when

(4.11.1. cont'd)

weldments are of a complex design configuration, or when machining close tolerances requires it.

2. For Seismic Class 1 structures, heat treatment charts and data sheets shall be identified as to component(s) and processed. When dated and signed they become part of the documentation record.
3. Marking fluid, chalk, tape, tags and other materials deleterious to components during thermal treatments shall be removed with suitable solvents.

4.12 Inspection and Tests

NDE and visual inspection shall be performed and evaluated, when required, by using qualified personnel and procedures meeting the requirements of Reference 2.2. Non-seismic items will be inspected by a Welding Supervisor, Metallurgy/Welding. For seismic items, a QA Welding Specialist or his designee shall perform the inspection.

4.13 Repairs to Base Materials and Welds

Repairs to base materials and welds shall be done in accordance with AWS D1.1 and MP-10.

4.14 Quality Assurance

1. Seismic Class 1

   Field weld data for full penetration welds shall be forwarded to the QA record for storage and shall include:

   1. Seismic Class 1 structural welding shall be subjected to the requirements of CP&L's corporate QA Program, Part I.
   2. Welding materials shall be identified and controlled so that they can be traced to each welded section of structural steel, or else a controlled procedure shall be employed which ensures that the specified materials are used.

2. Seismic 1 Records

   Field weld data for all full penetration welds shall include:

   1. Identification of the welding procedure used.
   2. Welder or welders performing the welding operation.

(4.14.2. cont'd)

3. Filler metal.
4. PWHT data.
5. NDE results and repair weld data NDE inspection.

4.15 To protect permanent plant equipment and cable trays in the area from damage prior to the initiation of the welding, cutting, burning or arc gouging operation, precautions shall be taken by the welder or fitter. Protection shall be in the form of an approved fire resistant or fire retardant material. If equipment is located over openings in the floor which permit hot metal to drop through to the equipment underneath, the same precautions apply.

5.0 EXHIBITS AND APPENDICES

5.1 Exhibit 1 - Acceptable and Unacceptable Weld Profiles (Rev. 0-9/79)

5.2 Exhibit 2 - Welding Inspection Assignment (Rev. 0-7/80)

5.3 Exhibit 3 - Illustrations of Weld Profiles For Pipe Hangers (Rev. 0-7/83)

5.4 Exhibit 4 - Measurement of Skewed Tee Fillets and Flare Bevel Groove Welds on Pipe Hangers (Rev. 0-7/83)

5.5 Exhibit 5 - Measurement of Fillet Welds at Tube Steel Radius on Pipe Hangers (Rev. 0-7/83)

5.6 Exhibit 6 - Inspection Request For Damaged/Ground Area (Rev. 0-9/83)

5.7 Exhibit 7 - Welding Engineering Hold Tag (Rev. 0-9/83)

5.8 Appendix A - Bead Width For Carbon Steel (Rev. 0-7/83) R7

5.9 Appendix B - Bead Width For Stainless Steel (Rev. 0-7/83)

Note: Below is a list of the attachments referenced.

1. AWS D1.1, Figure 2.9.1 (pages 9-23)
2. AWS D1.1, Figure 2.10.1 (pages 25-33)
3. Table A
4. Table B (Rev. 1-8/83) R7
5. Table C
6. Appendix D

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

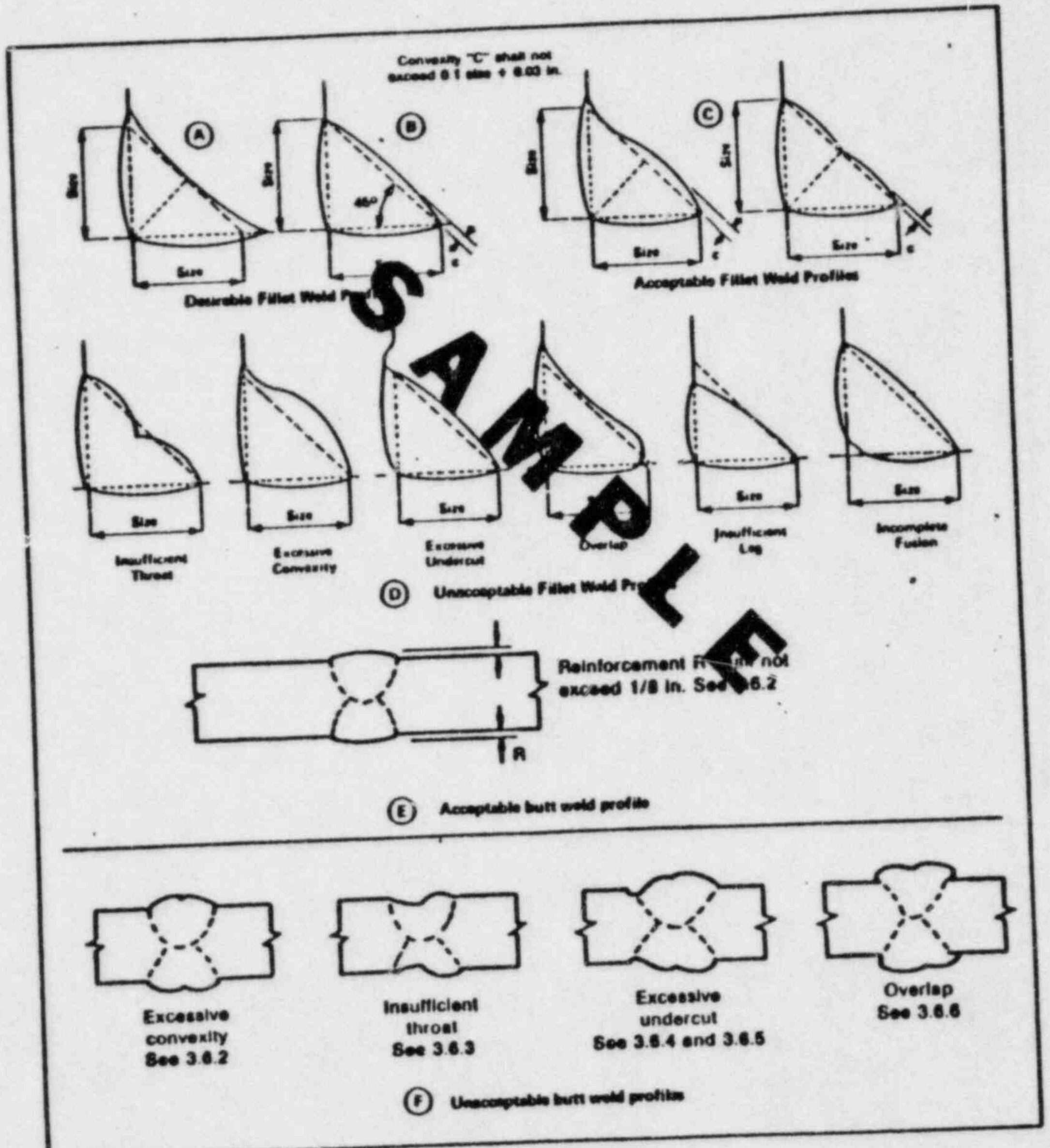


Exhibit 1 —*Acceptable and unacceptable weld profiles.*

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

Welding/Inspection Assignment

SAMPLE

WELDING PROC. + REV. NO. ------------------------

PWHT PROC. + REV. NO. ------------------------

FILL METAL TYPE--------- SIZE-------- SPEC--------

COMPLETE

INSPECTION REQ. CHECK IF REQUIRED ☐ ----------

VISUALLY INSPECT. FINAL WELD ☐ ----------

FINAL NDE RT-MT-PT-UT ☐ ----------

PWHT NDE RT-MT-PT-UT-VT. ☐ ----------

REMARKS: --

Exhibit 2 - Welding/Inspection Assignment
Instructions for welding seismic structures and hangers.

Rev. 0
7/83

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

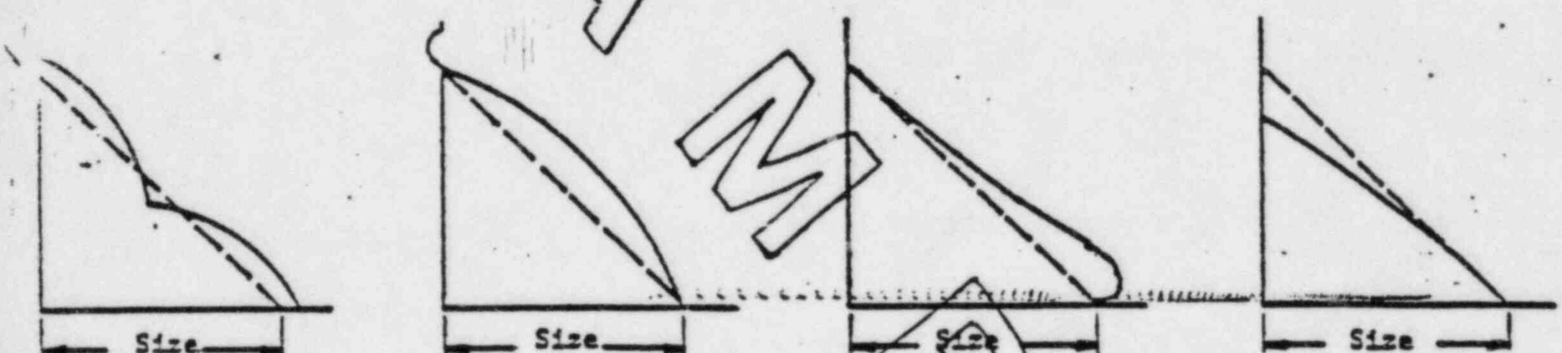
Exhibit 3
MP-08

ILLUSTRATIONS OF WELD PROFILES FOR PIPE HANGERS

Note: There is no limitation on excessiv convexity

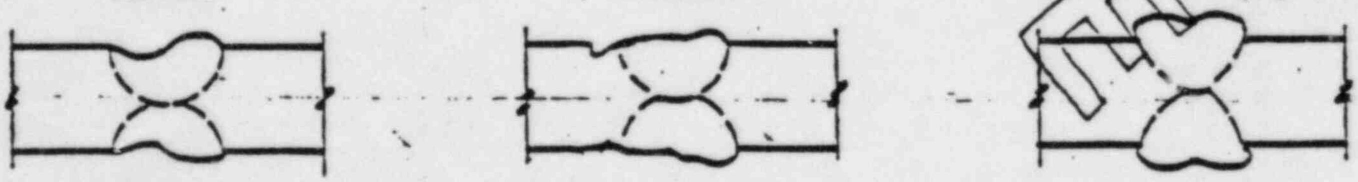
Desirable Fillet Weld Profile

Insufficient Throat | Undercut | Overlap without fusion | Insufficient Leg



Unacceptable Fillet Weld Profiles

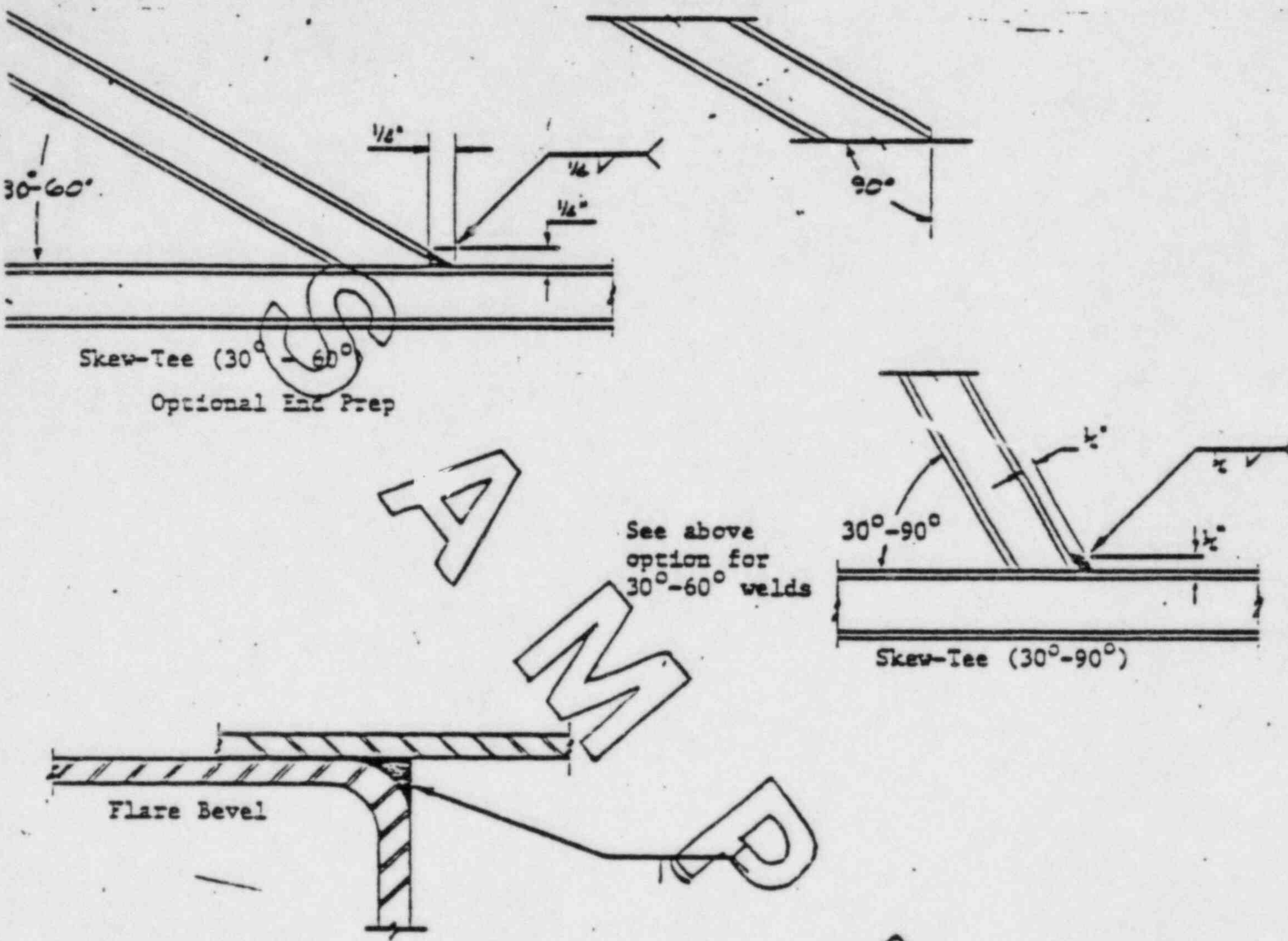
Insufficient Throat | Excessive Undercut | Overlap without fusion



Unacceptable Butt Weld Profiles

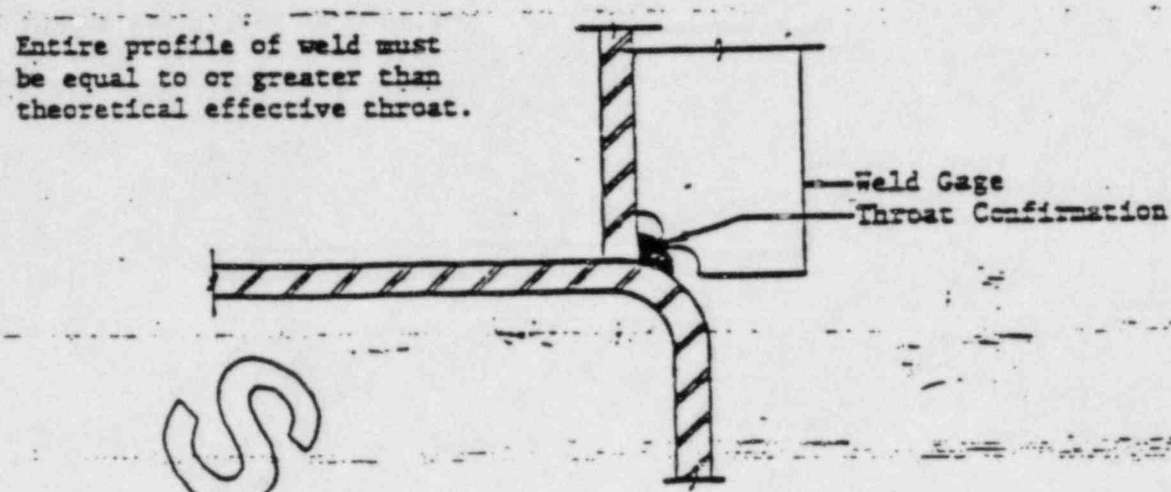
CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLLANT

MEASUREMENT OF SKEWED TEE FILLETS AND FLARE BEVEL GROOVE WELDS ON PIPE HANGERS



CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

MEASUREMENT OF FILLET WELDS AT TUBE STEEL RADIUS ON PIPE HANGERS



INSPECTION REQUEST FOR DAMAGED/GROUND AREA

Craft Personnel

Seismic ☐ Non-Seismic ☐

Material Type: ____________________

Material Thickness: ____________________ RFT NO.: ____________________

Product Form (plate, tube steel, W shape, etc.): ____________________

Drawing/Rev.: ____________________

Component Identification (embed, piece no. etc.): ____________________

Bldg. __________ Elevation __________ Zone __________

Actual Elevation __________ Location __________

Other Info: ____________________

Requested By: ____________________ Title __________ Date __________
(Signature)

Metallurgy/Welding Engineering

Visual Inspection Results: ☐ Acceptable
☐ Further Investigation Required

☐ Thickness (D-Meter) check required

Min. Wall Criteria ____________________ inch(es)

Actual Results (Min.) ____________________ inch(es) ☐ Acceptable ☐ Not Acceptable

☐ Hold Tag Applied

Weld Repair Required: ☐ Yes ☐ No ☐ Not Recommended (See Comments)

Comments (attach sketch, as needed): ____________________

Inspected by: ____________________ Title __________ Date __________
(Signature)

Rev. 0
9/83

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

Exhibit 7
MP-08

WELDING ENGINEERING HOLD TAG

No. ____________

WELDING ENGINEERING HOLD

DO NOT WELD

Hold Authorized By ____________ Date ______
Removal Authorized By __________ Date ______

Deficient Item Identification ______________________________
____

Reason for Hold ______________________________
____
____

- ☐ WELD to be cut out for repair
- ☐ Base Metal Repair
- ☐ Hold for repair instructions
- ☐ Repair without removal from installation

Inspector ______________________________ Date ____________

SAMPLE

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

BEAD WIDTH FOR CARBON STEEL

SMAW Size Electrodes	Maximum Weld Bead Width
1/16"	1/2"
3/32"	3/4"
1/8"	1"
5/32"	1"

GTAW Filler Materials (Manual)	Maximum Weld Bead Width
*0.035"	3/4"
*0.045"	3/4"
1/16"	1/4"
3/32"	3/8"
1/8"	7/16"

WEAVE TECHNIQUE (TRANSVERSE OSCILLATION) - MAXIMUM ALLOWABLE BEAD WIDTH

*Bare wire used in Automatic Welding

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

BEAD WIDTH FOR STAINLESS STEEL

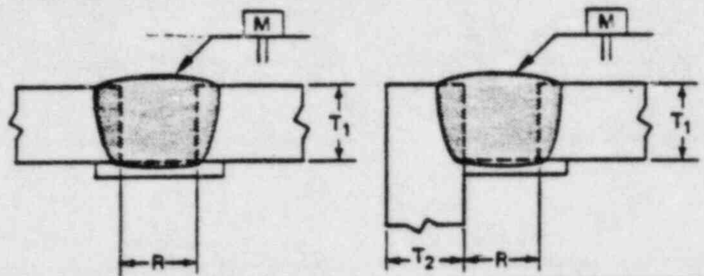
SMAW Size Electrodes	Maximum Weld Bead Width
1/16"	3/8"
3/32"	1/2"
1/8"	3/4"
5/32"	3/4"

GTAW Filler Materials (Manual)	Maximum Weld Bead Width
*0.035	5/8"
*0.045	5/8"
1/16"	1/4"
3/32"	3/8"
1/8"	1/2"

WEAVE TECHNIQUE (TRANSVERSE OSCILLATION) - MAXIMUM ALLOWABLE BEAD WIDTH

*Bare wire used in Automatic Welding

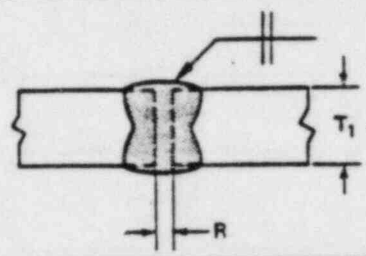
Square-groove weld (1)
Butt joint (B)
Corner joint (C)



**
M = steel (see 8.2.4, 9.2.5, 10.2.4)

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Root opening	Groove preparation: Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	B-L1a	1/4 max	–	$R=T_1$	+1/16,–0	+1/4,–1/16	All	–	–
SMAW	C-L1a	1/4 max	U	$R=T_1$	+1/16,–0	+1/4,–1/16	All	–	–
GMAW FCAW	B-L1a-GF	3/8 max	–	$R=T_1$	+1/16,–0	+1/4,–1/16	All	Not required	A

Square-groove weld (1)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Root opening	Groove preparation: Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-L1b	1/4 max	–	$R = T_1/2$	+1/16,–0	+1/16,–1/8	All	–	C
GMAW FCAW	B-L1b-GF	3/8 max	–	R = 0 to 1/8	+1/16,–0	+1/16,–1/8	All	Not required	A,C
SAW	B-L1-S	1/2 max	–	R = 0	±0	+1/16,–0	Flat	–	D

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

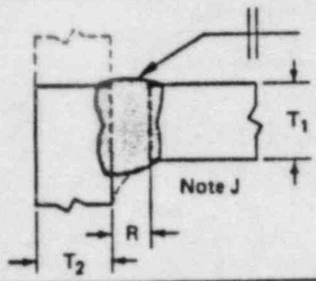
Note C: Gouge root before welding other side.

Note D: Welds must be centered on joint.

Fig. 2.9.1—Prequalified complete joint penetration groove welded joints

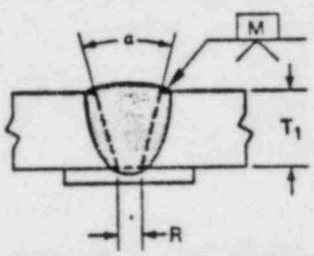
**The above references appear in AWS D1-1, See notes AA, for details.

Square-groove weld (1)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening	Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-L1b	1/4 max	U	$R = T_1/2$	+1/16,−0	+1/16,−1/8	All	–	C,J
GMAW FCAW	TC-L1-GF	3/8 max	U	R = 0 to 1/8	+1/16,−0	+1/16,−1/8	All	Not req.	A,C,J
SAW	TC-L1-S	3/8 max	U	R = 0	±0	+1/16,−0	Flat	–	J

Single-V-groove weld (2)
Butt joint (B)



M = steel (see 8.2.4, 9.2.5, 10.2.4)**

Tolerances**	As detailed (see 2.9.2)	As fit up (see 3.4.4)
R	+1/16,−0	+1/4,−1/16
α	+10°,−0°	+10°,−5°

Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening	Groove angle	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	B-U2a	U	–	R = 1/4	α = 45°	All	–	–
				R = 3/8	α = 30°	F,OH	–	–
				R = 1/2	α = 20°	F,OH	–	–
GMAW FCAW	B-U2a-GF	U	–	R = 3/16	α = 30°	F,V,OH	Required	A
				R = 3/8	α = 30°	F	Not req.	A
				R = 1/4	α = 30°	V,OH	Not req.	A
SAW	B-L2a-S	1/2 max	–	R = 1/4	α = 30°	F	–	–
SAW	B-U2-S	U	–	R = 5/8	α = 20°	F	–	–

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

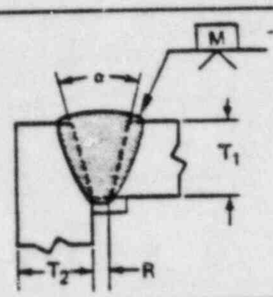
*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued) – Prequalified complete joint penetration groove welded joints

**The above references appear in AWS D1.1. See Note AA, attached, for details.

**The references below appear in AWS D1.1. See Note AA attached for details.

Single-V-groove weld (2)
Corner joint (B)

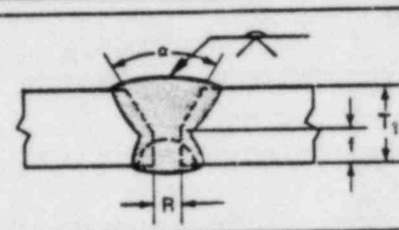


M = steel (see 8.2.4, 9.2.5, 10.2.4)**

Tolerances**	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/4,−1/16
α = +10°,−0°	+10°,−5°

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	C-U2a	U	U	R = 1/4	α = 45°	All	–	–
				R = 3/8	α = 30°	F,OH	–	–
GMAW FCAW	C-U2a-GF	U	U	R = 1/2	α = 20°	F,OH	–	–
				R = 3/16	α = 30°	F,V,OH	Required	A
				R = 3/8	α = 30°	F	Not req.	A
				R = 1/4	α = 30°	V,OH	Not req.	A
SAW	C-L2a-S	1/2 max	U	R = 1/4	α = 30°	F	–	–
SAW	C-U2-S	U	U	R = 5/8	α = 20°	F	–	–

Single-V-groove weld (2)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening Root face Groove angle	Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-U2	U	–	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	All	–	C
GMAW FCAW	B-U2-GF	U	–	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	All	Not required	A,C
SAW	B-L2b-S	Over 1/2 to 1 inclusive	–	R = 0 f = 1/4 max α = 60°	±0 +0,−1/4 +10°,−0°	+1/16,−0 ±1/16 +10°,−5°	Flat	–	K
SAW	B-L2c-S	Over 1/2 to 1	–	R = 0, α = 60° f = 1/4 max	R = ±0 f = +0,−f α = +10°,−0°	+1/16,−0 ±1/16 +10°,−5°	Flat	–	C
		Over 1 to 1-1/2	–	R = 0, α = 60° f = 1/2 max					
		Over 1-1/2 to 2	–	R = 0, α = 60° f = 5/8 max					

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

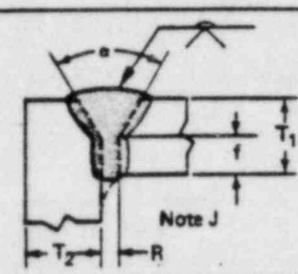
Note C: Gouge root before welding other side.

Note K: Weld root after welding at least one pass on arrow side.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

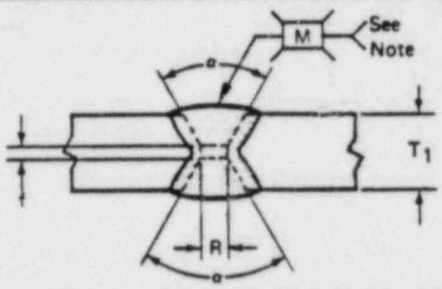
**The references below appear in AWS D1.1. See Note AA attached for details.

Single-V-groove weld (2)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening Root face Groove angle	Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	C-U2	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	All	–	C,J
GMAW FCAW	C-U2-GF	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	All	Not required	A,C,J
SAW	C-L2b-S	1 max	U	R = 0 f = 1/4 max α = 60°	±0 +0,−1/4 +10°,−0°	+1/16,−0 ±1/16 +10°,−5°	Flat	–	J,K

Double-V-groove weld (3)
Butt joint (B)



Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16,−0
f = ±0	+1/16,−0
α = +10°,−0°	+10°,−5°
Spacer = ±0	+1/16,−0

M = steel (see 8.2.4, 9.2.5, 10.2.4)**

Note: Same steel as base metal

Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening	Root face	Groove angle	Permitted welding positions*	Gas shielding for FCAW	Notes
SMAW	B-U3a	U, preferably 5/8 or thicker	–	R = 1/4	f = 0 to 1/8	α = 45°	All	–	C,M
				R = 3/8	f = 0 to 1/8	α = 30°	F,OH	–	
		Spacer = 1/8 x R		R = 1/2	f = 0 to 1/8	α = 20°	F,OH	–	
SAW	B-U3a-S	U Spacer = 1/4 x R	–	R = 5/8	f = 0 to 1/4	α = 20°	F	–	M

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note K: Weld root after welding at least one pass on arrow side.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

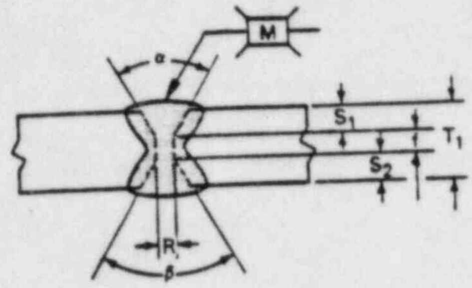
*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

For B-U3c-S only		
T_1		S_1
Over	to	
2	2-1/2	1-3/8
2-1/2	3	1-3/4
3	3-5/8	2-1/8
3-5/8	4	2-3/8
4	4-3/4	2-3/4
4-3/4	5-1/2	3-1/4
5-1/2	6-1/4	3-3/4

For $T_1 > 6\text{-}1/4$, or $T_1 \leq 2$
$S_1 = 2/3\ (T_1 - 1/4)$

Double-V-groove weld (3)
Butt joint (B)



M = Steel (see 8.2.4, 9.2.3, 10.25) **

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening / Root face / Groove angle	Tolerances ** As detailed (see 2.9.2)	Tolerances ** As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	B-U3b	U, preferably 5/8 or larger	–	R = 0 to 1/8 f = 0 to 1/8 α = β = 60°	+1/16,−0 +1/16,−0 +10°,−0	+1/16,−1/8 Not limited +10°,−5°	All	–	C,M
GMAW FCAW	B-U3-GF						All	Not required	A,C,M
SAW	B-U3b-S	1-1/8 min	–	R = 1/8 f = 0 α = β = 60° $S_1 = 2/3\ T_1$, S_2 = 3/8 min	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	Flat	–	M, P, X
SAW	B-L3-S	1-1/2 max	–	R = 0 f = 1/4 max α = 60°; β = 80° $S_1 = 2/3\ (T_1 - 1/4)$, $S_2 = 1/3\ (T_1 - 1/4)$	±0 +0,−1/4 +10°,−0°	+1/16,−0 Not limited +10°,−5°	Flat	–	M, K
SAW	B-U3c-S	U	–	R = 0 f = 1/4 max α = β = 60° To find S_1 see table above: $S_2 = T_1 - (S_1 + 1/4)$	±0 +0,−1/4 +10°,−0°	+1/16,−0 Not limited +10°,−5°	Flat	–	M, C

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note K: Weld root after welding at least one pass on arrow side.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note P: Weld S_2 first with shielded metal arc low-hydrogen electrodes. Root of this weld shall be back gouged. Weld S_1 with single- or multiple-pass submerged arc weld in flat position after manual arc welding is completed on other side.

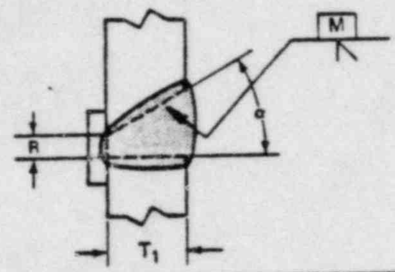
Note X: It is permissible for the groove opening to vary from 0-1/8 in., in which case, weld as follows: Weld the S_1 groove first with shielded metal arc using low hydrogen electrodes; complete the weld with submerged arc welding. The root of the SMAW weld shall be back gouged. Weld the S_2 groove with shielded metal arc using low hydrogen electrode or by submerged arc welding.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.

**The references below appear in AWS D1.1. See Note AA attached for details.

Single-bevel-groove weld (4)
Butt joint (B)

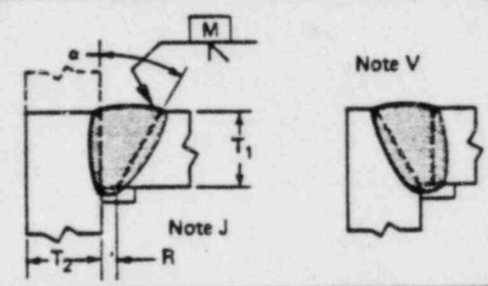


**M = steel (see 8.2.4, 9.2.5, 10.2.4)

Tolerances**	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/4,−1/16
α = +10°,−0°	+10°,−5°

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation		Permitted welding positions*	Gas shielding	Notes
		T_1	T_2	Root opening	Groove angle			
SMAW	B-U4a	U	–	R = 1/4	α = 45°	All	–	Br
				R = 3/8	α = 30°	F,OH	–	Br
GMAW FCAW	B-U4a-GF	U	–	R = 3/16	α = 30°	All	Required	A,Br
				R = 1/4	α = 45°	All	Required	A,Br
				R = 3/8	α = 30°	Flat	Not req.	A,Br

Single-bevel-groove-weld (4)
T-joint (T)
Corner joint (C)



**M = steel (see 8.2.4, 9.2.5, 10.2.4)

Tolerances**	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/4,−1/16
α = +10°,−0°	+10°,−5°

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation		Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Groove angle			
SMAW	TC-U4c	U	U	R = 1/4	α = 45°	All	–	J,V
				R = 3/8	α = 30°	F, OH	–	J,V
GMAW FCAW	TC-U4c-GF	U	U	R = 3/16	α = 30°	All	Required	A, J, V
				R = 3/8	α = 30°	Flat	Not req.	A, J, V
				R = 1/4	α = 45°	All	Not req.	A, J, V
SAW	TC-U4a-S	U	U	R = 3/8	α = 30°	Flat	–	J,V
				R = 1/4	α = 45°			

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note Br: Bridge application limits the use of these joints to the horizontal position

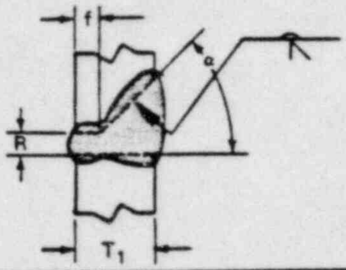
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Single-bevel-groove weld (4)
Butt joint (B)

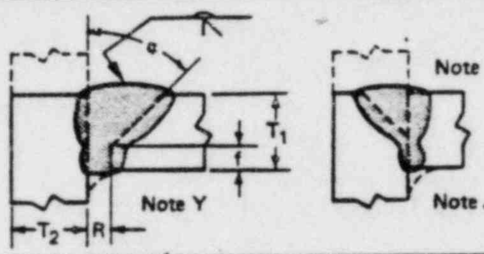


Limitations

Bridge application limits the use of these joints to horizontal position

Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening Root face Groove angle	Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	B-U4	U	–	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,–0 +1/16,–0 +10°,–0°	+1/16,–1/8 not limited +10°,–5°	All	–	C
GMAW FCAW	B-U4-GF	U	–				All	Not required	A,C

Single-bevel-groove weld (4)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening Root face Groove angle	Tolerances** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-U4a	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,–0 +1/16,–0 +10°,–0°	+1/16,–1/8 Not limited +10°,–5°	All	–	C,J,V
GMAW FCAW	TC-U4a-GF	U	U				All	Not req.	A,C,J,V
SAW	TC-L4a-S	3/4 max	U	R = 0 f = 1/8 max α = 60°	±0 +0,–1/8 +10°,–0°	+1/4,–0 ±1/16 +10°,–5°	Flat	–	J,V,Y

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Note Y: Shielded metal arc or submerged arc backing fillet weld required.

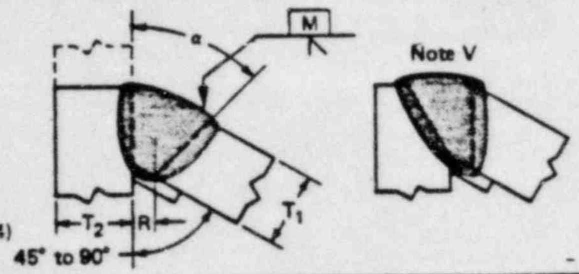
Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.

**The references below appear in AWS D1.1. See Note AA attached for details.

Single-bevel-groove weld (4)
T-joint (T)
Corner joint (C)

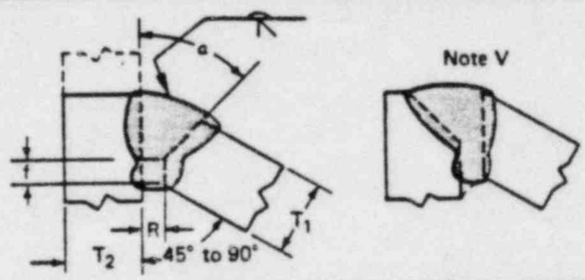
Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/4, −1/16
α = +10°, −0°	+10°, −5°



** M = steel (see 8.2.4, 9.2.5, 10.2.4)

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	TC-U4d	U	U	R = 1/4	α = 45°	All	–	J,V
				R = 3/8	α = 30°	F,OH	–	
GMAW FCAW	TC-U4d-GF	U	U	R = 3/16	α = 30°	All	Required	A,J,V
				R = 3/8	α = 30°	Flat	Not req.	
				R = 1/4	α = 45°	All		
SAW	TC-U4b-S	U	U	R = 3/8	α = 30°	Flat	–	J,V
				R = 1/4	α = 45°			

Single-bevel-groove weld (4)
T-joint(T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening Root face Groove angle	Tolerances ** As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-U4b	U	U	R = 0 to 1/8	+1/16, −0	+1/16, −1/8	All	–	C,J,V
GMAW FCAW	TC-U4b-GF	U	U	f = 0 to 1/8 α = 45°	+1/16, −0 +10°, −0°	Not limited +10°, −5°	All	Not required	A,C J,V
SAW	TC-L4b-S	3/4 max	U	R = 0 f = 1/8 max α = 60°	±0 +0, −1/8 +10°, −0°	+1/4, −0 ±1/16 +10°, −5°	Flat	–	J, V, Y

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

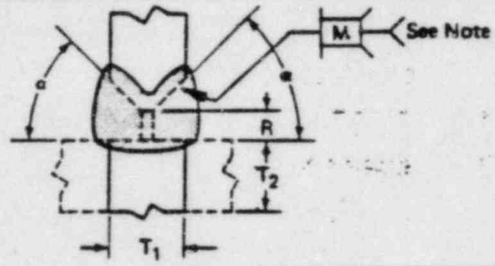
Note Y: Shielded metal arc or submerged arc backing weld required.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Double-bevel-groove weld (5)
Butt joint (B)
T-joint (T)
Corner joint (C)

M = steel (see 8.2.4, 9.2.5, 10.2.4)**
Note: Same steel as base metal



Tolerances**	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16, −0
f = +1/16, −0	±1/16
α = +10°, −0°	+10°, −5°
Spacer = +0	+1/16, −0

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Root face	Groove angle	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	B-U5b	U, preferably 5/8 or thicker Spacer = 1/8 X R	–	R – 1/4	f = 0 to 1/8	α = 45°	All	–	Br, C, M
	TC-U5a	U, preferably 5/8 or thicker Spacer = 1/8 X R	U	R = 1/4	f = 0 to 1/8	α = 45°	All	–	C, J, M, V
				R = 3/8	f = 0 to 1/8	α = 30°	F, OH	–	C, J, M, V

Note Br: Bridge application limits the use of these joints to the horizontal position

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

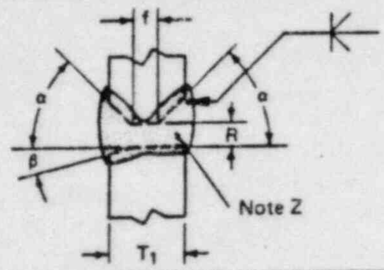
Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.

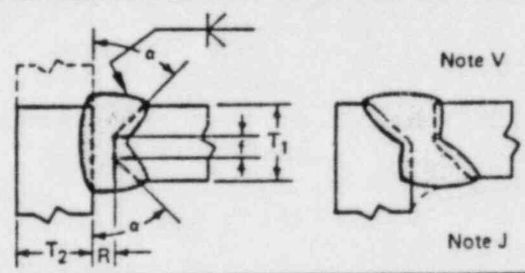
Double-bevel-groove weld (5)
Butt joint (B)



Limitations
Bridge applications limited to horizontal position

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening Root face Groove angles	Tolerances** As detailed (see 2.9.2)	Tolerances** As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-U5a	U, preferably 5/8 or thicker	–	R = 0 to 1/8 f = 0 to 1/8 α = 45° β = 0° to 15°	+1/16,–0 +1/16,–0 α + β, +10 –0	+1/16,–1/8 Not limited α + β, +10 –5	All	–	C, M, Z
GMAW FCAW	B-U5-GF	U, preferably 5/8 or thicker	–	R = 0 to 1/8 f = 0 to 1/8 α = 45° β = 0°	+1/16,–0 +1/16,–0 +10°,–0° ±0°	+1/16,–1/8 Not limited +10°,–5° –	All	Not req.	A, C, M

Double-bevel-groove weld (5)
T-joint(T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening Root face Groove angle	Tolerances** As detailed (see 2.9.2)	Tolerances** As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-U5b	U, preferably 5/8 or thicker	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,–0 +1/16,–0 +10°,–0°	+1/16,–1/8 Not limited +10°,–5°	All	–	C, J, M, V
GMAW FCAW	TC-U5-GF	U, preferably 5/8 or thicker	U				All	Not required	A, C, J, M, V
SAW	TC-U5-S	U	U	R = 0 f = 3/16 max α = 60°	±0 +0,–3/16 +10°,–0°	+1/16,–0 ±1/16 +10°,–5°	Flat	–	J, M, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

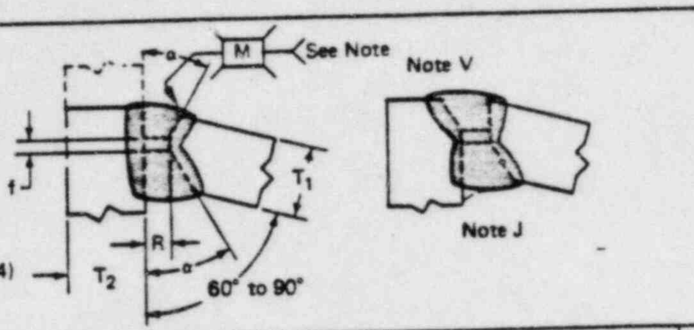
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Note Z: When lower plate is beveled, make the first root pass on this side.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Double-bevel-groove weld (5)
T-joint (T)
Corner joint (C)

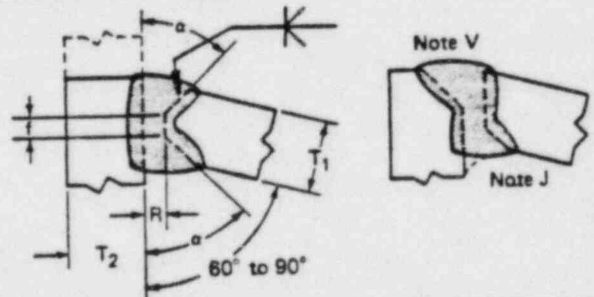


M = steel (see 8.2.4, 9.2.5, 10.2.4) **
Note: Same steel as base metal

Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16,–0
f = +1/16,–0	Not limited
α = +10°,–0°	+10°,–5°
Spacer = ±0	+1/16,–0

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Root face	Groove angle			
SMAW	TC-U5c	U, preferably 5/8 or thicker Spacer = 1/8 X R	U	R = 1/4	f = 0 to 1/8	α = 45°	All	–	C, J, V, M
				R = 3/8	f = 0 to 1/8	α = 30°	F, OH	–	C, J, V, M

Double-bevel-groove weld (5)
T-joint (T)
Corner joint (C)



M = steel (see 8.2.4, 9.2.5, 10.2.4) **
Note: Same steel as base metal

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Gas shielding for (FCAW)	Notes
				Root opening Root face Groove angle	Tolerances **				
		T_1	T_2		As detailed (See 2.9.2)	As fit up (See 3.3.4)			
SMAW	TC–U5d	U, preferably 5/8 or thicker	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,–0 +1/16,–0 +10°,–0°	+1/16,–1/8 Not limited +10°,–5°	All	–	C, J, V, M

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.

**The references below appear ;in AWS D1.1. See Note AA attached for details.

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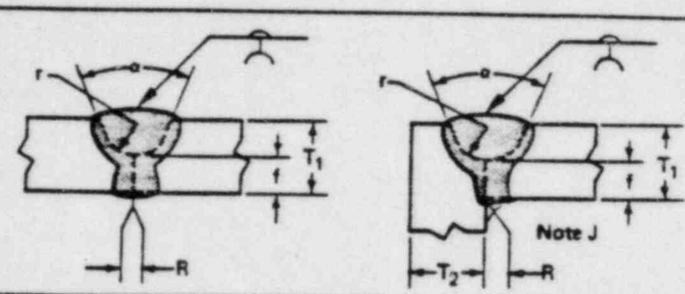
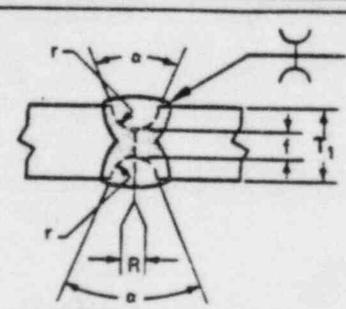
Single-U-groove weld (6)
Butt joint (B)
Corner joint (C)



Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/4,−1/16
α = +10°,−0°	+10°,−5°
f = ±1/16	Not limited
r = +1/4,−0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Root face	Groove radius	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	B-U6	U	U	R = 0° to 1/8	α = 45°	f = 1/8	r = 1/4	All	–	C
				R = 0° to 1/8	α = 20°	f = 1/8	r = 1/4	F,OH	–	C
	C-U6	U	U	R = 0° to 1/8	α = 45°	f = 1/8	r = 1/4	All	–	C,J
				R = 0° to 1/8	α = 20°	f = 1/8	r = 1/4	F,OH	–	C,J
GMAW FCAW	B-U6-GF	U	U	R = 0° to 1/8	α = 20°	f = 1/8	r = 1/4	All	Not req.	A,C
	C-U6-GF	U	U	R = 0° to 1/8	α = 20°	f = 1/8	r = 1/4	All	Not req.	A,C,J

Double-U-groove weld (7)
Butt joint (B)



Tolerances ** For B-U7 and B-U7-GF	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
α = +10°,−0	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	±1/16

Tolerances** For B-U7-S	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16,−0
f = +0,−1/4	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Root face	Groove radius	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	B-U7	U, preferably 5/8 or thicker	–	R = 0 to 1/8	α = 45°	f = 1/8	r = 1/4	All	–	C, M
				R = 0 to 1/8	α = 20°	f = 1/8	r = 1/4	F,OH	–	C, M
GMAW FCAW	B-U7-GF	U, preferably 5/8 or thicker	–	R = 0 to 1/8	α = 20°	f = 1/8	r = 1/4	All	Not required	A, C, M
SAW	B-U7-S	U	–	R = 0	α = 20°	f = 1/4 max	r = 1/4	F	–	M

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

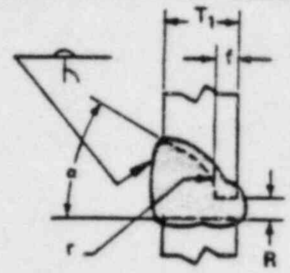
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1, but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1. *These fillet welds need not exceed 3/8 in.*

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

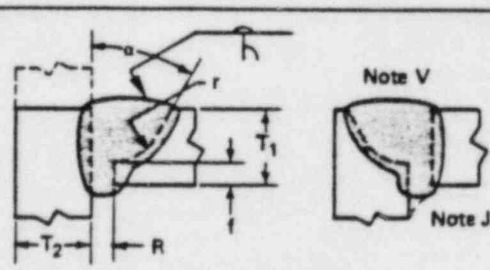
Single-J-groove weld (B)
Butt joint (B)



Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
α = +10°,−0°	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	B-U8	U	–	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	Br, C
GMAW FCAW	B-U8-GF	U	–	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A,Br,C

Single-J-groove weld (B)
T-joint (T)
Corner joint (C)



Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
α = +10°,−0°	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions*	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	TC-U8a	U	U	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	C,J,V
				R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	F,OH	–	C,J,V
GMAW FCAW	TC-U8a-GF	U	U	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A, C, J, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note Br: Bridge application limits the use of these joints to the horizontal position

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. Groove welds in corner and T-joints of bridges shall be reinforced with fillet welds equal to 1/4 T_1 but not more than 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

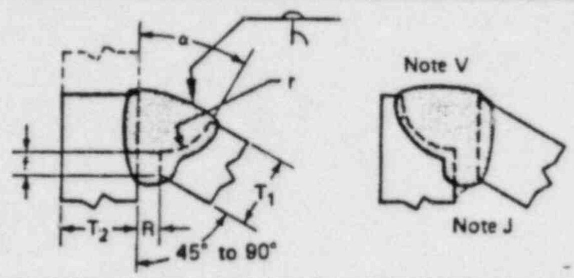
* F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.

**The references below appear in AWS D1.1. See Note AA attached for details.

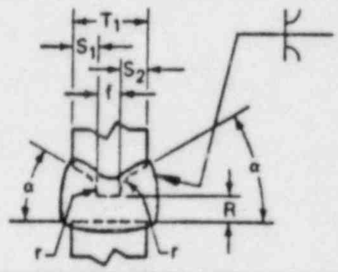
Single-J-groove weld (8)
T-joint (T)
Corner joint (C)



Tolerances***	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
α = +10°,−0°	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions*	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	TC-U8b	U	U	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	C,J,V
				R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	F,OH	–	C,J,V
GMAW FCAW	TC-U8b-GF	U	U	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A,C, J,V

Double-J-groove weld (9)
Butt joint (B)



Tolerances***	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
α = +10°,−0°	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	+1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	B-U9	U, preferably 5/8 or thicker	–	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	Br, C, M
GMAW FCAW	B-U9-GF	U, preferably 5/8 or thicker	–	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A, Br, C, M

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note Br: Bridge application limits the use of these joints to the horizontal position

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

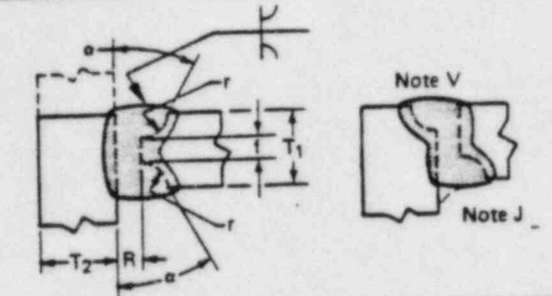
Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

* F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

**The references below appear in AWS D1.1. See Note AA attached for details.

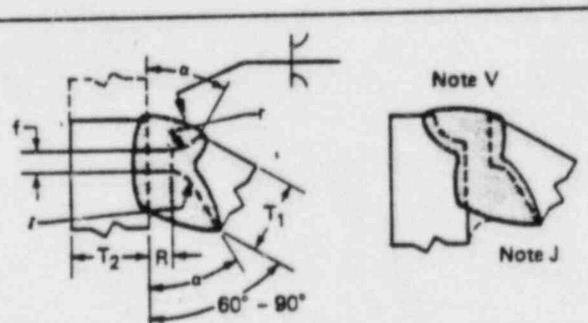
Double-J-groove weld (9)
T-joint (T)
Corner joint (C)



Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
α = +10°, −0°	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening	Groove angle	Root face	Groove radius	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-U9a	U, preferably 5/8 or thicker	U	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	C, J, M, V
				R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	F, OH	–	C, J, M, V
GMAW FCAW	TC-U9a-GF	U, preferably 5/8 or thicker	U	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A, C, J, M, V

Double-J-groove weld (9)
T-joint (T)
Corner joint (C)



Tolerances **	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
α = +10°, −0°	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening	Groove angle	Root face	Groove radius	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	TC-U9b	U, preferably 5/8 or thicker	U	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	C, J, M, V
				R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	F, OH		
GMAW FCAW	TC-U9b-GF	U, preferably 5/8 or thicker	U	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A, C J, M, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

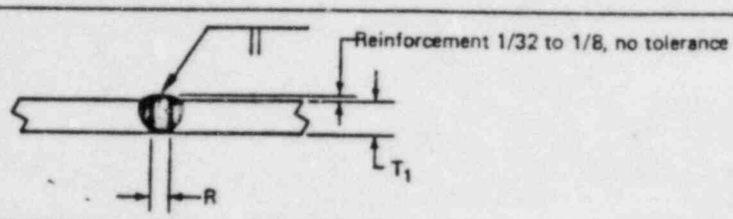
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

* F = Flat, OH = Overhead.

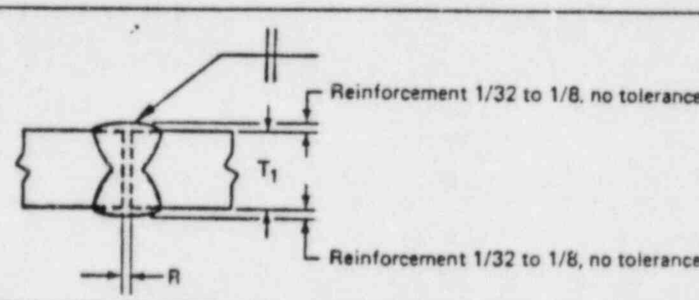
Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Square-groove weld (1)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Tolerances**: As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P1a	1/8	–	R = 0 to 1/16	+1/16,–0	±1/16	All	T_1	B
	B-P1c	1/4 max	–	$R = \frac{T_1}{2}$ min	+1/16,–0	±1/16	All	$\frac{3T_1}{4}$	B

Square-groove weld (1)
Butt joint (B)



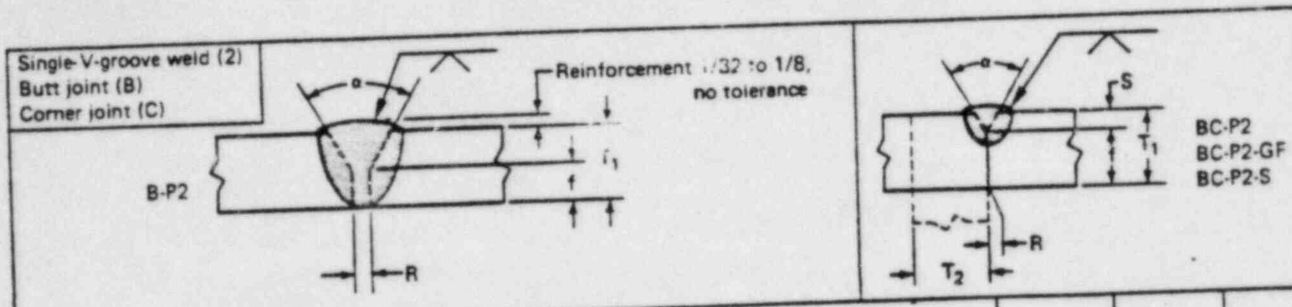
Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Tolerances**: As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P1b	1/4 max	–	R = 0 to 1/16	±0	+3/16 see also 3.3.2	All	T_1	C2

Note B: Joints welded from one side. These welds are not applicable to bridges.

Note C2: Root need not be gouged before welding second side. This weld is not applicable to bridges.

Fig. 2.10.1–Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening / Root face / Groove angle	Tolerances ** As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P2	1/2 max	–	R = 3/32 min f = 0 to 1/8 α = 60°	±1/16 ±1/16 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	T_1	B, L
SMAW	BC-P2	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min α = 60°	±0 ±1/16 +10°,–0°	+1/16,–0 ±1/16 +10°,–5°	All	S	E, L
GMAW FCAW	BC-P2-GF	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min α = 60°	±0 ±1/16 +10°,–0°	+1/16,–0 ±1/16 +10°,–5°	All	S	A, E, L
SAW	BC-P2-S	7/16 min	U	R = 0 f = 1/4 min α = 60°	±0 ±1/16 +10°,–0°	+1/16,–0 ±1/16 +10°,–5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note B: Joint is welded from one side only.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

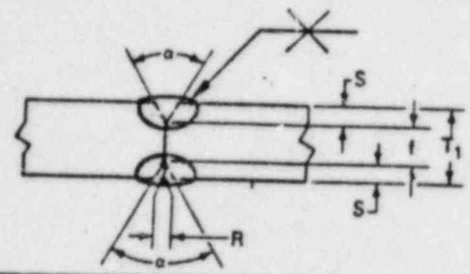
Note L: Butt and T-joints are not prequalified for bridges.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA attached for details.

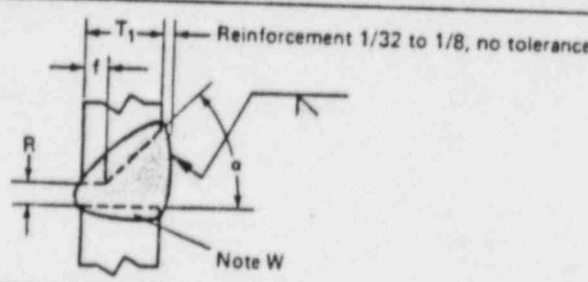
**The references below appear in AWS D1.1. See Note AA attached for details.

Double-V-groove weld (3)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Effective throat (E)	Notes
				Root opening Root face Groove angle	Tolerances **				
		T_1	T_2		As detailed (see 2.10.2)	As fit up (see 3.3.4)			
SMAW	B-P3	1/2 min	–	R = 0 f = 1/8 min α = 60°	+1/16,–0 –0 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	S	E, L Mp
GMAW FCAW	B-P3-GF	1/2 min	–	R = 0 f = 1/8 min α = 60°	+1/16,–0 –0 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	S	E, L, Mp
SAW	B-P3-S	3/4 min	–	R = 0 f = 1/4 min α = 60°	±0 –0 +10°,–0°	+3/16,–0♦ ±1/16 +10°,–5°	Flat	S	E, L Mp

Single-bevel-groove weld (4)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Effective throat (E)	Notes
				Root opening Root face Groove angle	Tolerances **				
		T_1	T_2		As detailed (see 2.10.2)	As fit up (see 3.3.4)			
SMAW	B-P4, TC-P10	1/2 max	–	R = 3/32 min f = 0 to 1/8 α = 45°	R = min ±1/16 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	T_1	B, L, W

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note B: Joint is welded from one side only.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.**

Note L: Butt and T-joints are not prequalified for bridges.

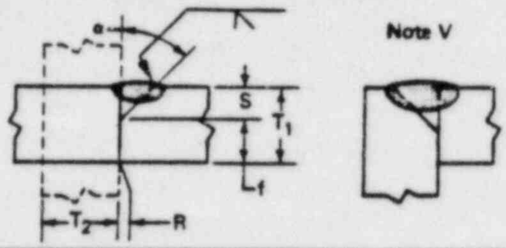
Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

Note W: Unbeveled face is the lower edge for horizontal position.

♦ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Single-bevel-groove (4)
Butt joint (B)
T-joint(T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening Root face Groove angle	Tolerances ** As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions*	Effective throat (E)	Notes
SMAW	BTC-P4	7/16 min (for bridges 1/2 min)	U	R = 0 f = 1/8 min α = 45°	+1/16,−0 −0 +10°,−0°	±1/16 ±1/16 +10°,−5°	All	S − 1/8	E, L, V
GMAW FCAW	BTC-P4-GF	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min α = 45°	+1/16,−0 −0 +10°,−0°	±1/16 ±1/16 +10°,−5°	F,H	S	A, E, L, V
		7/16 min					V,OH	S − 1/8	
SAW	TC-P4-S	7/16 min (for bridges 1/2 min)	U	R = 0 f = 1/4 min α = 60°	±0 −0 +10°,−0°	+3/16,−0‡ ±1/16 +10°,−5°	Flat	S	E, L, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

Note L. Butt and T-joints are not prequalified for bridges.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

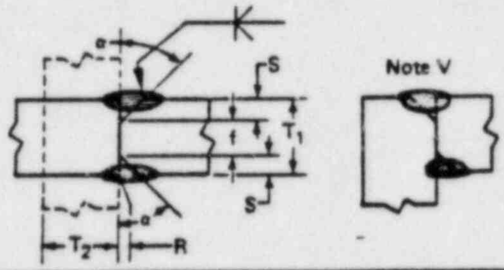
‡ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

* F = Flat, H = Horizontal, V = Vertical, OH = Overhead.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA, attached, for details.

Double-bevel-groove weld (5)
Butt joint (B)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening Root face Groove angle	Tolerances ** As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions*	Effective throat (E)	Notes
SMAW	BTC-P5	3/4 min (for bridges 1/2 min)	U	R = 0 f = 1/8 min α = 45°	+1/16,−0 −0 +10°,−0°	±1/16 ±1/16 +10°,−5°	All	S −1/8	E, L, Mp, V
GMAW FCAW	BTC-P5-GF	1/2 min (for bridges 5/8 min)	U	R = 0 f = 1/8 min α = 45°	+1/16,−0 −0 +10°,−0°	±1/16 ±1/16 +10°,−5°	F,H	S	A, E, L, Mp, V
		3/4 min					V,OH	S −1/8	
SAW	TC-P5-S	3/4 min (for bridges 7/8 min)	U	R = 0 f = 1/4 min α = 60°	±0 −0 +10°,−0°	+3/16,−0‡ ±1/16 +10°,−5°	Flat	S	E, L, Mp, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

Note L: Butt and T-joints are not prequalified for bridges.

Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

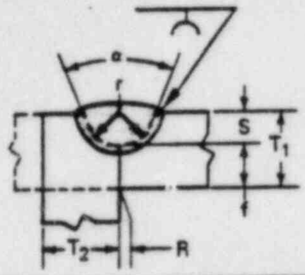
‡ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

* F = Flat, H = Horizontal, V = Vertical, OH = Overhead.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA, attached, for details.

Single-U-groove weld (6)
Butt joint (B)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening / Root face / Groove radius / Groove angle	Tolerances ** As detailed (see 2.10.2)	Tolerances ** As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	BC-P6	1/4 min (for bridges 5/16 min)	U	R = 0 to 1/8 f = 1/8 min r = 1/4 α = 45°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	E, L
GMAW FCAW	BC-P6-GF	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min r = 1/4 α = 20°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	A, E, L
SAW	BC-P6-S	7/16 min (for bridges 1/2 min)	U	R = 0 f = 1/4 min r = 1/4 α = 20°	±0 −0 +1/4,−0 +10°,−0°	+3/16,−0‡ ±1/16 ±1/16 +10°,−5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

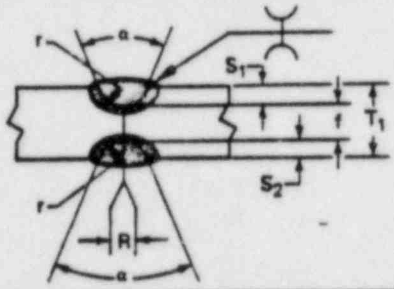
Note L: Butt and T-joints are not prequalified for bridges.

‡ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA, attached, for details.

Double-V-groove weld (7)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening / Root face / Groove radius / Groove angle	Tolerances ** As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P7	1/2 min (for bridges 5/8 min)	–	R = 0 to 1/8 f = 1/8 min r = 1/4 α = 45°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	E, L, Mp
GMAW FCAW	B-P7-GF	1/2 min (for bridges 5/8 min)	–	R = 0 f = 1/8 min r = 1/4 α = 20°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	A, E, L, Mp
SAW	B-P7-S	3/4 min (for bridges 7/8 min)	–	R = 0 f = 1/4 min r = 1/4 α = 20°	±0 −0 +1/4,−0 +10°,−0°	+3/16,−0‡ ±1/16 ±1/16 +10°,−5°	Flat	S	E, L, Mp

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

Note L: Butt and T-joints are not prequalified for bridges.

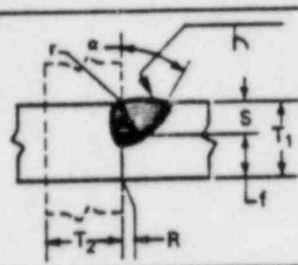
Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

‡ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

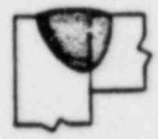
Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA, attached, for details.

Single-J-groove weld (B)
Butt joint (B)
T-joint (T)
Corner joint (C)



Note V



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening, Root face, Groove radius, Groove angle	Tolerances ** As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	BTC-P8	1/4 min (for bridges 5/16 min)	U	α = 45° R = 0 to 1/8 f = 1/8 min r = 3/8	+10°,-0° +1/16,-0 -0 +1/4,-0	+10°,-5° ±1/16 ±1/16 ±1/16	All	S	E, L, V
GMAW FCAW	BTC-P8-GF	1/4 min (for bridges 5/16 min)	U	α = 30°	+10°,-0°	+10°,-5°	All	S	A, E, L, V
SAW	C-P8-S	7/16 min (for bridges 1/2 min)	U	α = 20° R = 0 f = 1/4 min r = 1/2	+10°,-0° ± 0 -0 +1/4,-0	+10°,-5° +3/16,-0 ‡ ±1/16 ±1/16	Flat	S	E, V
SAW	T-P8-S	7/16 min	U	α = 45°	+10°,-0°	+10°,-5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

Note L: Butt and T-joints are not prequalified for bridges.

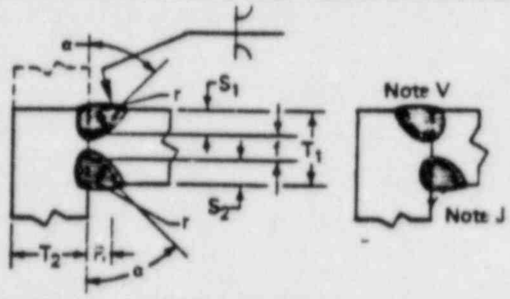
Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

‡ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above in AWS D1.1. See Note AA, attached, for details.

Double-J-groove weld (9)
Butt joint (B)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening, Root face, Groove radius, Groove angle	Tolerances ** As detailed (see 2.9.2)	Tolerances ** As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	BTC-P9	1/2 min (for bridges 5/8 min)	U	R = 0 to 1/8 f = 1/8 min r = 3/8 α = 45°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	E, L, J, V
GMAW FCAW	BTC-P9-GF	1/2 min (for bridges 5/8 min)	U	R = 0 f = 1/8 min r = 3/8 α = 30°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	A, E, L, V, J
SAW	C-P9-S	3/4 min (for bridges 7/8 min)	U	α = 20°	+10°,−0°	+10°,−5°	Flat	S	E, V, J
				R = 0 f = 1/4 min r = 1/2	±0 −0 +1/4,−0	+3/16,−0‡ ±1/16 ±1/16			
	T-P9-S	3/4 min	U	α = 45°	+10°,−0°	+10°,−5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings. **

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note L: Butt and T-joints are not prequalified for bridges.

Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

‡ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

**The references above appear in AWS D1.1. See Note AA, attached, for details.

NOTE AA

The following references as listed in AWS D1.1 are as follows:

Reference 9.2.5 — When material is ASTM A242 or A618, Grade 1, its weldability must be investigated by the welding engineer, Metallurgy/Welding prior to welding.

Reference 2.9.2 — Dimensional Tolerances. Dimensions of groove welds specified on design or detailed drawings may vary from the dimensions shown in Fig. 2.9.1 only within the following limits.

1. The specified thickness of base metal or weld effective throat is the maximum nominal thickness that may be used.
2. The groove angle is minimum; it may be detailed to exceed the dimensions shown by no more than 10 degrees.
3. The radius of J-grooves and U-grooves is minimum. It may be detailed to exceed the dimensions shown by no more than 1/8 in. (3 mm). U-grooves may be prepared before or after fit-up.
4. Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than 1/4 of the thickness of the thinner part joined, unless otherwise designated in Fig. 2.9.1.
5. The root face of the joint shall be as dimensioned in Fig. 2.9.1 with the following variations permitted:
   (1) For SMAW, GMAW, or FCAW it may be detailed to exceed the specified dimension by no more than 1/16 in. (2 mm). It may not be detailed less than the specified dimension.

NOTE AA (Cont'd)

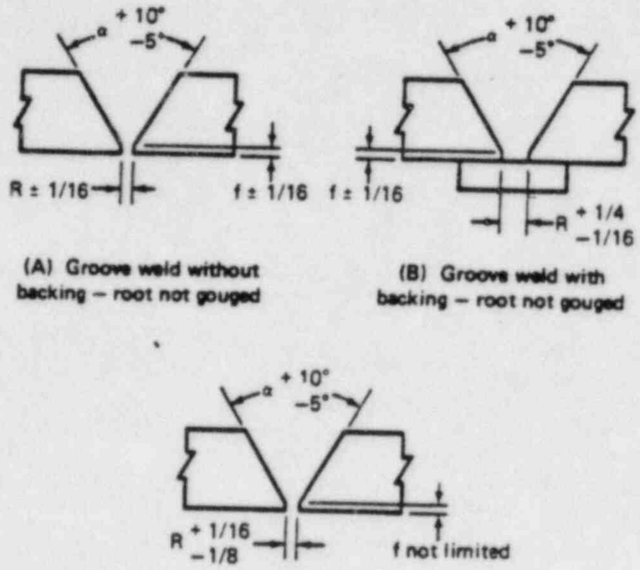
Reference 3.3.4 With the exclusion of electroslag and electrogas welding, and with the exception of 3.3.4.1 for root openings in excess of those permitted in the table below and illustrated in Fig. 3.3.4, the dimensions of the cross section of the groove-welded joints which vary from those shown on the detail drawings by more than the following tolerances shall be referred to the Engineer for approval or correction.

		Root not gouged*		Root gouged	
		in.	mm	in.	mm
(1)	Root face of joint	± 1/16	1.6	Not limited	
(2)	Root opening of joints without steel backing	± 1/16	1.6	+ 1/16 - 1/8	1.6 3.2
	root opening of joints with steel backing	+1/4 -1/16	6.4 1.6	Not applicable	
(3)	Groove angle of joint	+10 deg - 5 deg		+10 deg - 5 deg	

*See 10.13.1.1 (3) for tolerances for complete joint penetration tubular groove welds made from one side without backing, see AWS D1.1.

3.3.4.1 Root openings wider than those permitted in 3.3.4, but not greater than twice the thickness of the thinner part of 3/4 in. (19 mm), whichever is less, may be corrected by welding to acceptable dimensions prior to joining the parts by welding. Root openings larger than the above may be corrected by welding only with the approval of the Engineer.

NOTE AA (Cont'd)



(A) Groove weld without backing – root not gouged

(B) Groove weld with backing – root not gouged

(C) Groove weld without backing – root gouged

Notes:

1. α - groove angle.
2. R - root opening.
3. f - root face.
4. The groove configurations shown are for illustration only.

Fig. 3.3.4—Workmanship tolerances in assembly of groove welded butt joints

Reference 2.10.2 and Table 2.10.3

2.10.1 Partial joint penetration groove welds made by shielded metal arch welding, submerged arc welding, gas metal arc welding (except short circuiting transfer), or flux cored arc welding in butt, corner, and T-joints which may be used without performing the joint welding procedure qualification tests prescribed in 5.2 are detailed in Fig. 2.10.1 and are subject to the limitations specified in 2.10.2.

2.10.1.1 Definition. Except as provided in 10.13.1.1., groove welds without steel backing, welded from one side, and groove welds welded from both sides but without back gouging are considered partial joint penetration groove welds.

NOTE AA (Cont'd)

2.10.1.2 All partial joint penetration groove welds made by short circuiting transfer gas metal arc welding (see Appendix D) shall be qualified by the joint welding procedure qualification test prescribed in 5.2.

2.10.2 Dimensional tolerances. Dimensions of groove welds specified on design or detailed drawings may vary from the dimensions shown in Fig. 2.10.1 only within the following limits.

2.10.2.1 The groove angle is minimum; it may be detailed to exceed the dimensions shown by no more than 10 degrees.

2.10.2.2 The radius of the J-grooves and U-grooves is minimum. It may be detailed to exceed the dimensions shown by no more than 1/8 in. (3 mm). U-grooves may be prepared before or after fit-up.

2.10.2.3 Double-groove welds may have grooves of unequal depth, providing the weld deposit on each side of the joint conforms to the limitations of Fig. 2.10.1.

2.10.2.4 The minimum root face of the joints shall be 1/8 in. (3 mm), except that the minimum root face for joints to be welded by submerged arc welding shall be 1/4 in. (6 mm).

NOTE AA (Cont'd)

2.10.3 The effective throat of partial joint penetration square-, single- or double-V-, bevel-, J-, and U-groove welds shall be as shown in Table 2.10.3.

2.10.3.1 Shop or working drawings shall specify the groove depths (S) applicable for the effective throat (E) required for the welding process and position of welding to be used.

2.10.4 Groove preparations detailed for prequalified shielded metal arc welded joints may be used for prequalified gas metal arc or flux cored arc welding.

2.10.5 Corner Joints. For corner joints the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive melting.

Table 2.10.3
Minimum effective throat for partial joint penetration groove welds

Base metal thickness of thicker part joined (in. (mm))	Minimum effective throat** in.	Minimum effective throat** mm
To 1/4 (6.4) incl.	1/8*	3
Over 1/4 (6.4) to 1/2 (12.7) incl.	3/16	5
Over 1/2 (12.7) to 3/4 (19.0) incl.	1/4	6
Over 3/4 (19.0) to 1-1/2 (38.1) incl.	5/16	8
Over 1-1/2 (38.1) to 2-1/4 (57.1) incl.	3/8	10
Over 2-1/4 (57.1) to 6 (152) incl.	1/2	13
Over 6 (152)	5/8	16

*Minimum size for bridge applications is 3/16 in.

**Except the effective throat need not exceed the thickness of the thinner part.

TABLE A

Symbols for joint types

B - butt joint
C - corner joint
T - T joint
BC - butt or corner joint
TC - T or corner joint
BTC - butt, T, or corner joint

Symbols for base metal thickness and penetration

L - limited thickness - complete joint penetration
U - unlimited thickness - complete joint penetration
P - partial joint penetration

Symbols for weld types

1 - square-groove
2 - single-V-groove
3 - double-V-groove
4 - single-bevel-groove
5 - double-bevel-groove
6 - single-U-groove
7 - double-U-groove
8 - single-J-groove
9 - double-J-groove

Symbol for welding processes, if not shielded metal arc

S - submerged arc welding
G - gas metal arc welding
F - flux cored arc welding

TABLE B

WPS for Structural & Hangers for Seismic & Non-Seismic Welds

Type Joint	Joint Size	WPS (Qualification)	Weld Process Filler	Preheat* (min.)
Carbon Steels & Low Alloy Steels (Group II)				
Fillet	ALL	AW-1 (Prequalified)	SMAW E7018	**None (thickness thru 3/4") 50°F (over 3/4" thru 1½") 150°F (over 1½" thru 2½") 225°F (over 2½")
Groove	See Figures 2.9.1 & 2.10.1	"	"	"
Carbon Steels & Low Alloy Steels (Group II or PI, See Table C)				
Fillet	ALL	1A1 or 1A4 (Qualified)	SMAW E7018	**None (thickness thru 3/4") 50°F (over 3/4" thru 1½") 150°F (over 1½" thru 2½") 225°F (over 2½")
Fillet	ALL	1F1 (Qualified)	FCAW E71T-1	**None (thickness thru 3/4") 50°F (over 3/4"thru 1½") 150°F (over 1½" thru 2½") 225°F (over 2½")
Fillet	ALL	1F3 (Qualified)	FCAW E71T-1	100°F (thickness up to 1½") 150°F (over 1½" thru 2½") 225°F (over 2½")
Fillet	¼" max. thickness	1M1 (Qualified)	GMAW ER70S-2	50°F (thickness thru ¼")
Groove (With Backing)	Thru 1½"	1A4 (Qualified)	SMAW E-7018	Same As 1A4 table above
Groove (With Backing)	Thru 1½"	1F1 (Qualified)	FCAW E71T-1	Same as 1F1 table above
Groove (With Backing)	Thru 1½"	1F3 (Qualified)	FCAW E71T-1	Same as 1F3 table above
Groove (Without Backing)	(Contact Welding Engineer, Metallurgy/Welding)			

TABLE B (cont.)

Carbon & Low Alloy Steel to 304 Stainless Steel (or other P-8)

Fillet	ALL	1-8A1 (Qualified)	SMAW E304	50°F
Groove (With Backing)	3/16 (.1875) thru 3/8 (.3750)	"	"	"
Groove (with or without backing)	Over 3/8"	(Contact Welding Engineer, Metallurgy/Welding)		

*Thickness at the weld joint of the thickest member
**If the temperature is below 32°F, preheat to 70°F and maintain during welding

TABLE C

Carbon Steel and Low Alloy Steels (P-1) as Listed in ASME Section IX

Material Specification

SA-31 Grade A
Grade B

SA-36 . . .

SA-53 Acid Bessemer
Open Hearth
Grade A
Grade B

SA-106 Grade A
Grade B

SA-134

SA-135 Grade A

Grade B

SA-155 Grade C45

SA-155 Grade C50
Grade C55
Grade KC55
Grade KCF55

SA-155 Grade KC60
Grade KCF60
Grade KC65
Grade KCF65

SA-178 Grade A
Grade C

SA-179 . . .

SA-181 Class 60

SA-192

SA-210 Grade A-1

SA-214

SA-216 Grade WCA

SA-226

SA-234 Marking WPA

SA-234 Marking WPB

SA-266 Class 1

SA-283 Grade A
Grade B
Grade C
Grade D

SA-285 Grade A
Grade B
Grade C

SA-333 Grade 1

Grade 6

SA-334 Grade 1

Grade 6

SA-350 Grade LF1

SA-352 Grade LCA
Grade LCB

SA-369 Grade FPA

SA-372 Type I

SA-414 Grade A
Grade B
Grade C
Grade D
Grade E

SA-420 Grade WPL6

SA-442 Grade 55
Grade 60

SA-487 Class A and AN

SA-515 Grade 55
Grade 60
Grade 65

SA-516 Grade 55
Grade 60
Grade 65

SA-524 Grade I
Grade II

SA-556 Grade A2
Grade B2

SA-557 Grade A

Grade B

SA-587 . . .

SA-660 Grade WCA

SA-662 Grade A
Grade B

SA-671 Grade CA55
Grade CE55

SA-671 Grade CB60
Grade CC60
Grade CE60
Grade CB65
Grade CC65

SA-672 Grade A45

SA-672 Grade A50
Grade A55
Grade B55
Grade C55
Grade E55

SA-672 Grade B60
Grade C60
Grade E60
Grade B65
Grade C65

SA-675 Grade 45
Grade 50
Grade 55
Grade 60
Grade 65

SA-695 Type B Grade 35

SA-696 Grade B

SA-727

SA-105

SA-106 Grade C

SA-155 Grade KC70
Grade KCF70

SA-181 Class 70

SA-210 Grade C

SA-216 Grade WCB
Grade WCC

SA-234 Marking WPC

SA-266 Class 2
Class 4

SA-299

SA-350 Grade LF2

SA-352 Grade LCC

SA-372 Type II

SA-414 Grade F
Grade G

SA-420 Grade WPL6

SA-455 Type I
Type II

SA-487 Class AQ
Class B and BN
Class C and CN

SA-508 Class 1
Class 1A

SA-515 Grade 70

SA-516 Grade 70

SA-537 Class 1

SA-541 Class 1
Class 1A

SA-556 Grade C2

SA-557 Grade C

SA-660 Grade WCB
Grade WCC

SA-662 Grade C

SA-671 Grade CB70
Grade CC70
Grade CD70
Grade CK75

SA-672 Grade B70
Grade C70
Grade D70
Grade N75

SA-675 Grade 70

SA-691 Grade CMSH-70

Grade CMS-75

SA-695 Type B Grade 40

SA-696 Grade C

SA-737 Grade B

SA-738

SA-487 Class BQ
Class CQ

SA-537 Class 2

SA-671 Grade CD80

SA-672 Grade D80

SA-691 Grade CMSH-80

SA-737 Grade C

SA-724 Grade A (⅝ in. max. T)
Grade B (⅝ in. max. T)

Appendix D:
Short Circuiting Transfer

Short circuiting transfer is a type of metal transfer in gas metal arc welding in which melted material from a consumable electrode is deposited during repeated short circuits. For additional information, see Section 2 of the Sixth Edition of the WELDING HANDBOOK, page 23.24.

Typical current ranges for short circuiting transfer gas metal arc welding of steel

Electrode diam		Welding current, Amperes*			
		Flat position		Vertical and overhead positions	
in.	mm	min	max	min	max
0.030	0.8	50	150	50	125
0.035	0.9	75	175	75	150
0.045	1.2	100	225	100	175

*Electrode positive.

File: SH P-1/2

QA/QC Harris Plant

Personnel Training

Date: 4/5/84

Training Period: 3:00 pm to 4:00

Class Title: Non-Conformance Control

Procedure and Revision: CQA-3 Rev 3

Summary: Explained entire procedure - Discussed with inspectors how nonconformance flow works - Discussed recent revision changes - defined subordinate non conformances.

The following personnel attended the above described training:
(Print name, followed by signature.)

Jim Storey Jim Storey

Gerald W. GLASS Gerald W. Glass

Rick Garrison Rick Garrison

Steven R. Rake Steven R. Rake

Jerry Smith Jerry Smith

Douglas M. Brown Douglas M. Brown

Steven T. Russell Steven T. Russell

Mike Stephens M. L. Stephens

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: Vic Sag[illegible]

000616

File: SH P-1/2

QA/QC Harris Plant

Personnel Training

Date: 4/3/84

Training Period: 3:30 pm to 4:00 pm

Class Title: ~~QCI-19.5 Rev-1~~ * see Summary

Procedure and Revision: QCI-19.5 Rev-1

Summary:

* Identification and documentation of base metal deficiencies outside of the weld area of interest.

Procedure defined the "area of interest" and what to do when indications are discovered:

1) ASME Sect. III class 1, 2, 3, and MC items
ASME Sect VIII tanks & vessels
Ebasco Catagory 4 & 5 Mainsteam & Feedwater systems
Radwaste and Fire Protection systems
Fuel Pool Liner Plates

2) Seismic Class I items

The following personnel attended the above described training:
(Print name, followed by signature.)

Rick Garrison [signature]	A. James Watkins [signature]
Sherman Cothom [signature]	Mark Pfouts [signature]
Gerald W. GLASS [signature]	KM KENYON [signature]
Mike Stephens [signature]	
Steven R. Ruhe [signature]	
JERRY Smith [signature]	
Steven T. Russell [signature]	
Douglas M. Brown [signature]	
CARL WEAST [signature]	

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: [signature] Jim Storey

File: SH F-1/2

QA/QC Harris Plant

Personnel Training

Date: 3/29/84

Training Period: 3:30 PM to 4:00 PM

Class Title: Repair of Base metal and weldments

Procedure and Revision: MP-10 Rev-11

Summary:

See Attached Outline

The following personnel attended the above described training:
(Print name, followed by signature.)

Jerry Smith Jerry Smith
Gerald W. GLASS Gerald W. Glass
Steven T. Russell Steven T. Russell
Steven R. Rahn Steven R. Rahn
Kim Kenyon K.M. Kenyon
Jim Storey Jim Storey
Rick Garrison R. Garrison
Douglas M Brown Douglas M. Brown
Mark Pfouts Mark Pfouts

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: [signature]

[redacted]

March 30, 1984

MEMORANDUM TO: R. Hanford

FROM: D. Timberlake

SUBJECT: MP-10 Rev. 11 Training Class (Structural Welding)

On March 29, 1984, I conducted a 1/2 hour training class on the above subject for QC-Welding personnel. Attached is a copy of the training outline and attendance sheet.

DRT:cag

cc: Mr. P. Foscolo (w/o att)
Mr. W. Mercer (w/att)
Mr. M. Taylor (w/att)
Met./Welding File T-4d (w/att)

MP-10 Rev. 11 Training Class
(Structural Welding)

I. General (Repairs)

A. RSWDR's are required for:

1. Rejectable indications detected by MT, PT, UT and RT
2. Base metal repairs

B. Any weld defects that are detected visually or by info NDE DO NOT REQUIRE AN RSWDR. This is considered in-process welding.

C. After the repair is completed the repaired area shall be examined by the same method used to detect the original defect and by additional NDE as required.

II. Repairs made on Seismic I Structures

A. Repair welding of base metal defects

1. Visual inspection of area prior to welding is required
2. Flame cut edges
   a. Notches and gauges
   b. Internal Discontinuities
   Table A for acceptance limits

B. Repair of weld metal defects

C. Repair of misdrilled holes

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE MARCH 29, 1984 TIME 3:30 P LENGTH OF CLASS 1/2 HOUR

COURSE & TITLE MP-10 REV. 11 REPAIR OF BASE MATERIALS AND WELDMENTS (STRUCT

INSTRUCTOR DAVID TIMBERLAKE SHIFT

PERSONS IN ATTENDANCE

NAME		BADGE NO.
1. TOM ASHLEY	Tom Ashley	254
2. Gilbert A. DeBarros	Gilbert A. DeBarros	113
3. Robert L Plumlee	Robert L. Plumlee	486
4. CHRISTOPHER M CASE	Christopher M Case	107
5. JERRY O. TRAMMELL	Jerry O. Trammell	576
6. Melvin Carpenter	Melvin Carpenter	85
7. Thomas B. LEMBO	Thomas B. Lembo	724
8. Steven M Douglas	Steven M Douglas	115
9. David Dowell	David Dowell	573
10. TELLO ANGELINA	Tello Angelina	262
11. Harold L. Pruitt	Harold L. Pruitt	159
12. Michael R Boyd	Michael R Boyd	823
13. K M KENYON	K M Kenyon	400
14. A L LEONARD	A L Leonard	144
15. Mark Pfouts	Mark Pfouts	452
16. Steven T Russell	Steven T Russell	502
17. Steven R. Rahe	Steven R. Rahe	451
18. JERRY A. Smith	Jerry Smith	450
19. Jim Storey	Jim Storey	177
20. JOHN CADDELL	John Caddell	364
21. Gerald W. GLASS	Gerald W Glass	3002

QA/QC Harris Plant

Personnel Training

Date: March 27, 1984

Training Period: 3:30 pm till 4:00 pm

Class Title: Miscellaneous Steel Fabrication

Procedure and Revision: WP-18 Rev. 15

Summary: Class consisted of proper application and filling out of the WP-18 Form Rev. 9. What QA/QC should be aware of concerning the amount of information that is needed on the form and who is responsible for initiating, releasing, and review of the WP-18. Also how the form relates with attached documents such as drawings, QA-37 forms, and SWDR's.

The following personnel attended the above described training:
(Print name, followed by signature.)

Carl Weast [signature]	Jerry Smith [signature]
Rick Garrison [signature]	Sherman Cotham [signature]
Mark Pfouts [signature]	
A. James Watkins [signature]	
Mike Stephens [signature]	
Jim Storey [signature]	
Steven T. Russell [signature]	
Kevin M. Kenyon [signature]	
Douglas M. Brown Douglas M. Brown	

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: [signature] Steven R Rahe

File: SH P-1/2

QA/QC Harris Plant

Personnel Training

Date: 3/22/84

Training Period: 3:30 PM to 4:00 PM

Class Title: NDE Requirements for Seismic Pipe Hangers and Structural steel

Procedure and Revision: Site Spec. - 034 Rev-12

Summary:

See attached outline

The following personnel attended the above described training:
(Print name, followed by signature.)

Jim Storey	Jim Storey	Joseph J. Zysk	J. J. Zysk Jr.
Mark Pfouts	Mark Pfouts	Mike Stephens	M. Stephens
Steven Rabe	Steven N. Rabe		
Matt Brown	Matt Brown		
Steven Russell	Steve Russell		
Rick Greeson	Rick Greeson		
Gerald W. Glass	Gerald W. Glass		
Jerry Smith	Jerry Smith		
James Watkins	[illegible]		

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: [illegible]

Form 244

CP&L

Carolina Power & Light Company

Company Correspondence

March 26, 1984

MEMORANDUM TO: Ray Hanford

FROM: David Timberlake

SUBJECT: Site Spec. 034 Training Class

On Thursday, March 22, 1984 I conducted a ½ hour training class on the requirements of Site Spec. 034 Rev. 12 relative to structural and hanger welding for QC inspection personnel. Attached is an outline and attendance sheet for this class.

DRT:cag

cc: Mr. P. Foscolo (w/o att.)
[redacted]
Mr. M. Taylor (w/att.)
Met./Welding File T4-d (w/att.)

Site Spec. 034 Rev. 12 Training Class Outline

I. Pipe Hangers

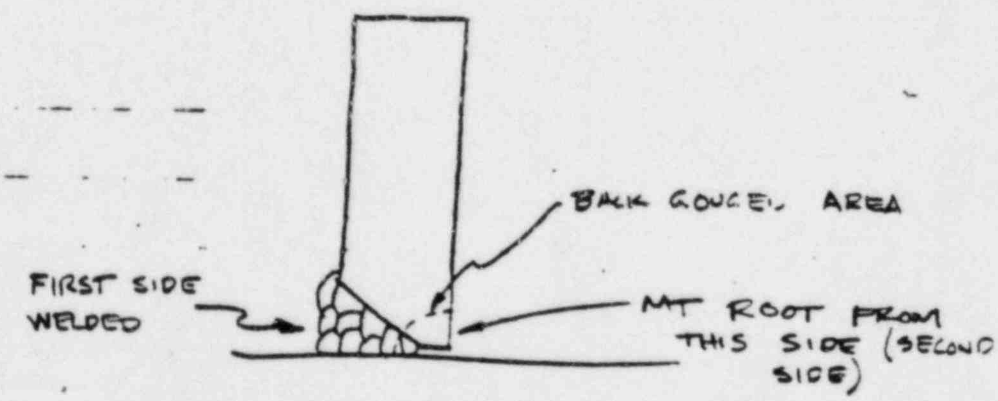
A- NDE in accordance with Table 1 (copy attached) for Seismic I hangers supporting ASME Class 1, 2 and 3 pipe

B- NDE in accordance with Table 3 (copy attached) for Seismic I hangers supporting category 4-8 pipe

II. Structural Steel

A- NDE in accordance with Table 4 (copy attached)

B- Double welded tee joints



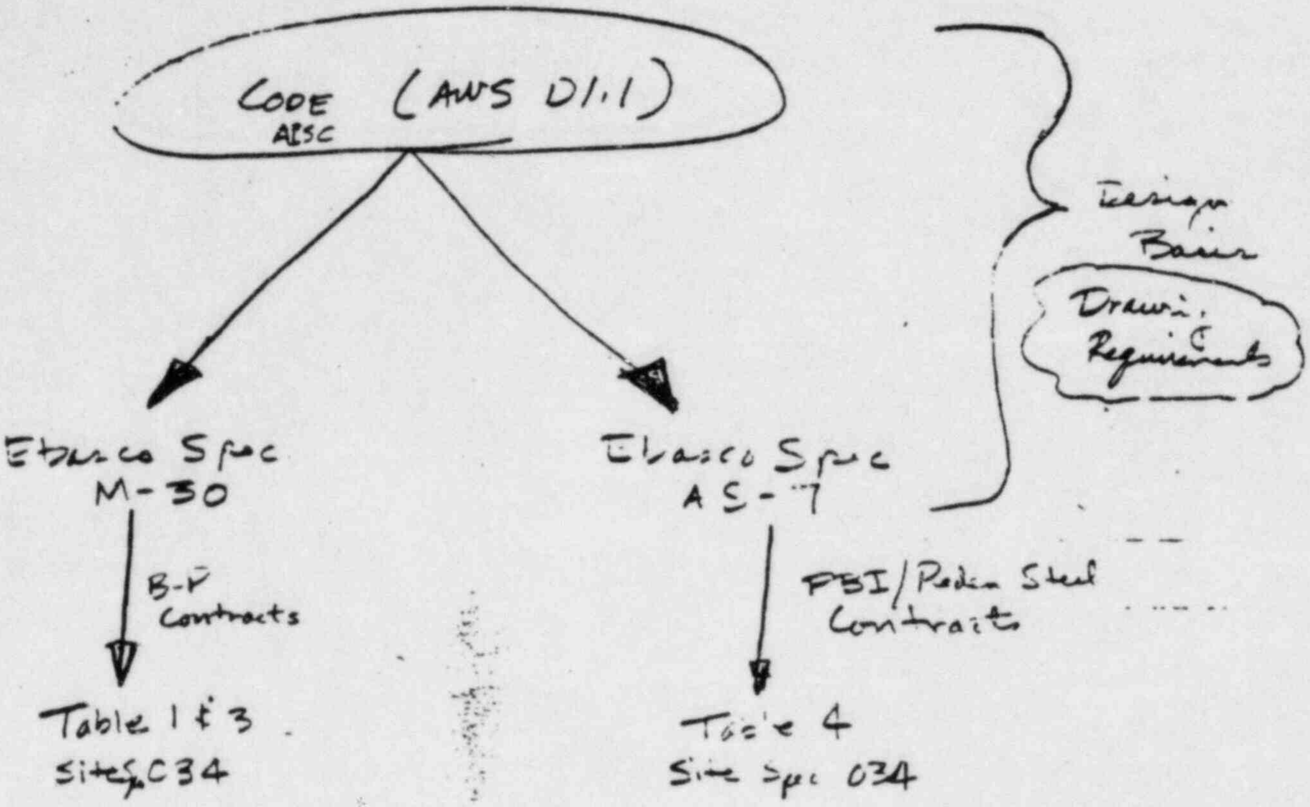
III. PIPE RESTRAINTS / LARGE FRAMES (SEE EXHIBIT NO. 1)

A- BERGEN - PATERSON CONTRACTS - NDE PER SITE SPEC 034 TABLES 1 & 3 (AS APPLICABLE

B-PBI (ET. AL.) CONTRACTS - NDE PER SITE SPEC 034 TABLE 4

EXHIBIT No. 1

Restraints / Large Frames



SYSTEMS/COMPONENTS/ITEMS	ASME CODE CLASS	MAT'L THK.	RT	PT	MT	UT	VT	NOTES	ACCEPTANCE CRITERIA
A. Carbon Steels (Cont'd)									
6. Pipe Hangers									AWS D1.1
a. Full Penetration Butt Welds	1		100%				100%	2,6,9	Per Ref. 2.14, 9.25.2
	2						100%	2,9	Per Ref. 2.14, 9.25.2
	3						100%	2,9	Per Ref. 2.14, 9.25.2
b. Full Penetration Tee Welds	1,2,3						100%	9	Per Ref. 2.14, 9.25.
c. Partial Penetration and Fillet Welds	1	≥1 inch Throat			100% (Fillets only)		100%	2,7	Per Ref. 2.14, 9.25.2
	1	<1 inch Throat					100%		Per Ref. 2.14
	2						100%		Per Ref. 2.14
	3						100%		Per Ref. 2.14

NDE AND VISUAL INSPECTION SPECIFICATION

Notes for Table 1

1. For either PT or MT, the external and accessible internal weld surfaces and adjacent base metal for at least 1/2 inch on each side of the weld shall be 100% examined.

2. PT is an acceptable alternate in lieu of MT. PT should be used on nominal pipe sizes 2 inches and less. R10

3. Acceptance criteria for material adjacent to the weld shall be per NB-2500.

4. Acceptance standards for material adjacent to the welds shall be per NC-2500.

5. Acceptance standards for materials adjacent to the welds shall be per ND-2500.

6. All full penetration butt joints in members designed to carry loads under any postulated load condition (primary memebers) shall be radiographed.

7. All fillet welds in members designed to carry loads under any postulated load condition (primary members) that have a throat dimension greater than 1 inch shall be examined by either the magentic particle or liquid penetrant method.

8. Applicable acceptance criteria.

9. Full penetration open butt weld joints shall receive a root pass inspection by either magnetic particle or liquid penetrant inspection when welded using the SMAW process. Full penetration open butt weld joints welded using the GTAW process for the root pass shall not require any root NDE.

10. ASME Code Case N-127(1755-1) (Reference 2.13) is invoked for alternate NDE requirements on those tube welds where automated welding machines are employed and the nominal tube size does not exceed 2 inches and the thickness does not exceed 0.20 inches. R10

SYSTEMS/COMPONENTS/ITEMS	Cat. Pipe	MAT'L THK.	RT	PT	MT	UT	VT	NOTES	ACCEPTANCE CRITERIA
A. Carbon Steel								3	B31.1 (Nonboiler external piping)
3. Fillet and Socket Welds	4	all			100%		100%	1	
	5	all					100%		
	6, 7, 8	all					100%		
4. Pipe Hangers Partial and Full Penetration Butt Welds and Fillet Welds	4	all					100%		Per Ref. 2.14
	5	all					100%		
	6, 7, 8	all					100%		
5. Stud Welds	4,5,6,7,8	All					100%		B31.1 (Non-Boiler External Piping)
6. Structural Attachment Welds	4	all					100%		
	5	all					100%		
	6,7,8	all					100%		

NDE AND VISUAL INSPECTION SPECIFICATION

Notes for Tables 2 and 3

1. PT is an acceptable alternate in lieu of MT.
2. For lube oil pipe other than that governed by Westinghouse Specification requirements, a visual inspection only is required. (An example is lube oil pipe supplied by Southwest Fabricators.)
3. For Category 4 through 8, base metal defects shall be evaluated per the base metal specification, not by the requirements for the weld. For base metal quality requirements, refer to Purchase Order and applicable ASTM or ASME Material Specification when evaluating defects (cracks or linear indications only to be evaluated) located more than 1/4" from the toe of the weld. Any cracks or linear indications which exceed 1/16" in length and which are located within 1/4" of the toe of the weld shall be repaired. R12

TABLE 4

SUMMARY OF NDE INSPECTION REQUIREMENTS

STRUCTURAL STEEL (SEISMIC CLASS 1 AND NONSEISMIC)

				RT	PT	MT	UT	VT	NOTES	ACCEPTANCE CRITERIA
Butt Welds	Full Penetrations			Note 5 100%				100%	1	Per Reference 2.1 AWS D1.1 9.25.2
	Partial Penetrations							100%	1	
Tee Welds	Full Penetrations					100%	Note 5 100%	100%	1,2,4	Per Ref. 2.14 AWS D1.1 9.25.2 and 9.25.3
	Partial Penetrations							100%	1	
Fillet Welds					See Note 3	See Note 3		100%	1,3	Per Ref. 2.14 AWS D1.1 9.25.2
Stud Welds										AWS D1.1, para. 4.30 for shear connectors
Cable Tray and Supports - Conduit Hangers - Fillet Welds								100%	1	Per Reference 2.1
Heating, Ventilating & Air Conditioning (HVAC)								100%	1	Per Reference 2.1

TABLE 4

NDE AND VISUAL INSPECTION SPECIFICATION

Notes to Table 4

1. Peening of welds is prohibited on Seismic Class 1. Peening of root and final pass is prohibited on nonseismic structural welds.

2. 100% MT or PT (if MT is not practical) of root pass and final weld layers.

3. Where noted on design drawings, fillet welds will be either MT or PT inspected.

4. The root inspection for double-welded joints shall be performed after back gouging.

5. For Seismic Class 1 only except when drawing explicitly deletes this requirement.

R11

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE 3-22-84 TIME 3:30- LENGTH OF CLASS

COURSE & TITLE Site Spec. 034 Rev. 12

INSTRUCTOR David Timberlake SHIFT 1st & 2nd

PERSONS IN ATTENDANCE

NAME		BADGE NO.
1. R. Olcott		3015
2. J Watkins	[signature]	3024
3. Robert L. Plumlee	Robert L Plumlee	486
4. TOM ASHLEY	Tom Ashley	572
5. S Douglas	Steve M Douglas	115
6. AL LEONARD	Al L Leonard	144
7. Shannon Gibson	Shannon Gibson	129
8. Melvin Carpenter	Melvin Carpenter	85
9. Harold L. O'Briant	Harold L. O'Briant	159
10. Thomas R. Lembo	Thomas R. Lembo	724
11. David Dowell	David Dowell	573
12. Michael R Boyd	Michael R Boyd	823
13. Rick S Garrison	[signature]	453
14. Gerald W. GLASS	Gerald W Glass	3002
15. JERRY SMITH	Jerry Smith	450
16. Joseph J. Zysk Jr	[signature]	362
17. MIKE Stephens	Mike Stephens	1271
18. Jim Storey	Jim Storey	177
19. Mark Pfouts	Mark Pfouts	452
20. Steven R. Rake	Steven R. Rake	451
21. Douglas M. Brown	Douglas M. Brown	86

PERSONS IN ATTENDANCE

NAME		BADGE NO.
22. Steven T. Russell	Steve T. Russell	502
23.		
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QA/QC Harris Plant

Personnel Training

Date: March 20 84

Training Period: 330 350 pm

Class Title: Q.C.I - 6.3 Control of A-36 Steel Stamps

Procedure and Revision: Q.C.I - 6.3 Rev. 3

Summary: Review of purpose, scope, general and Instruction covering design of A-36 stamp, QC control and receipt inspection.

The following personnel attended the above described training:
(Print name, followed by signature.)

Eric [illegible] [illegible]

Jerry Rhodes

Jim Storey Jim Storey

KM Kenyon K M Kenyon

Steven R Rohe Steven R. Rohe

Matt Brown Matt Brown

Gerald W. GLASS [illegible]

Joseph J Zysk [illegible]

Mark Pfouts Mark Pfouts

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: Michael Len Stephens

QA/QC Harris Plant

Personnel Training

Date: 3-14-84

Training Period: 3:45 to 4:15

Class Title: Weld Control

Procedure and Revision: C.Q.C. 19 Rev 11

Summary: Review of CQC 19, discussing duties of an QC inspector dealing specifically with Seismic (QA-24) inspections

The following personnel attended the above described training:
(Print name, followed by signature.)

Steven R Rohr Steven R. Rohr	Steven J. Russell Steven J. Russell
Mark Ptouts Mark Ptouts	Gerald W. GLASS Gerald W. Glass
Joseph J. Zysk J Zysk	Jerry Rhodes Jerry Rhodes
CARL WEAST Carl Weast	
TIM HANKINS Tim Hankins	
Jim Storey Jim Storey	
KM KENYON K M Kenyon	
JERRY SMITH Jerry Smith	
Douglas Matthews Brown Douglas M. Brown	

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: Michael Lee Stephens

File: SH P-1/2

QA/QC Harris Plant

Personnel Training

Date: 3-8-84

Training Period: 3:30pm - 4:00pm

Class Title: QA-37 Rev 3 NDE Documentation

Procedure and Revision: QA-37 Rev. 3

Summary: Completion of QA-37 (Nondestructive Examination Request) correctly

The following personnel attended the above described training:
(Print name, followed by signature.)

JERRY Smith Jerry Smith	Mark Pforts Mark Pfortz
DONALD Sands Donald Sands	RICK GARRISON [illegible]
MATT BROWN Matt Brown	
Steven Russell Steven Russell	
[illegible] K.M KENTON	
MIKE Stephens Michael L. Stephens	
[illegible] J. [illegible]	
Jim Storey Jim Storey	
Steven R. Rahe Steven R. Rahe	

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: Billy B. Brown

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Douglas M Brown Date: 3-6-84

Training Period: 4:00- 4:15

Class Title: CQC-7

(General Topics) I. Marking & Tagging

(Specific Topics) A. Materials

B. Identification marking Control

C. Marking Types

II. Tagging - Tag Types & Labels

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training.

Matt Brown MATT Brown (Instructor)	Jerry Rhodes Jerry Rhodes
Sherman Cotham Sherman Cotham	Steve Russell Steve Russell
Kevin Kenyon K M Kenyon	Don Sands Donald Sands
Rick Garrison	Jerry Smith Jerry Smith
Cameron Lucas	Mike Stephens Mike Stephens
Ward Mercer	Jim Storey
Mark Pfouts Mark Pfouts	Carl Whatley
Steve Rahe Steven R. Rahe	Carl Weast Carl Weast

Jim HANKINS Jim Hankins

Instructor: Douglas M Brown

File: SH P-1/2

CORPORATE QA/QC SECTION
PERSONNEL TRAINING

Instructor: KEVIN M. KENYON Date: 2/29/84

Training Period: 2/29/84

Class Title: SITE SPEC 033- STRUCTURAL WELDING FOR PERMANENT PLANT CONSTRUCTION

(General Topics) I. SCOPE AND GENERAL SECTION

(Specific Topics) A. DEFINITIONS

B. SYMBOLS

C. CODES AND STANDARDS

II. DETAILED WELDING REQUIREMENTS

A. WELDING QUALIFICATIONS & WELDING PROCESSES

B. FILLER METALS, FIELD DRAWINGS, AND WELDING REQUIREMENTS

C. CONTROL OF PREHEAT & INTERPASS TEMP., PWHT, AND REPAIRS

III. QUALITY ASSURANCE

A. SEISMIC CLASS1 RECORDS

B.

C.

The following personnel attended the above described training:

Matt Brown	Matt Brown	Jerry Rhodes	J. Rhodes
Sherman Cotham	Sherman Cotham	StevenRussell	Steven Russell
Kevin Kenyon	See Below	Don Sands	N/A
Rick Garrison	[illegible] Garrison	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	Mike Stephens
Ward Mercer	N/A	Jim Storey	N/A
Mark Pfouts	Mark Pfouts	Carl Whatley	CW 2-29-84 H C. Whatley
Steve Rahe	Steven R. Rahe	Carl Weast	Carl Weast

Jim HANKINS Jim Hankins

Instructor: K.M. Kenyon

QA/QC Harris Plant

Personnel Training

Date: 2/23/84

Training Period: 3:30 PM to 4:20 PM

Class Title: Basics of Nuclear Power

Procedure and Revision: NA

Summary:

The instructor gave a brief synopsis of the "Power Train" of a Pressurized Water Reactor. He then elaborated somewhat on how the reactor vessel is put together (ie; upper and lower internals, control rod drive mechanisms), how it ties into the steam generators (and how they are put together), and how it ultimately ties into the turbine generator to make electricity. He then explained the method for which new and spent nuclear fuel is handled (ie; loading and unloading from the reactor vessel).

The following personnel attended the above described training:
(Print name, followed by signature.)

Jerry Smith Jerry Smith	Donald Sands Donald Sands
Jerry Rhodes Jerry Rhodes	Mike Stephens Mike Stephens
Matt Brown Matt Brown	~~Michael R Boyd Michael R Boyd~~ 805 2/24
K.M Kenton K M Kenton	~~Jim Brooks Jim Brooks~~ 805 2/24
M. Hoyts Mark Hoyts	Jim Storey Jim Storey
Rick Garrison Rick Garrison	
Steven T Russell Steven T Russell	
Steven R. Rahe Steven R. Rahe	
Jim Hankins Jim Hankins	

Note: Procedure revisions must be recorded before transmitting to QA Records.

Instructor: O.F. Painter

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Jim HANKins Date: 2-21-84

Training Period: 300 Pm 315 Pm

Class Title: MP-21 REPAIR OF HVAC DUCT 54516

(General Topics) I. REPAIR

(Specific Topics) A. SCOPE

B. PROCEDURE

C. FIT-UP

II. CLEANING

A. GRINDING

B.

C.

III. WELD PROFILES

A. SHIELDING

B. COATINGS

C. DEVIATIONS

The following personnel attended the above described training:

Matt Brown	Matt Brown	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steven Russell	Steven Russell
Kevin Kenyon	N/A	Don Sands	D. Sands
Rick Garrison	Rick Garrison	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	N/A
Ward Mercer	N/A	Jim Storey	N/A
Mark Pfouts	Mark Pfouts	Carl Whatley	N/A
Steve Rahe	N/A	Carl Weast	N/A

Jim HANKins

Jim Hankins

Instructor: Jim Hankins

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: FASIH SHAIKH Date: 2/16/84

Training Period: 1 HR.

Class Title: QUALIFICATION OF WELDER & WELDING OPERATORS

(General Topics) I.

(Specific Topics) A.

B. See attached outline

C.

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Matt Brown	Matt Brown	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steve Russell	Steve Russell
Kevin Kenyon	K. M. Kenyon	Don Sands	N/A
Rick Garrison	[illegible]	Jerry Smith	Jerry Smith
Cameron Lucas	Richard [illegible]	Mike Stephens	Mike Stephens
Ward Mercer	N/A	Jim Storey	N/A
Mark Pfouts	Mark Pfouts	Carl Whatley	C. Whatley
Steve Rahe	Steven R. Rahe	Carl Weast	N/A
JIM HANKINS	Jim Hankins		

Instructor: Fasih Shaikh

Form 244

CP&L

Carolina Power & Light Company

Company Correspondence

February 7, 1984 WE-754

MEMORANDUM TO: R. Hanford/G. Forehand

FROM: F. Shaikh

SUBJECT: Training of Q.C. Inspectors on Qualification of Welding Procedures and Welders

A. Welding Procedure Qualification

1. Welding procedures and brazing procedures used for the SHNPP code work are qualified inaccordance with applicable site specification. The two most used codes are ASME Section IX and AWS D1.1. Section IX is utilized for piping category 1 thru 8. AWS D1.1 code is employed for structural welding and hangers.

   Carolina Power & Light Co. is the Nuclear Stamp holder hence all the welding procedures are qualified by CP&L personnel. Discipline Engineer, Metallurgy/Welding is responsible for qualifying all welding procedures for SHNPP and all other nuclear power plants.

2. Welding procedure specification (WPS) is a written document prepared to provide direction to the welder while making production welds. A welding procedure specification (WPS) describes in detail all of the variables which are essential, supplementary essential, and non-essential variable to the welding process. Details of actual welding procedure specification test requirements are given in general welding procedure, MP-01.

3. Procedure Qualification: The act of qualifying a welding procedure specification by actual welding of test coupons, the testing of specimens as required by the code, and the recording of the welding data and test results in a document called Procedure Qualification Record (PQR).

4. Procedure Qualification Record PQR

This form documents the essential variables of the specific welding process and actual variables such as amps, volts, preheat, etc. are recorded along with the test results of tensile tests, bend tests, impact tests as applicable.

5. Groove Weld & Fillet Welds

The groove weld tests qualifies the WPS for use with groove welds within the range of essential variables. Groove weld test shall also qualify for use with fillet welds in all thicknesses of metal, sizes of fillet welds and diameters of pipe within other essential variables.

6. Stud Welding

Our stud welding procedure is not qualified to ASME Section IX.

B. Welding Performance Qualification

1. All welders including tack welders are qualified by CP&L inaccordance with general welding procedure MP-02.

The welder qualification is limited by the essential variables given for each process.

2. Tests

The performance qualification test are intended to determine the ability of welders and welding operators to make sound welds.

Each company is required to qualify each welder for each welding process to be used in production welding.

Performance qualification is performed inaccordance with one of the qualified welding procedure. When performance qualification is done inaccordance with a WPS that requires post weld heat treatment, this post weld heat treatment is not required for welder qualification.

3. Renewal of Qualification

The performance qualification of a welder is affected under the following conditions:

(a) When the welder has not welded with a process during a period of 3 months or more, his qualification for that process will be expired; except when he is welding with another process, the period is extended once to 6 months.
(b) When he has not welded with any process during a period of 3 months, all his/her qualifications will be expired.
(c) When there is a specific reason to question welder's ability to

4. <u>Welder's Qualification Status Report</u>

Welder qualification status report is published every two weeks which lists all the welders who are qualified to weld on a WPS. The limitations of the welder qualification such as diameter, thickness range etc. is shown on the status report. A cross qualification of the welder qualification is also attached with the status report. Status report will be discussed in detail.

Fasil Shaikh

FAS:cag

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Jerry Smith Date: 2-14-84

Training Period: 3:30 to 4:00 PM

Class Title: Inspection criteria CAR-2165-A003 R/4

(General Topics) I. Scope

(Specific Topics) A.

B.

C.

II. Acceptance criteria

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training.

Matt Brown	N/A	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steven Russell	Steven Russell
Kevin Kenyon	K M Kenyon	Don Sands	N/A
Rick Garrison	Rick Garrison	Jerry Smith	N/A
Cameron Lucas	N/A	Mike Stephens	Mike Stephens
Ward Mercer	N/A	Jim Storey	Jim Storey
Mark Pfouts	Mark Pfouts	Carl Whatley	N/A
Steve Rahe	N/A	Carl Weast	N/A

Jim Hawkins · Jim Hawkins

Instructor: Jerry Smith

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Fasih Shaikh Date: 2/7/84

Training Period: 3:30 PM to 4:20 PM

Class Title: Weld Procedure Specifications

(General Topics) I. See attached outline

(Specific Topics) A.

B.

C.

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Matt Brown	Matt Brown	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steven Russell	Steven Russell
Kevin Kenyon	[illegible]	Don Sands	N/A
Rick Garrison	[illegible]	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	Mike Stephens
Ward Mercer	N/A	Jim Storey	Jim Storey
Mark Pfouts	N/A	Carl Whatley	C. Whatley
Steve Rahe	Steven R. Rahe	Carl Weast	N/A

Jim Hankins JIM HANKINS

Instructor: [illegible]

Form 244

CP&L

Carolina Power & Light Company

Company Correspondence

February 7, 1984

WE-754

MEMORANDUM TO: R. Hanford/G. Forehand

FROM: F. Shaikh

SUBJECT: Training of Q.C. Inspectors on Qualification of Welding Procedures and Welders

A. Welding Procedure Qualification

1. Welding procedures and brazing procedures used for the SHNPP code work are qualified inaccordance with applicable site specification. The two most used codes are ASME Section IX and AWS D1.1. Section IX is utilized for piping category 1 thru 8. AWS D1.1 code is employed for structural welding and hangers.

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2. Welding procedure specification (WPS) is a written document prepared to provide direction to the welder while making production welds. A welding procedure specification (WPS) describes in detail all of the variables which are essential, supplementary essential, and non-essential variable to the welding process. Details of actual welding procedure specification test requirements are given in general welding procedure, MP-01.

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This form documents the essential variables of the specific welding process and actual variables such as amps, volts, preheat, etc. are recorded along with the test results of tensile tests, bend tests, impact tests as applicable.

5. Groove Weld & Fillet Welds

The groove weld tests qualifies the WPS for use with groove welds within the range of essential variables. Groove weld test shall also qualify for use with fillet welds in all thicknesses of metal, sizes of fillet welds and diameters of pipe within other essential variables.

6. Stud Welding

Our stud welding procedure is not qualified to ASME Section IX.

B. Welding Performance Qualification

1. All welders including tack welders are qualified by CP&L inaccordance with general welding procedure MP-02.

The welder qualification is limited by the essential variables given for each process.

2. Tests

The performance qualification test are intended to determine the ability of welders and welding operators to make sound welds.

Each company is required to qualify each welder for each welding process to be used in production welding.

Performance qualification is performed inaccordance with one of the qualified welding procedure. When performance qualification is done inaccordance with a WPS that requires post weld heat treatment, this post weld heat treatment is not required for welder qualification.

3. Renewal of Qualification

The performance qualification of a welder is affected under the following conditions:

(a) When the welder has not welded with a process during a period of 3 months or more, his qualification for that process will be expired; except when he is welding with another process, the period is extended once to 6 months.
(b) When he has not welded with any process during a period of 3 months, all his/her qualifications will be expired.
(c) When there is a specific reason to question welder's ability to

4. <u>Welder's Qualification Status Report</u>

Welder qualification status report is published every two weeks which lists all the welders who are qualified to weld on a WPS. The limitations of the welder qualification such as diameter, thickness range etc. is shown on the status report. A cross qualification of the welder qualification is also attached with the status report. Status report will be discussed in detail.

Farid Shaikh

FAS:cag

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Ward Mercer   Date: 2-7-84

Training Period: 4:00 pm To 5:00 pm

Class Title: Final Review of Hanger Packages

(General Topics) I. QC. Review

(Specific Topics) A. SWDR Review (QA-34)

B. Traveler Review (Exhibit 3)

C. Drawing Rev. & Mods.

II. Material Status

A. Engineering Material Status (Exhibit 4)

B. QC Material Status (QA-34)

C.

III. Use of "N/A"

A. Line thru of unused blocks on SWDR

B.

C.

The following personnel attended the above described training.

Matt Brown	N/A	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	StevenRussell	Steven Russell
Kevin Kenyon	N/A	Don Sands	N/A
Rick Garrison	Rick Garrison	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	N/A
Ward Mercer	N/A	Jim Storey	N/A
Mark Pfouts	N/A	Carl Whatley	N/A
Steve Rahe	N/A	Carl Weast	N/A

Instructor: Ward Mercer

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Eugene Martin Date: 2/2/84

Training Period: 3:30 Pm to 4:30 Pm

Class Title:: Start-up Manual - Section VI

(General Topics) I. •

(Specific Topics) A.

B.

C.

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Matt Brown	N/A	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steve Russell	Steve Russell
Kevin Kenyon	K. M. Kenyon	Don Sands	N/A
Rick Garrison	[illegible]	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	Mike Stephens
Ward Mercer	N/A	Jim Storey	N/A
Mark Pfouts	N/A	Carl Whatley	C Whatley
Steve Rahe	Steven R. Rahe	Carl Weast	N/A

Instructor: Eugene Martin

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Dwight Estes Date: 1-26-84

Training Period: 3:30 Pm to 4:00Pm

Class Title: Radiation Safety

(General Topics) I.

(Specific Topics) A.

B.

C.

II.

A.

B.

C.

III.

A.

B.

C.

N/A

The following personnel attended the above described training.

Matt Brown	N/A	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steven Russell	Steve Russell
Kevin Kenyon	K M Kenyon	Don Sands	N/A
Rick Garrison	Rick Garrison	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	N/A
Ward Mercer	N/A	Jim Storey	Jim Storey
Mark Pfouts	N/A	Carl Whatley	C Whatley
Steve Rahe	Steven R Rahe	Carl Weast	N/A

Instructor: J. Dwight Estes

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Alan Lowe Date: 1-19-84

Training Period: 3:30 pm to 4:00 pm

Class Title:: Ultra-sonic Testing

(General Topics) I.

(Specific Topics) A.

B.

C.

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Matt Brown	N/A	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steve Russell	Steve Russell
Kevin Kenyon	K. M. Kenyon	Don Sands	N/A
Rick Garrison	[illegible]	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	Mike Stephens
Ward Mercer	N/A	Jim Storey	Jim Storey
Mark Pfouts	N/A	Carl Whatley	C. Whatley
Steve Rahe	Steven R. Rahe	Carl Weast	N/A

Instructor: [illegible]

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Michael Lee Stephens Date: 1-17-84

Training Period: 30 min.

Class Title:: MP-06

(General Topics) I. Cleaning

(Specific Topics) A. TYPES

B. Methods

C. Inspection

II. Welding

A. Root openings & Backing rings

B. Fit up's & Final weld

C. NDE

III. How MP-06 Differs from Hanger Criteria

A. TACK welds & Fit up

B. Finals

C. Inspection & NDE

The following personnel attended the above described training.

Matt Brown	N/A	Jerry Rhodes	Jerry Rhodes
Sherman Cotham	N/A	Steven Russell	Steve Russell
Kevin Kenyon	Kevin M. Kenyon	Don Sands	N/A
Rick Garrison	[signature]	Jerry Smith	Jerry Smith
Cameron Lucas	N/A	Mike Stephens	N/A
Ward Mercer	N/A Ward Mercer	Jim Storey	Jim Storey
Mark Pfouts	N/A	Carl Whatley	N/A
Steve Rahe	Steven R. Rahe	Carl Weast	N/A

Instructor: Michael Lee Stephens

A[illegible]IS TRAINING

2165-A-003 REV 5

1-17-84

AFTERNOON CLASS

1 hour CLASS

INSTRUCTOR: LEE WILLIAMS

Michael Stephens	Michael Stephens
K M Kenyon	K.M. KENYON
Steve Russell	S.T. Russell
C Whatley	C. WHATLEY
James G. Jackson	JAMES G. JACKSON
A L Leonard	A.L. LEONARD
Harold L. O'Briant	Harold L. O'Briant
Robert L. Plumlee	Robert L. PLUMLEE
Minnes Skanes	MINNES SKANES
Al Tittle	AL TITTLE
Sheldon Gibson	Sheldon Gibson
Jerry Smith	JERRY SMITH
William Pere	Bill Pere
Carl Weast	CARL WEAST
Sherman Cotham	Sherman Cotham
Mark Pfouts	Mark Pfouts
Thomas B. Lembo	THOMAS B. LEMBO

AWS Training

1 17-84

2165-A-003 REV 5

Jim Storey JIM STOREY

Mike King Mike King
K. V. Hati'

Pete Tingen PETE TINGEN

Jacky L. Buckner JACKY L. BUCKNER

Christopher M Case CHRISTOPHER M CASE

R. H. Bodine R. H. BODINE

Ward Mercer WARD MERCER

Melvin Carpenter MELVIN CARPENTER

Jerome Evers JEROME EVERS

Steven M. Douglas STEVEN M. DOUGLAS

Tom Ashley TOM ASHLEY

Walter D. Dowell WAlter D. Dowell

Tello Angelina TELLO ANGELINA

Douglas M. Brown Douglas M. Brown

Richard C Lucas RICHARD C LUCAS

Steven R. Rahe Steven R. Rahe

Gilbert A. DeBarros Gilbert A. DeBarros

Jerry Rhodes JERRY RHODES

Bob Mc Connell BOB Mc CONNELL

Doug. Lucas DOUG. LUCAS

Donald Sands DONALD SANDS

Rick J Garrison RICK J. GARRISON

C. E. Goins C. E. GOINS

Frank Gore F. GORE

Robert Taylor R. TAYLOR

JESSE Nicks Jesse Nicks

1.0 SCOPE

The intent of this design document is to provide the CP&L QA program with acceptance criteria that satisfies the design requirements and thereby allowing clarification from strict code interpretation during receipt inspection, reinspection, and field welding inspection. This criteria is applicable to both primary (first inspection, uncoated) and secondary inspections (receipt inspection included with quality release or reinspection, coated) for structural weldments designed to AWS D1.1 requirements. Secondary inspections may be performed through coatings. Primary inspections shall not be allowed through coatings unless allowed by the engineer. Any item not specifically covered in this criteria shall refer back to AWS D1.1.

This criteria covers joints which provide framing for components, such as cable tray, HVAC, conduit supports, instrument racks, ducting air control dampers, doors, hatch covers, pipe supports, etc. This is to include any item welded to AWS D1.1 standards.

This criteria is applicable to any weld joint where these imperfections are to be visually inspected per AWS D1.1.

As per AWS D1.1, welds with acceptable imperfections in combination shall be acceptable.

Based on the QA programs for acceptance prior to vendor release (or acceptance of field welds), any defects not identified during primary inspection and subsequently covered by coatings are not considered significant.

Visual inspection of welds shall be in accordance with AWS D1.1 except as modified below:

All visual inspection shall be performed at an eye-to-examination surface distance of no more than 24 inches, the inspector position within an angular region of 30 to 90 of the examination surface by personnel possessing 20/20 visual acuity. Visual aids which do not enhance 1X capability, such as mirrors, may be used. Visual inspection shall be used unless otherwise noted on design documents.

2.0 ACCEPTABILITY CRITERIA

2.1 Oversize Fillet Welds

Either or both fillet weld legs may exceed design size. Welds may be longer than specified. Continuous welds may be used in lieu of intermittent welds.

2.2 Undersize Fillet Welds

The leg of 1/4" and larger fillet welds may be 1/16" less than the required weld size for a continuous span of 2", provided there is no less than a 6" separation between each undersize increment. For welds less than 8" long, a continuous undersize span of 25% of the total weld run length will also apply. All 1/16" undersize increments less than 1/2" in length will be acceptable. For intermittent welds, 1/16" less than that required size will be accepted provided the undersize condition is no more than 40% of the weld length.

The leg of 3/16" fillet welds may be 1/32" less than the required according to the above provisions.

It is to be understood that the thickness of coatings on secondary inspections are not considered detrimental and the weld size criteria shall not be adjusted. Any unique application of coatings (excessive thickness, putty) shall be brought to

2.3 Porosity

Pores between 1/16" and 1/8" diameter shall be acceptable when separated by a minimum of one inch. Isolated pores less than 1/16" diameter shall be disregarded. Clustered porosity including all sizes to 0.030" contained within up to a 3/8" diameter circle shall be acceptable. Linear, in-line pores shall be considered as clustered porosity. It is to be understood that porosity not visible through coatings on secondary inspection are not considered significant.

2.4 Weld Profile

Fillet and butt weld convexity can be accepted without limit.

2.5 Craters

Welds may have underfilled craters provided underfill depth does not exceed 1/16" and the crater has a smooth contour blending gradually with the adjacent weld and base metal with no evidence of cracking.

2.6 Undercut

Steels 5/16" or thicker which were produced to a maximum specified tensile strength of 60,000 psi may contain weld undercut up to 1/16" in depth for a continuous span of 2" provided its surface width is less than 0.100" and there is no less than a 6" separation between each undercut increment. Weld runs less than 8" long may contain a continuous undercut span of 25% of the total weld length. All undercut less than 1/2" in length will be accepted provided the above width limit is adhered to. Undercut up to 1/32" depth is acceptable in all steels and all thicknesses.

2.7 Cracks

Cracks are unacceptable. It is to be understood that secondary inspections are intended to identify cracks that result from shipping damage or stress relief and, if relevant, would appear through the coating.

2.8 Arc Strikes

Arc strikes in high-strength, low-alloy steels (minimum specified tensile strength greater than 60,000 psi), shall be removed by grinding. The ground area shall be visually inspected to assure complete removal of the arc strike.

For other maximum specified 60,000 psi tensile steels, arc strikes shall be visually examined and accepted if no cracking is evident. If cracking is evident, the repair shall conform with Section 3.10 of AWS D1.1. Arc strike regions in these lower strength steels shall not require power brushing or grinding before visual examination. It is to be understood that cracks in arc strikes not visible through coatings on secondary inspections are not considered significant.

2.9 Fusion

Lack of fusion which does not exceed 1/4" in length when measured transverse or along the weld and each increment separated by 6" is acceptable.

Criteria for lack of fusion in transverse direction is applicable only in start/stop location.

Criteria for lack of fusion shall apply to overlap. It is to be understood that lack of fusion not visible through coatings on secondary inspections is not considered significant. Any unique application of coatings (excessive thickness, putty) shall be brought to the attention of QA management for resolution.

File: SH P-1/2

Iod

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Alan Lowe Date: 1/12/84

Training Period:

Class Title: Magnetic Particle ; Vacuum Box Presentation

(General Topics) I.

(Specific Topics) A.

B.

C.

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training.

Matt Brown	Douglas M. Brown	Jerry Rhodes	Jerry Rhodes
Sherman Cotham		Steven Russell	Steve Russell
Kevin Kenyon	K. M. Kenyon	Don Sands	
Rick Garrison	[illegible]	Jerry Smith	Jerry Smith
Cameron Lucas	Cameron Lucas	Mike Stephens	Mike Stephens
Ward Mercer		Jim Storey	
Mark Pfouts		Carl Whatley	C. Whatley
Steve Rahe	Steven R. Rahe	Carl Weast	

Instructor: Alan D. [illegible]

File: SH P-1/2

Lanel

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Rick Garrison Date: 1-10-85

Training Period: 12:30 PM to 1 PM

Class Title: WP-18 REV-14

(General Topics) I. DOCUMENTATION

(Specific Topics) A. SIGN OFF BLOCKS

B. INITIAL REVIEW

C. N/A BLANK BLOCKS

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training.

Matt Brown	Jerry Rhodes Jerry Rhodes
Sherman Cotham	Steve Russell Steve Russell
Kevin Kenyon K M Kenyon	Don Sands
Rick Garrison R. J. Garrison	Jerry Smith Jerry Smith
Cameron Lucas	Mike Stephens Mike Stephens
Ward Mercer	Jim Storey Jim Storey
Mark Pfouts	Carl Whatley C Whatley
Steve Rahe Steven R. Rahe	Carl Weast

Instructor: R. J. Garrison

File: SH P-1/2

Ward

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: JERRY Rhodes Date: 1/5/84

Training Period: 30 MIN.

Class Title: WP 139 – WORK PACKAGE PREPARATION

(General Topics) I.

(Specific Topics) A.

B.

C.

II.

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training.

Matt Brown Douglas W. Brown	Jerry Rhodes Jerry Rhodes
Sherman Cotham	Steve Russell Steve Russell
Kevin Kenyon Kevin M. Kenyon	Don Sands
Rick Garrison Rick Garrison	Jerry Smith Jerry Smith
Cameron Lucas Cameron Lucas	Mike Stephens Mike Stephens
Ward Mercer	Jim Storey Jim Storey
Mark Pfouts	Carl Whatley
Steve Rahe Steven M. Rahe	Carl Weast

Instructor: Jerry Rhodes

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Steven T. Russell Date: 12/29/83

Training Period: 4:00Pm to 4:15Pm

Class Title: MP-03 Weld Material Control

(General Topics) I. Scope / References

(Specific Topics) A. Establish guidelines for welding material

B. describes control required for weld mat'l.

C. For use with ASME, safety related & BOP

II. General

A. controlled access to storage areas

B. Weld Material Issue Station requirements

C.

III. Procedure

A. Material Supervisor | D. welding operator

B. Receiving Inspector | E. Weld Issue Station

C. Discipline Engineer | attendant

The following personnel attended the above described training:

Steven R. Rahe Steven R. Rahe

Richard C. ... Richard C...

Storey Jim Storey

KENYON Kevin M. Kenyon

Jerry Rhodes Jerry Rhodes

Jerry Smith Jerry Smith

C. Whatley C. Whatley

Griffith [illegible]

Instructor: Steven R. Russell

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Mark Pfouts   Date: 12-21-83

Training Period: 4:00 PM to 4:25 PM

Class Title:: QCI 6.3 Rev 3 and QCI 7.1 Rev 6

(General Topics) I. Control of A36 steel stamps

(Specific Topics) A. A36 steel stamp log.

B.

C.

II. QA Inspection status identification.

A. Marking and tagging.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training:

K.M. Kenton - Kevin M. Kenton	[illegible] Rahe Rahe
Jerry Rhodes - Jerry Rhodes	Carl Weast C. Weast
Brown - Douglas M. Brown	
Smith - Jerry Smith	
Storey - Jim Storey	
S.T. Russell Stewart Russell	
Mike Stephens MIKE Stephens	
WHATLEY C.W. Whatley	

Instructor: Mark Pfouts Pfouts

File: SH P-1/2

Ward

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Ward Mercer Date: 12/14/83

Training Period: 4:00Pm to 4:20Pm

Class Title: Documentation & Non-Conformance Reporting

(General Topics) I. Documentation

(Specific Topics) A. making entry/s on SWDR's

B. Requirements of QCI [illegible]

C.

II. Non-Conformance Reporting

A. How and when to initiate NCR's

B. Reporting in a timely manner

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Stephens Michael Lee Stephens	C.C. Whatley - Whatley
Rake [illegible] R. Rake	Brown - Douglas M. Brown
[illegible]rison [illegible]	S.T. Russell - Stewart Russell
Kenyon Kevin M. Kenyon	Storey - Jim Storey
Veast Saul Veast	Smith - Gary Smith
TRETAR Darrell V. Stretar	Griffith - [illegible]
Rhodes Gary Rhodes	
Lucas Richard C. Lucas	

Instructor: E Ward Mercer

File: ...

Word

CORPOR[illegible]E QA/QC SECTI[illegible]

PERSONNEL TRAINING

Instructor: Steven R. Rahie Date: 12/13/83

Training Period: 4:00PM to 4:25PM

Class Title:: Blueprint Reading

(General Topics) I. Blueprint Keys

(Specific Topics) A. Equipement Data

B. Drawing # and Revs.

C. Bill of Material

II. Basic Guides

A. Drafting Lines

B. Directions and orientation

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Mark Pfoutz	Jim Story
Steve Russell 12/13/83	Edward Olson
Dwayne M. Zeigler 12/13/83	
Jerry R. Walker 12/13/83	
Carl Weaver	
[illegible]	
[illegible] 12/13/83	
Jerry Smith	

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: M.D. Griffith Date: 12/6/83

Training Period: 3:50 PM to 4:25 PM

Class Title: CAR-2165-A-003 Rev-4 – Weld Inspection Criteria

(General Topics) I. acceptance Criteria

(Specific Topics) A. discontinuity limits

B.

C.

II. Allowed Visual Aids

A.

B.

C.

III.

A.

B.

C.

The following personnel attended the above described training:

Jerry Rhodes	C. Whatley
[illegible] R. Nale	Jerry Smith
[illegible]	John Story
Steve Russell	
[illegible]	
Douglas M. Brown	
Mike Stephens	
Kevin McHarge	

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: DouglAs M. Brown   Date: 11-29-83

Training Period: 3:45 To 4:05

Class Title: Site specification 033

(General Topics) I. DetAileD Welding Requirements

(Specific Topics) A. Welding Processes

B. Field Drawings

C.

II. Welding Requirements

A. Prep. + Cleaning

B. BAcking: STrips or Rings

C. PEENing

III. Temporary ATTachment welds

A. TAck welds / Defects

B. Arc STrikes / Preheating

C. Surface defects / Post weld Heat TreATment

The following personnel attended the above described training:

[signature]

Darrell V. Stetson

Gary Venetto

[signature]

Jerry Rhodes

C Whatley

Mike Stephens

[signature]

On Tuesday, November 29th, there will be a training class held for the latest revision to WP-110. It will be held at the Daniel's Training Annex.

10:00 AM	1:00 PM
Brown	Storey
Stephens	Lucas
Garrison	Pfouts
Russell	Whatley
Streter	Rhodes
Griffith	Smith
Kenyon	

File: SH P-1/2

Word

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: R.C. LUCAS Date: 11-22-83

Training Period: 3:30 TO 4:10

Class Title: MATERIAL STATUS VERIFICATION

(General Topics) I. MATERIAL STATUS VERIFICATION PROCED

(Specific Topics) A. GENERAL (A-36 STAMP & GREEN QA ACCEPT STICKER)

B. PROBLEMS - (FIREBARRIER, PIPE HANGERS)

C.

II. EXHIBIT I QCI 6.4

A. INSPECTOR RESPONSIBILITIES

B. VAULT ATTENDANT RESPONSIBILITIES

C.

III. PROPOSAL FOR REWRITE OF PROCED

A. PIPE HANGERS

B.

C.

The following personnel attended the above described training.

[signature]	[signature]
[signature]	Steven R. Rahe
[signature]	Mike Stephens
Jerry Rhodes	
Jim Story	
[signature]	
Gary Smith	
Carl Weart	

File: SH P-1/2

Ward

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Kevin M Kenyon Date: 11/15/83

Training Period: 4:00 - 4:30 PM 11/15/83

Class Title: MP 04 Procedure for Post Weld Heat Treatment

(General Topics) I. General Section

(Specific Topics) A. Nominal Thickness of welds

B. Heating Methods, Holding Time & Temp

C. Heating & Cooling Rates

II. Procedure

A. Local PWHT

B. Temp Control

C. Joint Preparation for PWHT

III.

A.

B.

C.

The following personnel attended the above described training.

Mike Stephens

Richard C. Yatzer

Douglas M. Brown

[illegible]

Jerry Smith

Mark Pfout

Darrell V. Stretar

File: SH P-1

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: Jim Storey Date: 11/8/83

Training Period:

Class Title: MP-05 Permanent Marking of Site Mat'l's & Components

(General Topics) I. Methods of Marking Rev. 18

(Specific Topics) A. Description

B. thickness limitations

C.

II. Requirements for Marking

A. Welder Symbol

B. ID Transfering

C. weld ID

III.

A.

B.

C.

The following personnel attended the above described training:

Mark Pfouts	Darrell V. Stratton
Kevin M. Kenison	C. Whatley
Steven R. Rohe	Carl Wheat
Mike Stephens	Jerry Smith
Donald Sands	[illegible]
[illegible]	Jim Storey
Douglas M. [illegible]	
[illegible]	

File: SH P-1/7

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Instructor: CARL WEAST Date: 11-2-83

Training Period: 4:00 pm To 4:30 pm.

Class Title: MP-10 Rev. 10 - WELD REPAIR OF BASE METAL AND WELDMENTS

(General Topics) I. DOCUMENTATION

(Specific Topics) A. REPAIR WDR - WHEN REQUIRED - WHEN NOT REQUIRED

B. INITIATION OF REPAIR WDR

C.

II. INVOLVED CODES

A. ASME

B. AWS

C. MODIFICATION OF AWS CODE BY CAR-2165-A-003

III. WELD REPAIRS

A. BASE METAL REPAIRS

B. WELD REPAIRS

C.

The following personnel attended the above classroom training:

Ward

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Date: 11/2/83

Training Period: 11/2/83

Topic: MP-10 Rev. 10

Instructor CARL WEAST

The following personnel attended the above described training:

Kevin M. Kerr

Mike Stephens

Steven M. Rahe

Larry Smith

Donald Sand

Mack Sprout

S. Hewitt Russell

R. C. Lucas

Carl Weast
Instructor

File: SH P-1/2

Word

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Date: 10-25-83

Training Period: ____________________

Topic: NDEP-605 REV. 1

CAR-2165 A-003 REV. 2

Visual EXAMINATION OF SEISMIC I, STRUCTURAL AND HANGER

WELDS SHEARON HARRIS NUCLEAR POWER PLANT

Instructor Darell V. Stretar

The following personnel attended the above described training:

Steven R. Nahe
[illegible]
Mark Pfoust
[illegible] Bunsell
Donald Sands
Mike Tipkins
Sherman Cottham
Kevin M. Kenyon
Jim Stone
Gerry Smith
Carl Weart
Douglas M. Brown
[illegible]

Darell V. Stretar

Instructor

DANIEL CONSTRUCTION COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

TRAINING RECORD

DATE Oct. 20, 1983 TIME 3:30PM LENGTH OF CLASS ONE HOUR

COURSE & TITLE MP-08 Rev. 6 PCN #3+2 AND MP-10 (Structural Base Metal Repair)

INSTRUCTOR DAVID TIMBERLAKE SHIFT 1st

PERSONS IN ATTENDANCE

NAME	BADGE NO.
1. [illegible signature]	CP&L 801
2. [illegible signature]	TSL 1124
3. [illegible signature]	TSL 357
4. [illegible signature]	CP&L 314
5. Christopher M Case	CP&L 882
6. Robert G. Plumlee	TSL 128
7. [illegible signature]	CP&L
8. Mike Stephens	CP&L 363
9. [illegible] B. [illegible]	TSL VISITOR 03
10. Darrell V. Stretar	561
11. [illegible signature]	TSL 1197
12. Jerry Smith	TSL 578
13. Randy Cooper	TSL 1209
14. [illegible signature]	TSL 225
15. [illegible signature]	T.S.L. 564
16. Mack [illegible]	TSL 991
17. [illegible] R. [illegible]	TSL 494
18. [illegible signature]	TSL 581
19. R.D. Smith	TSL 893
20. [illegible] A. [illegible]	C.PL 898
21. [illegible signature]	[illegible] 827

PERSONS IN ATTENDANCE

	NAME	BADGE NO.
22.	Jim Story	CP&L - 347
23.	Walter Dowell	504
24.	M. Skaaes	586
25.	Tom Ashley	254
26.	Harry McDougle	281
27.	Kevin M. Young	CP&L 309
28.	Don Sands	TSC 573
29.	Tim Hawkins	CP&L 869
30.		
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43.		
44.		
45.		
46.		
47.		

[redacted]

October 24, 1983

MEMORANDUM TO: Ray Hanford

FROM: David Timberlake

SUBJECT: Training Class for QC-Welding (Structural and Pipe Hangers) Inspectors

On Thursday October 20, 1983 I conducted a one (1) hour training class in the large conference room. An outline and attendance sheet are attached.

DRT:cag

cc: Mr. Ralph Bodine
Mr. Ward Mercer
Mr. Vic Safarian
Mr. Fasih Shaikh
Mr. M. F. Thompson, Jr.
Mr. Jim Trammel
Metallurgy/Welding File T-4d

MP-08 Rev. 6, PCN #2 and PCN #3 and MP-10
(Structural Base Metal Repair)

I. MP-08 Rev. 6

A. Procedure Change Notice #2 (copy attached)

B. Procedure Change Notice #3 - Partial (copy attached)

1. Paragraph 4.5.3.5
2. Exhibit 6

II. MP-10 Structural Base Metal Repairs

A. Minimum wall criteria

1. Based on ASTM material specification
2. Example of ASTM A6

B. Structural significance of areas of base metal reduction

1. For DDR reportability - handled on a case by case basis based on load and "as-built" condition.
2. Damage to systems/components that have not been turned over on an RFT the situation will be handled as an in process repair (not structurally significant).

Rev. 3
8/83

Exhibit 13
AP-IV-03

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PROCEDURE CHANGE NOTICE

Procedure No. MP-08 **Revision No.** 6 **Change No.** 2

Procedure Title General Welding Procedure for Structural Steel (Seismic and Non-Seismic) and Hangers

Applicable - FCR's: N/A **DCN's:** N/A

Affected Paragraphs	Description of Change
4.2.2	Change to Read:
	The surface of base metal approximately one inch adjacent to the weld
	joint, in the plane of welding, need only be cleaned of those loose
	materials which may fall into the molten weld metal and coatings which,
	due to fumes caused by heating or burning, could leave a harmful residue
	in the weld. Tightly adhering rust which has been cleaned with a hand
	wire brush shall be permissible.
4.2.5	Change to Read:
	Prior to weld joint inspection, any coatings that will prevent visual or
	non-destructive inspection of the weld and heat-affected zone shall be
	removed. (approximately 1/2 inch from the toe of the weld, where
	accessible).

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SHEARON HARRIS N. P. P.

The approval of this Procedure Change Notice authorizes deviation from the named procedure to the extent described above.

The holder of the affected procedure shall retain this notice with the procedure until the next procedure revision is in effect.

APPROVALS		DATE
ORIGINATOR	Emory Upchurch RH	9/27/83
QA/QC REVIEW	M M. Heal	10/3/83
CP&L	R. Haigford For M.F. Thompson Jr.	10/3/83

Rev. 3
8/83

Exhibit 13
AP-IV-03

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

PROCEDURE CHANGE NOTICE

Dwt 9/30/83

Procedure No. MP-08 Revision No. 6 Change No. ~~2~~ 3

Procedure Title GENERAL WELDING PROCEDURE FOR STRUCTURAL STEEL (SEISMIC, NON-SEISMIC) AND HANGERS

Applicable - FCR's: N/A DCN's: N/A

Affected Paragraphs	Description of Change
4.5.3.5	CHANGE TO READ
	"AFTER REMOVING TEMPORARY ATTACHMENTS FROM
	SEISMIC AND NON-SEISMIC STRUCTURAL COMPO-
	NENTS, CRAFT PERSONNEL SHALL REQUEST IN
	WRITING, USING EXHIBIT 6, THAT METALLURGY/
	WELDING PERSONNEL EXAMINE THE AREA TO DETER-
	MINE THAT THE SURFACE HAS BEEN MADE FLUSH
	WITH THE ORIGINAL SURFACE AS REQUIRED BY
	AWS D1.1, PARAGRAPH 9.24. THE AREA OF RE-
	MOVAL OF PERMANENT PLANT STRUCTURAL ITEMS DUE
	TO DESIGN CHANGES, MISLOCATIONS, ETC., SHALL BE
	SUBJECTED TO THE SAME INSPECTION CRITERIA AS
	TEMPORARY ATTACHMENTS AND SHALL BE HANDLED
	AS NOTED ABOVE. IF ADDITIONAL EXAMINATION (SUCH
	AS A D-METER) OR A BASE METAL WELD REPAIR
	IS REQUIRED, A WELDING ENGINEERING HOLD TAG

The approval of this Procedure Change Notice authorizes deviation from the named procedure to the extent described above.

The holder of the affected procedure shall retain this notice with the procedure until the next procedure revision is in effect.

APPROVALS		DATE
ORIGINATOR	[illegible] / [illegible]	9-30-83
QA/QC REVIEW	M.M. [illegible]	10-3-83
CP&L	R. Hanford FOR M.F. THOMPSON	10/3/83

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

PROCEDURE CHANGE NOTICE CONTINUATION SHEET

Procedure No. MP-08 Revision No. 6 Change No. ~~2~~ 3 DWT 9/30/83

Affected Paragraphs	Description of Change
	(SEE EXHIBIT 7) SHALL BE PLACED ON THE AREA OF CONCERN UNTIL SUCH EXAMINATION AND/OR REPAIRS ARE INITIATED. BASE METAL REPAIRS SHALL BE HANDLED IN ACCORDANCE WITH REFERENCE 2.9."

5.0 ADD THE FOLLOWING:
5.8 EXHIBIT 6 - INSPECTION REQUEST FOR DAMAGED/GROUND AREA (REV. 0 - 9/83)
5.9 EXHIBIT 7 - WELDING ENGINEERING HOLD TAG (REV. 0 - 9/83)
TABLE B (REV. 1 - 8/83)

JUSTIFICATION: CLARIFICATION OF INSPECTION OF TEMPORARY ATTACHMENT REMOVAL AREAS AND ADDITION OF WPS'S TO TABLE B.

The approval of this Procedure Change Notice authorizes deviation from the named procedure to the extent described above.

The holder of the affected procedure shall retain this notice with the procedure until the next procedure revision is in effect.

INSPECTION REQUEST FOR DAMAGED/GROUND AREA

Craft Personnel

Seismic ☐ Non-Seismic ☐

Material Type: ____

Material Thickness: ____ RFT NO.: ____

Product Form (plate, tube steel, W shape, etc.): ____

Drawing/Rev.: ____

Component Identification (embed, piece no. etc.): ____

Bldg. ____ Elevation ____ Zone ____

Actual Elevation ____ Location ____

Other Info: ____

Requested By: ____ (Signature) Title ____ Date ____

Metallurgy/Welding Engineering

Visual Inspection Results: ☐ Acceptable ☐ Further Investigation Required

☐ Thickness (D-Meter) check required

Min. Wall Criteria ____ inch(es)

Actual Results (Min.) ____ inch(es) ☐ Acceptable ☐ Not Acceptable

☐ Hold Tag Applied

Weld Repair Required: ☐ Yes ☐ No ☐ Not Recommended (See Comments)

Comments (attach sketch, as needed): ____

Inspected by: ____ (Signature) Title ____ Date ____

SAMPLE

File: SH P-1/2

CORPORATE QA/QC SECTION
PERSONNEL TRAINING

Date: October 18, 1983

Training Period: October 18, 1983

Topic: QCI 19.4 PREPARATION AND SUBMITTAL OF SEISMIC WELD DATA REPORT Rev. 4

Instructor KEVIN M. KENYON

The following personnel attended the above described training:

Darell V. Stietar	Jerry H. Rhodes	
[illegible]	K. Taline	
[illegible]	Jimmy Smith	
Mike Stephens	E. Paul Allen	
Donald [illegible]	C. [illegible]	
Jim Story	Richard Coffman	
Thomas R. Nale		

Kevin M. Kenyon
Instructor

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Date: 10/11/83

Training Period: 7:30 Am to 8:00 Am

Topic: QCI-19.3 Rev-5

Instructor Jerry Smith

The following personnel attended the above described training:

Mike Stephens

Darell V. Stretar

Jim Story

Steven R. Frake

R. Ward Meier

L. Cline

Jerry G. Rhodes

D. Sands

C. Whatley

Mark Pfaunt

Jerry Smith
Instructor

SDS
10/11/83

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Date: 3-22-83

Training Period: 10 minutes

Topic: Base metal reduction in pipe hangers and structural steel. Inspectors were reinstructed to observe for base metal reductions outside the weld area and request Weld Engineering evaluation in cases where acceptability cannot be determined by the inspector.

Instructor E. W. Mercer

The following personnel attended the above described training:

TSL	CP&L
Rick Garrison	Kevin Kenyon
Mike King	Jane Martin
Mark PFouts	Wayne Martin
Carl Weast	George Carpenter
Al Tittle	Gil DeBarros
Jerry Smith	Matt Brown
Dave Jarvis	
Ron Mays	
Chuck Goins	
James Jackson	

E. Ward Mercer

Instructor

File: SH P-1/2

CORPORATE QA/QC SECTION

PERSONNEL TRAINING

Date: 1-27-83

Training Period: 15 minutes

Topic: Base metal reduction in pipe hangers and structural steel. Inspectors were instructed to observe for base metal reductions outside the normal weld area. If areas are noted and acceptability cannot be determined by the inspectors, Weld Engineering is to be notified via a 3 part memo for evaluation. Areas that are found to be unacceptable will be identified as a nonconformance.

Instructor E. W. Mercer

The following personnel attended the above described training:

TSL	CP&L
	Kevin Kenyon
Mike King	Jane Martin
Carl Weast	Wayne Martin
Al Tittle	George Carpenter
Jerry Smith	Gilbert DeBarros
Dave Jarvis	Matt Brown
Ron Mays	
Chuck Goins	
James Jackson	

Ward Mercer

Instructor

[redacted]

December 9, 1980

Memo To: R. Hanford

From: D. Timberlake

Subject: Welder Craft Training - Bimonthly Update

A two and one half hour training class was held on November 24, 25, 26, Dec. 3, and 9, 1980, for all welders and welding foremen. The following is an outline of what was covered in each class:

1. A review of welding symbols including a clarification of the flare bevel symbol that is used on hangers.

2. The meaning and application of preheat and interpass temperatures were discussed. Also a preheat demonstration was given to class members in the training school after the conclusion of the classroom training to show how to preheat and measure preheat temperatures.

3. A review of Welding Procedure Specification No. AW-1 was included with a discussion of the various prequalified joint designations that are incorporated in this WPS.

4. A review of MP-03, Welding Material Control (see attached Handout) which included the reading of B. Isom's letter on MP-03.

5. A review of MP-08, General Welding Procedure for Structural Steel (Seismic, Non-Seismic) and Hangers.

Training records are on file in Met./Welding Engineering.

David Timberlake

DT:bb

CC: F. Shaikh
A. Lucas
G. Forehand
J. Givens

000494

Rev. 6
3/79 DOCUMENT CONTROL

CAROLINA POWER AND LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

AP-IX-04
Exhibit 1

RECEIVED
OCT 22 1980

REQUEST FOR CLARIFICATION OF INFORMATION (RCI)

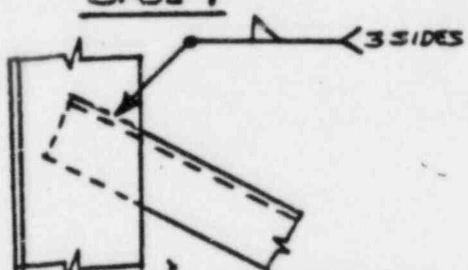
Please Reply By: SHEARON HARRIS N.P.P.	RCI - E - 010

Reference Documents: CAR-2168-G-7047 REV. 4
1364-41845 R0 CSH 10-22-80

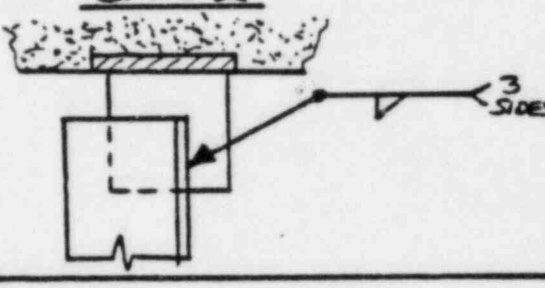
Description: HVAC & CABLE TRAY RESTRAINT STRUCTURES TYPICAL CONNECTION DETAILS WELDING SYMBOLS

Inquiry: PLEASE CLARIFY THE LOCATIONS OF WELDS FOR THE FOLLOWING TYPICAL CONNECTIONS AND WELD SYMBOLS USED ON EBASCO AND PEDEN STEEL HANGER DRAWINGS:

CASE 1



CASE 2

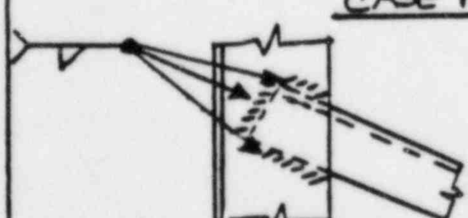


C.S. Hinnant	Resid. Eng.-Elect	10-21-80	C.S. Hinnant	Resid. Eng-Elect	10-21-80
Originator	Title	Date	Approved	Title	Date

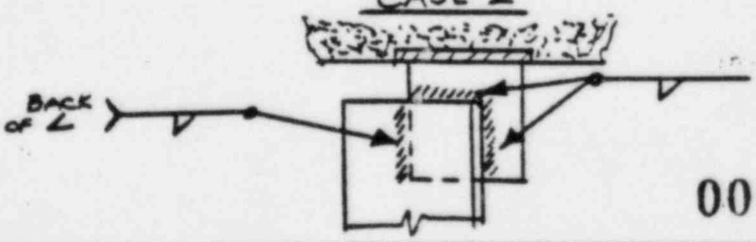
Response:

THE CORRECT WELD LOCATIONS ARE SHOWN BY HASH MARKS ON THE FOLLOWING SKETCHES ALONG WITH MORE DEFINITIVE WELD SYMBOLS FOR SOME CASES. (THESE RESPONSES HAVE BEEN DISCUSSED WITH EBASCO AND ARE NUMBERED THE SAME AS THE INQUIRY SKETCHES ABOVE.)

CASE 1



CASE 2



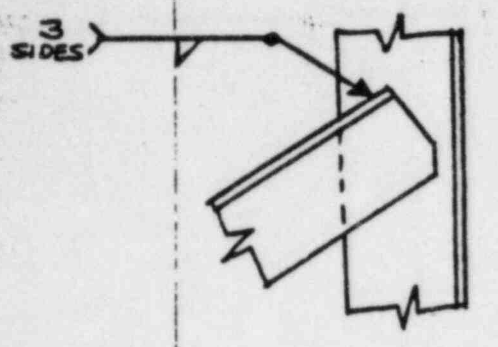
000495

C.S. Hinnant	Resid. Eng-Elect	10-21-80	C.S. Hinnant	Resid. Eng-Elect	10-21-80
Response Signature	Title	Date	Approval	Title	Date

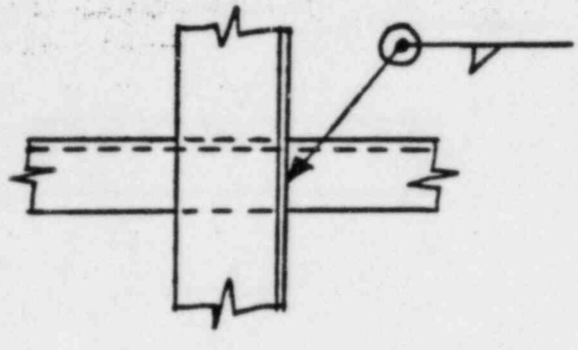
"Need-to-Know" Distribution	ROSIE ROHLETTER	GARY ROGERS	
	RAY HANFORD	A.M. LUCAS	
	JIM BELL	SCOTTY HINNANT	

INQUIRY CONT.

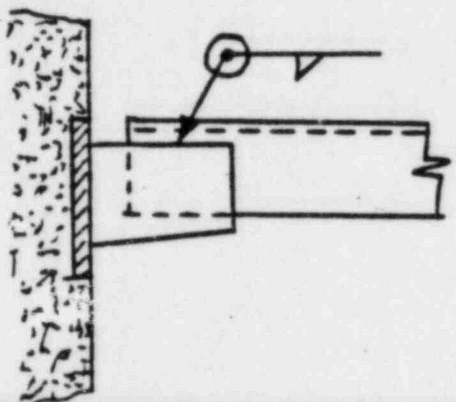
CASE 3



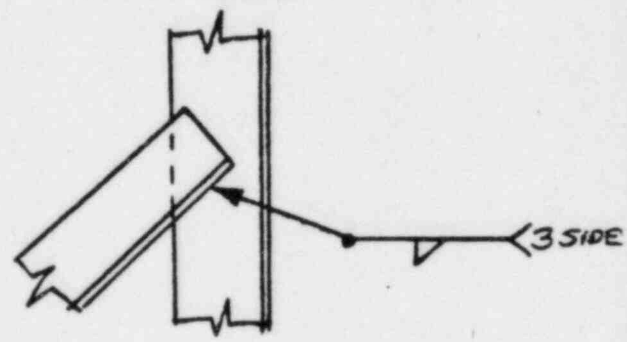
CASE 4



CASE 5

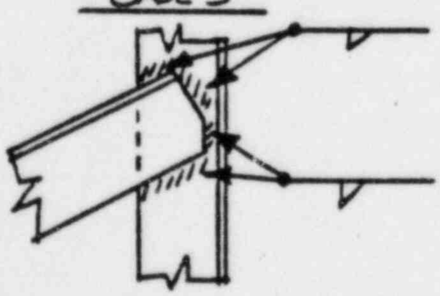


CASE 6

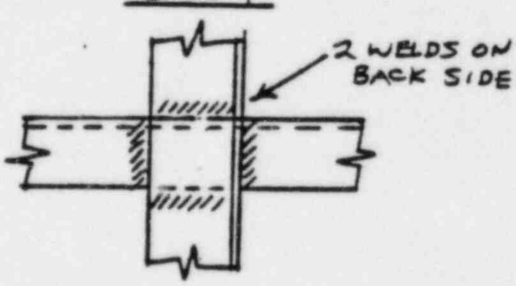


RESPONSE

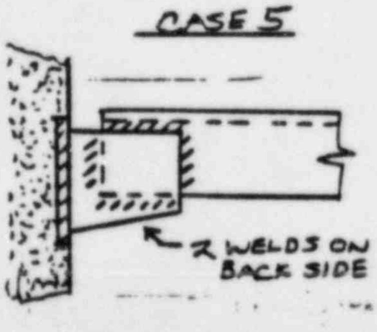
CASE 3



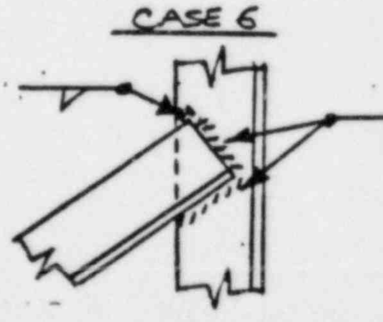
CASE 4



CASE 5



CASE 6



000496

Rev. 6
3/79

CAROLINA POWER AND LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

REQUEST FOR CLARIFICATION OF INFORMATION (RCI)

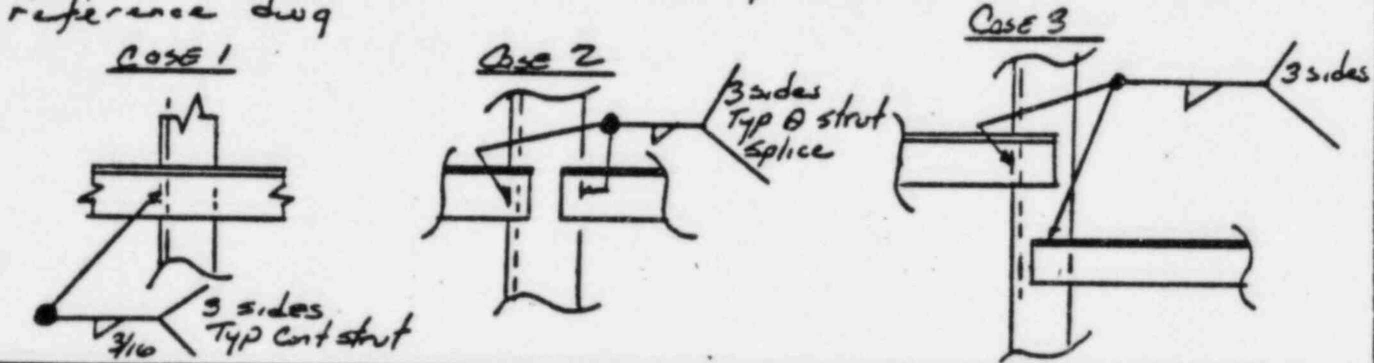
DOCUMENT CONTROL
Exhibit I
RECEIVED
OCT 23 1980
SHEARON HARRIS N. P. P.

Please Reply By: ASAP	**RCI -** E - 011

Reference Documents:
PEDEN STEEL Contract # C-3986-N sht E21 (1364-16292)

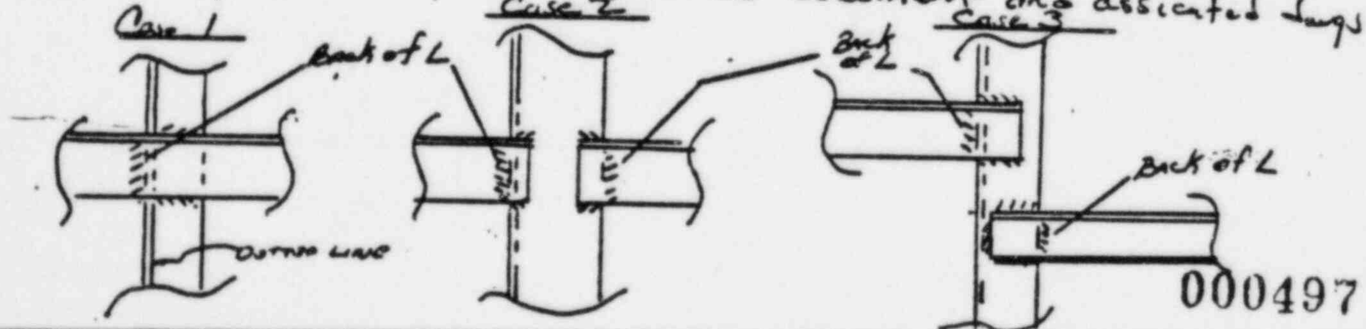
Description: HVAC (Rab#1) Duct support Erection Plan Typical Connection Details ~~and weld symbols~~ related only to the above referance document

Inquiry: Clarify the locations of welds for the following typical connections ~~and weld symbols~~ used on the above reference dwg



J. R. Bell — Sr Eng — 10-23-80 Originator — Title — Date	C S Hinnant — Resid Eng-Elect Approved — Title — Date

Response: The correct weld locations are shown by slash marks on the sketches shown below. These weld locations have been discussed with Peden Steel and are selected typicals and unique only to the above reference document and assciated dwgs



000497

J. R. Bell — Sr Eng — 10-23-80 Response Signature — Title — Date	C S Hinnant — Resid Eng-Elect. — 10-23-80 Approval — Title — Date

"Need-to-Know" Distribution			
	R. Bohlethur / B Goodman	R. Handford	J. R. Bell (uncontrol)
	B. Cline	V. Saferian	
	S. Hinnant	A. Luscas	

①

Rev. 6
3/79

CAROLINA POWER AND LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

AP-IX-04

Exhibit 1

REQUEST FOR CLARIFICATION OF INFORMATION (RCI)

Please Reply By: ASAP	RCI - W - 035

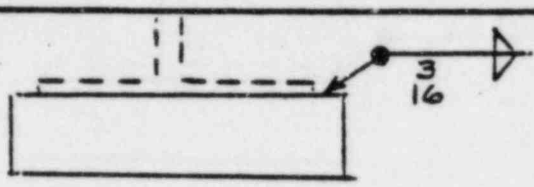
Reference Documents:

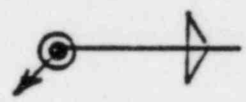
1364-41845 R0.   NY435076

DOCUMENT CONTROL
RECEIVED
OCT 6 1980
SHEARON HARRIS N. P. P.

Description:
DETAIL R - BRACE FOR TURBINE BUS DUCT

Inquiry:



IS THIS WELDING SYMBOL CORRECT FOR THIS DETAIL? OR SHOULD IT BE LIKE THE FOLLOWING  .

Darryl A Rogers / Eng / 10-3-80	C S Hinnant / Resid Eng Elect / 10-6-80
Originator / Title / Date	Approved / Title / Date

Response:

THE WELDING SYMBOL IS CORRECT AS SHOWN ON DETAIL R. THE PLATE SHOULD BE WELDED ON THE TWO ENDS ONLY AND NOT ALL THE WAY AROUND. THIS INFORMATION WAS VERIFIED BY PAUL HAYES OF PEDEN STEEL COMPANY.

000498

Darryl A Rogers / Eng / 10-3-80	C S Hinnant / Resid Eng Elect / 10-6-80
Response Signature / Title / Date	Approval / Title / Date

"Need-to-Know" Distribution	ROZIE ROHLETTER		
	GREG MESHAW		
	[illegible]		

Rev. 6
3/79

CAROLINA POWER AND LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

AP-IX-04
Exhibit 1

REQUEST FOR CLARIFICATION OF INFORMATION (RCI)

Please Reply By: ASAP	RCI - W-039

Reference Documents:

1364-41845 R0 .

Description:

TURBINE BLDG UNIT # 1
GENERAL SHEET OF DETAILS FOR DUCT SUPPORTS

Inquiry:

DETAIL F WELDING SYMBOL $\frac{3}{16}$ SAYS WELD ALL AROUND BUT THE ARROW POINTS TO JUST THE BACK SIDE OF C6 OR L4x4 SHOULD THE PIECE BE WELDED ALL AROUND ON THE FRONT SIDE?

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OCT 13 1980
SHEARON HARRIS N. P. P.

Gary A Rogers	ENG	10-10-80	C S Hinnant	Resid. Eng.-Elect.	10-10-80
Originator	Title	Date	Approved	Title	Date

Response:

THE PIECE, EITHER C6 OR L4x4, SHOULD BE WELDED ALL THE WAY AROUND ON THE FRONT AND BACK, AS PER PAUL HAYES OF PEDEN STEEL. (DISCUSSED IN TELECON BETWEEN PAUL HAYES AND GARY ROGERS ON 10-10-80)

000499

Gary A Rogers	ENG	10-10-80	C S Hinnant	Resid. Eng.-Elect.	10-13-80
Response Signature	Title	Date	Approval	Title	Date

"Need-to-Know" Distribution	GARY ROGERS		
	GREG MESHAW		
	[illegible]		

Rev. 6
3/79

CAROLINA POWER AND LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

AP-IX-04
Exhibit 1

REQUEST FOR CLARIFICATION OF INFORMATION (RCI)

Please Reply By: ASAP	RCI - W - 040

Reference Documents:

1364-41842 R O

Description:
TURBINE BLDG UNIT #1
GENERAL SHEET OF DETAILS FOR DUCT SUPPORTS

Inquiry:
SECT S SHOWS A BRACE BEING WELDED TO THE BEAM. WHICH WELDING DETAIL DO WE USE?

DOCUMENT CONTROL
RECEIVED
OCT 14 1980
SHEARON HARRIS N. P. P.

Originator	Title	Date	Approved	Title	Date
Harry A Rogers	ENG.	10-13-80	CS Hinnant	Resid. Eng-Elect	10-13-80

Response:
THIS IS A DRAFTING ERROR. THE BRACE SHOULD BE WELDED TO THE HANGER, PIECE # 15B6, USING DETAIL B.

THIS INFORMATION OBTAINED BY TELCON BETWEEN PAUL HAYES (PEDEN) AND DAN HARSHBARGER.

000500

Response Signature	Title	Date	Approval	Title	Date
Harry Rogers	ENG.	10-13-80	CS Hinnant	Resid Eng-Elect	10-13-80

"Need-to-Know" Distribution	GARY ROGERS		
	GREG MESHAW		

Outline for Welder TRAINING Class.

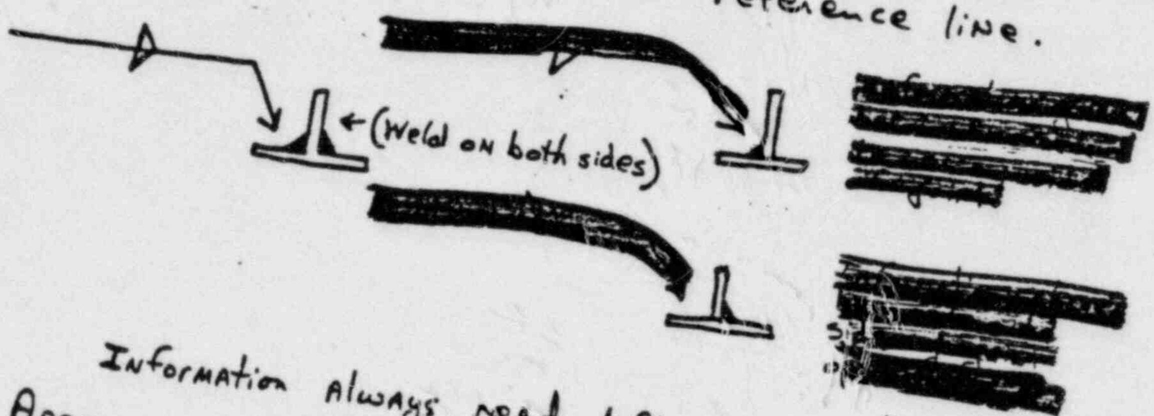
I Introduction

A. Hand-out on weld symbols given to each person in class. (attached). Attendance Taken

B. Reason men brought to class... Hanger Prob's NRC

II Weld Symbols

A. Reference line : Size & Type weld and finish information given above & below reference line.



[redacted]

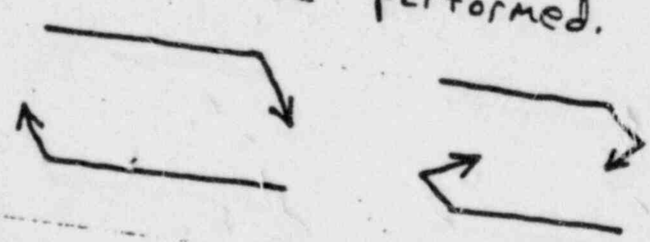
[redacted]

[redacted]

[redacted]

Information always read left to right.

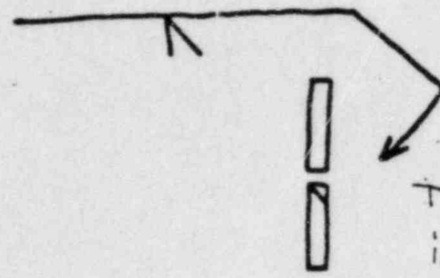
B. Arrow : designates where preparation and weld will be performed.



Broken arrow shows which piece will be prepared. example on next page.

000501

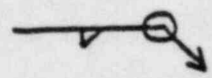
example:

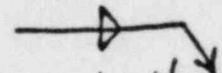


Desired bevel shown in red.

C. <u>Supplementry</u> <u>Symbol</u> :

1. Weld All Around : O

ex.  requires continuous fillet weld All Around member at joint.

Note: This should not be confused with  which means fillet weld on both sides yet not all around.

2. Field Weld symbol : old symbol •
New AWS symbol

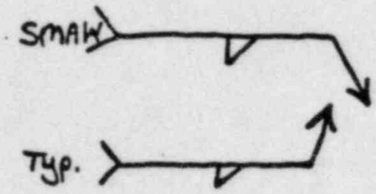
ex. 

D. <u>TAil</u> : 

Used to specify welding process or specification or other supplementary information. <u>Often omitted</u>.

000502

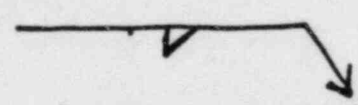
ex.



when "TYP." is specified, sometimes drawing is not clear. welder should get with foreman to contact mechanical Engineers or Weld Engineer for clarification, when this is not clear.

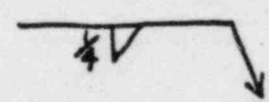
E. Typical weld symbols seen on Berg. Patterson Draws.

1. Fillet weld



a.) Size of fillet weld Always should be specified on drawing in front of fillet symbol.

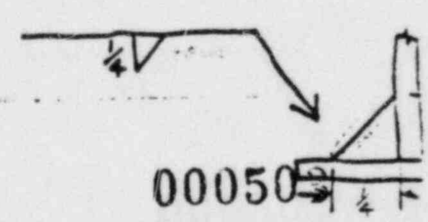
ex.



b.) measure fillets:

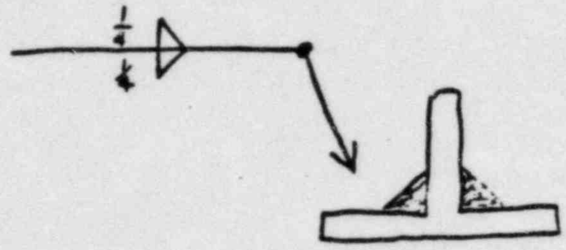
size is measure of leg length.

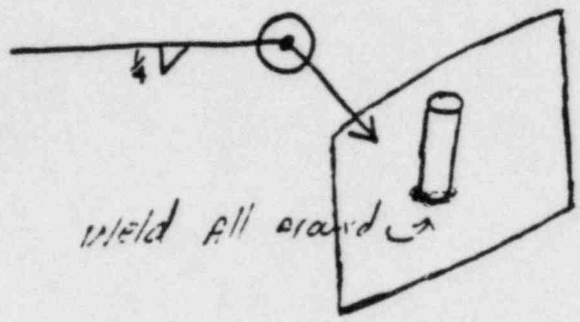
ex.



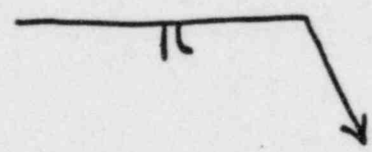
00050

Excessive concavity or convexity of the

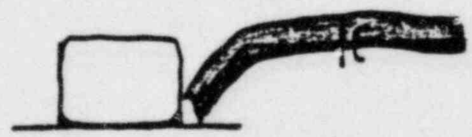




2. <u>Flare</u> <u>Weld</u> :

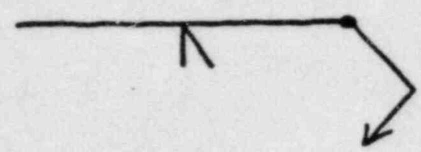


Example : Tube steel on plate



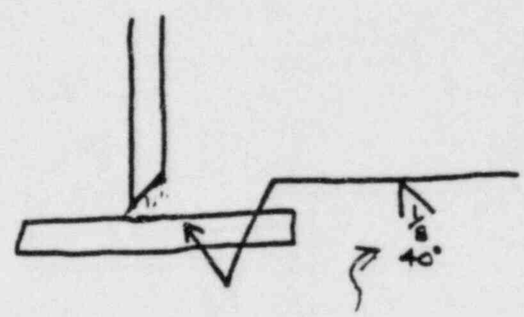
Note: This is Not A full penetration weld.
Sometimes weld symbol on drawings calls for fillet weld rather than flare. This mistake should be brought to attention of mechanical Engineering.

3. <u>Bevel</u>



Full penetration bevel welds without backing should not be welded with WPS 1A1. Welder should be qualified for open root welding with WPS 1A3 prior to attempting these welds.

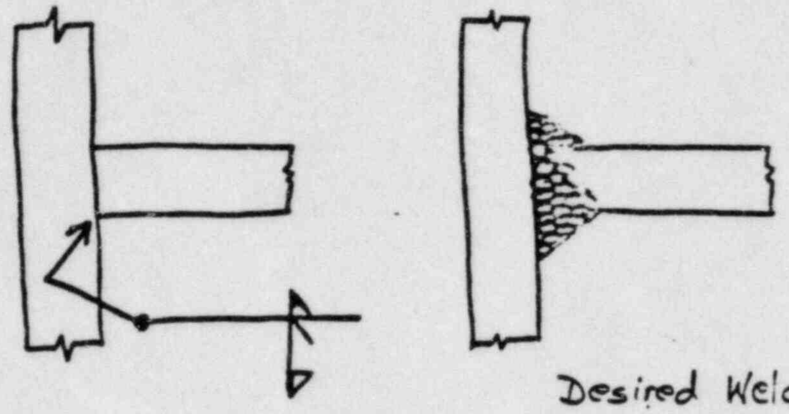
ex.



Root spacing and bevel angle. If not specified, see applicable procedures (WPS, [illegible]

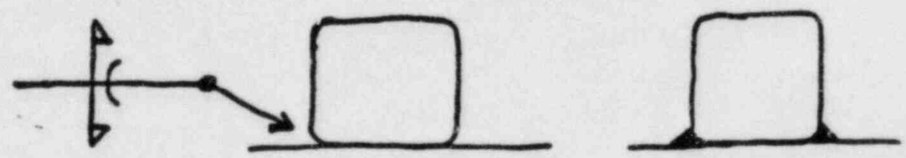
F. Combination Weld Symbols

1. Bevel with Fillet



Desired Weld

2. Flare with Fillet



III. Discussion of Misunderstood Procedures

A. Stamping - MP-05

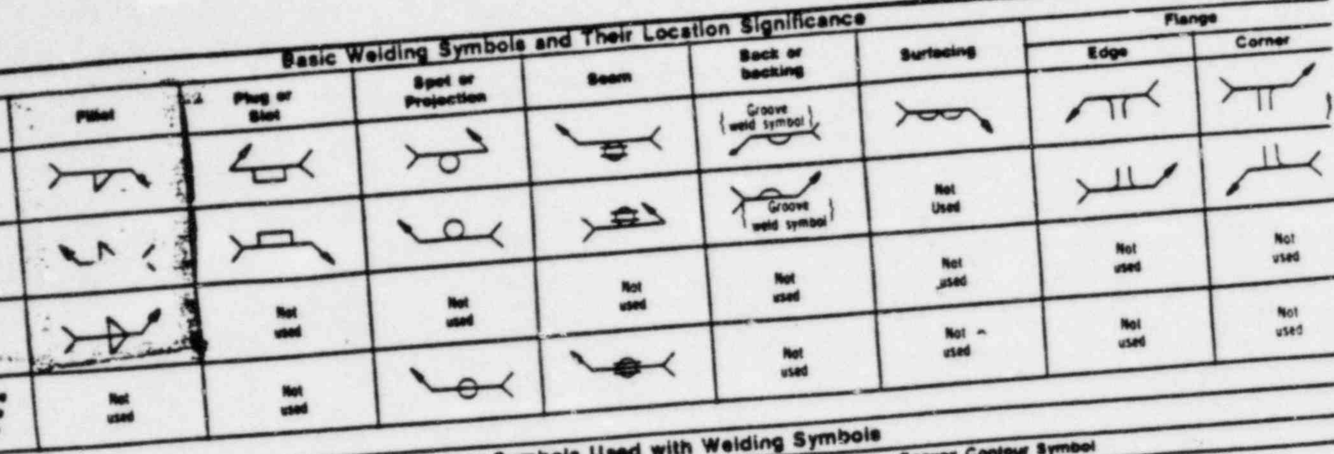
1. Changes to MP-05 to help prevent excessive stamping on Hanger Welds
2. Request that all welders obtain "Nissen" Pipe markers to use for "boxing in" of all stencil marking for welder identification.

000506

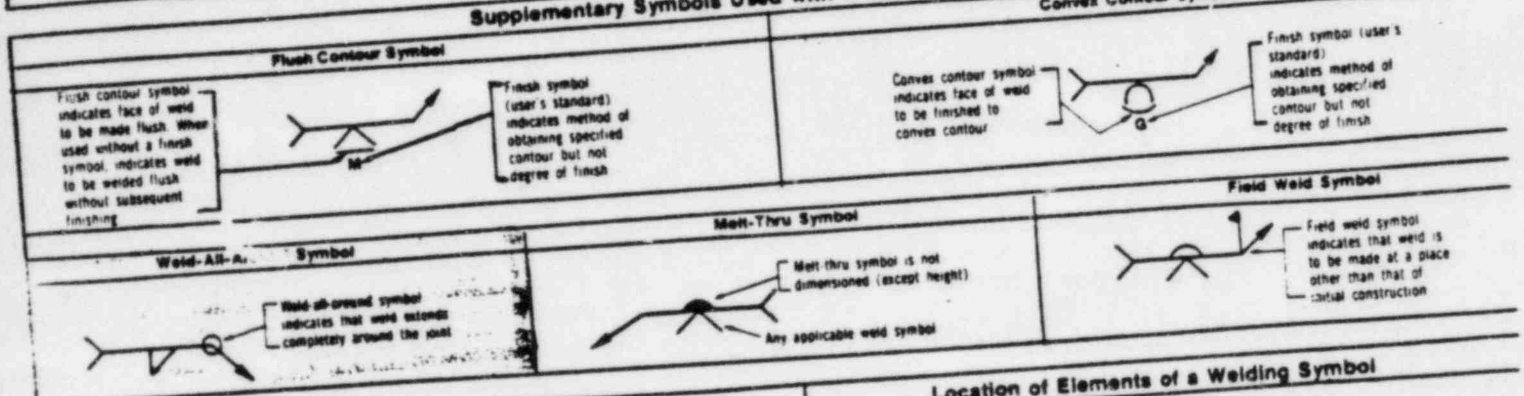
ex. $\boxed{\text{SH 19}}$ ← Box In

Basic Welding Symbols and Their Location Significance

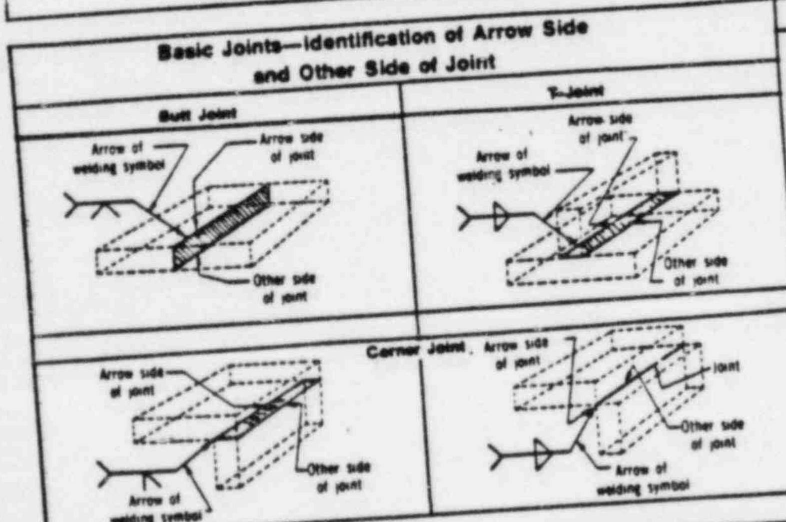
Location Significance	Fillet	Plug or Slot	Spot or Projection	Seam	Back or backing	Surfacing	Flange: Edge	Flange: Corner
Arrow side					Groove weld symbol			
Other side					Groove weld symbol	Not Used		
Both sides		Not used	Not used	Not used	Not used	Not used	Not used	Not used
No arrow side or other side significance	Not used	Not used			Not used	Not used	Not used	Not used



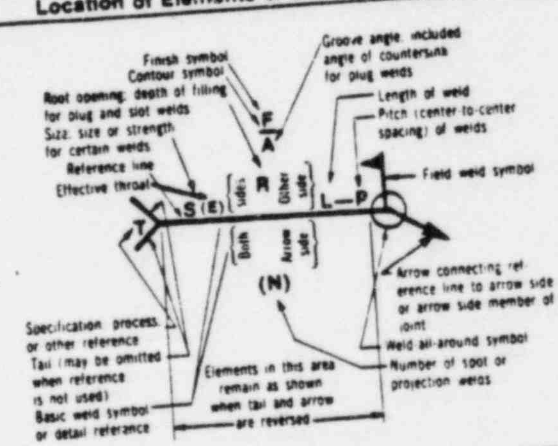
Supplementary Symbols Used with Welding Symbols



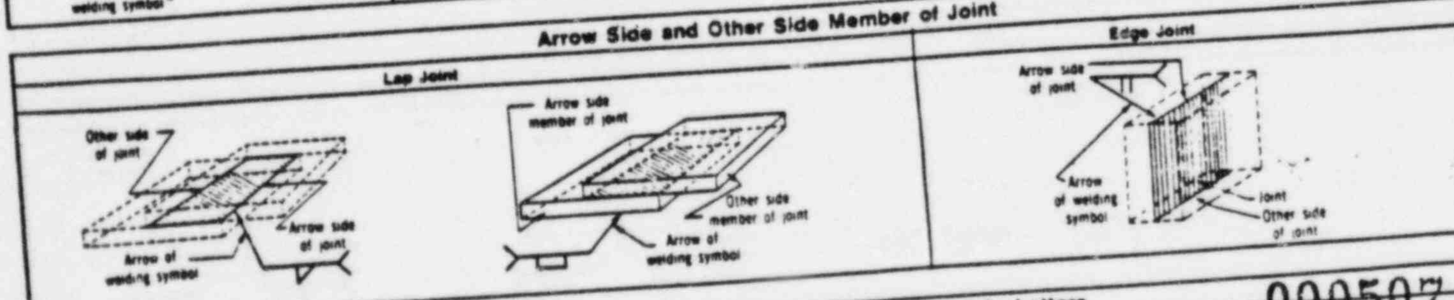
Basic Joints—Identification of Arrow Side and Other Side of Joint



Location of Elements of a Welding Symbol



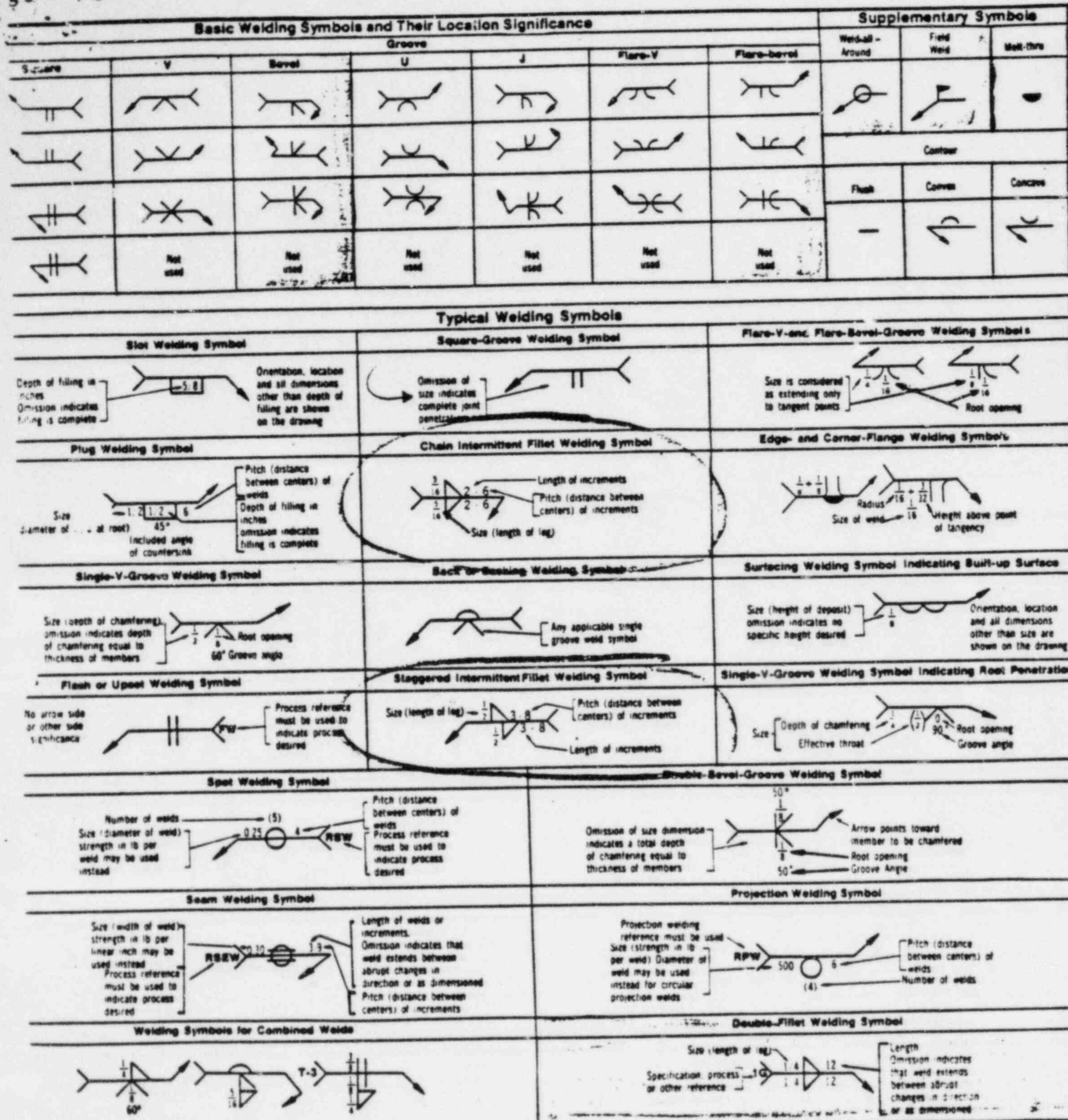
Arrow Side and Other Side Member of Joint



000507

Designation of Welding and Allied Processes by Letters

- AAC .... air carbon arc cutting
- AAW .... air acetylene welding
- ABD .... adhesive bonding
- AB .... arc brazing
- AC .... arc cutting
- AHW .... atomic hydrogen welding
- AOC .... oxygen arc cutting
- AW .... arc welding
- B .... brazing
- BB .... block brazing
- BMAW .... bare metal arc welding
- CAC .... carbon arc cutting
- CAW .... carbon arc welding
- CAW-G .... gas carbon arc welding
- CAW-S .... shielded carbon arc welding
- CAW-T .... twin carbon arc welding
- CW .... cold welding
- DB .... dip brazing
- DFB .... diffusion brazing
- DFW .... diffusion welding
- DS .... dip soldering
- EASP .... electric arc spraying
- EBC .... electron beam cutting
- EBW .... electron beam welding
- ESW .... electroslag welding
- EXW .... explosion welding
- FB .... furnace brazing
- FCAW .... flux cored arc welding
- FCAW-EG .... flux cored arc welding—electrogas
- FLB .... flow brazing
- FLOW .... flow welding
- FLSP .... flame spraying
- FOC .... chemical flux cutt.
- FOW .... forge weldin
- FRW .... friction weldir
- FS .... furnace solderin
- FW .... flash weldin
- GMAC .... gas metal arc cuttin
- GMAW .... gas metal arc weldin
- GMAW-EG .... gas metal arc welding—electroga



Designation of Welding and Allied Processes by Letters

000503

[illegible]W-P	gas metal arc welding—pulsed arc	IB	induction brazing	LOC	oxygen lance cutting	OFC-P	oxypropane cutting	PSP	plasma spraying	S	soldering
[illegible]-S	gas metal arc welding— short circuiting arc	INS	iron soldering	MAC	metal arc cutting	OFW	oxyfuel gas welding	RB	resistance brazing	SAW	submerged arc welding
		IRB	infrared brazing	OAW	oxyacetylene welding	OHW	oxyhydrogen welding	RPW	projection welding	SAW-S	series submerged arc welding
[illegible]C	gas tungsten arc cutting	IRS	infrared soldering	OC	oxygen cutting	PAC	plasma arc cutting	RS	resistance soldering	SMAC	shielded metal arc cutting
[illegible]W	gas tungsten arc welding	IS	induction soldering	OFC	oxyfuel gas cutting	PAW	plasma arc welding	RSEW	resistance seam welding	SMAW	shielded metal arc welding
[illegible]W-P	gas tungsten arc welding—pulsed arc	IW	induction welding	OFC-A	oxyacetylene cutting	PEW	percussion welding	RSW	resistance spot welding	SSW	solid state welding
[illegible]W	high frequency resistance welding	LBC	laser beam cutting	OFC-H	oxyhydrogen cutting	PGW	pressure gas welding	ROW	roll welding	SW	stud arc welding
[illegible]W	hot pressure welding	LBW	laser beam welding	OFC-N	oxynatural gas cutting	POC	metal powder cutting	RW	resistance welding	TB	torch brazing

~~Ray Hatfield~~ A. Lucas
G. Fulghum

DANIEL CONSTRUCTION COMPANY

Form 16-99-3 (9-78)

INTER-OFFICE COMMUNICATION

SHEARON HARRIS NUCLEAR POWER PLANT
NEW HILL, N.C. 27562

TO: ALL WELDING SUPERVISION

DATE: November 11, 1980

FROM: B. B. Isom

SUBJECT: Control of Welding Material

We are experiencing difficulty in following the rules on welding material control as required by the Site Procedure MP-03. Several NCR's and Memos have been written as well as meetings being held to cause those people, associated with welding, to be aware of the correct methods of welding material control. Violations have continued to occur and a disregard for following Procedure MP-03 is being demonstrated; therefore more stringent corrective action must be applied whereby welders will recognize the seriousness of controlling welding material.

All welding supervision, general foremen and foremen should review Procedure MP-03 and become familiar with the pertinent parts regarding material control whereby this information may be relayed to the welders and same may be observed for compliance. The following rules must be strictly enforced by all personnel:

1. Coated welding electrodes MUST NOT BE REMOVED from a heated caddy oven and layed down in the welding work area. While welding is in progress, a welder is permitted to store a few electrodes (approximately 12 maximum) in a leather pouch at his work location. If welding is stopped, the electrodes should be returned to the heated caddy.

2. Coated Welding Electrodes must not be exposed to moisture or rain. Scrap any electrodes exposed to moisture as required by Procedure MP-03.

3. All Heated Caddy Ovens Must be connected to an electrical outlet in the work location. Check the light on the caddy oven frequently to ensure the electricity is on.

4. Any Electrode Caddy Oven found cold must be returned immediately to the Weld Issue Station with a new Weld Material Requisition to obtain another.

5. Unauthorized personnel found unplugging a welder's heated electrode oven will be subject to disciplinary action by management.

Violators should receive written reprimands and if a person continues to disregard the rules and procedures which control site welding, such individual must be terminated.

Please lend your assistance in correcting this problem.

B. B. Isom

B. B. Isom

BBI/RHM/jal

cc: J. Poythress, R. Rohletter, R. H. McMillan, G. A. Rabb, D. B. Turner, W. Rodgers, J. P. Kirk, R. A. Rydarowski, H. O. Ford

000509

WELDER CRAFT TRAINING

Highlights of MP-03-Welding Material Control

1. Exposure time is considered to be the period of time hygroscopic material is not contained in a holding oven or heated portable rod caddy.

2. Rebaked electrodes shall not be used on Code Class work. These electrodes are painted red on their tips.

3. No welder shall pass welding filler materials, issued to him, to another welder for use with the exception of a welding operator for automatic welding.

4. Issue time limit for heated containers and the welding electrodes contained therein is one shift or twelve hours.

5. Any welding stubs or scrap welding material (including wet material) should be discarded by the welder or welding supervisor in proper containers marked scrap. Failure to do so can result in disciplinary action.

6. In filling out a WMR, a Welding Foreman shall ensure that the following information is included: electrode size and classification, welders symbol, WPS and revision, job description, drawing or isometric number and revision, joint number, amount of electrodes requested, signature of the supervisor and date.

7. A welders responsibilities shall include the following:
   a. Have a container for placing used electrode stubs and shall bend all scrapped material and place it in the container with stubs to be discarded.
   b. Return all undamaged and unused material to the Weld Material Issue Room at the end of the shift.
   c. A copy of the WMR shall be maintained by the welder at his work station until he has used all the materials issued or returned with the unused portion and his copy of WMR to the Weld Material Issue Room.

8. Change in E70S-2 designation to ER70S-2.

Highlights of MP-08-General Welding Procedure For Structural Steel (Seismic, Nonseismic) and Hangers

1. Weld joint configuration shall be as specified on the design drawing. Where no joint configuration is specified by design, the joint configuration shall be essentially as shown on the welding procedure specification.

2. Any defects that appear on the surface of the weld beads shall be removed by chipping or grinding before depositing the next successive bead of welding.

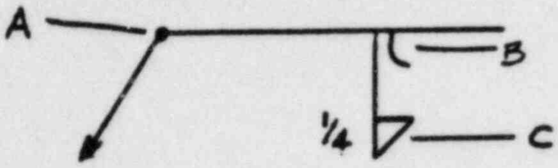
TEST WELDER CRAFT TRAINING (Nov. 80)

Name: ______________________

Stencil Number: ______________________

Date: ______________________

1. Explain the three parts of the following welding symbol by matching the correct answer with the corresponding letter.



A - ______ 1 - Flare bevel

B - ______ 2 - Weld all around

C - ______ 3 - Fillet weld

4 - Field weld

2. The temperature at which the base metal of a weld joint must be maintained before the initiation of welding is called the preheat temperature. The temperature that the base metal adjacent to the weld must not exceed prior to the initiation of each weld pass is called the interpass temperature.

3. T or F Rebaked electrodes, which have their tips painted red, shall not be used on Code Class work. (Circle correct answer)

4. The designation for E70S-6 bare carbon steel wire has been changed to ____________.

5. T or F When it is necessary to preheat a weld joint to prevent condensation, the weld joint area shall be preheated until it is warm to hand touch. (Circle correct answer)

6. T or F Temporary attachments may be removed by hammer blows. (Circle correct answer)

000511

PREQUALIFIED JOINT WELDING PROCEDURE
PROCEDURE SPECIFICATION

Material specification Carbon Steel Base Metal listed under table 4.1.1 Group I & II
Welding process SMAW
Manual or machine Manual
Position of welding All
Filler metal specification SFA 5.1
Filler metal classification E-7018
Flux N/A
Weld metal grade* N/A
Shielding gas N/A Flow rate N/A
Single or multiple pass Multiple
Single or multiple arc Single
Welding current Direct Current
Polarity Reverse
Welding progression Vertical Upward
Root treatment N/A
Preheat and interpass temperature --Preheat: See Below** Interpass: 500°F max.
Postheat treatment None
Thickness - Limited & Unlimited Per Joint Details.*

WELDING PROCEDURE

Pass no.	Electrode size	Welding current		Travel speed	Joint detail *
		Amperes	Volts		
All	3/32"-	65-120	19-25	-	This procedure is applicable to partial penetration & full penetration joint designs as given in Fig. 2.9.1 & Fig. 2.10.1 and fillet welds in accordance with Figure 2.7.1. (See Attached Figures)
	1/8"	75-160	20-25	-	
	5/32	120-200	20-28		

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NOV 5 1980
SHEARON HARRIS N. P. P.

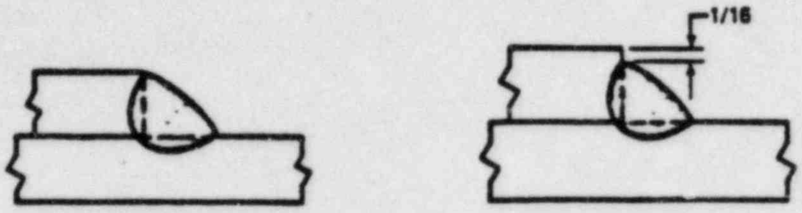
This procedure may vary due to fabrication sequence, fit-up, pass size, etc., within the limitation of variables given in 4B, C, or D of AWS D1.1, Structural Welding Code. (1980 Edition)

Procedure no. AW-1
Note: AW-1 was formerly P1-1-A No.1
Revision no. 3

Manufacturer or contractor Carolina Power & Light
Authorized by R Hanford
Date 11/5/80

**Preheat:

Thickness of thickest part at point of welding	Minimum Temperature
Up to 3/4"	None. (If base metal is below 32°F, preheat to 70°F min.)
Over 3/4" thru 1 1/2"	50°F min.
Over 1 1/2" thru 2 1/2"	150°F min.
Over 2 1/2"	225°F min.



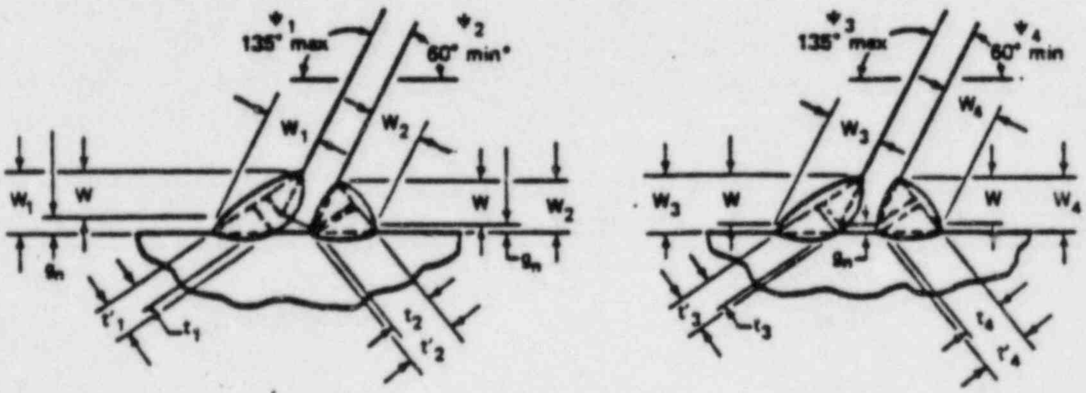
Base metal less than 1/4 thick

(A)

Base metal 1/4 or more in thickness

(B)

Maximum size of fillet weld along edges



(C)

(D)

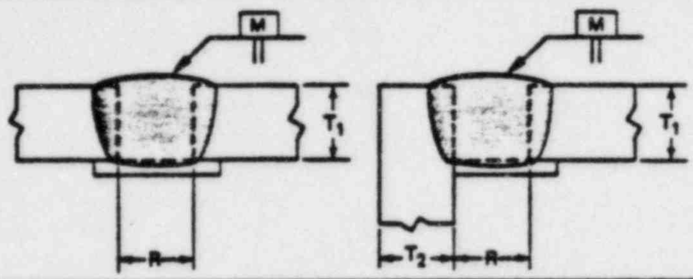
Skewed T-joints

Note: $t_{(n)}$, $t'_{(n)}$ = effective throats dependent on magnitude of gap (g_n). See 3.3.1. Subscript (n) represents 1, 2, 3, or 4.

*Angles smaller than 60 degrees are permitted; however, in such cases, the weld is considered to be a partial joint penetration groove weld.

Fig. 2.7.1—Details for prequalified fillet welds

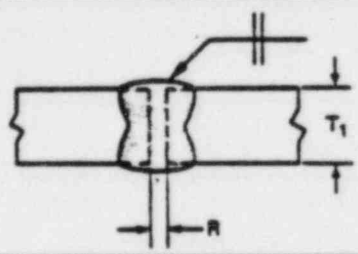
Square-groove weld (1)
Butt joint (B)
Corner joint (C)



M = steel (see 8.2.4, 9.2.5, 10.2.4)

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	B-L1a	1/4 max	–	$R=T_1$	+1/16,–0	+1/4,–1/16	All	–	–
	C-L1a	1/4 max	U	$R=T_1$	+1/16,–0	+1/4,–1/16	All	–	–
GMAW FCAW	B-L1a-GF	3/8 max	–	$R=T_1$	+1/16,–0	+1/4,–1/16	All	Not required	A

Square-groove weld (1)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-L1b	1/4 max	–	$R = T_1/2$	+1/16,–0	+1/16,–1/8	All	–	C
GMAW FCAW	B-L1b-GF	3/8 max	–	R = 0 to 1/8	+1/16,–0	+1/16,–1/8	All	Not required	A,C
SAW	B-L1-S	1/2 max	–	R = 0	±0	+1/16,–0	Flat	–	D

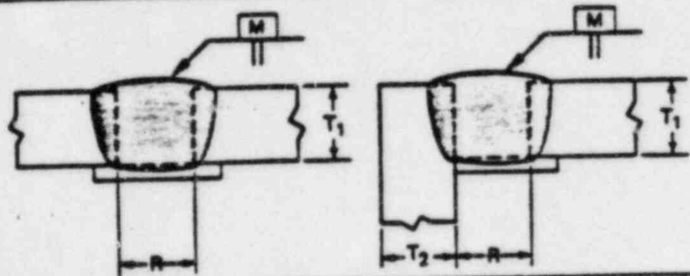
Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note D: Welds must be centered on joint.

Fig. 2.9.1—Prequalified complete joint penetration groove welded joints

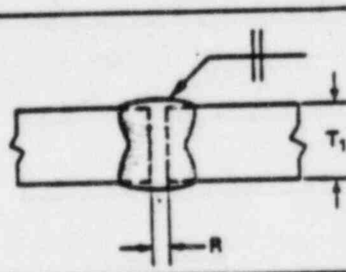
Square-groove weld (1)
Butt joint (B)
Corner joint (C)



M = steel (see 8.2.4, 9.2.5, 10.2.4)

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	B-L1a	1/4 max	–	$R = T_1$	+1/16,–0	+1/4,–1/16	All	–	–
	C-L1a	1/4 max	U	$R = T_1$	+1/16,–0	+1/4,–1/16	All	–	–
GMAW FCAW	B-L1a-GF	3/8 max	–	$R = T_1$	+1/16,–0	+1/4,–1/16	All	Not required	A

Square-groove weld (1)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-L1b	1/4 max	–	$R = T_1/2$	+1/16,–0	+1/16,–1/8	All	–	C
GMAW FCAW	B-L1b-GF	3/8 max	–	R = 0 to 1/8	+1/16,–0	+1/16,–1/8	All	Not required	A,C
SAW	B-L1-S	1/2 max	–	R = 0	±0	+1/16,–0	Flat	–	D

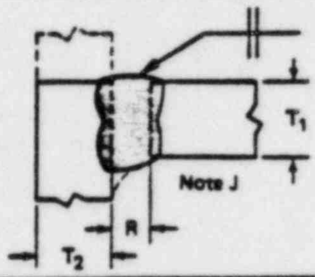
Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note D: Welds must be centered on joint.

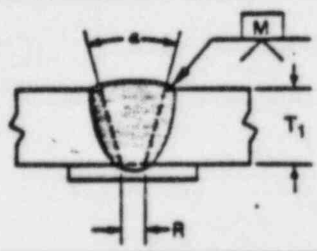
Fig. 2.9.1—Prequalified complete joint penetration groove welded joints

Square-groove weld (1)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Gas shielding for FCAW	Notes
					Tolerances				
		T_1	T_2	Root opening	As detailed (see 2.9.2)	As fit up (see 3.3.4)			
SMAW	TC-L1b	1/4 max	U	$R = T_1/2$	+1/16,−0	+1/16,−1/8	All	–	C,J
GMAW FCAW	TC-L1-GF	3/8 max	U	R = 0 to 1/8	+1/16,−0	+1/16,−1/8	All	Not req.	*,C,J
SAW	TC-L1-S	3/8 max	U	R = 0	±0	+1/16,−0	Flat	–	J

Single-V-groove weld (2)
Butt joint (B)



M = steel (see 8.2.4, 9.2.5, 10.2.4)

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.4.4)
R = +1/16,−0	+1/4,−1/16
α = +10°,−0°	+10°,−5°

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation		Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Groove angle			
SMAW	B-U2a	U	–	R = 1/4	α = 45°	All	–	–
				R = 3/8	α = 30°	F,OH	–	–
				R = 1/2	α = 20°	F,OH	–	–
GMAW FCAW	B-U2a-GF	U	–	R = 3/16	α = 30°	F,V,OH	Required	A
				R = 3/8	α = 30°	F	Not req.	A
				R = 1/4	α = 30°	V,OH	Not req.	A
SAW	B-L2a-S	1/2 max	–	R = 1/4	α = 30°	F	–	–
SAW	B-U2-S	U	–	R = 5/8	α = 20°	F	–	–

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

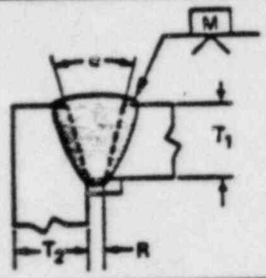
Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Single-V-groove weld (2)
Corner joint (B)

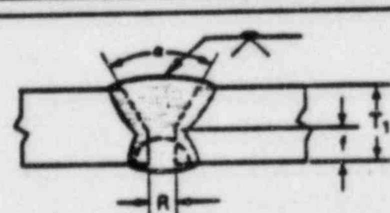


Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/4, −1/16
α = +10°, −0°	+10°, −5°

M = steel (see 8.2.4, 9.2.5, 10.2.4)

Welding process	Joint designation	Base metal thickness U = unlimited T_1	T_2	Groove preparation Root opening	Groove angle	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	C-U2a	U	U	R = 1/4	α = 45°	All	–	–
				R = 3/8	α = 30°	F, OH	–	–
GMAW FCAW	C-U2a-GF	U	U	R = 1/2	α = 20°	F, OH	–	–
				R = 3/16	α = 30°	F, V, OH	Required	A
				R = 3/8	α = 30°	F	Not req.	A
				R = 1/4	α = 30°	V, OH	Not req.	A
SAW	C-L2a-S	1/2 max	U	R = 1/4	α = 30°	F	–	–
SAW	C-U2-S	U	U	R = 5/8	α = 20°	F	–	–

Single-V-groove weld (2)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening Root face Groove angle	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-U2	U	–	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16, −0 +1/16, −0 +10°, −0°	+1/16, −1/8 Not limited +10°, −5°	All	–	C
GMAW FCAW	B-U2-GF	U	–	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16, −0 +1/16, −0 +10°, −0°	+1/16, −1/8 Not limited +10°, −5°	All	Not required	A, C
SAW	B-L2b-S	Over 1/2 to 1 inclusive	–	R = 0 f = 1/4 max α = 60°	±0 +0, −1/4 +10°, −0°	+1/16, −0 ±1/16 +10°, −5°	Flat	–	K
SAW	B-L2c-S	Over 1/2 to 1	–	R = 0, α = 60° f = 1/4 max	R = ±0 f = +0, −f α = +10°, −0°	+1/16, −0 ±1/16 +10°, −5°	Flat	–	C
		Over 1 to 1-1/2	–	R = 0, α = 60° f = 1/2 max					
		Over 1-1/2 to 2	–	R = 0, α = 60° f = 5/8 max					

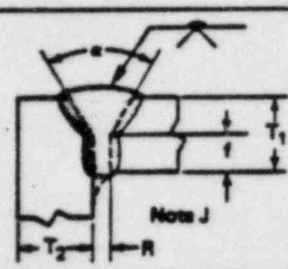
Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note K: Weld root after welding at least one pass on arrow side.

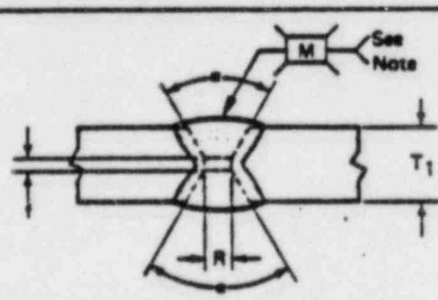
Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Single-V-groove weld (2)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Gas shielding for FCAW	Notes
					Tolerances				
		T_1	T_2	Root opening Root face Groove angle	As detailed (see 2.9.2)	As fit up (see 3.3.4)			
SMAW	C-U2	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	All	–	C,J
GMAW FCAW	C-U2-GF	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 60°	+1/16,−0 +1/16,−0 +10°, [illegible]	+1/16,−1/8 Not limited +10°,−5°	All	Not required	A,C,J
SAW	C-L2b-S	1 max	U	R = 0 f = 1/4 max α = 60°	±0 +0,−1/4 +10°,−0°	+1/16,−[illegible] ±1/16 +10°,−5°	Flat	–	J,K

Double-V-groove weld (3)
Butt joint (B)



M = steel (see 8.2.4, 9.2.5, 10.2.4)

Note: Same steel as base metal

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16,−0
f = ±0	+1/16,−0
α = +10°,−0°	+10°,−5°
Spacer = ±0	+1/16,−0

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions*	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Root face	Groove angle			
SMAW	B-U3a	U, preferably 5/8 or thicker	–	R = 1/4	f = 0 to 1/8	α = 45°	All	–	C,M
				R = 3/8	f = 0 to 1/8	α = 30°	F,OH	–	
		Spacer = 1/8 x R		R = 1/2	f = 0 to 1/8	α = 20°	F,OH	–	
SAW	B-U3a-S	U Spacer = 1/4 x R	–	R = 5/8	f = 0 to 1/4	α = 20°	F	–	M

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

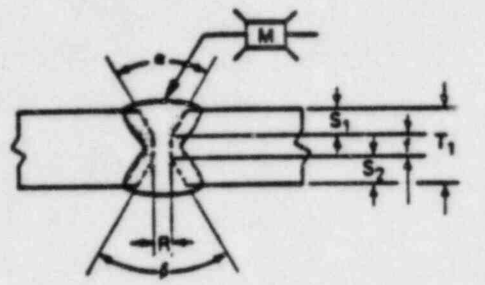
Note K: Weld root after welding at least one pass on arrow side.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Double-V-groove weld (3)
Butt joint (B)



M = Steel (see 8.2.4, 9.2.3, 10.25)

For B-U3c-S only		
T_1		S_1
Over	to	
2	2-1/2	1-3/8
2-1/2	3	1-3/4
3	3-5/8	2-1/8
3-5/8	4	2-3/8
4	4-3/4	2-3/4
4-3/4	5-1/2	3-1/4
5-1/2	6-1/4	3-3/4
For T_1 > 6-1/4, or T_1 < 2 $S_1 = 2/3 (T_1 - 1/4)$		

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Gas shielding for (FCAW)	Notes
				Root opening Root face Groove angle	Tolerances				
		T_1	T_2		As detailed (see 2.9._)	As fit up (see 3.3.4)			
SMAW	B-U3b	U, preferably 5/8 or larger	–	R = 0 to 1/8 f = 0 to 1/8 α = β = 60°	+1/16,–0 +1/16,–0 +10°,–0	.1/16,–1/8 Not limited +10°,–5°	All	–	C,M
GMAW FCAW	B-U3-GF						All	Not required	A,C,M
SAW	B-U3b-S	1-1/8 min	–	R = 1/8 f = 0 α = β = 60° $S_1 = 2/3\ T_1$, S_2 = 3/8 min	+1/16,–0 +1/16,–0 +10°,–0	+1/16,–1/8 Not limited +10°,–5°	Flat	–	M, P, X
SAW	B-L3-S	1-1/2 max	–	R = 0 f = 1/4 max α = 60°; β = 80° $S_1 = 2/3 (T_1 - 1/4)$, $S_2 = 1/3 (T_1 - 1/4)$	±0 +0,–1/4 +10°,–0°	+1/16,–0 Not limited +10°,–5°	Flat	–	M, K
SAW	B-U3c-S	U	–	R = 0 f = 1/4 max α = β = 60° To find S_1 see table above: $S_2 = T_1 - (S_1 + 1/4)$	±0 +0,–1/4 +10°,–0°	+1/16,–0 Not limited +10°,–5°	Flat	–	M, C

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note K: Weld root after welding at least one pass on arrow side.

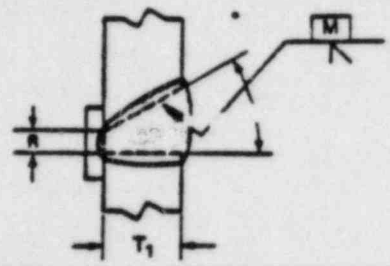
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note P: Weld S_2 first with shielded metal arc low-hydrogen electrodes. Root of this weld shall be back gouged. Weld S_1 with single- or multiple-pass submerged arc weld in flat position after manual arc welding is completed on other side.

Note X: It is permissible for the groove opening to vary from 0-1/8 in., in which case, weld as follows: Weld the S_1 groove first with shielded metal arc using low hydrogen electrodes; complete the weld with submerged arc welding. The root of the SMAW weld shall be back gouged. Weld the S_2 groove with shielded metal arc using low hydrogen electrode or by submerged arc welding.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Single-bevel-groove weld (4)
Butt joint (B)

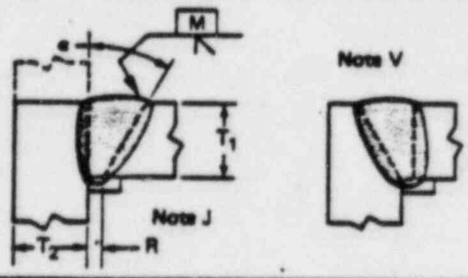


M = steel (see 8.2.4, 9.2.5, 10.2.4)

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/4, −1/16
α = +10°, −0°	+10°, −5°

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Permitted welding positions*	Gas shielding	Notes
SMAW	B-U4a	U	–	R = 1/4	α = 45°	All	–	Br
				R = 3/8	α = 30°	F, OH	–	Br
GMAW FCAW	B-U4a-GF	U	–	R = 3/16	α = 30°	All	Required	A, Br
				R = 1/4	α = 45°	All	Required	A, Br
				R = 3/8	α = 30°	Flat	Not req.	A, Br

Single-bevel-groove-weld (4)
T-joint (T)
Corner joint (C)



M = steel (see 8.2.4, 9.2.5, 10.2.4)

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/4, −1/16
α = +10°, −0°	+10°, −5°

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	TC-U4a	U	U	R = 1/4	α = 45°	All	–	J, V
				R = 3/8	α = 30°	F, OH	–	J, V
GMAW FCAW	TC-U4a-GF	U	U	R = 3/16	α = 30°	All	Required	A, J, V
				R = 3/8	α = 30°	Flat	Not req.	A, J, V
				R = 1/4	α = 45°	All	Not req.	A, J, V
SAW	TC-U4a-S	U	U	R = 3/8	α = 30°	Flat	–	J, V
				R = 1/4	α = 45°			

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note Br: Bridge application limits the use of these joints to the horizontal position (see 9.12.1.5).

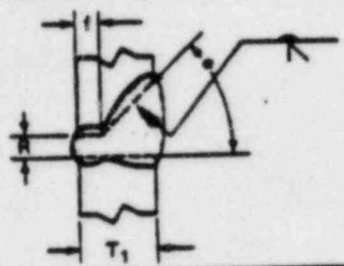
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Single-bevel-groove weld (4)
Butt joint (B)

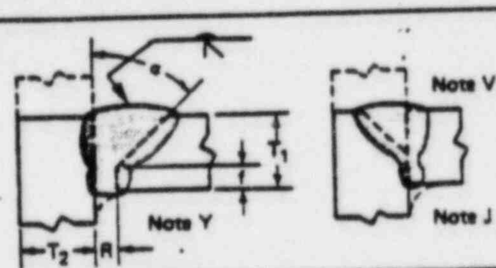


Limitations

Bridge application limits the use of these joints to horizontal position (see 9.12.1.5).

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening / Root face / Groove angle	Tolerances: As detailed (see 2.9.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for (FCAW)	Notes
SMAW	B-U4	U	–	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 not limited +10°,−5°	All	–	C
GMAW FCAW	B-U4-GF	U	–				All	Not required	A,C

Single-bevel-groove weld (4)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening / Root face / Groove angle	Tolerances: As detailed (see 2.9.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-U4a	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,−0 +1/16,−0 +10°,−0°	+1/16,−1/8 Not limited +10°,−5°	All	–	C,J,V
GMAW FCAW	TC-U4a-GF	U	U				All	Not req.	A,C,J,V
SAW	TC-L4a-S	3/4 max	U	R = 0 f = 1/8 max α = 60°	±0 +0,−1/8 +10°,−0°	+1/4,−0 ±1/16 +10°,−5°	Flat	–	J,V,Y

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

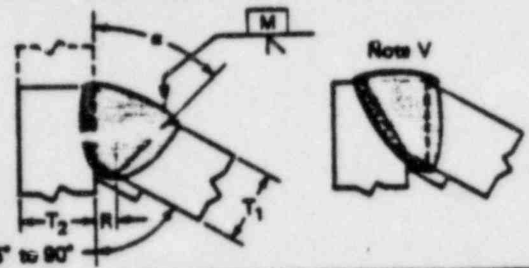
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Note Y: Shielded metal arc or submerged arc backing fillet weld required.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Single-bevel-groove weld (4)
T-joint (T)
Corner joint (C)

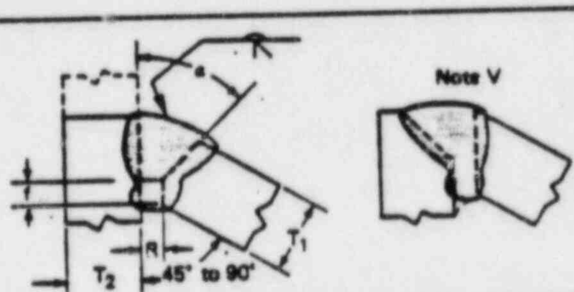


M = steel (see 8.2.4, 9.2.5, 10.2.4)

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, –0	+1/4, –1/16
α = +10°, –0°	+10°, –5°

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation		Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Groove angle			
SMAW	TC-U4d	U	U	R = 1/4	α = 45°	All	–	J,V
				R = 3/8	α = 30°	F,OH	–	
GMAW FCAW	TC-U4d-GF	U	U	R = 3/16	α = 30°	All	Required	A,J,V
				R = 3/8	α = 30°	Flat	Not req.	
				R = 1/4	α = 45°	All		
SAW	TC-U4b-S	U	U	R = 3/8	α = 30°	Flat	–	J,V
				R = 1/4	α = 45°			

Single-bevel-groove weld (4)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Gas shielding for FCAW	Notes
				Root opening Root face Groove angle	Tolerances				
		T_1	T_2		As detailed (see 2.9.2)	As fit up (see 3.3.4)			
SMAW	TC-U4b	U	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16, –0 +1/16, –0 +10°, –0°	+1/16, –1/8 Not limited +10°, –5°	All	–	C,J,V
GMAW FCAW	TC-U4b-GF	U	U				All	Not required	A,C J,V
SAW	TC-L4b-S	3/4 max	U	R = 0 f = 1/8 max α = 60°	±0 +0, –1/8 +10°, –0°	+1/4, –0 ±1/16 +10°, –5°	Flat	–	J, V, Y

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

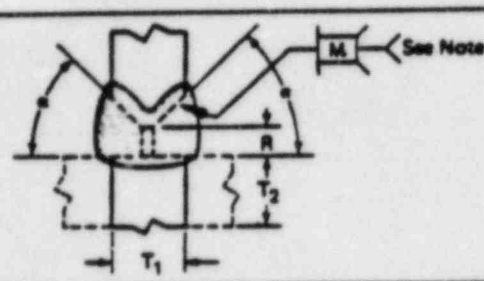
Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Note Y: Shielded metal arc or submerged arc backing weld required.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Double-bevel-groove weld (5)
Butt joint (B)
T-joint (T)
Corner joint (C)



M = steel (see 8.2.4, 9.2.5, 10.2.4)
Note: Same steel as base metal

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16, −0
f = +1/16, −0	±1/16
α = +10°, −0°	+10°, −5°
Spacer = +0	+1/16, −0

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Root face	Groove angle			
SMAW	B-U5b	U, preferably 5/8 or thicker Spacer = 1/8 X R	–	R - 1/4	f = 0 to 1/8	α = 45°	All	–	Br, C, M
SMAW	TC-U5a	U, preferably 5/8 or thicker Spacer = 1/8 X R	U	R = 1/4	f = 0 to 1/8	α = 45°	All	–	C, J, M, V
SMAW	TC-U5a	U, preferably 5/8 or thicker Spacer = 1/8 X R	U	R = 3/8	f = 0 to 1/8	α = 30°	F, OH	–	C, J, M, V

Note Br: Bridge application limits the use of these joints to the horizontal position (see 9.12.1.5).

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

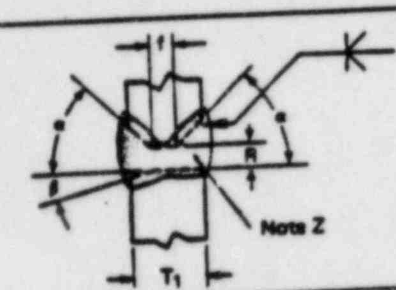
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Double-bevel-groove weld (5)
Butt joint (B)

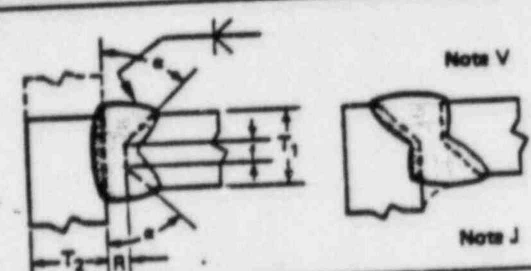


Limitations

Bridge applications limited to horizontal position (see 9.12.1.5).

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening, Root face, Groove angles	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	B-U5a	U, preferably 5/8 or thicker	–	R = 0 to 1/8 f = 0 to 1/8 α = 45° β = 0° to 15°	+1/16,–0 +1/16,–0 α + β, +10 –0	+1/16,–1/8 Not limited α + β, +10 –5	All	–	C, M, Z
GMAW FCAW	B-U5-GF	U, preferably 5/8 or thicker	–	R = 0 to 1/8 f = 0 to 1/8 α = 45° β = 0°	+1/16,–0 +1/16,–0 +10°,–0° ±0°	+1/16,–1/8 Not limited +10°,–5° –	All	Not req.	A, C, M

Double-bevel-groove weld (5)
T-joint(T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening, Root face, Groove angle	Tolerances: As detailed (see 2.9.2)	As fit up (see 3.3.4)	Permitted welding positions	Gas shielding for FCAW	Notes
SMAW	TC-U5b	U, preferably 5/8 or thicker	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16,–0 +1/16,–0 +10°,–0°	+1/16,–1/8 Not limited +10°,–5°	All	–	C, J, M, V
GMAW FCAW	TC-U5-GF	U, preferably 5/8 or thicker	U				All	Not required	A, C, J, M, V
SAW	TC-U5-S	U	U	R = 0 f = 3/16 max α = 60°	±0 +0,–3/16 +10°,–0°	+1/16,–0 ±1/16 +10°,–5°	Flat	–	J, M, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

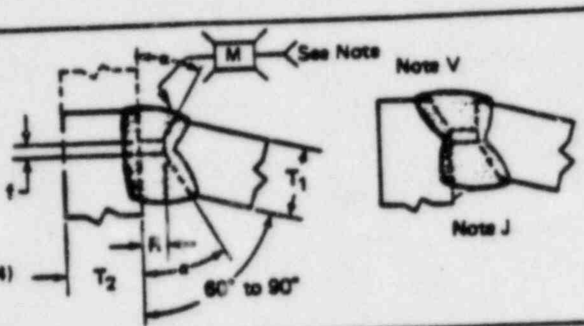
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Note Z: When lower plate is beveled, make the first root pass on this side.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Double-bevel-groove weld (5)
T-joint (T)
Corner joint (C)



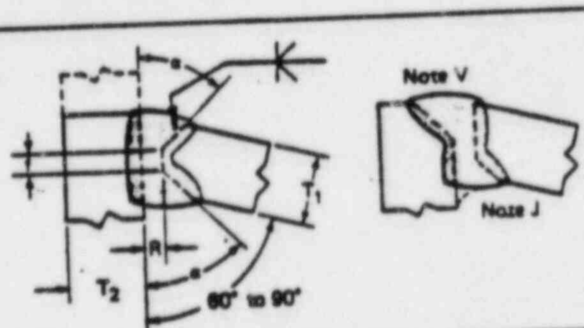
M = steel (see 8.2.4, 9.2.5, 10.2.4)

Note: Same steel as base metal

Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16, −0
f = +1/16, −0	Not limited
α = +10°, −0°	+10°, −5°
Spacer = ±0	+1/16, −0

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Root face	Groove angle			
SMAW	TC-U5c	U, preferably 5/8 or thicker Spacer = 1/8 X R	U	R = 1/4	f = 0 to 1/8	α = 45°	All	–	C, J, V, M
				R = 3/8	f = 0 to 1/8	α = 30°	F, OH	–	C, J, V, M

Double-bevel-groove weld (5)
T-joint (T)
Corner joint (C)



M = steel (see 8.2.4, 9.2.5, 10.2.4)

Note: Same steel as base metal

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Gas shielding for (FCAW)	Notes
				Root opening Root face Groove angle	Tolerances				
		T_1	T_2		As detailed (See 2.9.2)	As fit up (See 3.3.4)			
SMAW	TC-U5d	U, preferably 5/8 or thicker	U	R = 0 to 1/8 f = 0 to 1/8 α = 45°	+1/16, −0 +1/16, −0 +10°, −0°	+1/16, −1/8 Not limited +10°, −5°	All	–	C, J, V, M

Note C: Gouge root of joint before welding the other side.

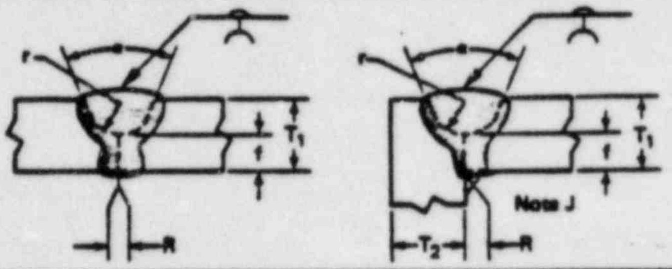
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

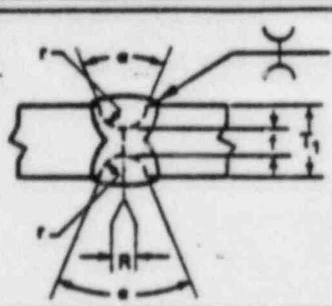
Single-U-groove weld (6)
Butt joint (B)
Corner joint (C)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/4, −1/16
e = +10°, −0°	+10°, −5°
f = ±1/16	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Root face	Groove radius	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	B-U6	U	U	R = 0° to 1/8	e = 45°	f = 1/8	r = 1/4	All	–	C
				R = 0° to 1/8	e = 20°	f = 1/8	r = 1/4	F,OH	–	C
	C-U6	U	U	R = 0° to 1/8	e = 45°	f = 1/8	r = 1/4	All	–	C,J
				R = 0° to 1/8	e = 20°	f = 1/8	r = 1/4	F,OH	–	C,J
GMAW FCAW	B-U6-GF	U	U	R = 0° to 1/8	e = 20°	f = 1/8	r = 1/4	All	Not req.	A,C
	C-U6-GF	U	U	R = 0° to 1/8	e = 20°	f = 1/8	r = 1/4	All	Not req.	A,C,J

Double-U-groove weld (7)
Butt joint (B)



Tolerances For B-U7 and B-U7-GF: As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
e = +10°, −0	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Tolerances For B-U7-S: As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = ±0	+1/16, −0
f = +0, −1/4	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening	Groove angle	Root face	Groove radius	Permitted welding positions*	Gas shielding for (FCAW)	Notes
SMAW	B-U7	U, preferably 5/8 or thicker	–	R = 0 to 1/8	a = 45°	f = 1/8	r = 1/4	All	–	C, M
				R = 0 to 1/8	a = 20°	f = 1/8	r = 1/4	F,OH	–	C, M
GMAW FCAW	B-U7-GF	U, preferably 5/8 or thicker	–	R = 0 to 1/8	e = 20°	f = 1/8	r = 1/4	All	Not required	A, C, M
SAW	B-U7-S	U	–	R = 0	e = 20°	f = 1/4 max	r = 1/4	F	–	M

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root of joint before welding the other side.

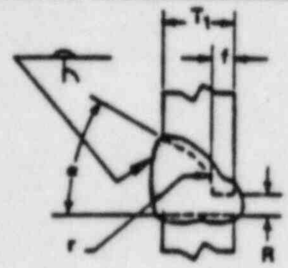
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1, but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1. *These fillet welds need not exceed 3/8 in.*

Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

*F = Flat, OH = Overhead

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

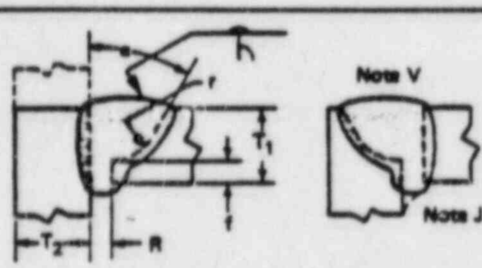
Single-J-groove weld (B) Butt joint (B)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
e = +10°,−0°	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	B-U8	U	–	R = 0 to 1/8	e = 45°	f = 1/8	r = 3/8	All	–	Br, C
GMAW FCAW	B-U8-GF	U	–	R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	All	Not required	A,Br,C

Single-J-groove weld (B) T-joint (T) Corner joint (C)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16,−0	+1/16,−1/8
e = +10°,−0°	+10°,−5°
f = +1/16,−0	Not limited
r = +1/4,−0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions*	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	TC-U8a	U	U	R = 0 to 1/8	e = 45°	f = 1/8	r = 3/8	All	–	C,J,V
				R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	F,OH	–	C,J,V
GMAW FCAW	TC-U8a-GF	U	U	R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	All	Not required	A, C, J, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note Br: Bridge application limits the use of these joints to the horizontal position (see 9.12.1.5).

Note C: Gouge root before welding other side.

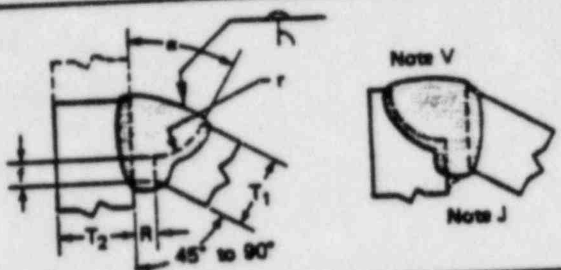
Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. Groove welds in corner and T-joints of bridges shall be reinforced with fillet welds equal to 1/4 T_1 but not more than 3/8 in.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

*F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

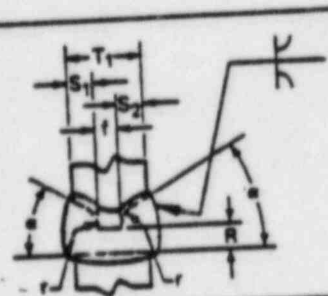
Single-J-groove weld (8)
T-joint (T)
Corner joint (C)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
α = +10°, −0°	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions*	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	TC-U8b	U	U	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	C,J,V
				R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	F,OH	–	C,J,V
GMAW FCAW	TC-U8b-GF	U	U	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A,C, J,V

Double-J-groove weld (9)
Butt joint (B)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
α = +10°, −0°	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	B-U9	U, preferably 5/8 or thicker	–	R = 0 to 1/8	α = 45°	f = 1/8	r = 3/8	All	–	Br, C, M
GMAW FCAW	B-U9-GF	U, preferably 5/8 or thicker	–	R = 0 to 1/8	α = 30°	f = 1/8	r = 3/8	All	Not required	A, Br, C, M

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note Br: Bridge application limits the use of these joints to the horizontal position (see 9.12.1.5).

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

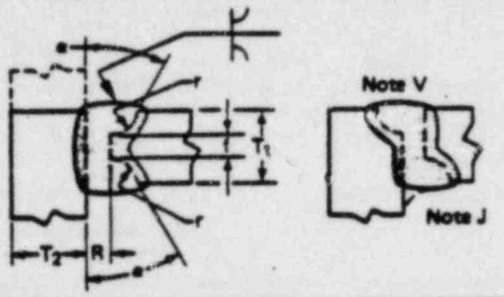
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

* F = Flat, OH = Overhead.

Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

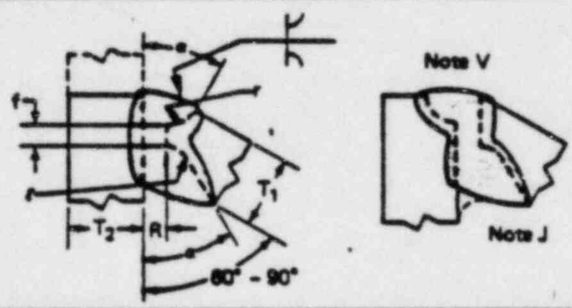
Double-J-groove weld (9)
T-joint (T)
Corner joint (C)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
e = +10°, −0°	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions	Gas shielding for FCAW	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	TC-U9a	U, preferably 5/8 or thicker	U	R = 0 to 1/8	e = 45°	f = 1/8	r = 3/8	All	–	C, J, M, V
				R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	F, OH	–	C, J, M, V
GMAW FCAW	TC-U9a-GF	U, preferably 5/8 or thicker	U	R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	All	Not required	A, C, J, M, V

Double-J-groove weld (9)
T-joint (T)
Corner joint (C)



Tolerances	
As detailed (see 2.9.2)	As fit up (see 3.3.4)
R = +1/16, −0	+1/16, −1/8
e = +10°, −0°	+10°, −5°
f = +1/16, −0	Not limited
r = +1/4, −0	±1/16

Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation				Permitted welding positions*	Gas shielding for (FCAW)	Notes
		T_1	T_2	Root opening	Groove angle	Root face	Groove radius			
SMAW	TC-U9b	U, preferably 5/8 or thicker	U	R = 0 to 1/8	e = 45°	f = 1/8	r = 3/8	All	–	C, J, M, V
				R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	F, OH		
GMAW FCAW	TC-U9b-GF	U, preferably 5/8 or thicker	U	R = 0 to 1/8	e = 30°	f = 1/8	r = 3/8	All	Not required	A, C J, M, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note C: Gouge root before welding other side.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

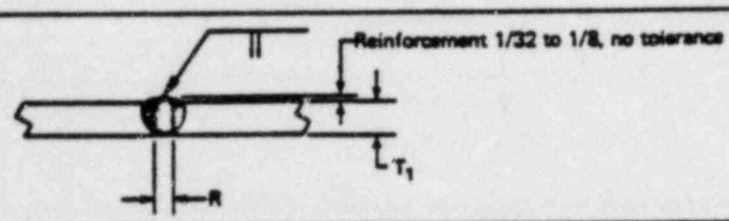
Note M: Double-groove welds may have grooves of unequal depth, but the depth of the shallower groove shall be no less than one-fourth of the thickness of the thinner part joined.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

* F = Flat, OH = Overhead.

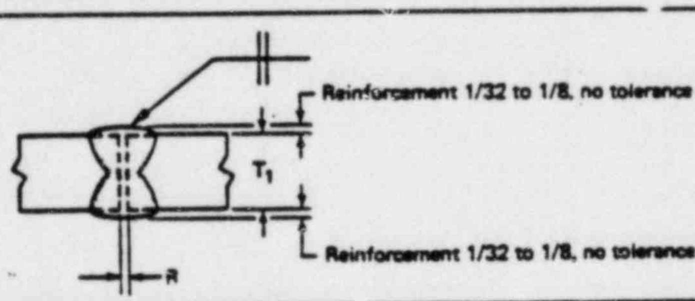
Fig. 2.9.1 (continued)—Prequalified complete joint penetration groove welded joints

Square-groove weld (1)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Effective throat (E)	Notes
					Tolerances				
		T_1	T_2	Root opening	As detailed (see 2.10.2)	As fit up (see 3.3.4)			
SMAW	B-P1a	1/8	–	R = 0 to 1/16	+1/16, –0	±1/16	All	T_1	B
	B-P1c	1/4 max	–	$R = \frac{T_1}{2}$ min	+1/16, –0	±1/16	All	$\frac{3T_1}{4}$	B

Square-groove weld (1)
Butt joint (B)

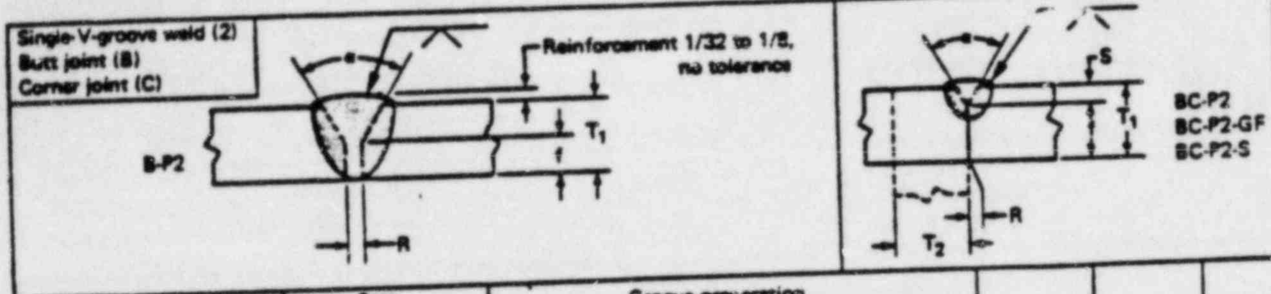


Welding process	Joint designation	Base metal thickness (U = unlimited)		Groove preparation			Permitted welding positions	Effective throat (E)	Notes
					Tolerances				
		T_1	T_2	Root opening	As detailed (see 2.10.2)	As fit up (see 3.3.4)			
SMAW	B-P1b	1/4 max	–	R = 0 to 1/16	±0	+3/16 see also 3.3.2	All	T_1	C2

Note B: Joints welded from one side. These welds are not applicable to bridges.

Note C2: Root need not be gouged before welding second side. This weld is not applicable to bridges.

Fig. 2.10.1—Prequalified partial joint penetration groove welded joints



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening / Root face / Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P2	1/2 max	–	R = 3/32 min f = 0 to 1/8 α = 60°	±1/16 ±1/16 +10°, –0°	±1/16 ±1/16 +10°, –5°	All	T_1	B, L
SMAW	BC-P2	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min α = 60°	±0 ±1/16 +10°, –0°	+1/16, –0 ±1/16 +10°, –5°	All	S	E, L
GMAW FCAW	BC-P2-GF	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min α = 60°	±0 ±1/16 +10°, –0°	+1/16, –0 ±1/16 +10°, –5°	All	S	A, E, L
SAW	BC-P2-S	7/16 min	U	R = 0 f = 1/4 min α = 60°	±0 ±1/16 +10°, –0°	+1/16, –0 ±1/16 +10°, –5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

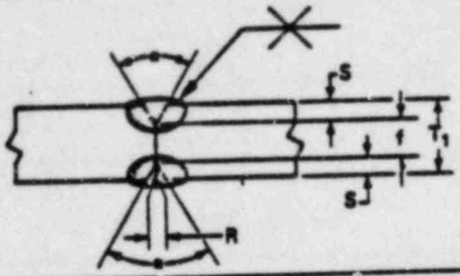
Note B: Joint is welded from one side only.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

Note L: Butt and T-joints are not prequalified for bridges.

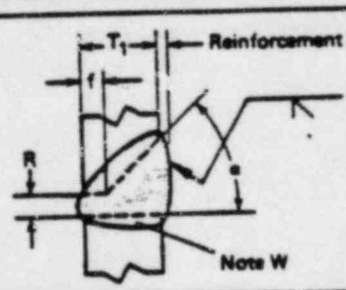
Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Double-V-groove weld (3)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening, Root face, Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P3	1/2 min	–	R = 0 f = 1/8 min α = 60°	+1/16,–0 –0 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	S	E, L Mp
GMAW FCAW	B-P3-GF	1/2 min	–	R = 0 f = 1/8 min α = 60°	+1/16,–0 –0 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	S	E, L Mp
SAW	B-P3-S	3/4 min	–	R = 0 f = 1/4 min α = 60°	±0 –0 +10°,–0°	+3/16,–0♦ ±1/16 +10°,–5°	Flat	S	E, L Mp

Single-bevel-groove weld (4)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening, Root face, Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P4, TC-P10	1/2 max	–	R = 3/32 min f = 0 to 1/8 α = 45°	R = min ±1/16 +10°,–0°	±1/16 ±1/16 +10°,–5°	All	T_1	B, L, W

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note B: Joint is welded from one side only.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

Note L: Butt and T-joints are not prequalified for bridges.

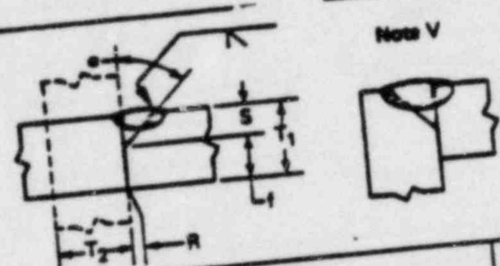
Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also the effective throat (E), less any reduction, applies individually to each groove.

Note W: Unbeveled face is the lower edge for horizontal position.

♦ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Single-bevel-groove (4)
Butt joint (B)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening, Root face, Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions*	Effective throat (E)	Notes
SMAW	BTC-P4	7/16 min (for bridges 1/2 min)	U	R = 0 f = 1/8 min α = 45°	+1/16, −0 −0 +10°, −0	±1/16 ±1/16 +10°, −5°	All	S − 1/8	E, L, V
GMAW FCAW	BTC-P4-GF	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min α = 45°	+1/16, −0 −0 +10°, 0°	±1/16 ±1/16 +10°, −5°	F, H V, OH	S S − 1/8	A, E, L, V
		7/16 min							
SAW	TC-P4-S	7/16 min (for bridges 1/2 min)	U	R = 0 f = 1/4 min α = 60°	±0 −0 +10°, −0°	+3/16, −0† ±1/16 +10°, −5°	Flat	S	E, L, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

Note L: Butt and T-joints are not prequalified for bridges.

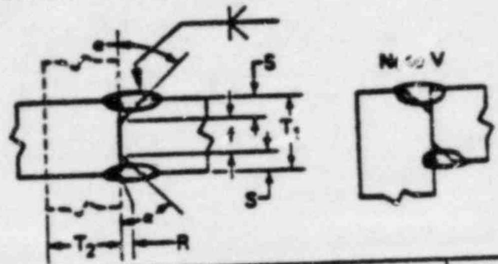
Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

† Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

* F = Flat, H = Horizontal, V = Vertical, OH = Overhead.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Double-bevel-groove weld (5)
Butt joint (B)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening Root face Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions*	Effective throat (E)	Notes
SMAW	BTC-P5	3/4 min (for bridges 1/2 min)	U	R = 0 f = 1/8 min α = 45°	+1/16,−0 −0 +10°,−0°	±1/16 ±1/16 +10°,−5°	All	S −1/8	E, L, Mp, V
GMAW FCAW	BTC-P5-GF	1/2 min (for bridges 5/8 min)	U	R = 0 f = 1/8 min α = 45°	+1/16,−0 −0 +10°,−0°	±1/16 ±1/16 +10°,−5°	F,H	S	A, E, L, Mp, V
		3/4 min					V,OH	S −1/8	
SAW	TC-P5-S	3/4 min (for bridges 7/8 min)	U	R = 0 f = 1/4 min α = 60°	±0 −0 +10°,−0°	+3/16,−0♦ ±1/16 +10°,−5°	Flat	S	E, L, Mp, V

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

Note L: Butt and T-joints are not prequalified for bridges.

Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

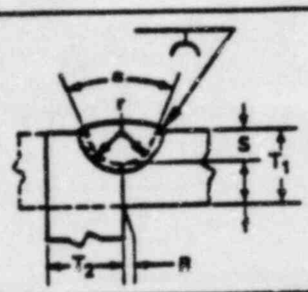
Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

♦ Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

* F = Flat, H = Horizontal, V = Vertical, OH = Overhead.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Single-U-groove weld (6)
Butt joint (B)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T	Groove preparation: Root opening Root face Groove radius Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	BC-P6	1/4 min (for bridges 5/16 min)	U	R = 0 to 1/8 f = 1/8 min r = 1/4 α = 45°	+1/16,–0 –0 +1/4,–0 +10°,–0°	±1/16 ±1/16 ±1/16 +10°,–5°	All	S	E, L
GMAW FCAW	BC-P6-GF	1/4 min (for bridges 5/16 min)	U	R = 0 f = 1/8 min r = 1/4 α = 20°	+1/16,–0 –0 +1/4,–0 +10°,–0°	±1/16 ±1/16 ±1/16 +10°,–5°	All	S	A, E, L
SAW	BC-P6-S	7/16 min (for bridges 1/2 min)	U	R = 0 f = 1/4 min r = 1/4 α = 20°	±0 –0 +1/4,–0 +10°,–0°	+3/16,–0* ±1/16 ±1/16 +10°,–5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

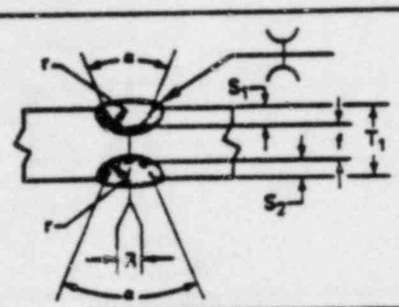
Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

Note L: Butt and T-joints are not prequalified for bridges.

* Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued) – Prequalified partial joint penetration groove welded joints

Double-V-groove weld (7)
Butt joint (B)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening, Root face, Groove radius, Groove angle	Tolerances: As detailed (see 2.10.2)	As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-P7	1/2 min (for bridges 5/8 min)	–	R = 0 to 1/8 f = 1/8 min r = 1/4 α = 45°	+1/16,–0 –0 +1/4,–0 +10°,–0°	±1/16 ±1/16 ±1/16 +10°,–5°	All	S	E, L, Mp
GMAW FCAW	B-P7-GF	1/2 min (for bridges 5/8 min)	–	R = 0 f = 1/8 min r = 1/4 α = 20°	+1/16,–0 –0 +1/4,–0 +10°,–0°	±1/16 ±1/16 ±1/16 +10°,–5°	All	S	A, E, L, Mp
SAW	B-P7-S	3/4 min (for bridges 7/8 min)	–	R = 0 f = 1/4 min r = 1/4 α = 20°	±0 –0 +1/4,–0 +10°,–0°	+3/16,–0* ±1/16 ±1/16 +10°,–5°	Flat	S	E, L, Mp

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

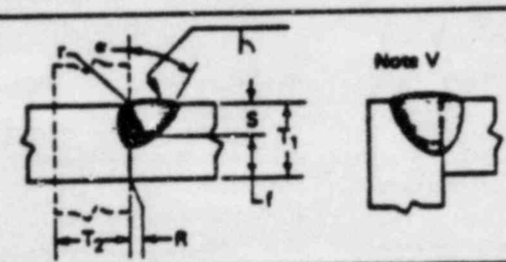
Note L: Butt and T-joints are not prequalified for bridges.

Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

* Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Single-J-groove weld (B)
Butt joint (B)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T1	T2	Groove preparation: Root opening / Root face / Groove radius / Groove angle	Tolerances: As detailed (see 2.10.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	BTC-P8	1/4 min (for bridges 5/16 min)	U	α = 45°	+10°,−0°	+10°,−5°	All	S	E, L, V
				R = 0 to 1/8 f = 1/8 min r = 3/8	+1/16,−0 −0 +1/4,−0	±1/16 ±1/16 ±1/16			
GMAW FCAW	BTC-P8-GF	1/4 min (for bridges 5/16 min)	U	α = 30°	+10°,−0°	+10°,−5°	All	S	A, E, L, V
SAW	C-P8-S	7/16 min (for bridges 1/2 min)	U	α = 20°	+10°,−0°	+10°,−5°	Flat	S	E, V
				R = 0 f = 1/4 min r = 1/2	±0 −0 +1/4,−0	+3/16,−0 * ±1/16 ±1/16			
SAW	T-P8-S	7/16 min	U	α = 45°	+10°,−0°	+10°,−5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

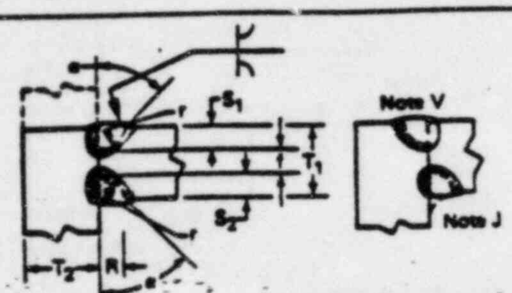
Note L: Butt and T-joints are not prequalified for bridges.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

* Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

Double-J-groove weld (9)
Butt joint (B)
T-joint (T)
Corner joint (C)



Welding process	Joint designation	Base metal thickness (U = unlimited) T_1	T_2	Groove preparation: Root opening, Root face, Groove radius, Groove angle	Tolerances: As detailed (see 2.9.2)	Tolerances: As fit up (see 3.3.4)	Permitted welding positions	Effective throat (E)	Notes
SMAW	B-TC-P9	1/2 min (for bridges 5/8 min)	U	R = 0 to 1/8 f = 1/8 min r = 3/8 α = 45°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	E, L, J, V
GMAW FCAW	BTC-P9-GF	1/2 min (for bridges 5/8 min)	U	R = 0 f = 1/8 min r = 3/8 α = 30°	+1/16,−0 −0 +1/4,−0 +10°,−0°	±1/16 ±1/16 ±1/16 +10°,−5°	All	S	A, E, L, V, J
SAW	C-P9-S	3/4 min (for bridges 7/8 min)	U	α = 20°	+10°,−0°	+10°,−5°	Flat	S	E, V, J
				R = 0 f = 1/4 min r = 1/2	±0 −0 +1/4,−0	+3/16,−0• ±1/16 ±1/16			
	T-P9-S	3/4 min	U	α = 45°	+10°,−0°	+10°,−5°	Flat	S	E, L

Note A: Not prequalified for gas metal arc welding using short circuiting transfer. Refer to Appendix D.

Note E: Minimum effective throat (E) as shown in Table 2.10.3; S as specified on drawings.

Note J: If fillet welds are used in buildings to reinforce groove welds in corner and T-joints, they shall be equal to 1/4 T_1 but need not exceed 3/8 in. The reinforcement of groove welds in corner joints, when required, and T-joints in bridges shall be made with fillet welds equal to 1/4 T_1, but need not exceed 3/8 in.

Note L: Butt and T-joints are not prequalified for bridges.

Note Mp: Double-groove welds may have grooves of unequal depth, provided they conform to the limitations of Note E. Also, the effective throat (E), less any reduction, applies individually to each groove.

Note V: For corner joints, the outside groove preparation may be in either or both members, provided the basic groove configuration is not changed and adequate edge distance is maintained to support the welding operations without excessive edge melting.

• Fit-up tolerance, SAW: see 3.3.2; for rolled shapes R may be 5/16 inches in thick plates if backing is provided.

Fig. 2.10.1 (continued)—Prequalified partial joint penetration groove welded joints

No. HR- 21

Corrective Action & Disposition of Hanger Reinspection

[no attached report ws]

Hanger No. 7021-EC2357

Hanger Ispection Report # 150

Detail rework required listed below:

1. Correct undersize weld - See detail (B) of the attached report — [signature] QA Accept

2. ______ QA Accept

3. ______ QA Accept

4. ______ QA Accept

5. ______ QA Accept

6. ______ QA Accept

7. ______ QA Accept

8 ______ QA Accept

[signature] 32/68 — Completed by — 1/28/81 Date

R. Rohletter — Issued To — 1/20/81 Date — [signature] QA Accepted By — 1/28/81 Date

[redacted]

P. O. Box 101, New Hill, N. C. 27562
March 31, 1983

Mr. James P. O'Reilly NRC-52
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest (Suite 3100)
Atlanta, Georgia 30303

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
1986-90 - 900,000 KW - UNITS 1 & 2
SEISMIC CLASS 1 ELECTRICAL, HVAC AND CONDUIT
SUPPORTS INSTALLED AND ACCEPTED THAT WERE NOT
IN ACCORDANCE WITH DESIGN, ITEM 119

Dear Mr. O'Reilly:

On March 3, 1983, Mr. N. J. Chiangi notified the NRC (Mr. A. Hardin) of a potentially reportable item per the provisions of 10CFR50.55(e). The NRC was informed that Seismic Class 1 Electrical, HVAC and Conduit Supports were fabricated and installed on site and accepted by a Quality Control inspector, no longer with CP&L, that were not in accordance with design documents. There are approximately 900 items which are suspect. This item is still being evaluated for reportability and to determine acceptability or extent of corrective action required. These evaluations are expected to be complete by May 16, 1983. For this reason, we request an extension until June 1, 1983 for submitting a report on the reportability of this item.

Thank you for your consideration in this matter.

Yours very truly,

R. M. Parsons
Project General Manager
Shearon Harris Nuclear Power Plant

RMP/sh

cc: Mr. G. Maxwell (NRC-SHNPP)
Mr. V. Stello (NRC)

bcc: Mr. H. R. Banks	Mr. G. L. Forehand
Mr. N. J. Chiangi	Mr. C. H. Moseley
Mr. W. J. Hurford	Mr. S. Hinnant
Mr. A. B. Cutter	Dr. T. S. Elleman
Mr. L. I. Loflin	Mr. M. F. Thompson
Mr. M. A. McDuffie	Mr. J. Nevill
Mr. R. M. Parsons	Mr. H. W. Bowles
Mr. Sheldon D. Smith	Dr. J. D. E. Jeffries

FORM 21-50M

CP&L
Carolina Power & Light Company

Raleigh, N. C. 27602

COPY

E & C QA
MAR 25 1982

March 24, 1982

CLM [illegible] 3/25/82
LGD [illegible] 3/25
JVG [illegible] 3/29/82

File: SH N-2/18
Item 72

CQAD 82-519

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest
Atlanta, Georgia 30303

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
UNDERSIZED SKEWED TEE FILLET WELDS ON SEISMIC I PIPE HANGERS

Dear Mr. O'Reilly:

On February 24, 1982, the NRC (Mr. T. Landis) was notified by Carolina Power & Light Company (Mr. N. J. Chiangi) of an item considered potentially reportable per the provisions of 10CFR50.55(e) and 10CFR21. The NRC was informed that certain skewed tee welds on previously accepted Seismic I pipe hangers were subsequently found to be rejectable due to undersize welds.

The intent of this letter is to inform you that Carolina Power & Light Company has not been able to complete its evaluation concerning this matter since all reinspections have not been completed to determine the scope of the problem. Bergen-Paterson and CP&L QC inspectors have been made aware of the correct method of measuring skewed tee welds and Ebasco vendor surveillance and site receiving QA inspectors have been alerted to this problem.

Due to the amount of reinspection involved, it is now anticipated that the completion of the reportability evaluation will be accomplished by November 15, 1982, at which time, the NRC will be informed of the results. Completion of corrective action will depend on the results of the evaluations and extent of corrective action required. Once the item is deemed reportable, the NRC will be so notified and the projected date of completion of corrective action and final report provided through submittal of an interim letter.

Thank you for your consideration in this matter.

CLM/mt

Yours very truly,

Original Signed By
N. J. Chiangi

N. J. Chiangi - Manager
Engineering & Construction
Quality Assurance/Quality Control

CLM/mt

cc: Mr. G. Maxwell
Mr. V. Stello (2)

bcc: Mr. H. R. Banks
Mr. N. J. Chiangi
Mr. A. B. Cutter
Mr. C. R. Dietz
Dr. T. S. Elleman
Mr. G. L. Forehand
Mr. T. L. Harrington
Mr. E. Harris
Mr. S. Hinnant
Mr. P. W. Howe
Mr. L. I. Loflin
Mr. A. M. Lucas
Mr. M. A. McDuffie
Mr. C. H. Moseley
Mr. R. M. Parsons
Mr. Sheldon D. Smith
Mr. R. B. Starkey

FORM 21-100M

CP&L
Carolina Power & Light Company
Raleigh, N. C. 27602

COPY

September 13, 1982

FILE: SH N-2/18
ITEM 96

CQAD 82-1530

E & C QA
SEP 15 1982

ROUTE TO	INITIALS	DATE
CEM	CEM	9/29
LC	[illegible]	[illegible]

Mr. James P. O'Reilly
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, Northwest
Atlanta, Georgia 30303

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400
SEISMIC PIPE HANGERS PREVIOUSLY ACCEPTED BY
QC WELDING INSPECTOR

Dear Mr. O'Reilly:

Attached is an interim report on the subject item which was deemed reportable per the provisions of 10CFR50.55(e) on August 13, 1982. CP&L is pursuing this matter, and it is currently projected that corrective action and submission of the final report will be accomplished by July 1, 1983.

Thank you for your consideration in this matter.

Yours very truly,

Original Signed By
N. J. Chiangi

N. J. Chiangi - Manager
Engineering & Construction
Quality Assurance/Quality Control

NJC/gea (212)
Attachment

cc: Mr. G. Maxwell W/A
Mr. V. Stello

bcc: Mr. H. R. Banks W/A
Mr. D. L. Bensinger/HI/A-2D W/A
Mr. A. B. Cutter W/A
Mr. C. R. Dietz W/A
Dr. T. S. Elleman W/A
Mr. G. L. Forehand (2) W/A
Mr. T. L. Harrington W/A
Mr. E. Harris W/A
Mr. S. Hinnant W/A
Mr. P. W. Howe W/A
Mr. L. I. Loflin W/A
Mr. A. M. Lucas W/A
Mr. M. A. McDuffie W/A
Mr. C. H. Moseley, Jr. W/A
Mr. R. M. Parsons W/A
Mr. Sheldon D. Smith W/A
Mr. R. B. Starkey, Jr. W/A
File

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT

UNIT NO. 1

PIPE HANGERS PREVIOUSLY ACCEPTED BY QC WELDING INSPECTORS

Interim Report
September 8, 1982

Reportable Under 10CFR50.55(e)

SUBJECT:	Deficient field welds on pipe hangers previously accepted by QC welding inspectors.
ITEMS:	Seismic pipe hangers.
SUPPLIED BY:	N/A - Hangers furnished by Bergen-Paterson, but problem deals with field welds.
NATURE OF DEFICIENCY:	1. Missing and undersized welds 2. Cosmetic weld defects 3. Inaccurate and incomplete QC documentation 4. QC inspections performed by personnel whose work was suspect 5. Poor workmanship
DATE PROBLEM OCCURRED:	Prior to July 29, 1982
DATE PROBLEM REPORTED:	August 13, 1982 - CP&L (N. J. Chiangi) notified the NRC (A. Hardin) that this item was reportable under the provisions of 10CFR50.55(e).
SCOPE OF PROBLEM:	Pipe hangers having field welds were found to be unacceptable. Per the letter submitted on August 13, 1982, 38 hangers were identified as being unacceptable. Since that time approximately 140 additional hangers have been identified as having weld deficiencies. As a result of the increase in problems it is thought that the hanger program needs extensive evaluation. For this reason, approximately 4000 seismic pipe hangers must be reinspected to ensure all identified problems are corrected.

<u>Note</u>

The scope of the reinspection will include undersized skewed-tee welds which were found to be potentially reportable (see CQAD 82-519 dated 3/24/82) and the deficient shop welds which were reportable (see NPED-821332 dated 8/10/82).

SAFETY IMPLICATION: Deficient welds could cause a pipe hander supporting a safety-related pipe to fail under seismic conditions. As a result, this could adversely affect the safe operation of this facility.

REASON THE DEFICIENCY IS REPORTABLE: The deficiencies represent a breakdown in the QA program as well as deficiencies in construction.

CORRECTIVE ACTION:

1. Have prepared a pipe hanger inspection/ documentation procedure (QCI 19.3).
2. Continuing to hold training classes with both craft and inspection personnel.
3. NDEP-601 is being revised so that visual inspection criteria for pipe hangers will comply with AWS D.1.1.
4. Have begun routine surveys performed by QC Supervisor on each QC inspector's field work to ensure that the inspector complies with the QC procedures.
5. Each inspector's paper work is being reviewed on a routine basis.
6. Documentation has been reviewed identifying hangers requiring reinspection. Preparations are in process for hanger reinspection, reworking - if required, and correctly documenting all affected seismic pipe hangers.

FINAL REPORT: A final report will be issued once the corrective action described above has been completed. It is projected that the submittal date is July, 1983.

FCR etc

41-3(e)

APF-00[illegible]
Rev. 27
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

ORIGINAL

AP-IX-05
Exhibit 1
Page 1 of 2

~~FC~~/PW -AS-380

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☐ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: Angle Iron Connections for Cable tray, Conduit, and HVAC Hangers + supports ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment All structural steel HVAC, Conduit and cable tray Hangers and Hanger support Drawings (ATTACHMENT A)

EBASCO structural connection details Typically call for three sides to be welded on angle iron connections. Typically the drawings will call for a certain size weld on the two parallel sides and the end (see attachment A sheet 1 of 2 for Definitions) There are cases in the field when the constructor has welded the two parallel sides and the side opposite the end.

Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

In such cases where the parallel sides and the side opposite the end are welded with the proper size weld required by the drawing and when the length of the weld on the ~~end (as called ...)~~ side opposite the end is equal to or greater than the length of the weld on the end ~~is equal to or greater~~ (as called for in the drawings), allow the field to accept for use as is.

Uncontrolled Copy
FOR INFORMATION ONLY

Justification: [By EBASCO]; PROPOSED RECOMMENDED ACTION WILL NOT JEOPARDIZE THE INTEGRITY OF THE STRUCTURE.

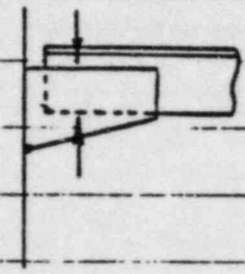
Requested by:		Site Approval:	
Charles S. French	1/9/81	C. S. Hinnant	1-11-81
Discipline Engineer	Date	Senior Resident Engineer	Date

First Distribution:
(Original) Design Organization
(Copy) Chuck French
(Copy) Vic Satarian
(Copy) R. Rohlotter
(Copy)

DOCUMENT CONTROL
RECEIVED
MAR 5 1981
SHEARON HARRIS

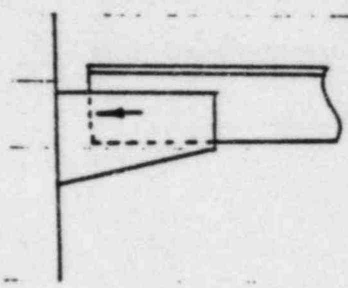
Definitions of sides to be welded

PW-AS-380

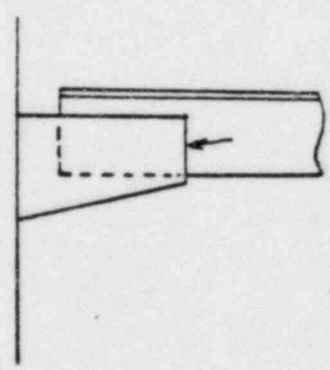


Arrows Indicate Parallel sides

Attachment A
Sht. 1 of 2



Arrow Indicates End



Arrow indicates Side opposite of End

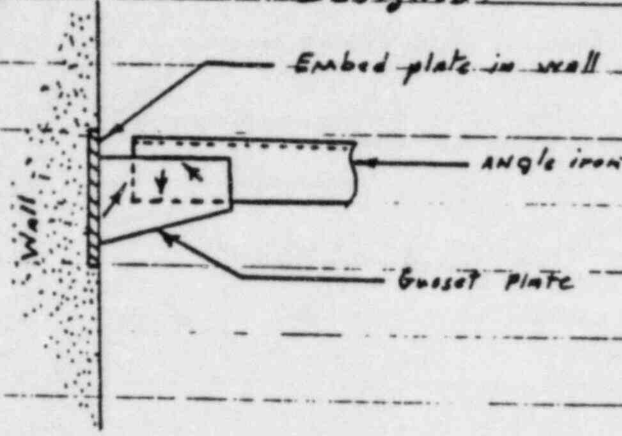
CASE 1

Designed:

RW AS-380

Short Arrows indicate sides welded

Attachment A
Sht. 2 of 2



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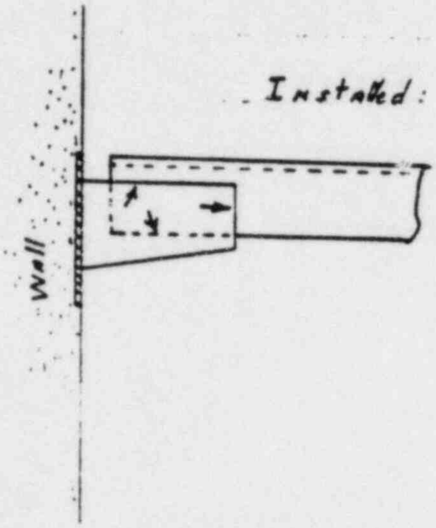


Short Arrows indicate sides welded

APF-001
Rev. 7
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of 4

FCR/PW AS 372 Rev 1

ORIGINAL

Type of Request: ☐ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☒ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: Seismic ~~& Nonseismic~~ HVAC, Conduit Cable Tray, ~~Bus Duct Support~~ HANGERS. Erection of hangers with gaps between embedded strip plates ☒ Q ☐ Non-Q CLT 1/14/81

Conflict/Condition

Reference Documents or Attachment All conduit, cable tray, HVAC, bus duct support hanger drawings

Uncontrolled Copy
FOR INFORMATION ONLY

See attached continuation sheet

VOID
DO NOT USE FOR CONSTRUCTION
Date 2-19-82 By FCR-AS-372R2 DW

Recommended Action: ☐ Please Investigate and Resolve
☐ Please Resolve as Follows

See attached continuation sheet

SEE EBASCO COMMENTS ON PG. 2 OF 4

DOCUMENT CONTROL
RECEIVED
MAR 10 1981
SHEARON HARRIS N. P. P.

Justification: Recommended action will not compromise the structural integrity of the support hangers
Justification By Ebasco

Requested by: [signature] 1/13/81
Discipline Engineer Date

Site Approval: C S Hinnant for AML 1-13-81
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy) Chuck French
(Copy) R. Rohletter
(Copy)
(Copy)

2
10

Continuation Sheet

Conflict / Condition

There exist in the field conditions where the embed design drawings call for specific lengths of embedded plates. In a majority of cases, the total lengths of the embedded plates are obtained by using a combination of shorter plates end to end. Using this type of construction practice, invariably a certain size gap always exists between the embedded plates. In certain areas, in locating the gusset plates to the embed plates to attach a support hanger, the gusset plates needs to be welded across the gap between the two adjoining embedded plates. What is the minimum space allowed between the embedded plates before it becomes necessary to use a bridging plate, and what is the maximum distance between the embedded plates allowed before a bridging plate is no longer permissible?

Recommended Action

(Option #1)

Allow the field to use a 1" x 5½" x 6¼" bridging plate for a W1 or C1 embedded strip plate, 1" x 7½" x 6¼" bridging plate for a W2 or C2 embedded strip plate if the minimum distance between the adjoining plates is ¼ of an inch, and a maximum distance of one inch between the adjoining plates. A minimum of three inches of bridging plate shall be welded to each adjoining embed, and where necessary, the attaching members shall be shortened by one inch to compensate for the one inch thick bridging plate. A DCN should be initiated to incorporate this FCR to drawing CAR-2168-G-6091

BY: DATE

CHKD. BY DATE

POWER PLANT CONSTRUCTION

COMPUTATION SHEET

SHEET 4 OF 4

DEPT.

SUBJECT

FCR-AS-372 Rev 1

FORM NO. 1630

(Option #2)

An alternative for construction to option #1 with the same conflict/conditions as stated above is to replace the design size gusset plate to the size required in order to make up for the gap between the adjoining embedded strip plates. For example if a 3/8" gap exists between adjoining strip plates and the design drawings require a 6" x 7" long gusset plate, replace this gusset plate with one that is 6 3/8" x 7". This option is to be used whenever there is a gap between adjoining embedded strip plates of 1/4" or more up to a maximum of one inch.

APF-001
Rev. 17
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of 2

ORIGINAL

FCR/PW 45-356

Type of Request: ☐ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☒ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: ☒ Q ☐ Non-Q

All Areas Involving Seismic Conduit And Cable Tray Hangers

Conflict/Condition

Reference Documents or Attachment All Pedon Steel Seismic Conduit And Tray Hanger Erection Dwgs - SHP45, FCR E-078

On sect. A and sect. B of FCR E-078 there are welding symbols indicating the need for square welds to be used for the connection of the 1/4" gusset plates to the vertical angle. The field is having difficulties in executing this particular type of weld.

Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

Allow the field to use a single beveled full penetration weld in place of the square weld.

Uncontrolled Copy
FOR INFORMATION ONLY

DOCUMENT CONTROL
RECEIVED
JAN 23 1981
SHEARON HARRIS N. P. P.

Justification:

Weld change will not compromise the structual integrity of the welded connections.

Requested by: [signature] 12/18/80
Discipline Engineer Date

Site Approval: C S Hinnant [signature] 12-18-80
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy) Chuck French
(Copy) R. Roslatter
(Copy)
(Copy)

APF-001
Rev. 17
11/6/80

ORIGINAL

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of ~~2~~3

FCR/PW A-354

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☐ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: Cable Tray, Conduit, And HVAC hanger Supports (Angle Iron Connections) ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment: Car 2168-G-7000 Series (7001-7199)

EBASCO structural connection details typically call for three sides to be welded on angle iron connections. Typically the drawings call for a 3/16" weld on the two parallel sides and the end. (See attachment sheet 3 of 3 for definitions of "end", "parallel sides", and "side opposite end")

There are cases in the field where the Constructor has welded the two parallel sides and the side opposite the end. See typical case 1, 2, and 3 on Attached sheet 3 of 3

Recommended Action: ☐ Please Investigate and Resolve ☒ Please Resolve as Follows

In such cases where the parallel sides and the side opposite the end are welded (3/16" weld as called for) and when the length of the weld on the side opposite the end is equal to or longer than the length (called for by the drawings) of the weld on the end, allow the field to accept for use as is.

Uncontrolled Copy
FOR INFORMATION ONLY

Justification: [By EBASCO]; RECOMMENDED ACTION WILL NOT JEOPARDIZE THE INTEGRITY OF THE STRUCTURE.

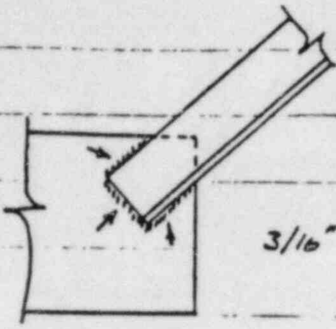
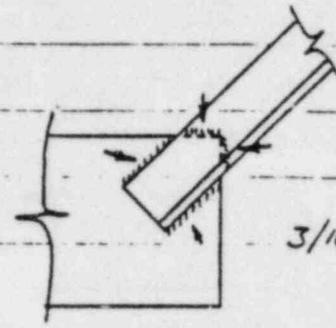
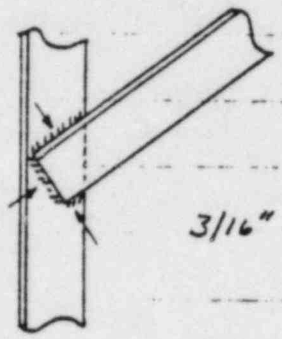
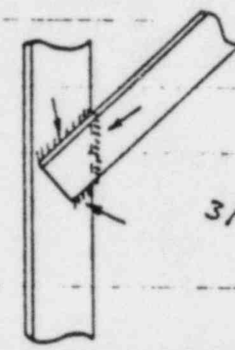
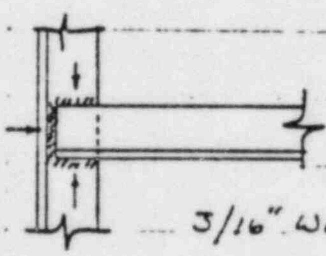
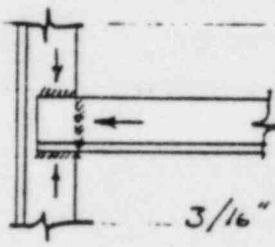
Requested by: CS Hinnant 12-12-80
Discipline Engineer — Date

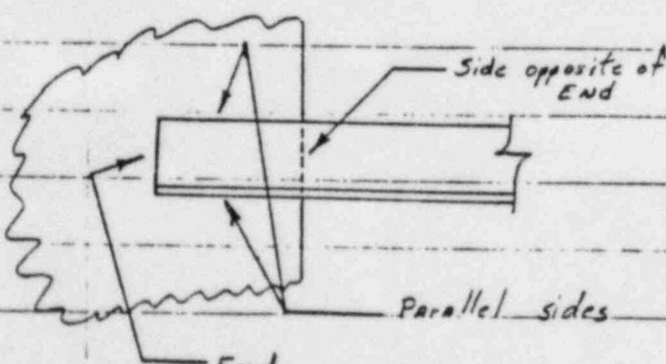
Site Approval: CS Hinnant for PML 12-12-80
Senior Resident Engineer — Date

First Distribution:
(Original) Design Organization
(Copy) Jack French
(Copy) R. [illegible]
(Copy)
(Copy)

DOCUMENT CONTROL
RECEIVED
FEB 2 1981
SHEARON HARRIS N. P. P.

2
9

	Designed	Proposed
CASE 1	 3/16" weld	 3/16" weld
CASE 2	 3/16" weld	 3/16" weld
Case 3	 3/16" weld	 3/16" weld



Definition: End, Parallel sides, & Side opposite of end.

3 of 3
12-16-88 T.K. PW-AS-354

Note: Arrows indicate sides welded — Attachment sheet 3 of 3

APP-001
Rev. 17
11/6/80

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DEC 17 1980

AP-IX-03
Exhibit 1

FCR-AS-350

Design Organization Approval (AE) ☒ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG

Comments:

Nicholas C. Tassoulos AE 2/26/81 — Walt [signature] PE 2/26/81

Signature Title Date — Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

[signature] 3/3/81 — [signature] 3/3/81

Discipline Engineer Date — MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

[signature] for AHL 3-4-81
Senior Resident Engineer Date

Second Distribution:
(Original) Document Control — (Copy)
(Copy) — (Copy)
(Copy) — (Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

Comments:

[signature] 5/8/81
Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control — (Copy)
(Copy) — (Copy)
(Copy) — (Copy)

RECEIVED
DEC 18 1980
M. WEBER
CIVIL ENGINEERING DEPT.

Continuation Sheet

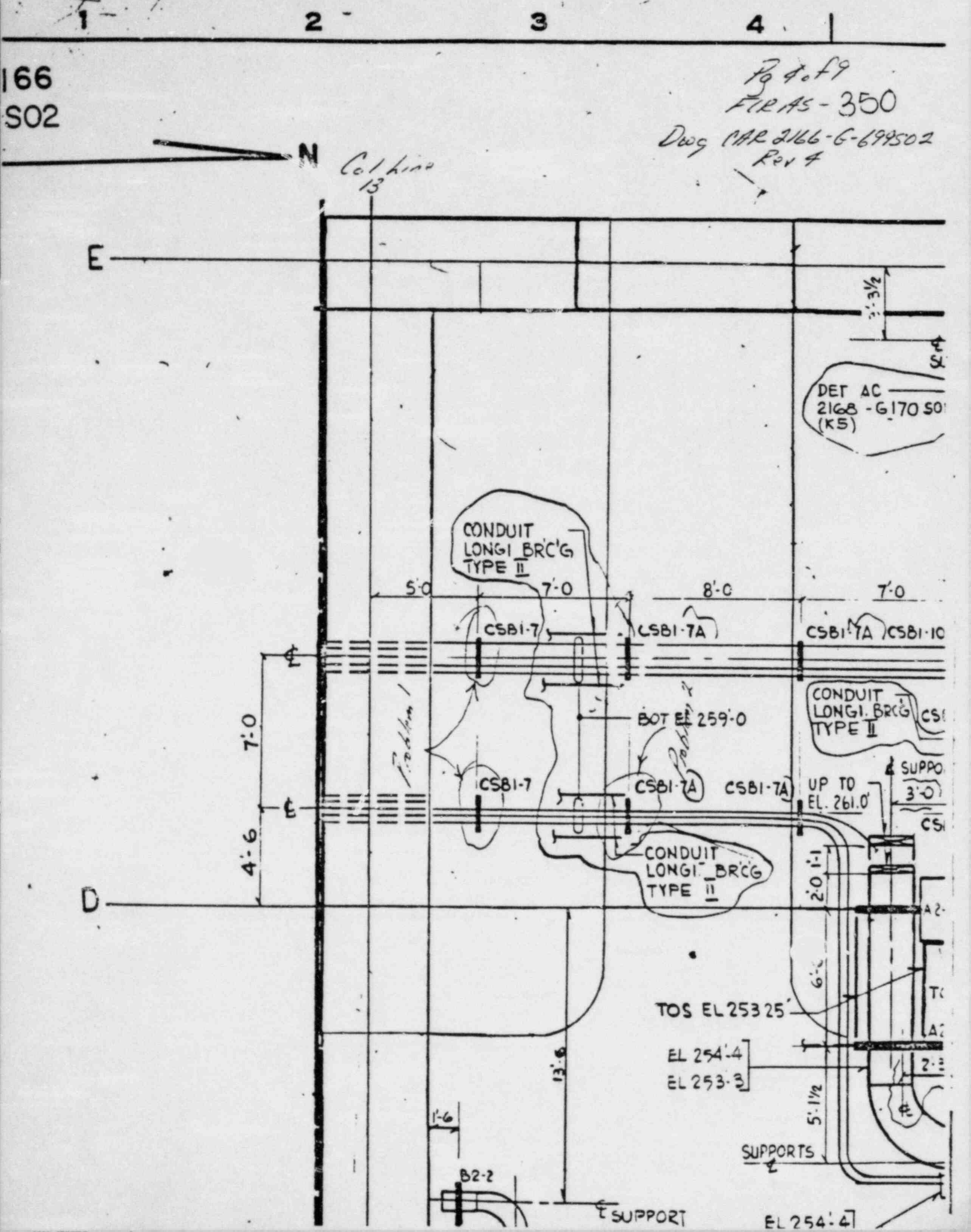
Conflict/Condition

Problem #1) The field is having difficulties installing two CSB1-7 conduit support hangers as per DCN ~~446~~ 560 -083 to the correct elevation due to the diagonal bracing coming in contact with the bottom of the C6×10.5×9'-10" long channel. Channel location is five feet from column line 13. See page 4, for hanger location and page 5, for hanger detail

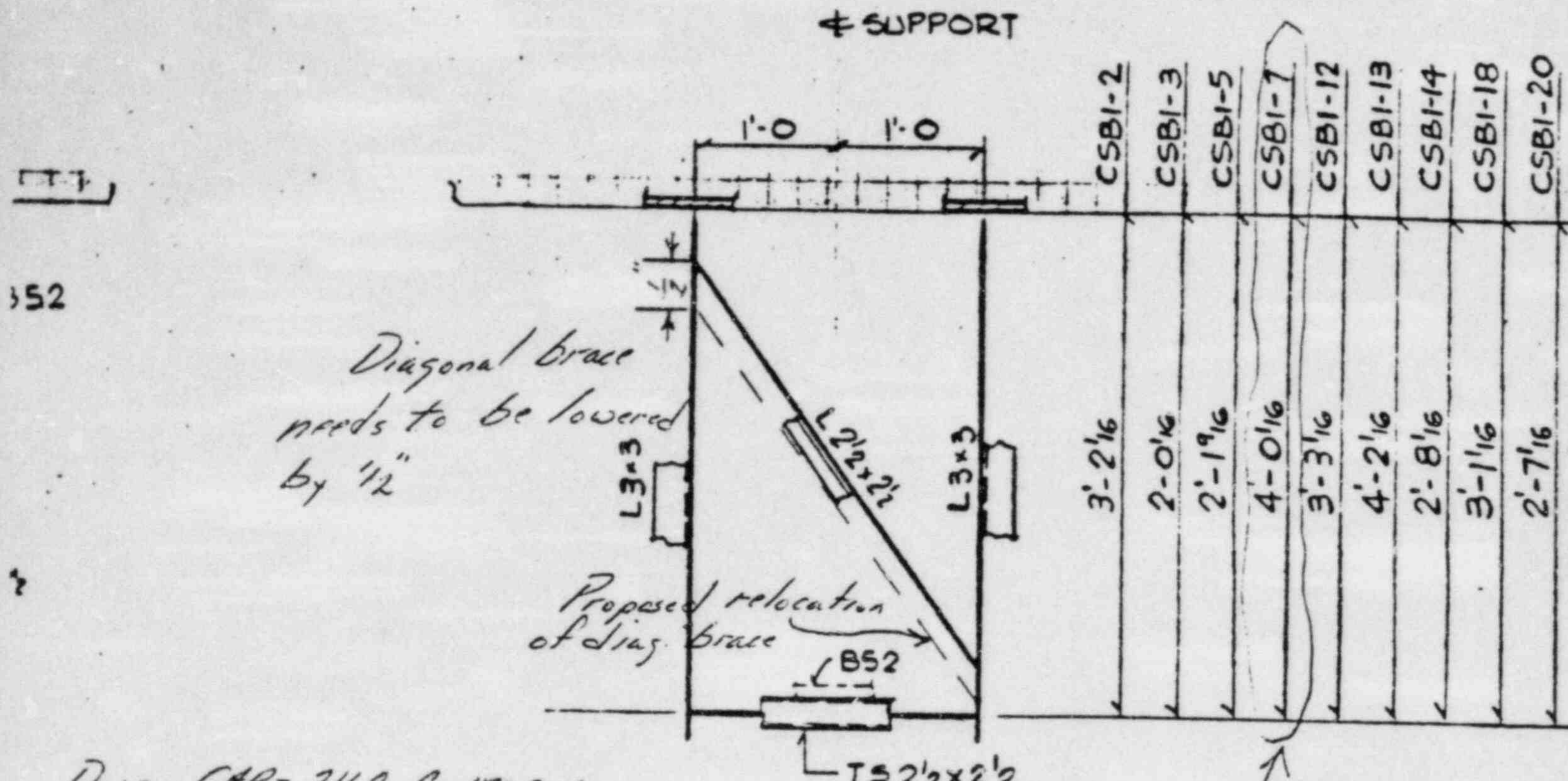
Problem #2.) The field is also having difficulties in erecting hanger CSB1-7A located 12 feet from column line 13 and 4'-6" from column line D, due to a HVAC hanger interference. The design location of the HVAC hanger, number F1291, is 13 feet north of column line 13 and 4'-4" west of column line D. See page 4 for conduit hanger location, page 6 for CSB1-7A hanger detail, page 7 for HVAC support hanger location and page 8 for HVAC hanger detail.

166
S02

Pg 4 of 9
FIR AS - 350
Dwg CAR 2166-G-699S02
Rev 4



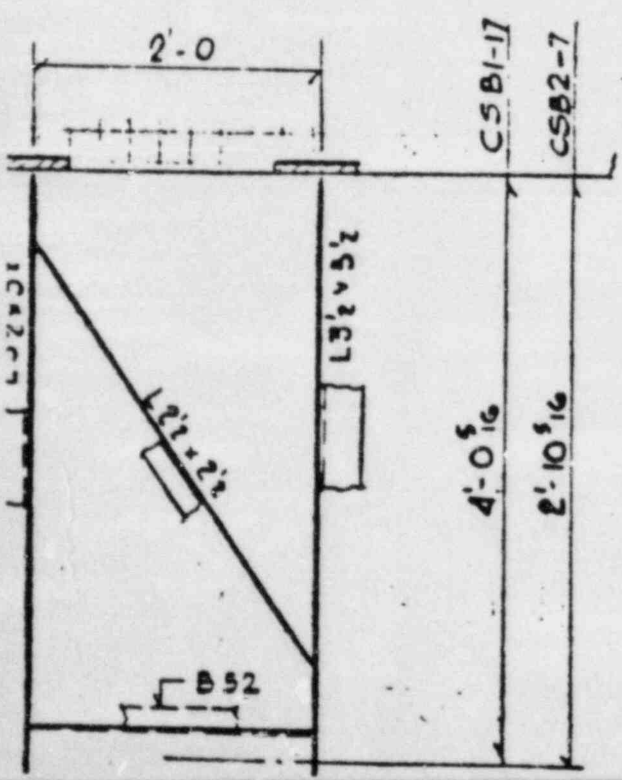
9 | 10 | 11 FOR AS-350 | 12

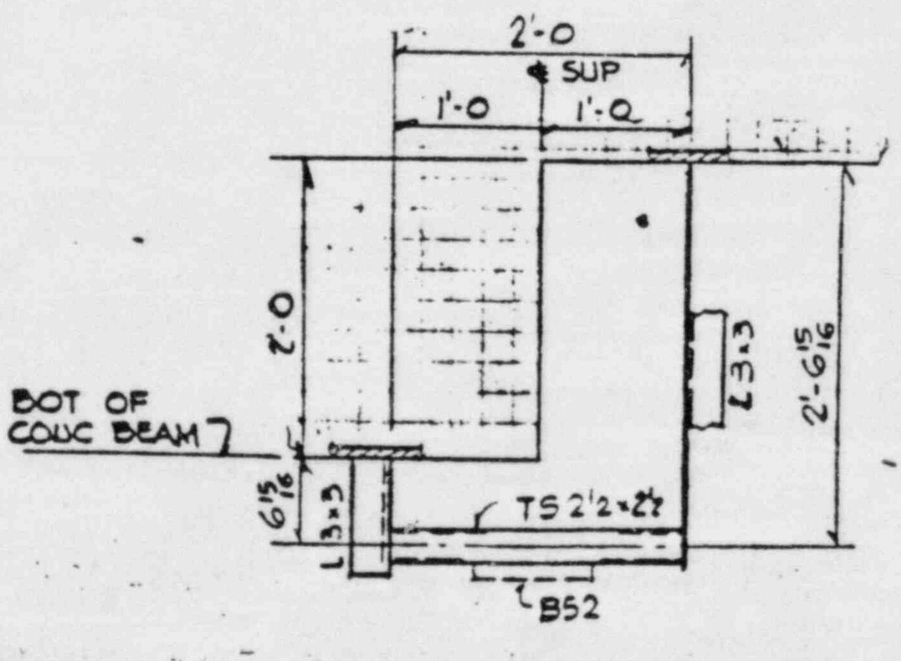


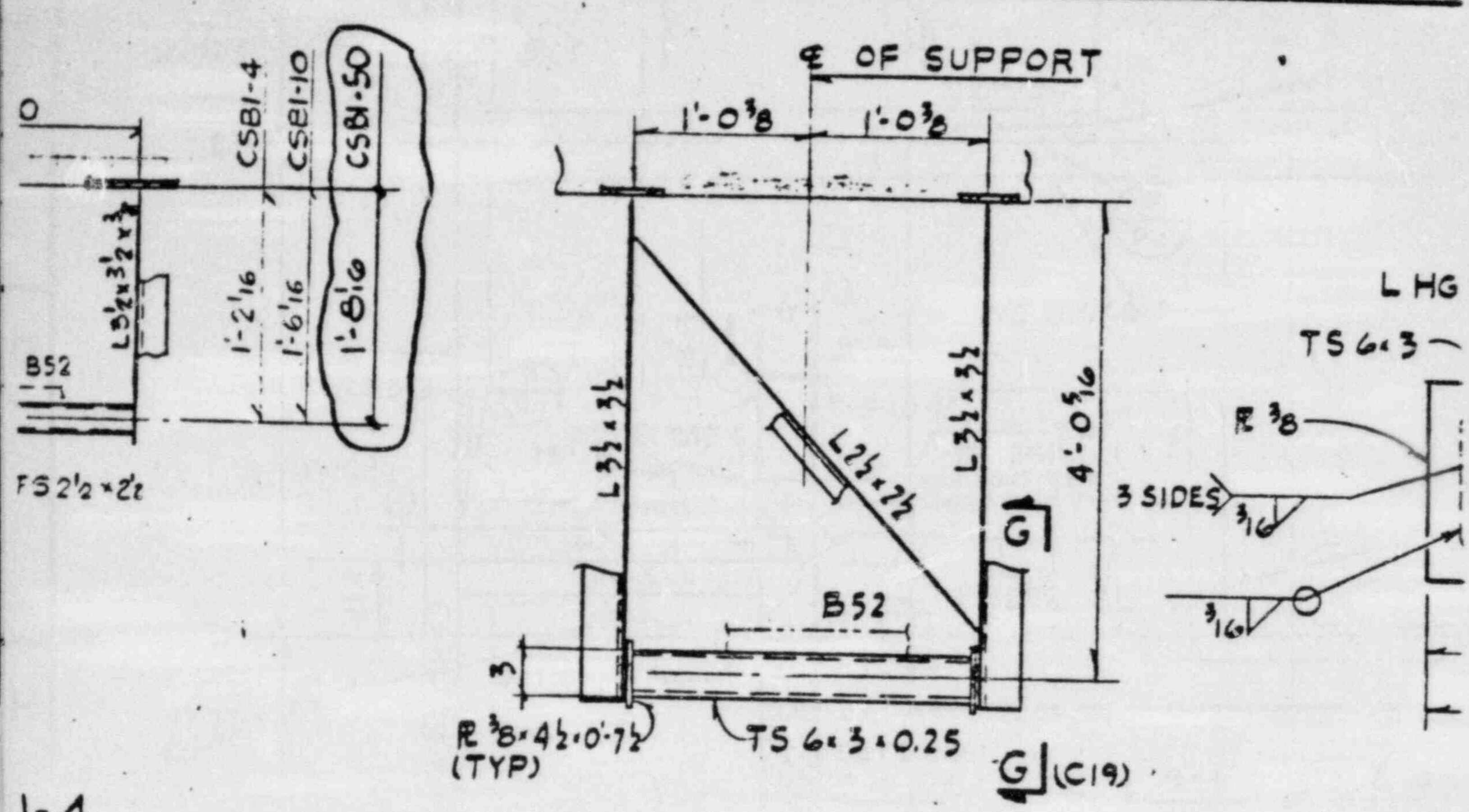
Dwg CAR-2168-G-170S06
Rev 4

Problem 1

CSBI-2, CSBI-3, CSBI-5, CSBI-7, CSBI-12
CSBI-13, CSBI-14, CSBI-18 CSBI-20 CSBI-23
CSBI-24, CSBI-51







CSBI-7A

1-4
1-10
1-50

SUP (FOR LOCATION SEE ELECT DWGS (TYP)

Problem 2.) HVAC hanger F1291 interfere with the erection of conduit support hanger CSBI-7A

Dwg CAR 2168-G-170506
Rev 4

NOTES

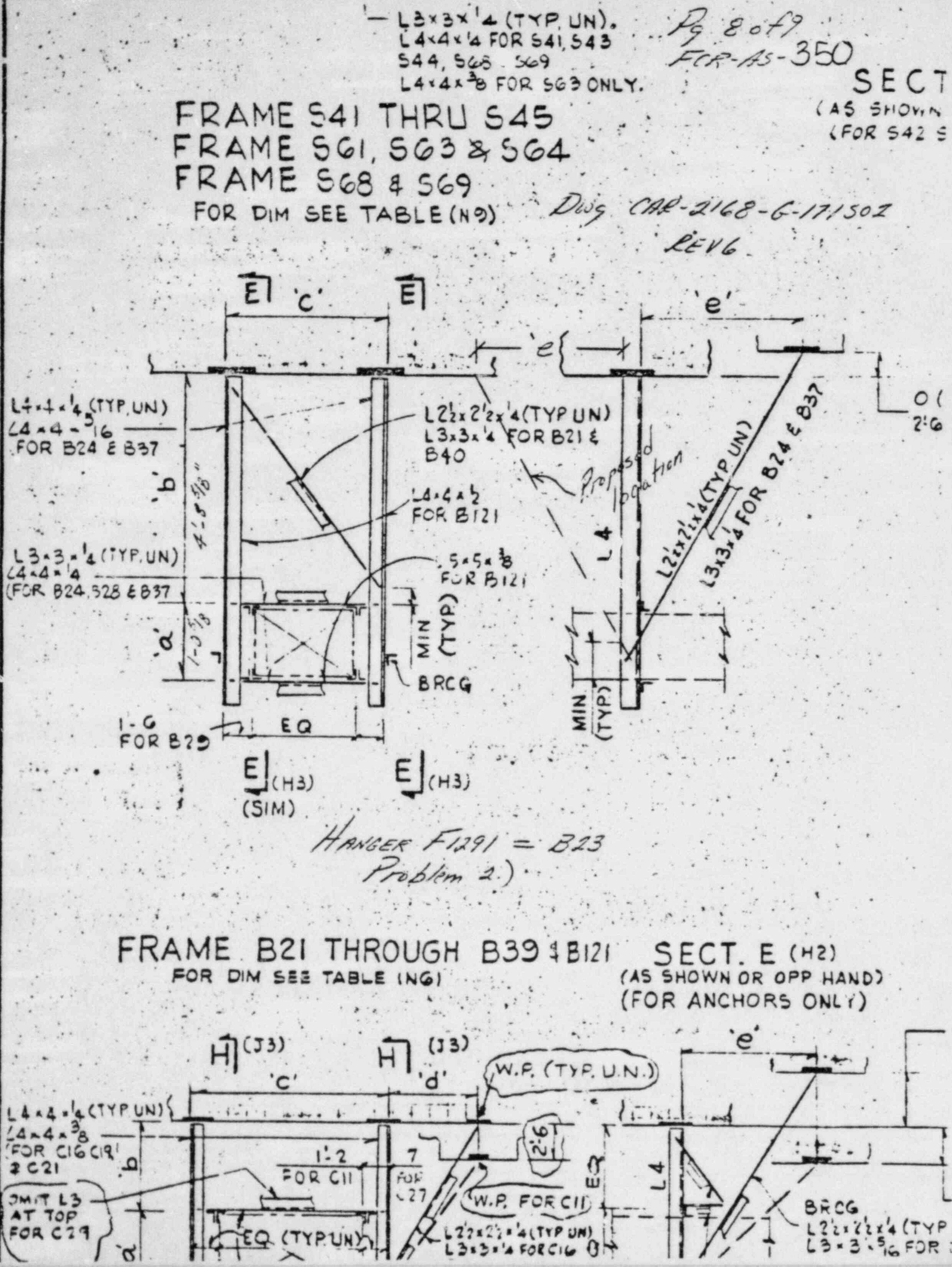
DESIGN, FABRICATION & E
STEEL SHALL BE IN ACC
SPECIFICATION FOR DE
ERECTION OF STRUCTURA
(7TH EDITION) AND EBASCO

STRUCTURAL STEEL SHALL
ASTM SPECIFICATION A-3

TUBULAR STEEL SHALL BE IN
A-500 GR B OR A-501

ALL ANGLES TO BE ¼" THICK
WALL THICKNESS, U.N.

CLEANING & PAINTING OF S


Pg 8 of 9
FCR-AS-350
L3×3×¼ (TYP. UN).
L4×4×¼ FOR S41, S43
S44, S68 S69
L4×4×⅜ FOR S63 ONLY.
FRAME S41 THRU S45
FRAME S61, S63 & S64
FRAME S68 & S69
FOR DIM SEE TABLE (N9)
SECT
(AS SHOWN
(FOR S42 S
Dwg CAR-2168-G-171S02
REV6
'c'
'e'
e
L4×4×¼ (TYP. UN)
L4×4×5/16
FOR B24 & B37
L2½×2½×¼ (TYP UN)
L3×3×¼ FOR B21 &
B40
Proposed location
L4×4×½
FOR B121
'b'
L3×3×¼ (TYP. UN)
L4×4×¼
(FOR B24, B28 & B37
L5×5×⅜
FOR B121
'a'
MIN (TYP)
BRCG
1-6
FOR B29
EQ
E (H3)
(SIM)
E (H3)
L4
L2½×2½×¼ (TYP UN)
L3×3×¼ FOR B24 & B37
MIN (TYP)
2'6
HANGER F1291 = B23
Problem 2.)
FRAME B21 THROUGH B39 & B121
FOR DIM SEE TABLE (N6)
SECT. E (H2)
(AS SHOWN OR OPP HAND)
(FOR ANCHORS ONLY)
H (J3)
H (J3)
'c'
'd'
'e'
W.P. (TYP. U.N.)
L4×4×¼ (TYP UN)
L4×4×⅜
(FOR C16 C19
& C21
b
1'-2
FOR C11
7
FOR C27
2'6
OMIT L3
AT TOP
FOR C29
EQ (TYP UN)
W.P. FOR C11
L2½×2½×¼ (TYP UN)
L3×3×¼ FOR C16
EQ
L4
BRCG
L2½×2½×¼ (TYP
L3×3×5/16 FOR

Recommended Action

Problem 1) Allow the field to cut and relocate the diagonal bracing by lowering ~~and lower~~ the diagonal bracing 1/2" to clear the interference problem.

Problem 2.) Allow the field to remove the east diagonal brace of the HVAC support which interferes with the installation of the conduit support hanger, and relocate the diagonal brace to the north side of the vertical leg. See page 8 for detail.

The west diagonal brace can not be relocated to the north side of the west vertical leg due to no embed being located at the point where the west diagonal brace would need to be fastened. If the design load conditions for the HVAC hanger requires the west diagonal brace to also be relocated to the north side of the west vertical leg, allow the field to bridge across the existing embedded plates using a C6×10.5 channel. Allow the channel to be fastened to the embeds as per FCR-AS-314 Rev 1. The 'e' distance for the HVAC hanger support will remain as per designed.

RECEIVED MAR 2 1981

PW-AS-349 Rev. 1

Design Organization Approval (AE)☒ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.)
to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.
Comments: PER TELECON BETWEEN NICK TASSOULAS AND JAMES NEVILL ON 3-17-81.
J. Nevill 3/17/81
SEE EBASCO COMMENTS ON EBASCO ATTACHMENT J.N.

Nicholas C. Tassoulas	SAE	3/24/81	Walt [illegible]	PE.	4/1/81
Signature	Title	Date	Signature	Title	Date

CP&L Harris Plant Engineering Approval Required ☐ Yes ☐ No

Telephone Resolution ☐ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

J. Nevill 3/17/81		J. Nevill	3/17/81
Discipline Engineer	Date	MHPE or PPE	Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

E.E. Willett for 3-18-81
Senior Resident Engineer Date

Second Distribution:
(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

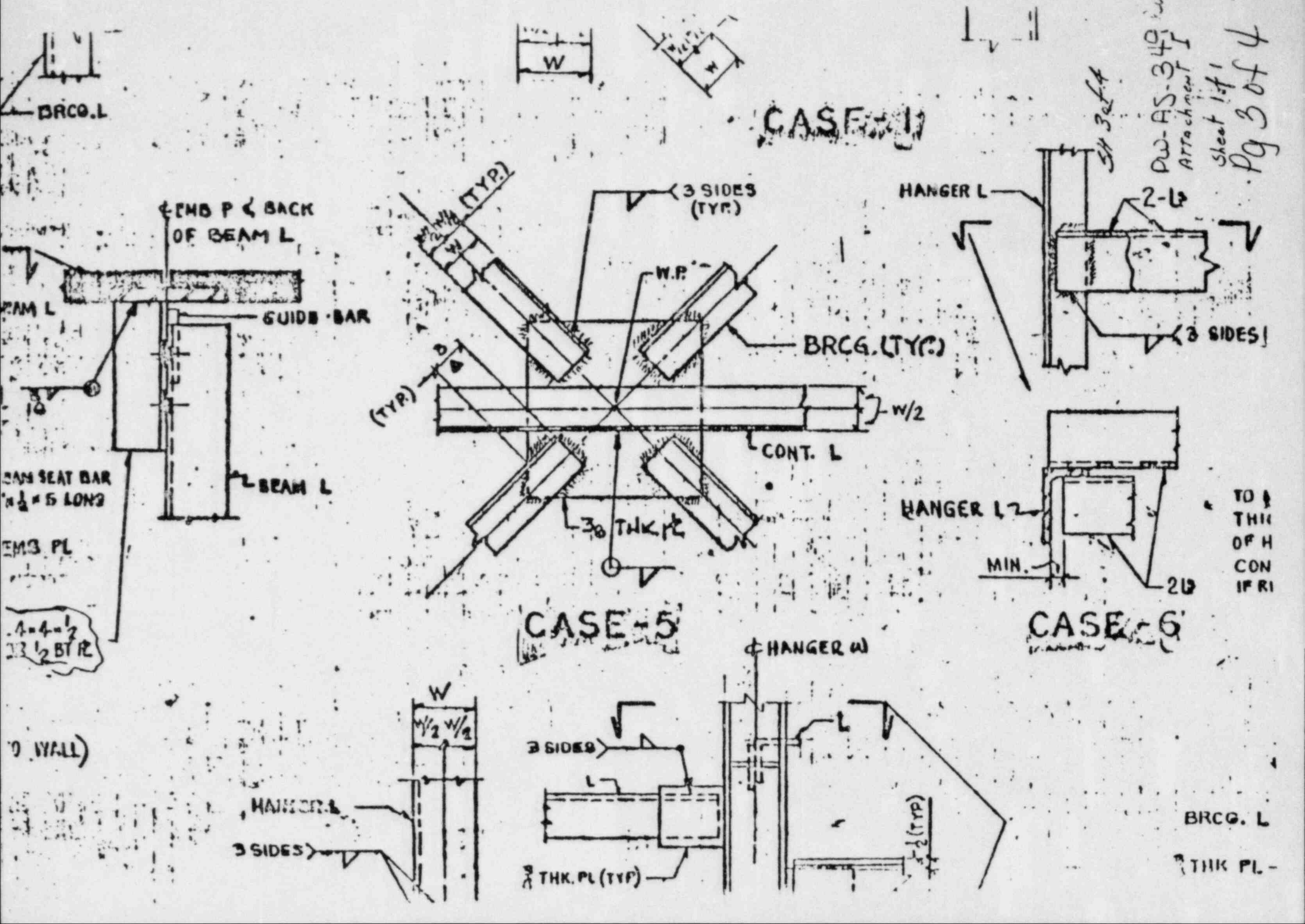
Discipline Engineer Date

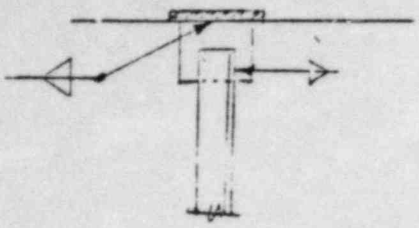
Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

RECEIVED
MAR 24 1981
M. WEBER
CIVIL ENGINEERING DEPT.

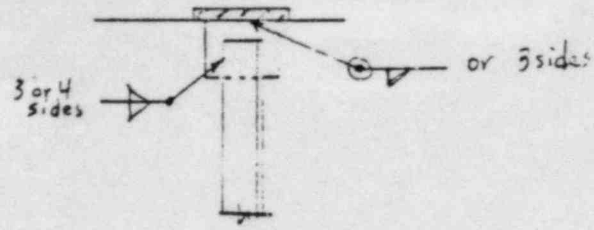
ATTACHMENT I

DESIGN AS SHOWN
SHADED AREAS INDICATE INSTALLED CONDITIONS

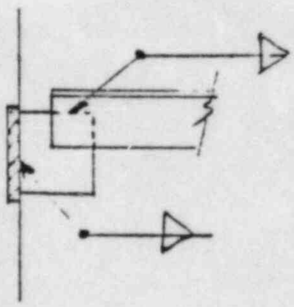




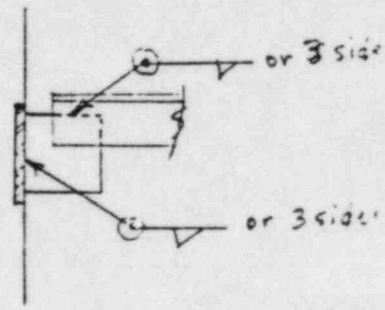
DESIGNED



INSTALLED



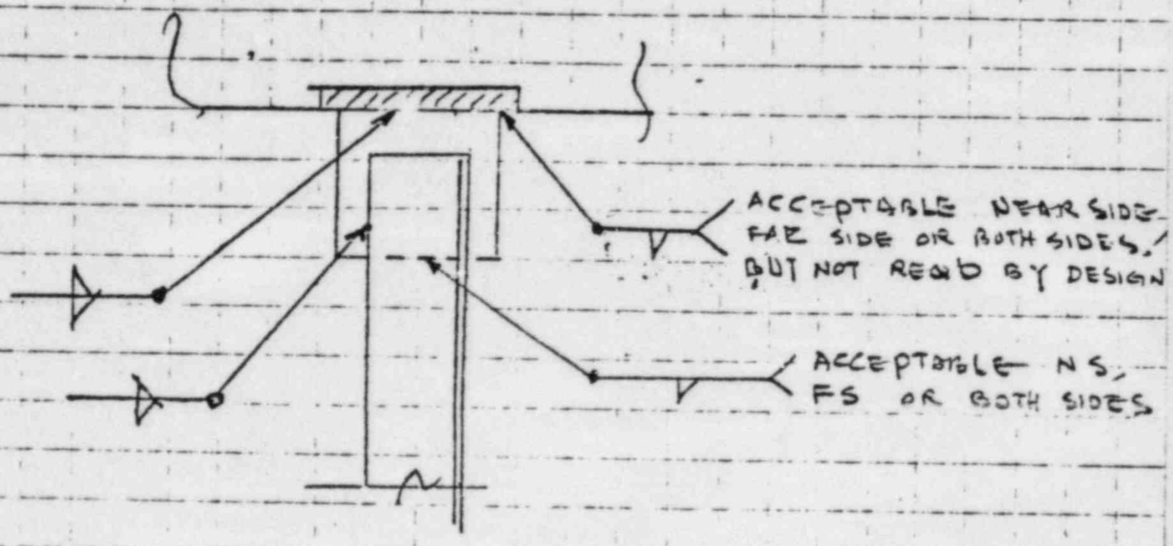
DESIGNED



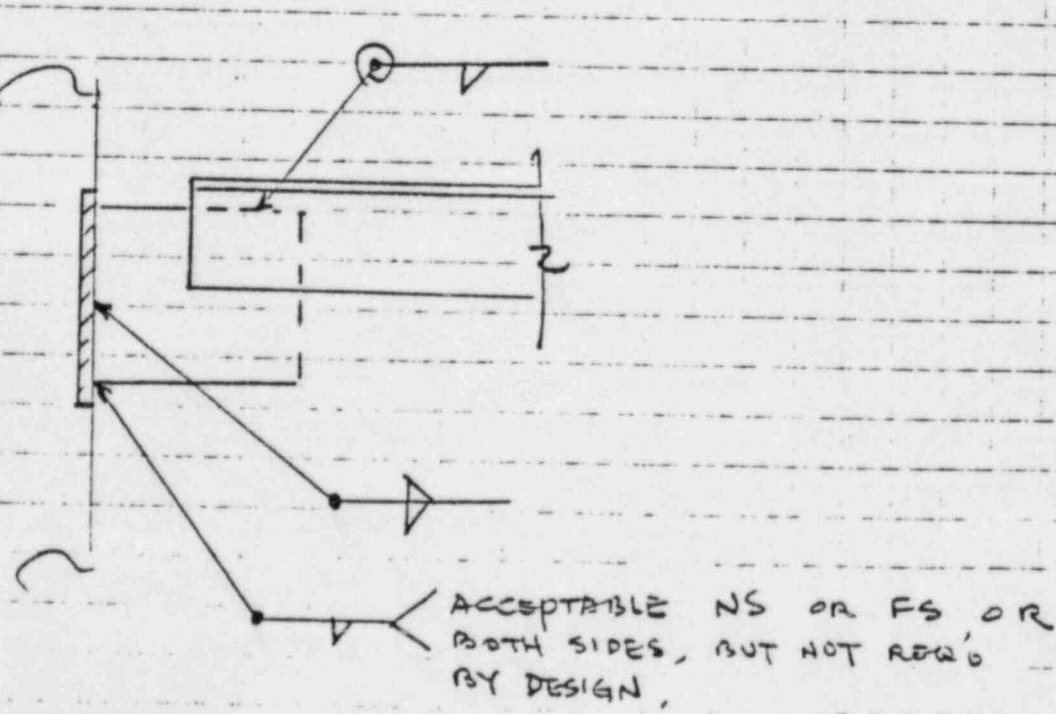
INSTALLED

EBASCO SERVICES INCORPORATED
NEW YORK

BY OY DATE 3-24-81
SHEET 1 OF 1
CHKD. BY ADB DATE 3-24-81
OFS NO. DEPT. NO.
CLIENT CAR
PROJECT SHNPP
SUBJECT EBASCO ATTACHMENT TO FCR-AS-349 R1



CASE I.



CASE II.

RECEIVED
DEC 17 1980
PROJECT ENGINEERING

PW-AS-347

Design Organization Approval (AE)☒ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ~~☒~~ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed

Comments: FOR PROBLEM #1; THE WELD AS SHOWN ON PAGE 3 OF 3 IS APPROVED AS RECOMMENDED.
~~FOR PROBLEM #2 & #3; SEE EBASCO ATTACHMENT, PAGE 1 OF 1, FOR RECOMMENDED ACTION.~~

Nicholas C. Tassoulas AE 3/5/81 — Signature Title Date

Mario S. Verdibello APE 3/6/81 — Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

NOTE: LATER APPROVAL OF FCR-C-446 ALLOWS PROBLEMS #2 & #3 TO BE ACCEPTED AS RECOMMENDED.

4/23/81 — Discipline Engineer Date

4/23/81 — MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

for AML 4-23-81 — Senior Resident Engineer Date

Second Distribution:
(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

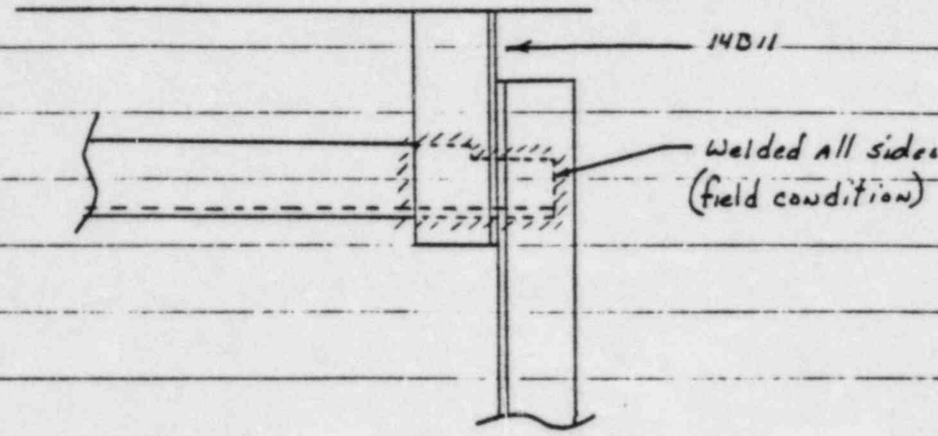
Comments:

Charles S. French 5/8/81 — Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

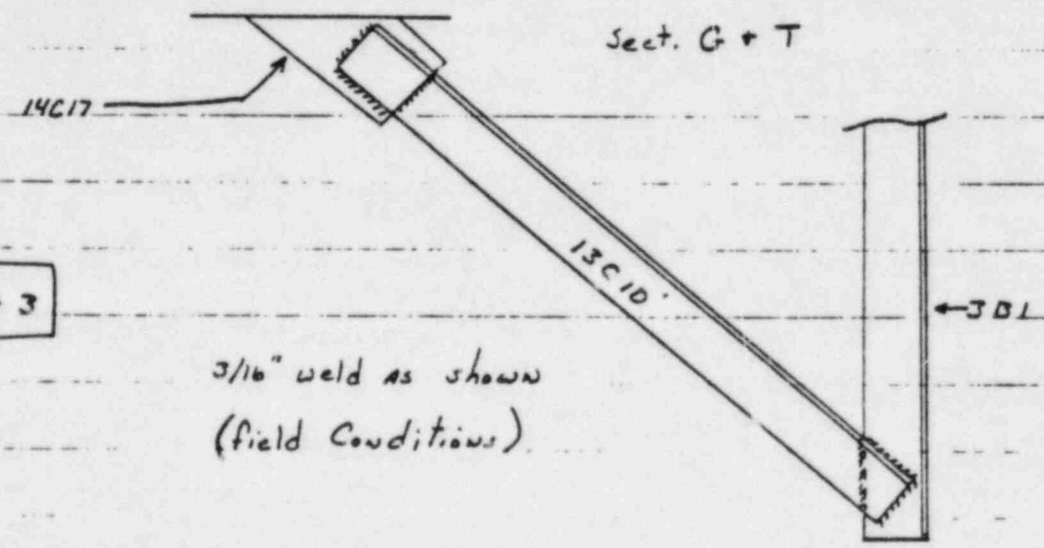
Conflict / Condition - Continued -

Problem #1



CAR-2168-G-7043
↑ Peden Steel Co C-3980N Sheet E2 Detail "A2" - EMDRAC 1364-14208R0 ↑

Problem 2 + 3



Problem 2 is Section G

Problem 3 is Section T

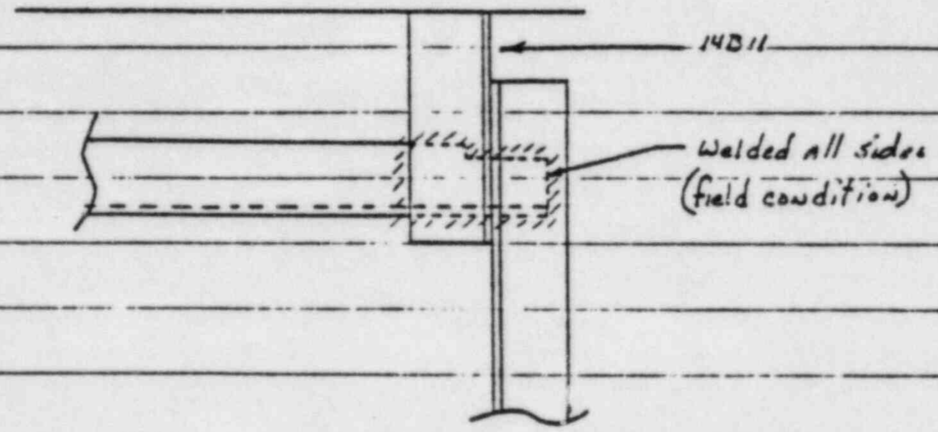
CAR-2168-G-7044
↑ Peden Steel Co C-3980N Sheet E3 Sect. G + T EMDRAC 1364-14209R1

PW-AS-347
Page 3 of 3

EBASCO ATTACHMENT TO PW-AS-347 PAGE 1 OF 1

Conflict / Condition - Continued -

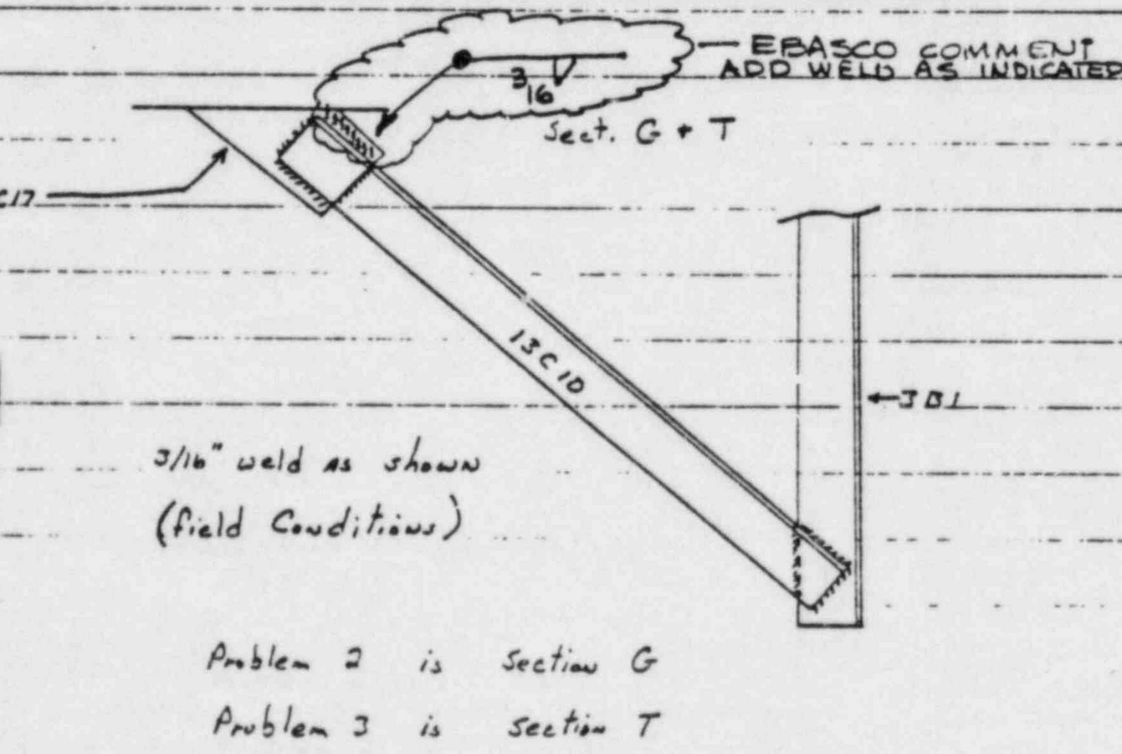
Problem #1



CAR-2168-G7043

↑ Peden Steel Co C-398ON sheet E2 Detail "A2" - EMDRAC 1364-14208RO ↑

Problem 2+3



Problem 2 is Section G

Problem 3 is Section T

CAR-2168-G-7044

↑ Peden Steel Co C-398ON Sheet E3 Sect. G + T EMDRAC 1364-14209R1

FCR-AS-384 Rev 1

esign Organization Approval (AE)☒ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

his change requires the following Document(s) (Specification, Drawing, SAR, etc.)
o be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

omments:

f.n.

Nicholas C. Tassoulas	AE	1/27/81	Mario S. Vedibello	AEE	1/28/81
Signature	Title	Date	Signature	Title	Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

[signature] 2/2/81		[signature] 2/2/81	
Discipline Engineer	Date	MHPE or PPE	Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

C.S. Hinnant for AML 2-2-81
Senior Resident Engineer Date

Second Distribution:
(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

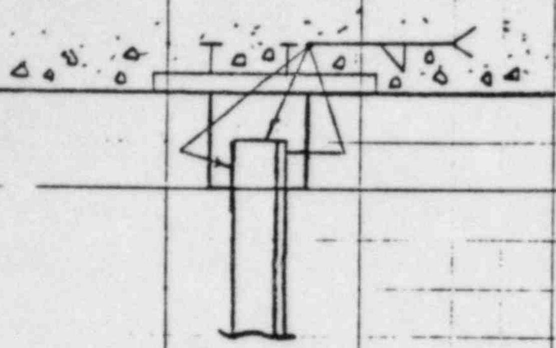
Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

BY______ DATE ______ POWER PLANT CONSTRUCTION SHEET 3 OF 3

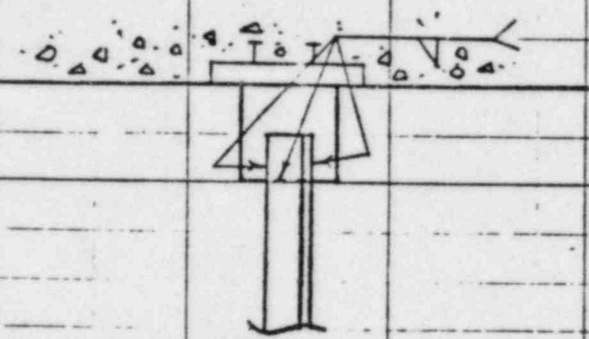
CHKD. BY______ DATE ______ COMPUTATION SHEET DEPT. ______

SUBJECT ______ FCR-AS-334 Rev. 1

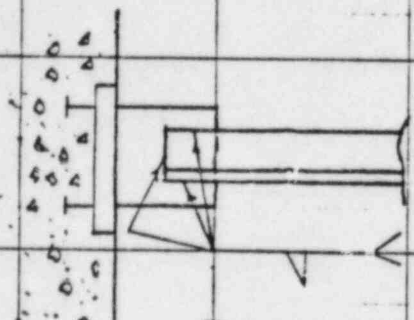
FORM NO. 1630



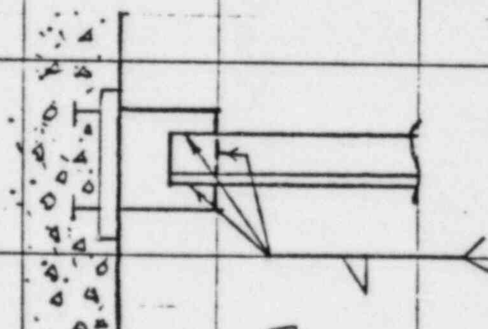
DESIGNED



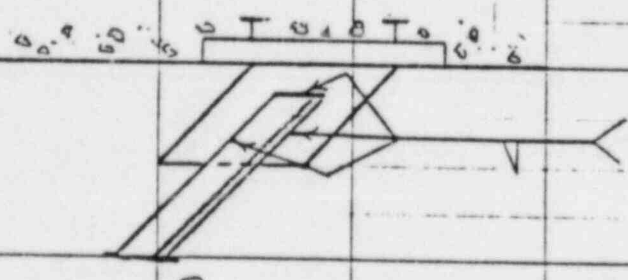
PROPOSED



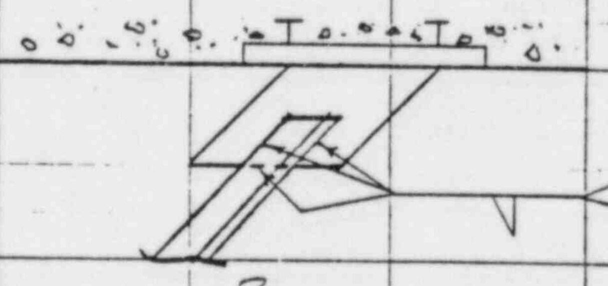
DESIGNED



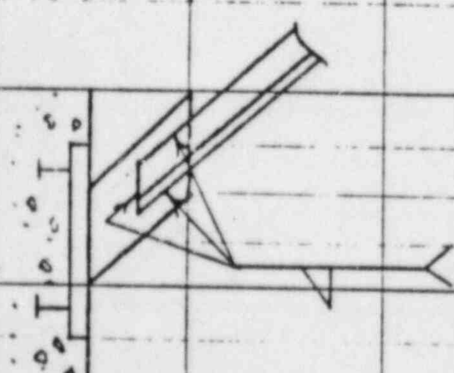
PROPOSED



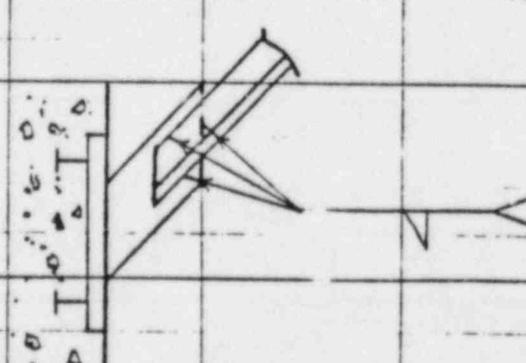
DESIGNED



PROPOSED



DESIGNED



PROPOSED

-001
. 16
6/80

ORIGINAL

AP-IX-05
Exhibit 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

Page 1 of 2

FCR/~~PW~~ AS-218 REV.2

Type of Request: ☐ Permanent waiver to "use-as-is" ☐ ASME Section III Division 2
☒ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: RAB I COMMON BLDG HVAC/CABLE TRAY RESTRAINT STRUCTURES ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment 2168-G-7021, REV.4, FCR-AS-218 REV 1.

FCR-AS-218, REV.1, CALLS FOR HANGER NO. HC-2308 TO BE INSTALLED USING A WT 6x26.5 @ 10½" LONG AS AN EXTENSION OF THE INSTALLED C2 EMBEDDED PLATE. THIS PARTICULAR SECTION OF STEEL IS NOT AVAILABLE IN THE FIELD.

Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

ALLOW THE FIELD TO USE A WT 8x25 @ 10½" LONG IN PLACE OF THE REQ'D WT 6x26.5.

Uncontrolled Copy
FOR INFORMATION ONLY

DOCUMENT CONTROL
RECEIVED
OCT 10 1980
SHEARON HARRIS N. P. P.

Justification: CHANGE IN SIZE OF THE SECTIONS WILL NOT AFFECT THE DESIGN INTENT.

Requested by: John T. Reef O.E. — 8/26/80
Discipline Engineer — Date

Site Approval: Bill [signature] for AMS — 8/26/80
Senior Resident Engineer — Date

First Distribution:
(Original) Ebasco
(Copy) ERNIE FELTON
(Copy)
(Copy)
(Copy)

APF-001
Rev. 17
11/6/80

RECEIVED
APR 6 - 1981
PROJECT ENGINEERING

TELECOPIED

PW-AS-152 Rev. 2

AP-IX-05
Exhibit 1

Design Organization Approval (AE)☐ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed ______

Comments:

J.W. Nicholas C. Tassoulas SAE 4/20/81 | Walt [signature] PE 4/20/81

Signature Title Date | Signature Title Date

CP&L Harris Plant Engineering Approval Required ☐ Yes ☐ No

Telephone Resolution ☐ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

[signature] 4/22/81 | [signature] 4/22/81

Discipline Engineer Date | MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

[signature] for AHL 4-22-81

Senior Resident Engineer Date

Second Distribution:

(Original) Document Control
(Copy)
(Copy)

(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

Comments:

[signature] 5/8/81

Discipline Engineer Date

Final Distribution:

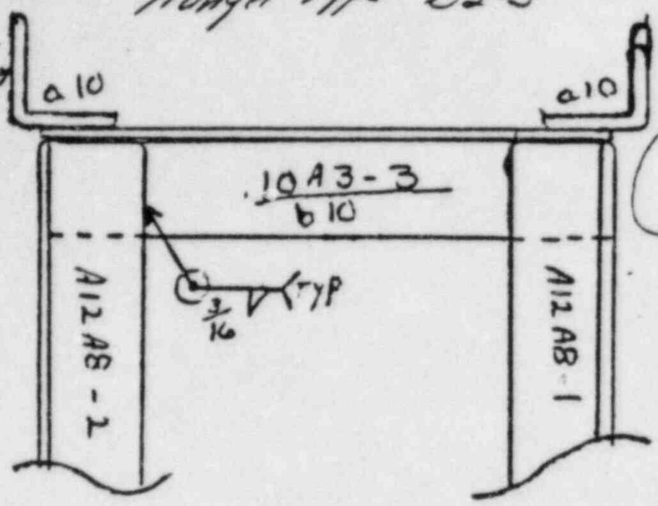
(Original) File in Doc. Control
(Copy)
(Copy)

(Copy)
(Copy)
(Copy)

697501-9

#1

Hanger Type B2-5



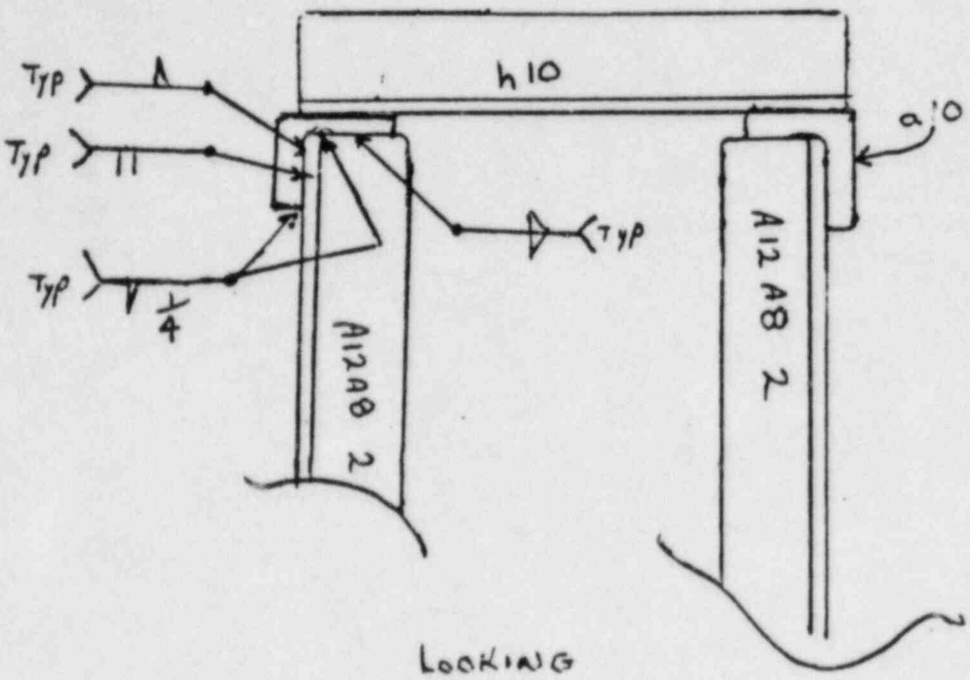
LOOKING UP

Location - 4'-0" West of col. line F_2 & 4'-7" North of col. line 16

Attachment #1

697501-10

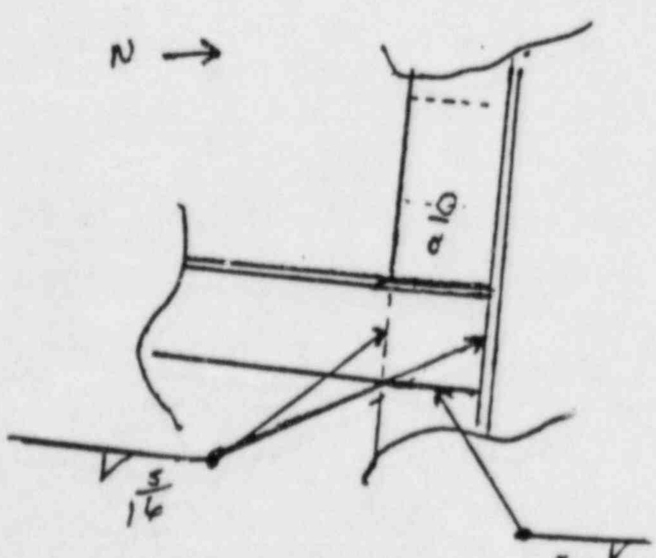
Hanger Type E2-5



LOOKING
UP

#1

Location - 4'-7" North of Col. Line 16 & 3'-0" East of Col. Line F2



DCN
560-026

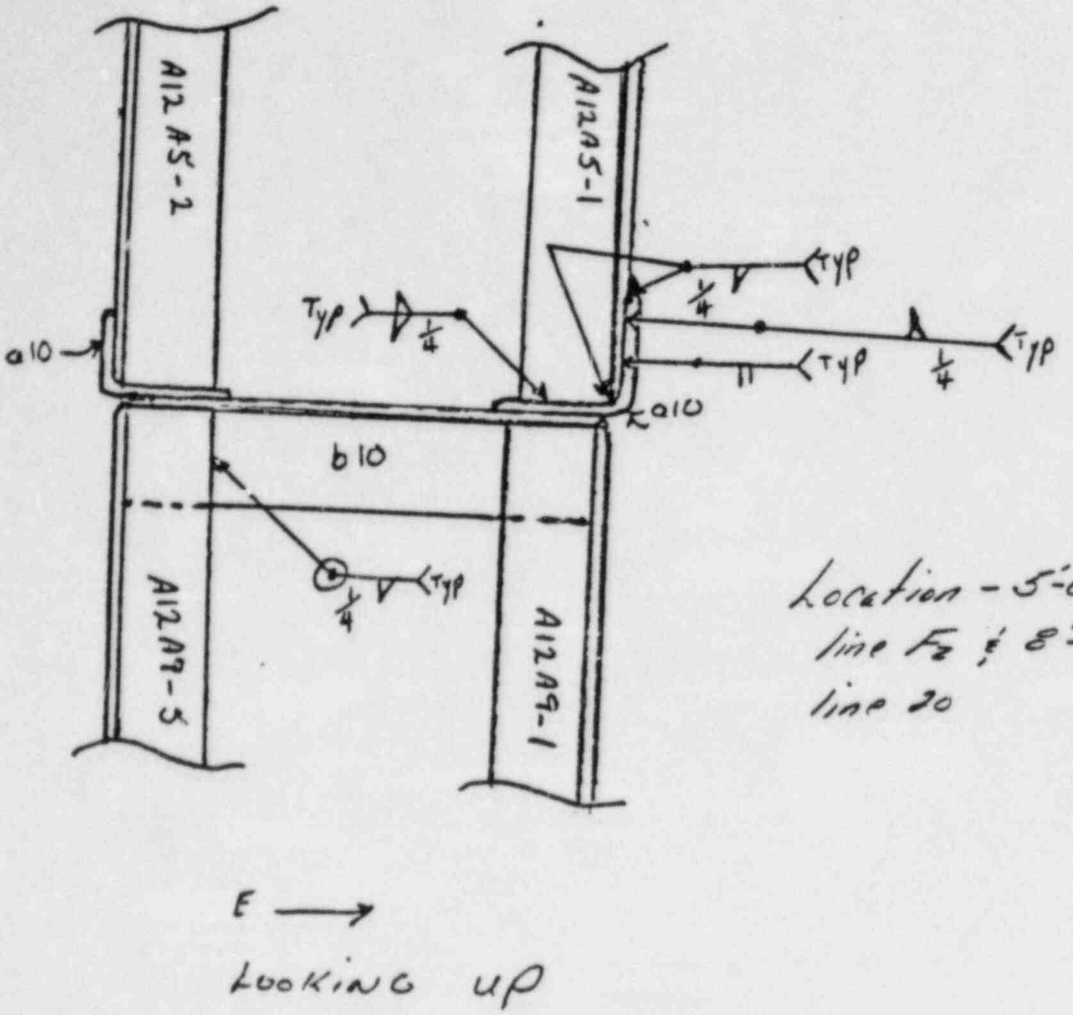
Attachment #2

697501-12

Pg 5 of 7
PW-AS-152
Rev. 2

#1

HANGER TYPE B2-3



Location - 5'-0" east of col. line F2 & 8'-0" south of col line 20

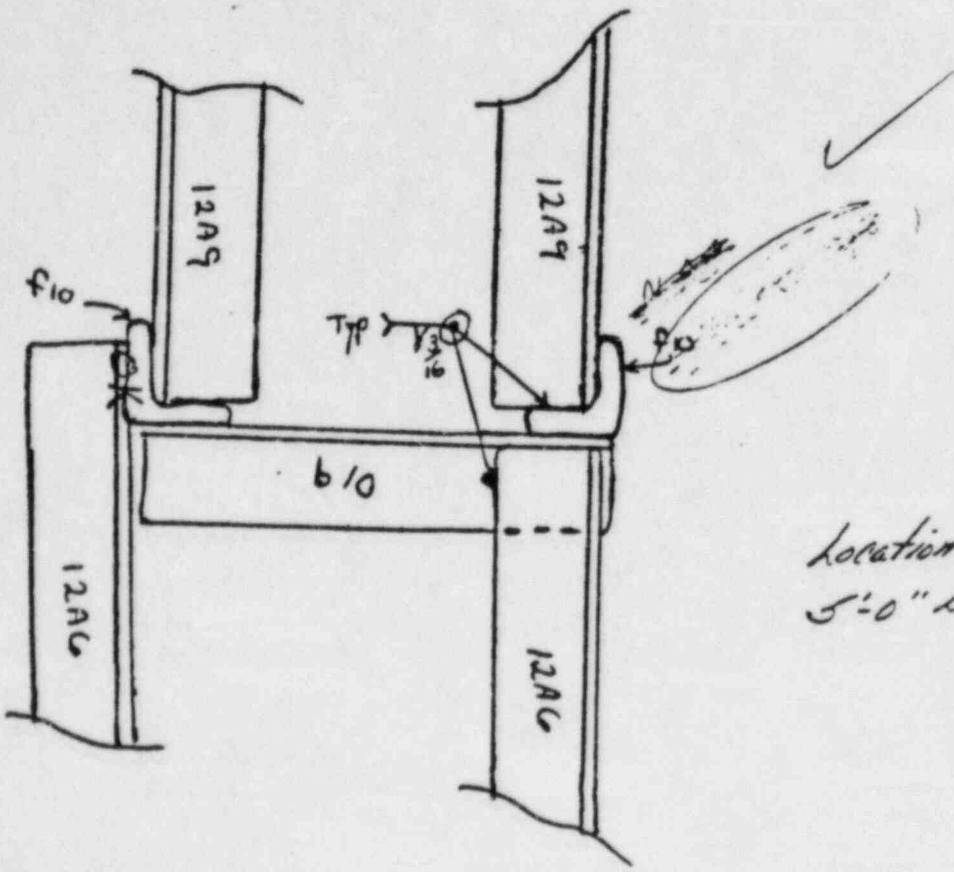
Attachment #3

697501-13

Pg 6 of 7
PW-AS-152
Rev. 2

HANGER TYPE B2-4

#1



Location - Col. Line 20 &
5'-0" East of Col. Line F2

Attachment #4

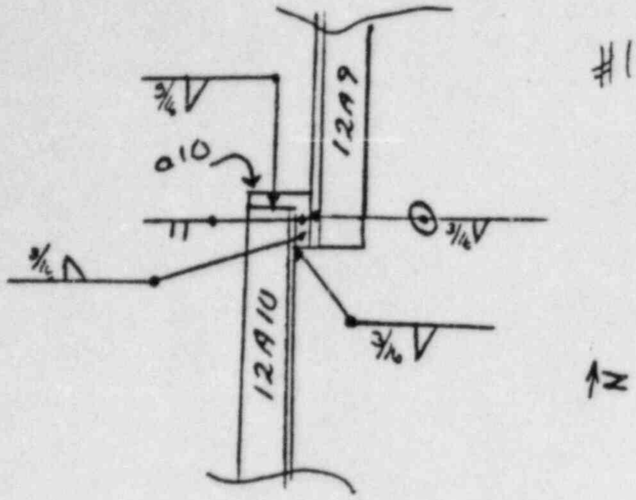
697501-16

HANGER TYPE - B2-3

PW-AS-152

Rev 2

#1



Location - 4'-0" North of Col-Line 22 & 5'-0" East of Col Line F_2

Looking Up

12A10 TO a10 to 12A9

Attachment #5

No. HR- 030

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1105

Hanger Ispection Report # 58

Detail rework required listed below:

1. Problem 173 - Pc Mk 39P3 to gusset plate 13G15 - add 3/16" fillet weld to fourth side — D. [signature] QA Accept

2. Problem 167 - Pc Mk 39P4 to gusset plate 13G15 - add 3/16" fillet weld to fourth side. — D. [signature] QA Accept

3. Problem 169 - Pc Mk 39P3 to gusset plate 13G15 - add 3/16" fillet weld to fourth side — D. [signature] QA Accept

4. Problem 170 - Pc Mk 39P4 to P2F39 - grind off weld spatter and arc strikes — D. [signature] QA Accept

5. Add weld metal to correct undercut — QA Accept

6. — QA Accept

7. — QA Accept

8 — QA Accept

R Franklin — Completed by

4/2/81 — Date

R. Rehbotter — Issued To

3/24/18 — Date

D. [signature] — QA Accepted By

4/6/81 — Date

Reviewed and Accepted
By OR. [signature] 4/9/81

PAGE 58

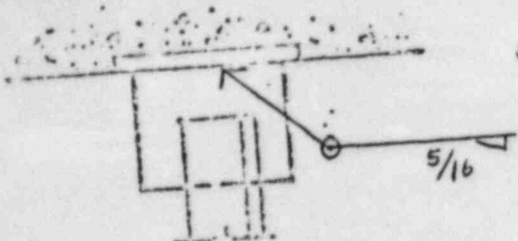
HANGER WELD INSPECTION FORM

F1105 — HANGER NUMBER

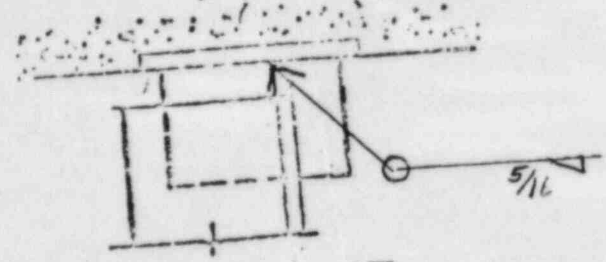
1364-16320 — EMDRAD DWG. NO. — 2 REV

RAB — BLDG. — 247 — ELEVATION — [illegible signature] — INSPECTOR

SB14



D.



13616 TO Embed — PC. MK. TO PC. MK.

13616 TO Embed — PC. MK. TO PC. MK.

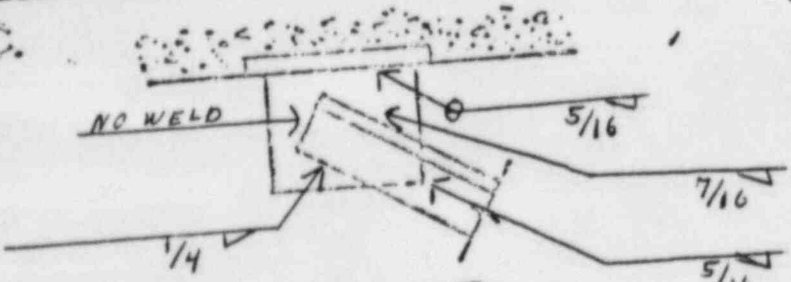
13616 P2F39

Extra weld per FCR-AS-392 R1

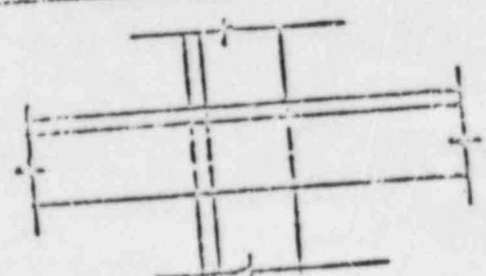
C.

B

C.



D.



TO — PC. MK. TO PC. MK.

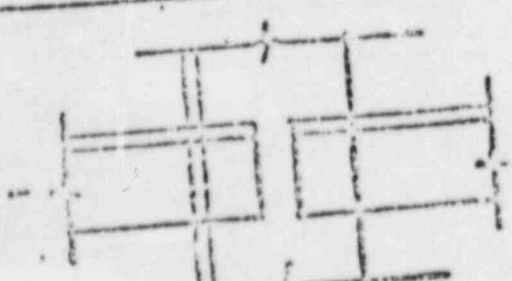
13615 TO Embed — PC. MK. TO PC. MK.

13615 39P3

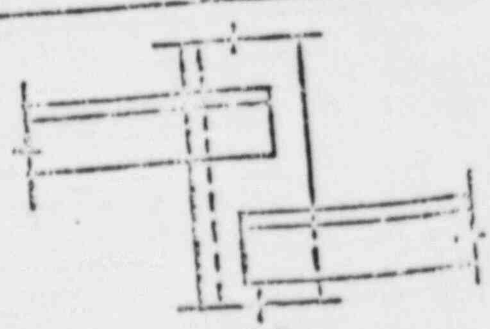
✓

E.

E.



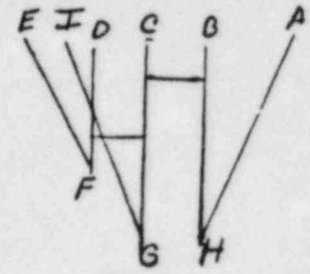
F.



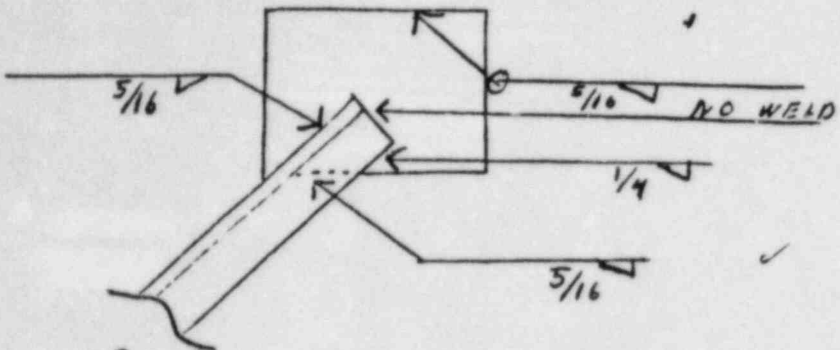
TO — PC. MK. TO PC. MK.

TO — PC. MK. TO PC. MK.

SEE OTHER

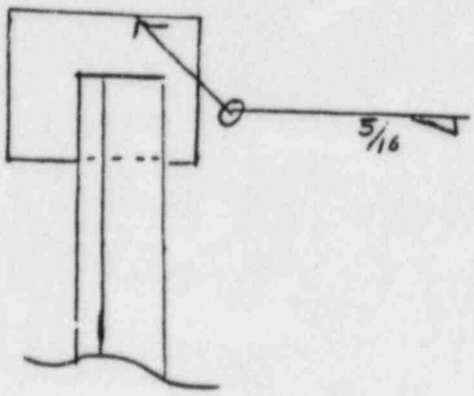


A



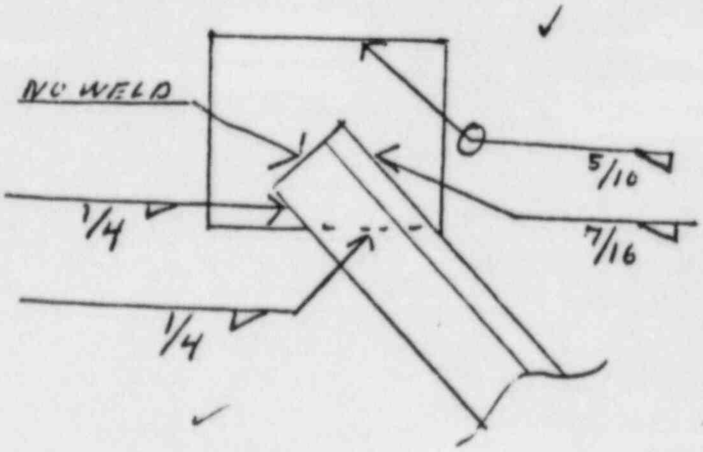
39P4 To 13G15
13G15 Embed

D



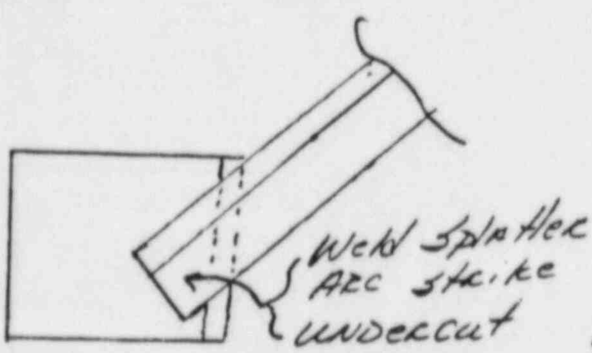
P2f39 To 13G16
13G16 Embed

I



39P3 to 13G15
13G15 to Embed

H



39P4 To P2f39

eL 190 North

No. HR- 028

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1005

Hanger Ispection Report # 69

Detail rework required listed below:

1. ✓Problem 218 - Pc MK 2G21 to gusset plate 13G19 - add 3/16" fillet weld to fourth side — N/A EJ7 4-10-81 QA Accept

2. ✓Problem 217 - Pc MK 2G7 to gusset plate 13G16 - add weld to side shown on backside — N/A EJ7 4-10-81 ~~William Pere~~ BP 4-10-81 QA Accept

3. ✓Increase weld to 5/16" on gusset to embed — William Pere QA Accept

4. ______ QA Accept

On Problem 217 - the weld along the

5. backside of 2G7 to 13G16 weld is not completed BP 4-10-81 QA Accept

6. ABOVE has been accepted [initials] 4/10/81 QA Accept

7. ______ QA Accept

8 ______ QA Accept

R Franklin — Completed by — 3 1 24 1 81 Date

R. Robillette — Issued To — 3 1 24 1 81 — Date — ~~[signature]~~ BP William Pere — QA Accepted By — 4 1 10 1 81 — Date

COPY 69

HANGER WELD INSPECTION FORM

F1005
HANGER NUMBER

1364-12756
EMDRAC DWG. NO.

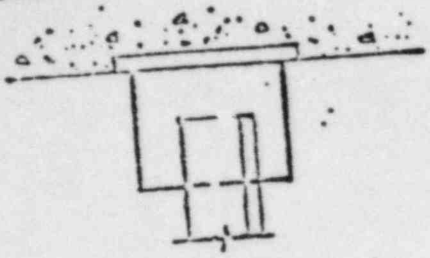
5
REV.

RAB
BLDG

190
ELEVATION

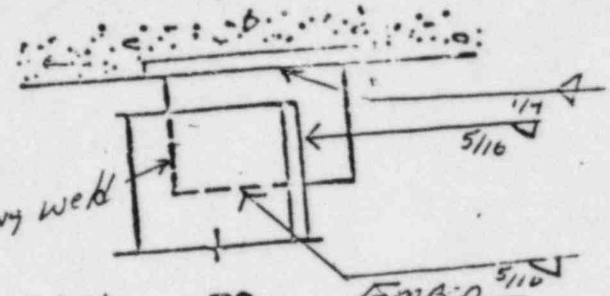
[signature]
INSPECTOR

A.



Unable to read Symbols

B.



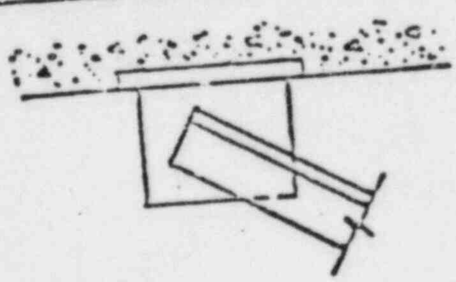
missing weld

___ TO ___
PC. MK. PC. MK.

13616 TO EMBED
PC. MK. PC. MK.

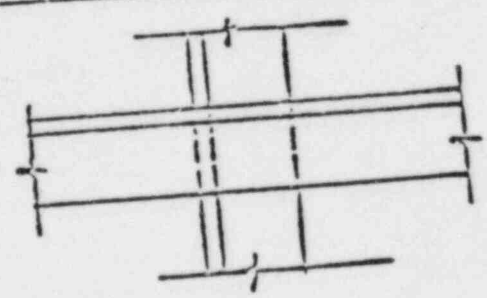
13616 267

C.



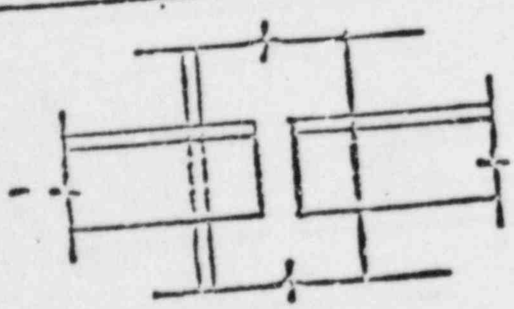
___ TO ___
PC. MK. PC. MK.

D.



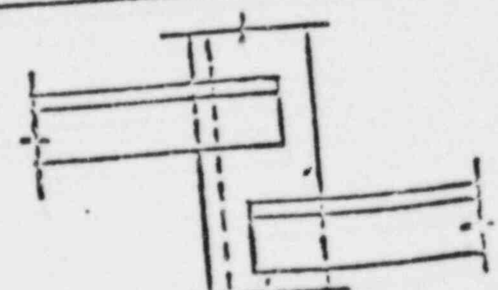
___ TO ___
PC. MK. PC. MK.

E.



___ TO ___
PC. MK. PC. MK.

F.

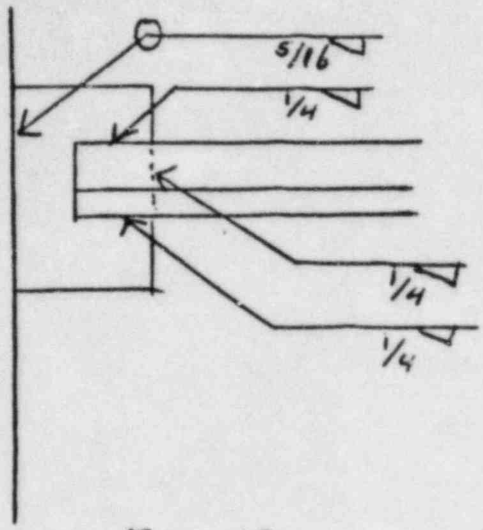


___ TO ___
PC. MK. PC. MK.

SEE OTHER SIDE

Reviewed and Approved By QA KM 4/22/81

~~Reviewed and Accepted By QA KM 4/22/81~~ KM 4/22/81



13G19 TO EMBED

13G19 TO 2G21

HANGER WELD INSPECTION FORM

F1004(S-2) 3477 1B001 — HANGER NUMBER

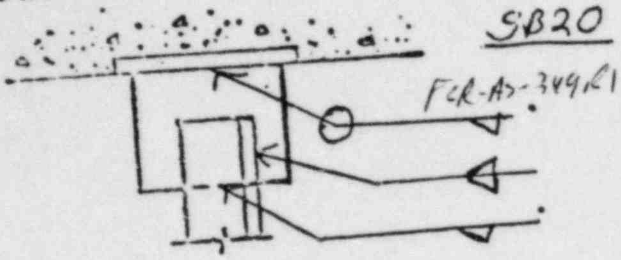
1364-12756 — EMDRAC DWG. NO. — 5 REV.

RAB — BLDG

190 — ELEVATION

INSPECTOR

A.



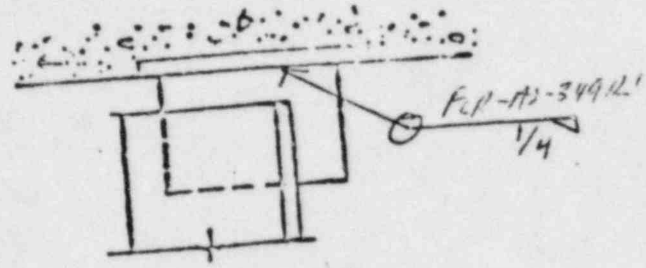
13E16 TO EMBED
PC. MK. PC. MK.

13E16 TO 1612

-Over Size Weld → FCR-AS-342R1

214

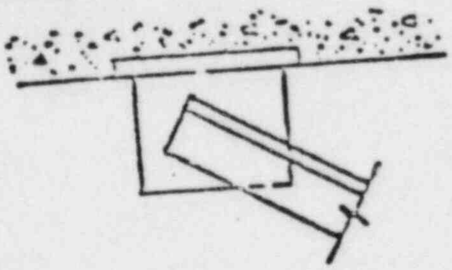
B.



13E16 TO EMBED
PC. MK. PC. MK.

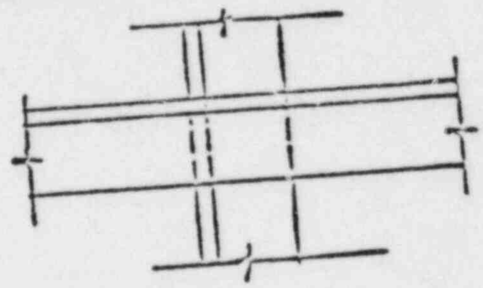
215

C.



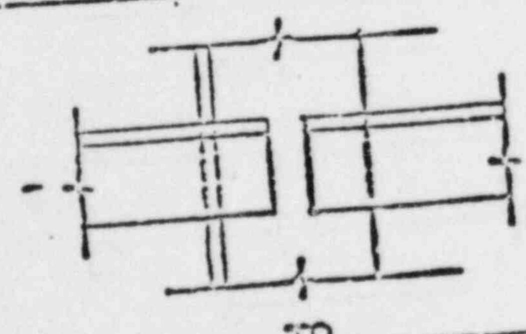
TO
PC. MK. PC. MK.

D.



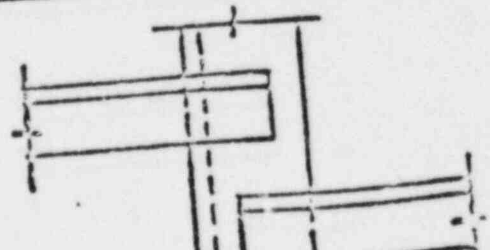
TO
PC. MK. PC. MK.

E.



TO
PC. MK. PC. MK.

F.



TO
PC. MK. PC. MK.

Reviewed and Accepted by QA.
SM 4/1/81

el 190 South

No. HR- ~~[illegible]~~ 040

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1000

Hanger Ispection Report # 77

Detail rework required listed below:

1. Problem 234 - Gusset plate 13G16 to embed - improper weld, improper fitup - cut gusset — D. [signature] QA Accept

from embed and from a72 and refit and reweld inaccordance with drawing — D. [signature] QA Accept

~~2. Problem 235 - Beam a72 to gusset 13G16 - fit & weld in accordance with detail X [illegible]~~ — N/C EE7 QA Accept

4. ______ QA Accept

5. ______ QA Accept

6. ______ QA Accept

7. ______ QA Accept

8 ______ QA Accept

R Franklin — Completed by

1 / 1 — Date

R. Kohletter — Issued To

2 /24 /81 — Date

D. [signature] — QA Accepted By

4/2 /81 — Date

Reviewed and Accepted By QA. [initials] 4/9/81

HANGER WELD INSPECTION FORM

F 1000 — HANGER NUMBER

1364-12756 — ENDRAC DWG. NO.

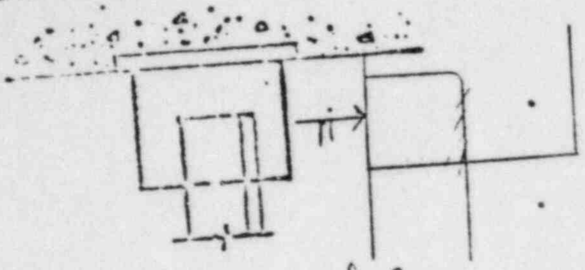
5 — REV.

RAB — BLDG

190 — ELEVATION

Perci — INSPECTOR

A.

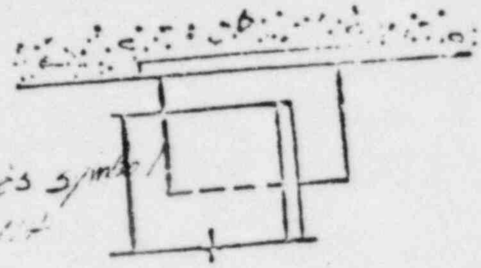


NO welder's symbol
BCI-AS-114

13G16 TO at 2
PC. MK. PC. MK.

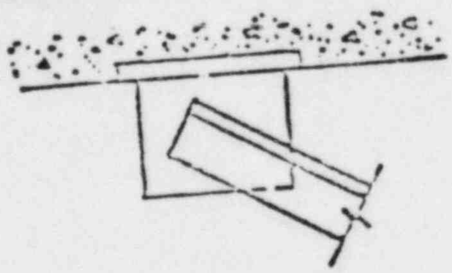
Weld not as drawing
over size welds

B.



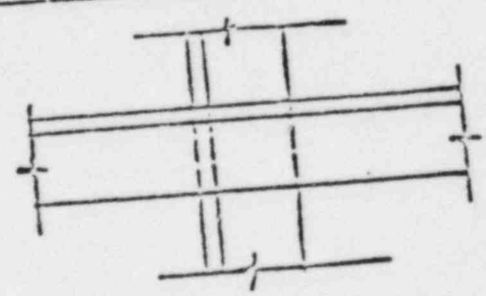
PC. MK. TO PC. MK.

C.



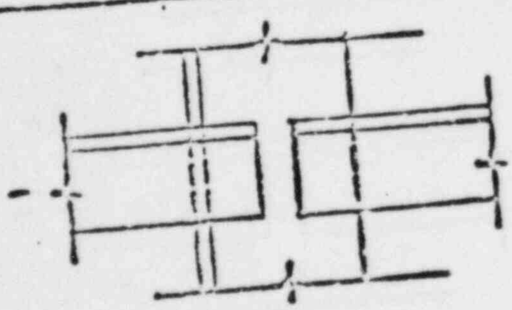
PC. MK. TO PC. MK.

D.



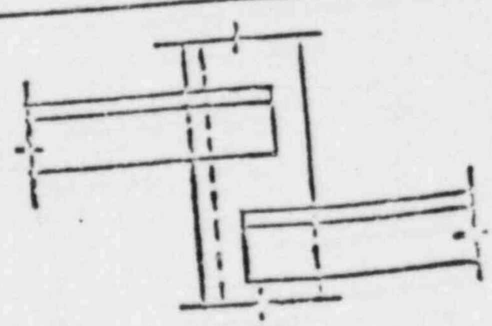
PC. MK. TO PC. MK.

E.

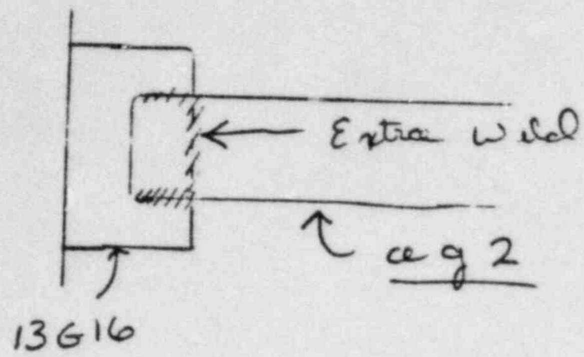


PC. MK. TO PC. MK.

F.



PC. MK. TO PC. MK.


Extra weld
ag 2
13G16

No. HR- 042

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1009

Hanger Ispection Report # 80

Detail rework required listed below:

1. Problem 242 - Indicate correct welder's symbol

QA Accept

2. Problem 243 - add 3/16" fillet weld to fourth side of 6S25 to Gusset 13915

QA Accept

3.

QA Accept

4.

QA Accept

5.

QA Accept

6.

QA Accept

7.

QA Accept

8

QA Accept

R Franklin
Completed by

3/27/81
Date

/ /
Issued To
Date

QA Accepted By
3/27/81
Date

HANGER WELD INSPECTION FORM

F1009 — HANGER NUMBER

1364-12756 — EMDRAC DWG. NO.

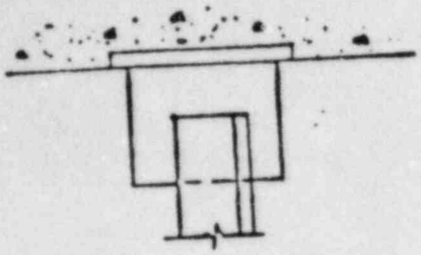
5 — REV.

RAB — BLDG.

190 — ELEVATION

[illegible signature] — INSPECTOR

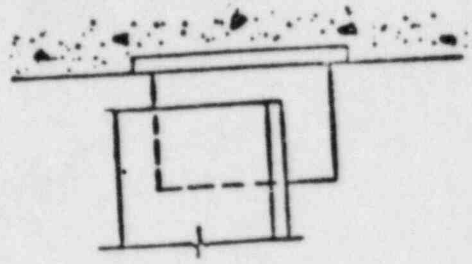
A.



No Welding symbols ✓

______ TO ______
PC. MK. — PC. MK.

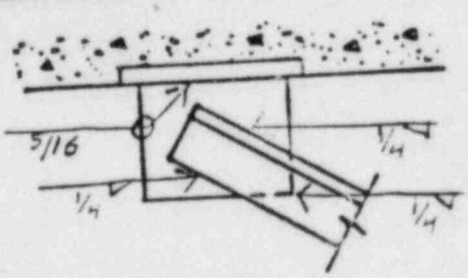
B.



______ TO ______
PC. MK. — PC. MK.

Oversize per FCR-AS-392 R1
Extra weld per FCR-AS-349 R1

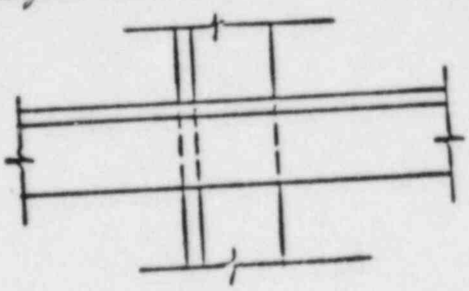
C.



13G15 TO Embed
PC. MK. — PC. MK.

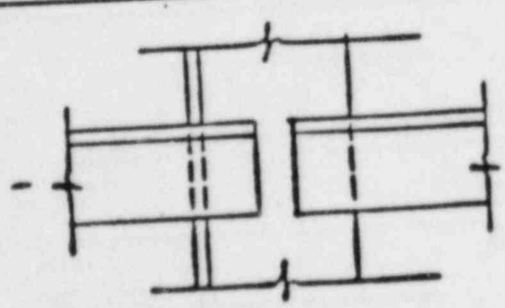
13G15 6G25 ✓

D.



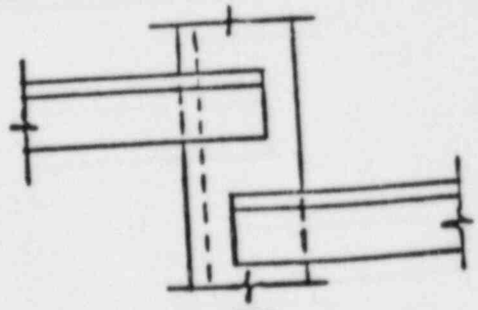
______ TO ______
PC. MK. — PC. MK.

E.



______ TO ______
PC. MK. — PC. MK.

F.

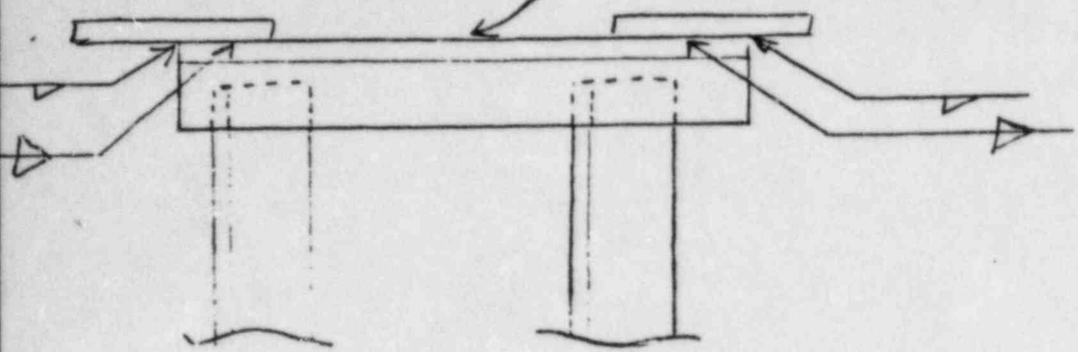


______ TO ______
PC. MK. — PC. MK.

F1004 80

A

Pc ANGLE not on dwg spans Two Embed PLATES

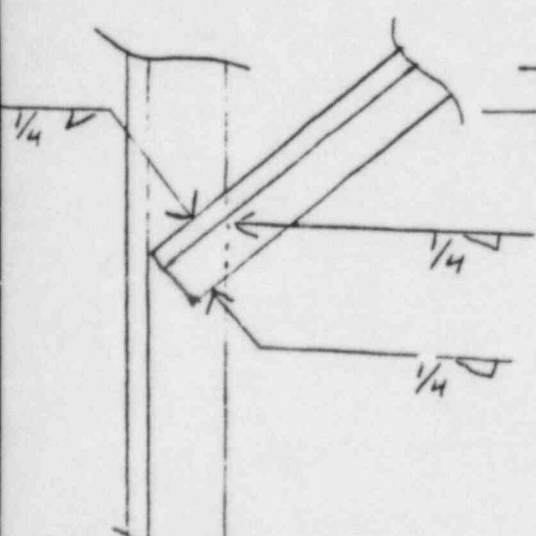


Per FCR-HVAC-006

Angle to Embed

to

B

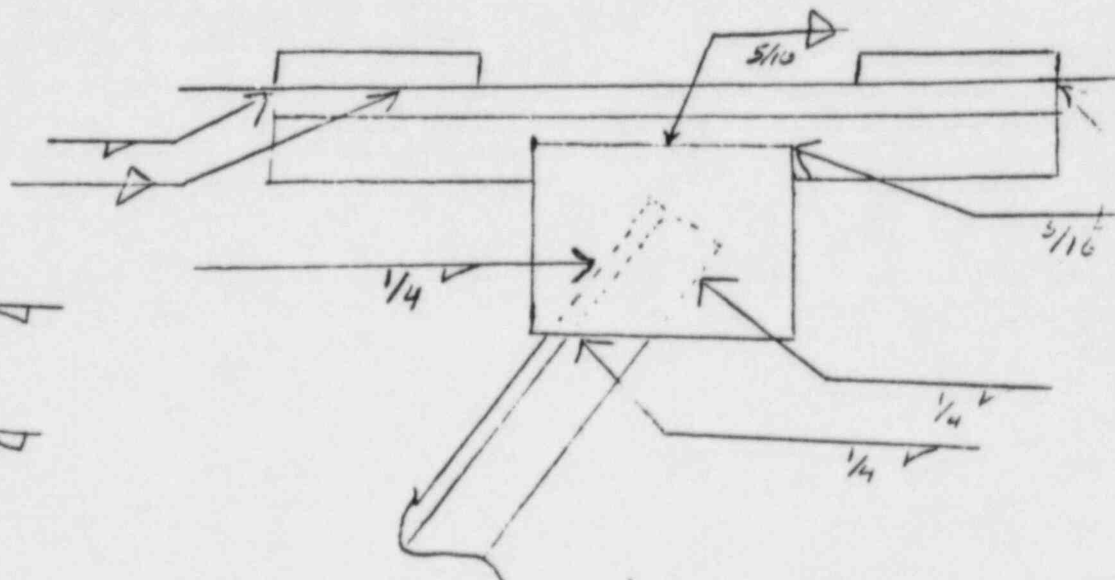


6G25 to 1G9

to

(001)

E



Angle to Embed

13G15 to Angle

Pc ANGLE not on dwg SPANS Two Embed Plates

6G25 to Angle

Per FCR-HVAC-006

(002)

No. HR- 046

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1099

Hanger Ispection Report # 001

Detail rework required listed below:

1. Problem 001 - Remove arc strikes by grinding.

D. [signature] QA Accept

2. Problem 002 - Remove excessive convexity Acme 3320 to K1a35

D. [signature] QA Accept

3. ______ QA Accept

4. ______ QA Accept

5. ______ QA Accept

6. ______ QA Accept

7. ______ QA Accept

8 ______ QA Accept

R Franklin 4/7/81
Completed by Date

R Rohletter 4/1/81 D. [signature] 4/7/81
Issued To Date QA Accepted By Date

Reviewed and Accepted By QA [initials] 4/9/81

HANGER WELD INSPECTION FORM

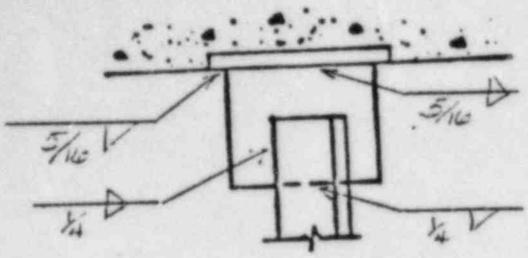
001

F-1099 — HANGER NUMBER
1214 K-318 — EMDRAC DWG. NO.
1 — REV.

RAB — BLDG.
236 — ELEVATION
[illegible signature] — INSPECTOR

3B14

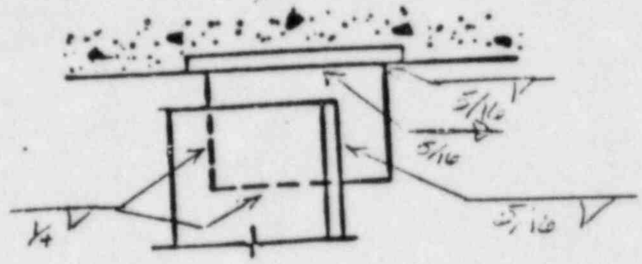
A.



131-16 TO EMBED
PC. MK. PC. MK.

K1235 131-16

B.

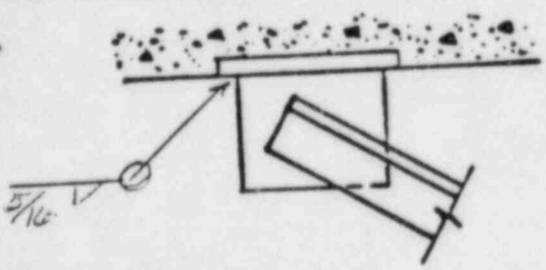


12C-16 TO EMBED
PC. MK. PC. MK.

K1235 126-16

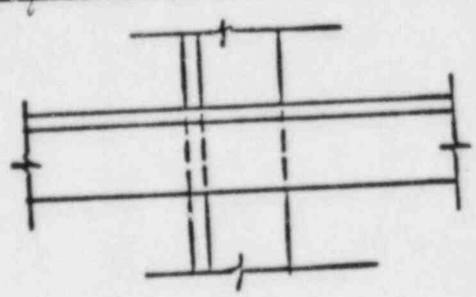
Oversize per FCR-AS-342 R1
Additional welds per FCR-AS-349R1

C.



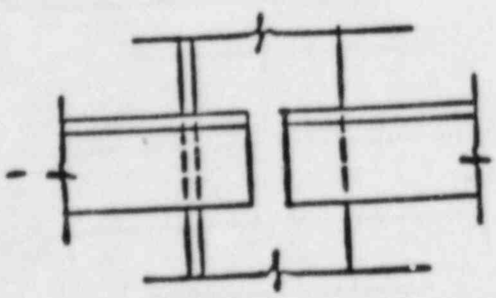
131-15 TO EMBED
PC. MK. PC. MK.

D.



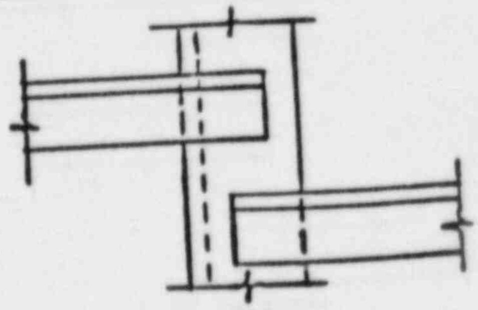
TO
PC. MK. PC. MK.

E.



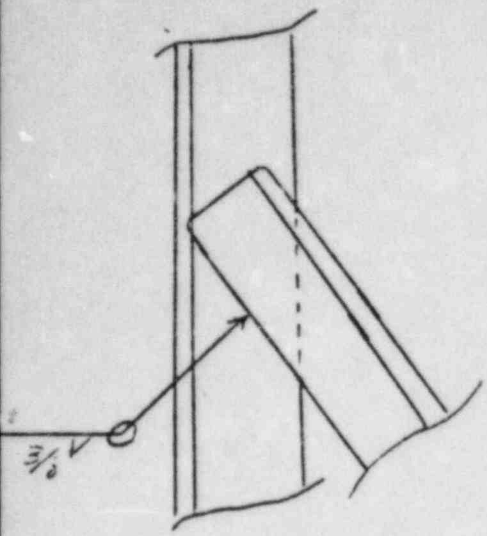
TO
PC. MK. PC. MK.

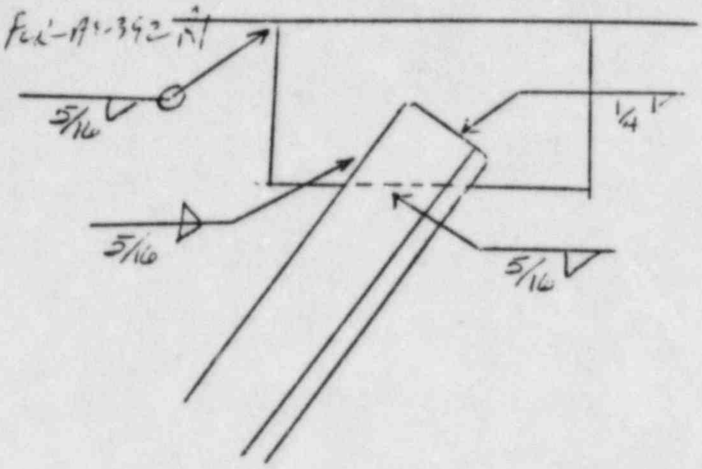
F.



TO
PC. MK. PC. MK.

Excessive welds per
FCR-AS-342 R1
Oversize per FCR-AS-342 R1





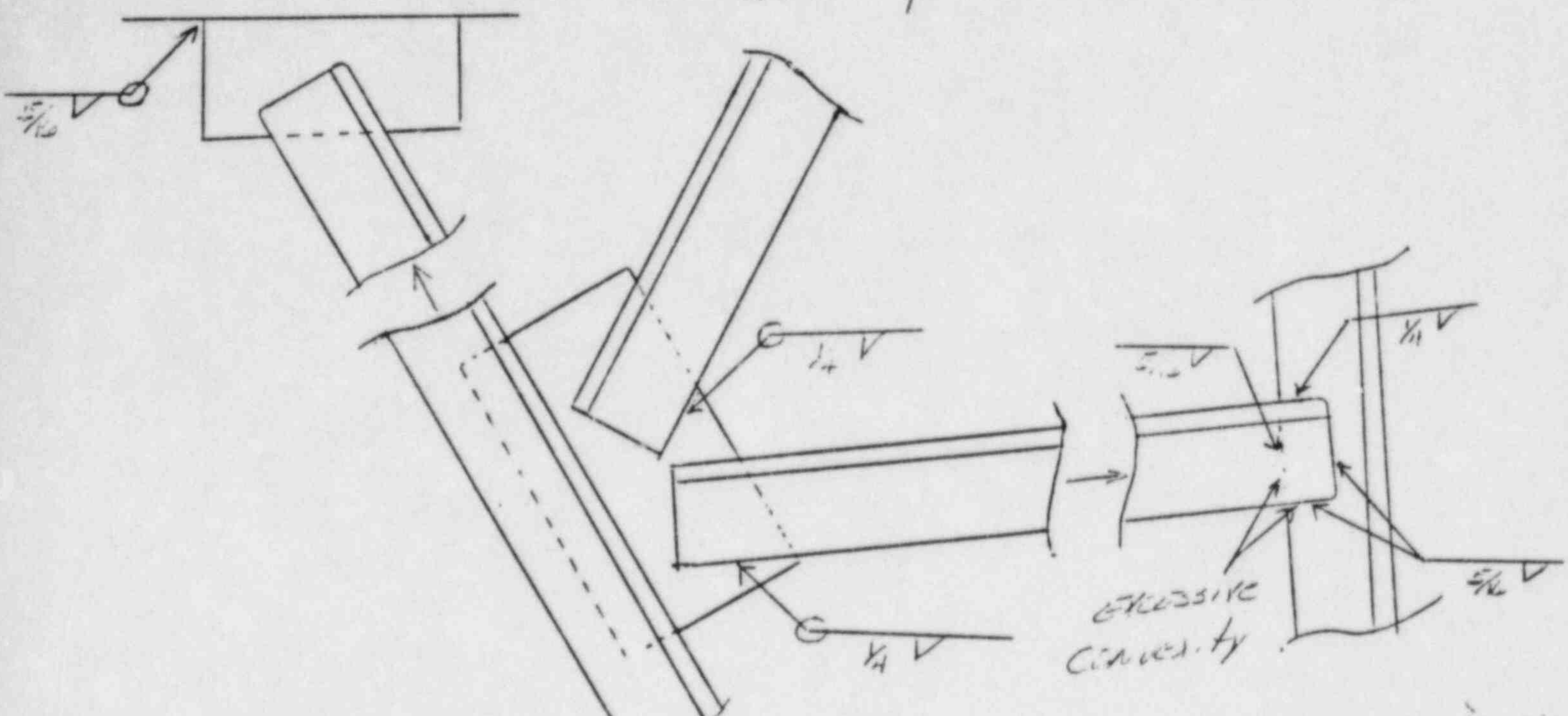
Pc Mk.	to	Pc Mk.
K1C35		38K6

Pc Mk.	to	Pc Mk.
13G15		EMBED
13G15		38K6

Hanger Weld Inspection Form

Pc mk 13C-15 to Pc mk EMBED

Extra weld per FCR-AS-349 R1
Oversize per FCR-AS-392R1



P. mk 38C9 to Pc mk PLR35

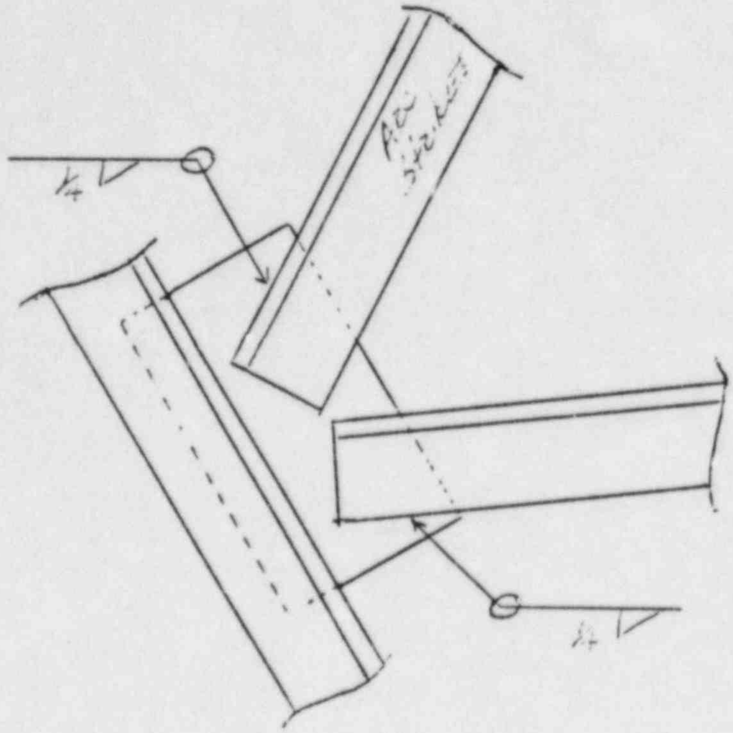
38C8 Pc mk to 3/8" PL Pc mk

38C9 3/8" PL

002

Hanger Weld Inspection Form

Oversize per FCR-AS-392R1



001

38K8	Pc mk to	3/8" PL	Pc Mk
38K9		3/8" PL	

HANGER WELD INSPECTION FORM

PW ~~FCR~~-AS-

1

3986

F-1049 (D4) 171302 — HANGER NUMBER

1364-K318 — EMDRAC DWG. NO.

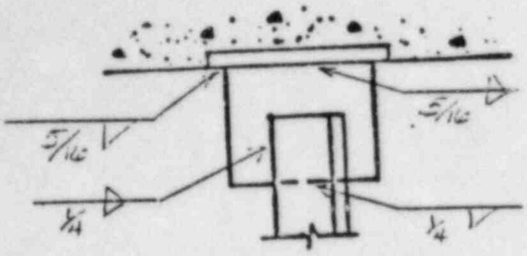
1 — REV.

CAB — BLDG.

236 — ELEVATION

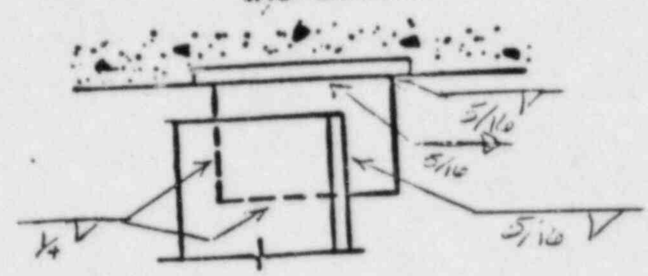
[illegible signature] — INSPECTOR

A.



3B14

B.



131-11 TO EMBED
PC. MK. PC. MK.

K1035 131-11

(001)

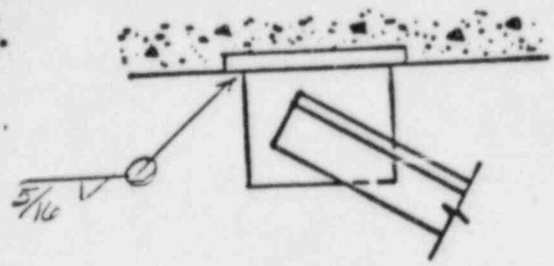
136-16 TO EMBED
PC. MK. PC. MK.

K1035 136-16

(002)

FCR-AS-349R1
FCR-AS-392R1

C.

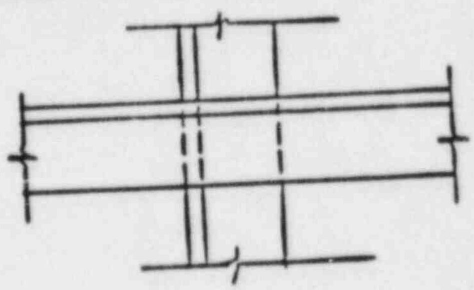


136-15 TO EMBED
PC. MK. PC. MK.

(003)

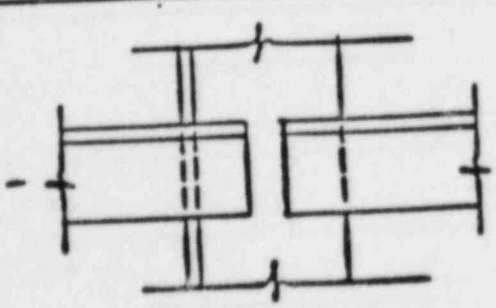
FCR-AS-349R1

D.



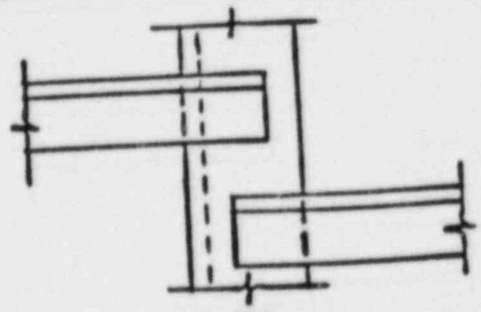
TO
PC. MK. PC. MK.

E.



TO
PC. MK. PC. MK.

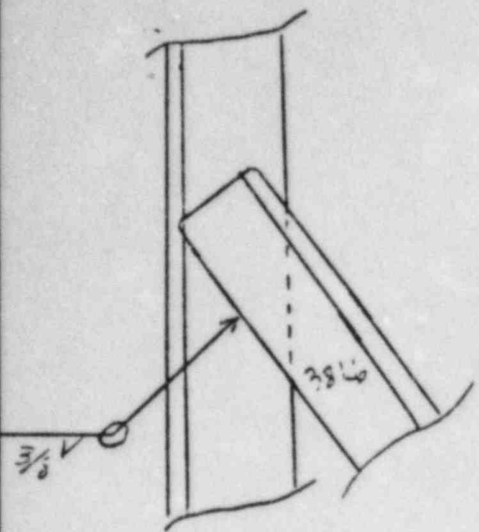
F.



TO
PC. MK. PC. MK.

QA/QC Review and Accept [illegible signature]

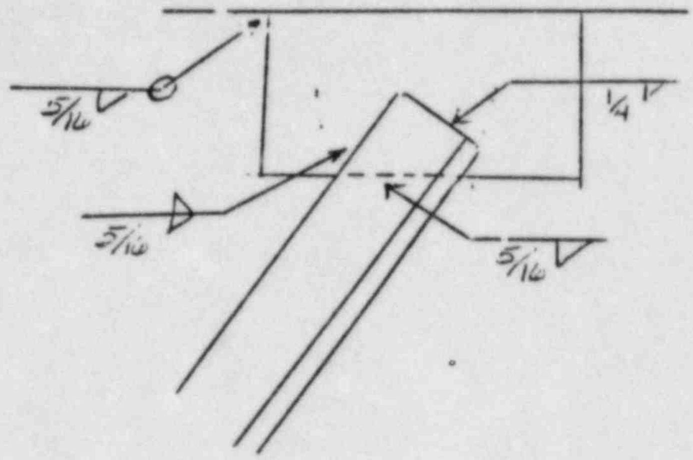
3-20-81



PL Mk. to PL Mk.

K1C35 38K6

004



PL Mk. to PL Mk.

13G15 EMBED

13G15 38K6

005

FCR-AS-349R1

FCR-AS-392R1

No. HR- 008

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1696

Hanger Ispection Report # 17

Detail rework required listed below:

1. Pc Mark 62N3 To Gusset Plate 17616 - welding symbol unclear - re stencil
   [signature] QA Accept

2. ____ QA Accept

3. ____ QA Accept

4. ____ QA Accept

5. ____ QA Accept

6. ____ QA Accept

7. ____ QA Accept

8 ____ QA Accept

R Franklin — Completed by — 3/25/81 Date

Issued To — / / Date — [signature] QA Accepted By — 3/25/81 Date

HANGER WELD INSPECTION FORM

F-1696
HANGER NUMBER

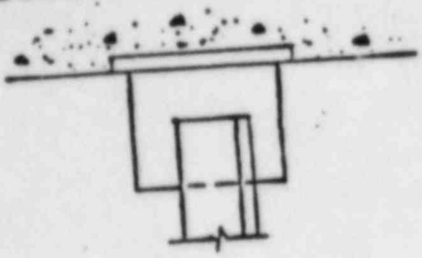
2168-G171502 E11
EMDRAC DWG. NO.

1
REV.

RAB
BLDG.

247
ELEVATION

[illegible] 3-6-81
INSPECTOR

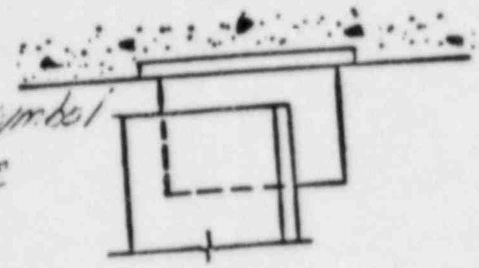


C2A5 TO 13E11
PC. MK. TO PC. MK.

(see reverse side)

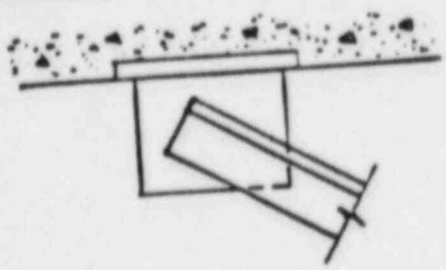
B.

welder's symbol unclear



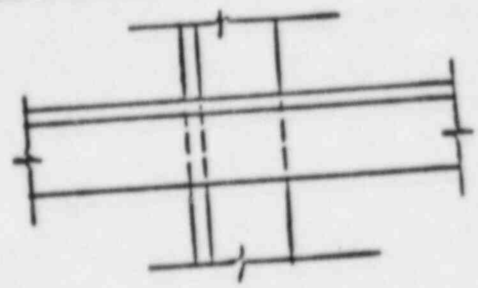
PC. MK. TO PC. MK.

C.



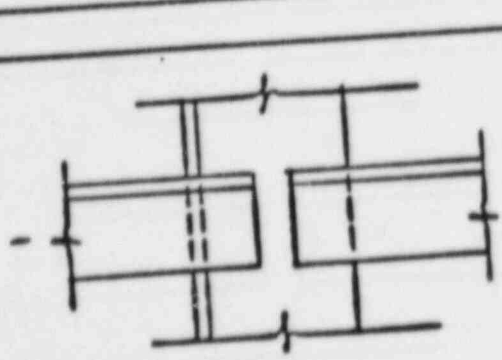
PC. MK. TO PC. MK.

D.



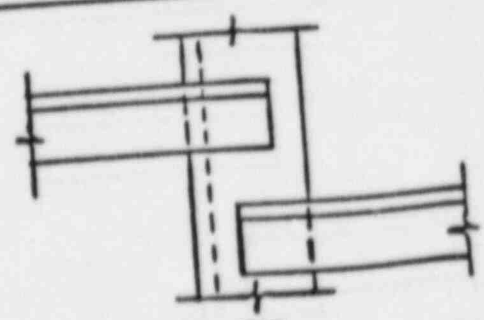
PC. MK. TO PC. MK.

E.



PC. MK. TO PC. MK.

F.

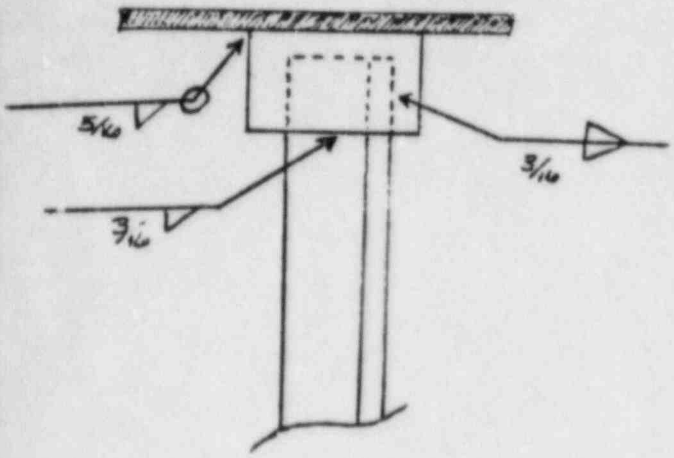


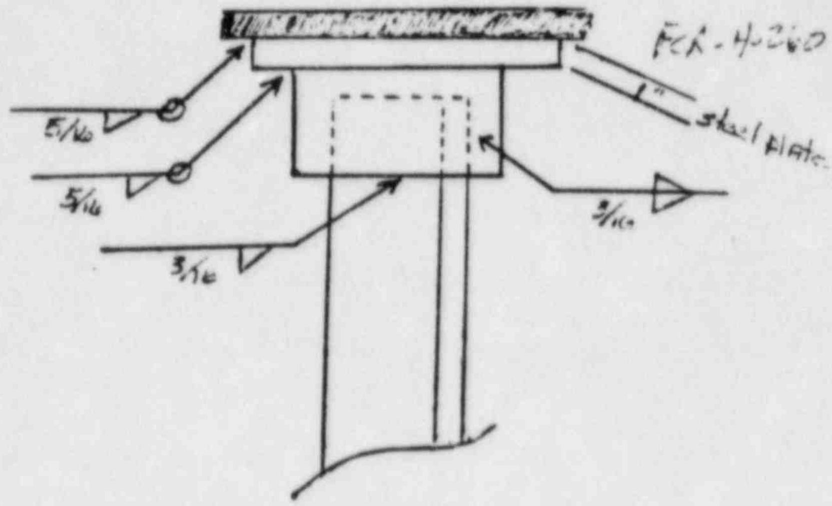
PC. MK. TO PC. MK.

Reviewed and accepted by QA.
SYM 4/1/81

East pc. mk. 62N5 to
pc. mk. 136-16

West pc. mk. 62N5 to
pc. mk. 136-16





pc. mk. 136-16 to pc. mk. embed

pc. mk. 136-16 to pc. mk. embed

Oversize per FCR-AS-392R1
extra weld per FCR-AS-349R1

PW-AS-477
pending on
fitup only

No. HR- 011

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1086

Hanger Ispection Report # 28

Detail rework required listed below:

1. Problem 060 — Arc strikes & spatter on Pc. Mk. 45K6 to K1a36 — Grind & remove Arc strikes & spatter — QA Accept [signature]

2. Problem 056 — undercut at 45K1 to K1A36 reweld to build weld & remove undercut — QA Accept [signature]

3. Problem 055 — Piece mark 45K6 to Gusset - Grind off weld spatter — QA Accept [signature]

4. Problem 054 — Gusset Plate 13615 to embed - Grind slag and reweld. Build throat size on north side — QA Accept [signature]

5. ______ — QA Accept

6. ______ — QA Accept

7. ______ — QA Accept

8 ______ — QA Accept

R Franklin — Completed by

3/25/81 — Date

______ — Issued To

/ / — Date

[signature] — QA Accepted By

3/25/81 — Date

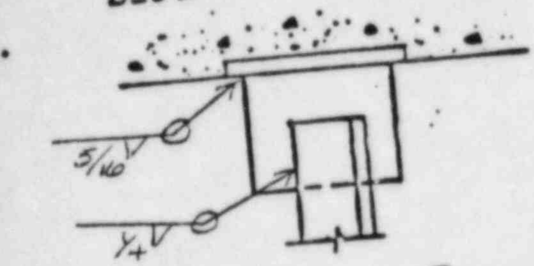
HANGER WELD INSPECTION FORM

1364-16318 EMDRAC DWG. NO. — 1 REV.

F-1086 HANGER NUMBER — INSPECTOR

RAB BLDG — 236 ELEVATION

3B54

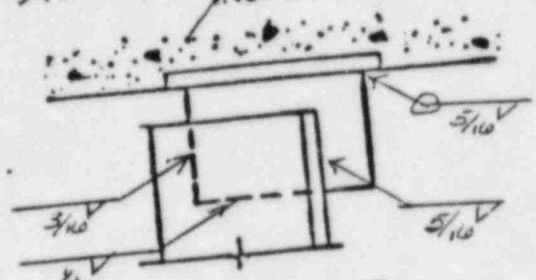


13616 TO EMBED
PC. MK. PC. MK.

13616 K1a36

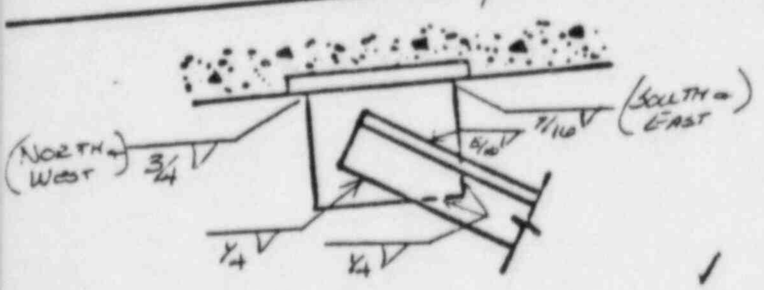
Extra welds per FCR-AS-349R1
Oversize per FCR-AS-392 R1

B.



13616 TO EMBED
PC. MK. PC. MK.

13616 K1a36

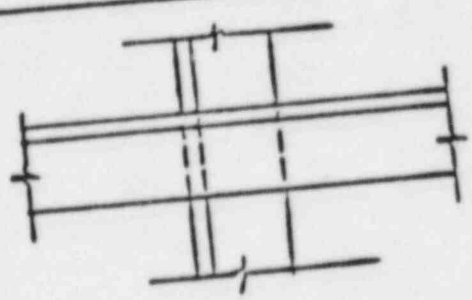


13615 TO EMBED
PC. MK. PC. MK.

13615 45K2

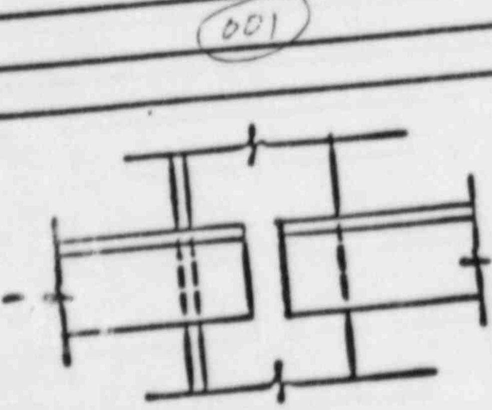
(001)

D.



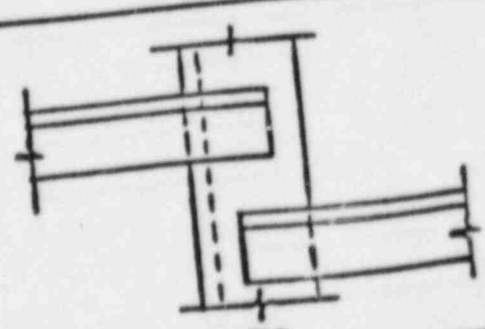
TO
PC. MK. PC. MK.

E.



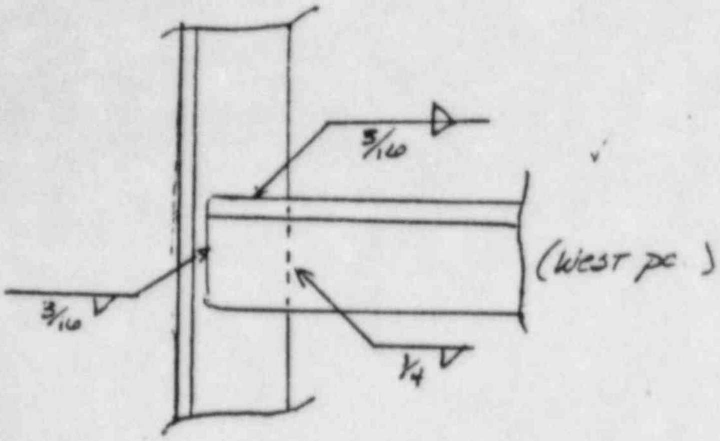
TO
PC. MK. PC. MK.

F.

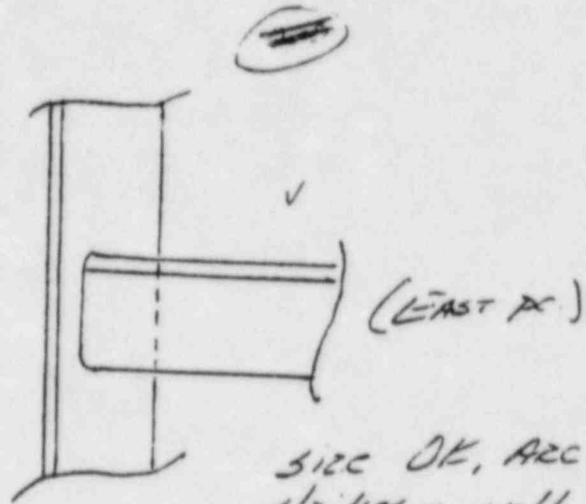


TO
PC. MK. PC. MK.

Reviewed and Accepted
By QA 4/27/81

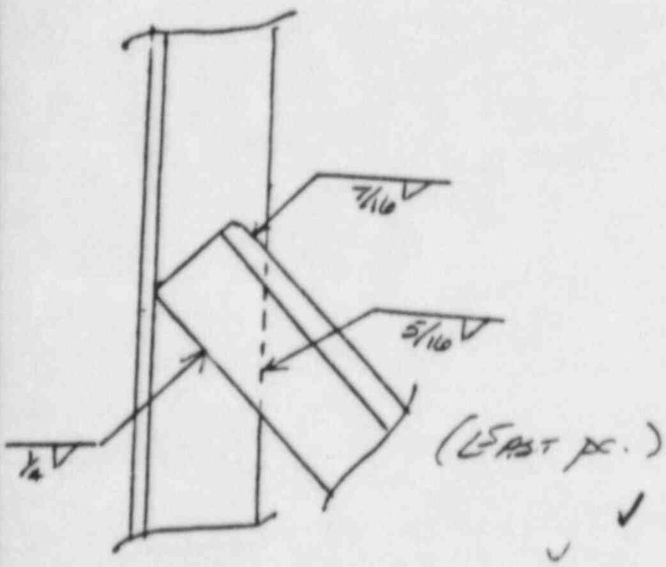


Pc. mk. to Pc. mk.
45K6 Kla36

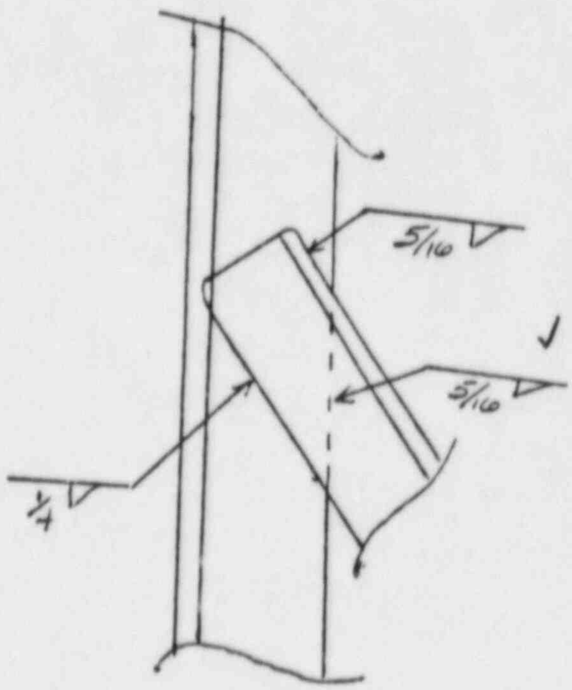


size OK, Arc strikers + weld spatter.

Pc. mk. to Pc. mk.
45K6 Kla36



Pc. mk. to Pc. mk.
45K5 Kla36

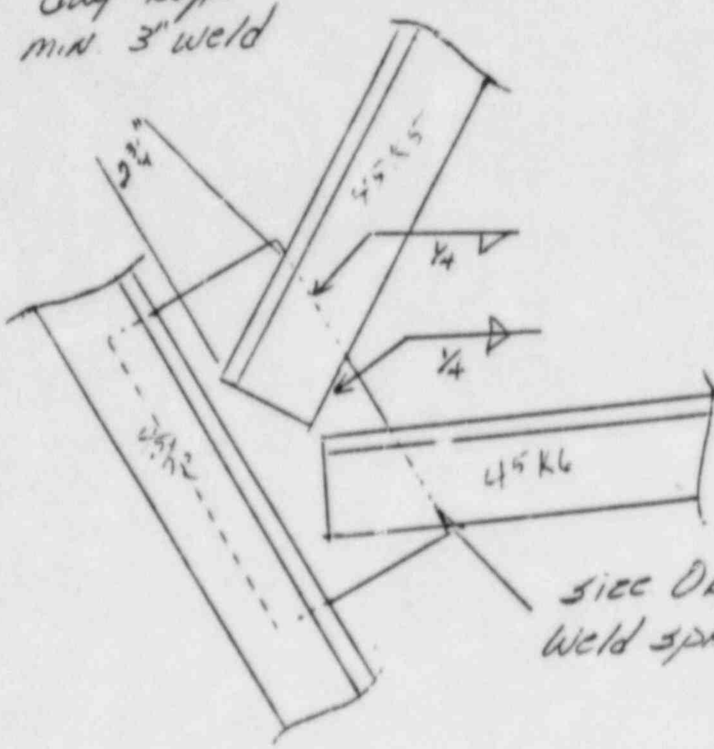


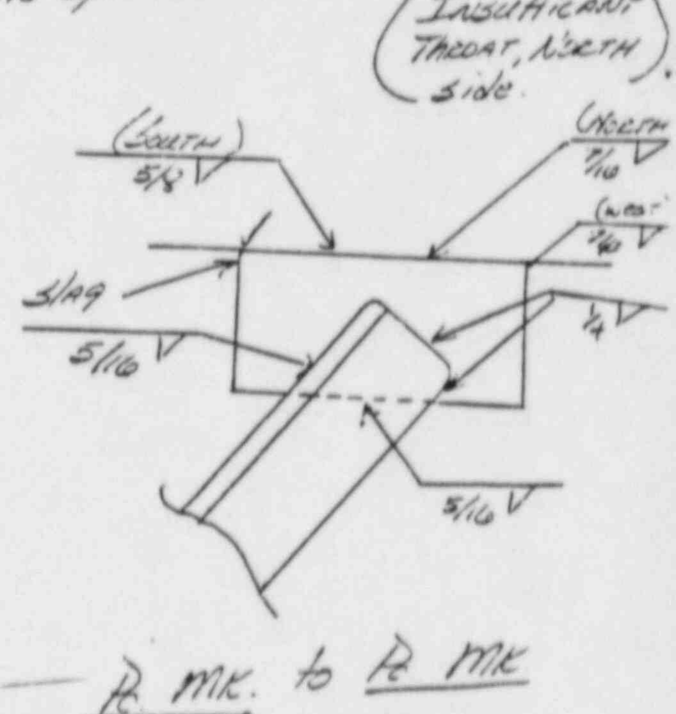
Pc. mk. to Pc. mk.
45K5 Kla36

F-1086

Hanger Weld Inspection Form

SS7 4-22-81
~~Tracking~~ PW-AS-510





45K6 Pc mk to 3/8" PL Pc mk

003

oversize per FCR-AS-392R1
extra welds per FCR-AS-349R1 — Pc MK. to Pc MK

Pc MK.	Pc MK
K1d36	13G-15
13G15	Embed

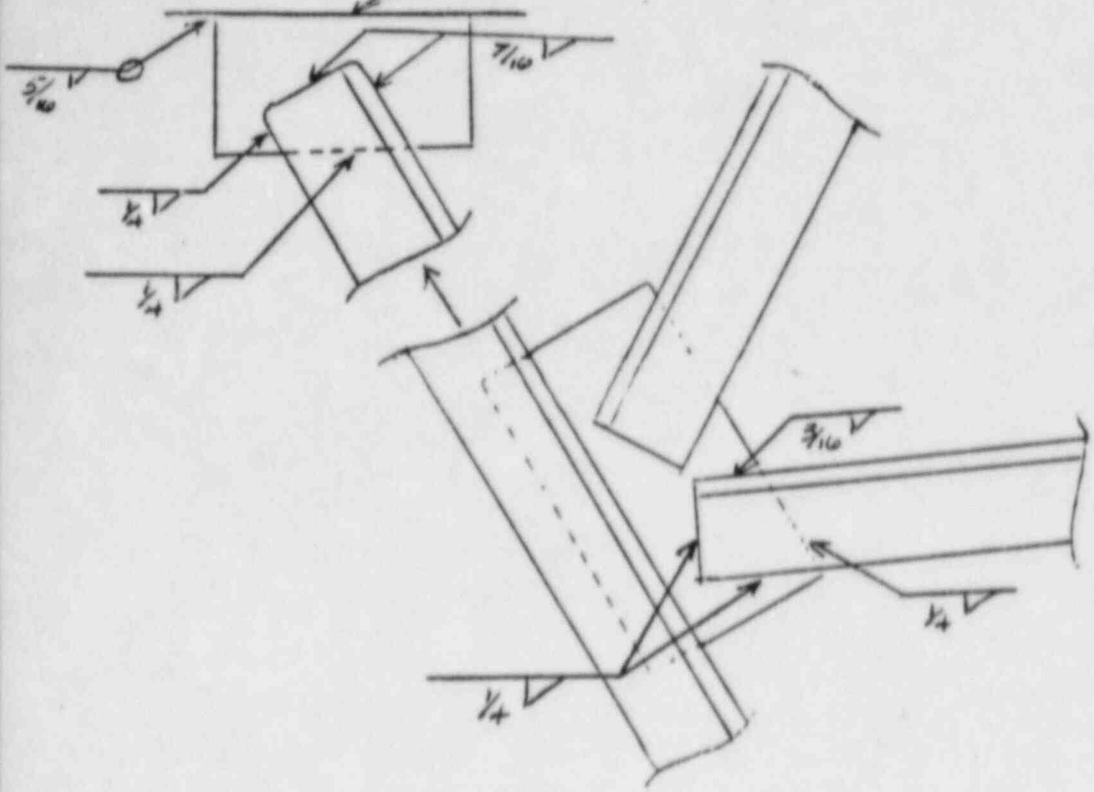
003

F-1056

Hanger Weld Inspection Form

Pl. mk. 45K1 to Pl. mk. 13G15 (welded across gap in embed plate)

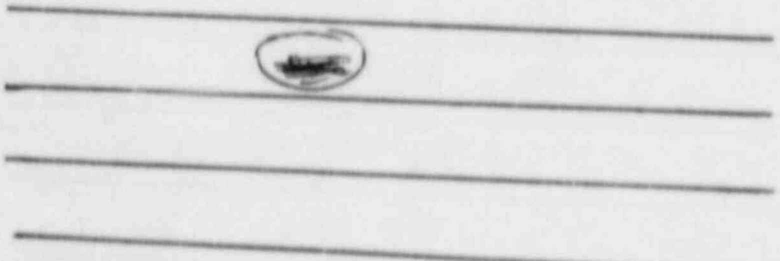
ACI-W-049

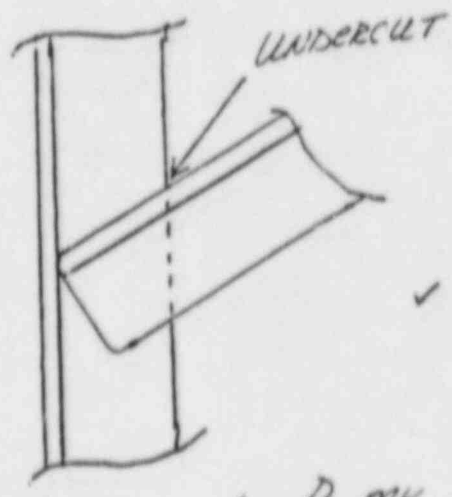


Extra welds per FCR-AS-349R1

oversize per FCR-AS-392R1

45K6 Pl mk to 3/8" Pl Pl mk





Pl. mk. 45K1 to Pl. mk. K1a36

PAGE

HANGER WELD INSPECTION FORM

Sh 12

1021-HC2309 — HANGER NUMBER

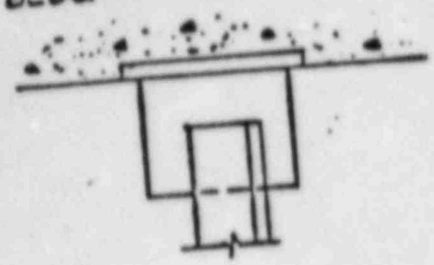
1364-20167 — EMDRAC DWG. NO.

4 — REV.

RAB — BLDG

236 — ELEVATION

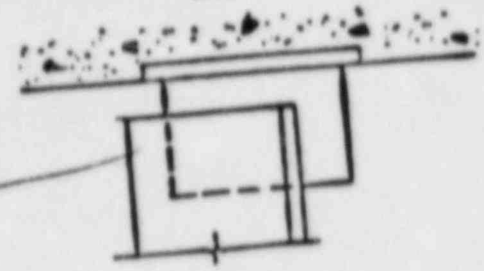
&T — INSPECTOR



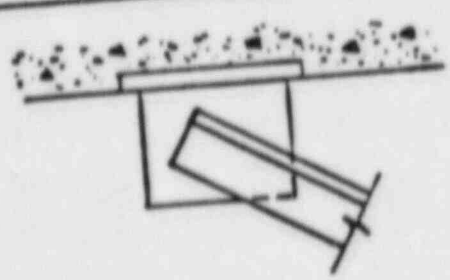
Accepted

PC. MK. TO PC. MK.

B.

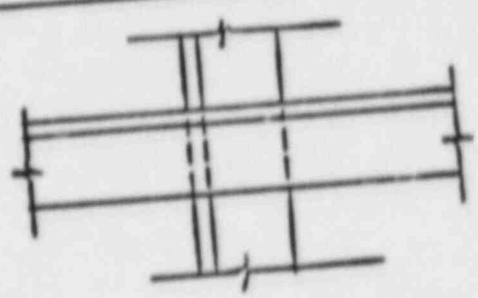


PC. MK. TO PC. MK.



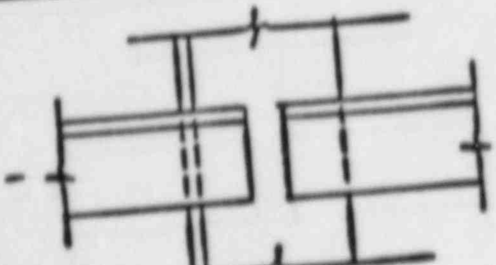
PC. MK. TO PC. MK.

D.



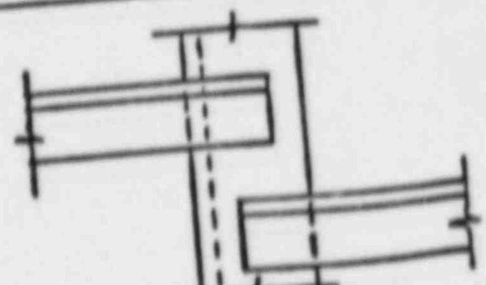
PC. MK. TO PC. MK.

E.



PC. MK. TO PC. MK.

F.



PC. MK. TO PC. MK.

No. HR- 012

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1102

Hanger Ispection Report # 30

Detail rework required listed below:

1. Problem 69 - remove arc strikes from pc. mk. K2a23. — Calvin A Mcdonald, QA Accept

2. Problem 69 - remove spatter from 13616 at embed connection. Build weld & remove undercut at K2a23 TO 13916. — Calvin A Mcdonald, QA Accept

3. ______ QA Accept

4. ______ QA Accept

5. ______ QA Accept

6. ______ QA Accept

7. ______ QA Accept

8 ______ QA Accept

R Franklin — Completed by — 3/26/81 — Date

Issued To — / / — Date — Calvin A Mcdonald — QA Accepted By — 3/26/81 — Date

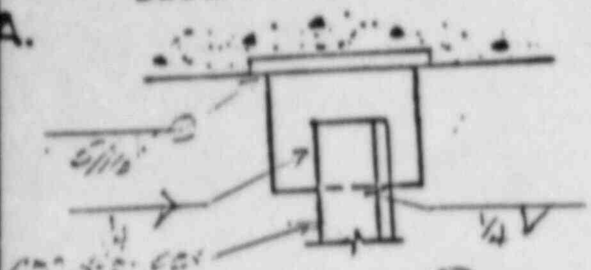
HANGER WELD INSPECTION FORM

1-MC-9 — HANGER NUMBER

3-4-16-318 — EMDRAC DWG. NO. — 1 REV.

RAB — BLDG. — 956 — ELEVATION — [illegible signature] — INSPECTOR

A.

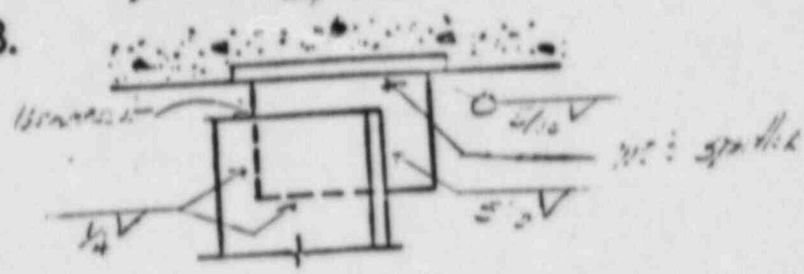


sht 13

[illegible] TO Embed
PC. MK. — PC. MK.

[illegible] — KC2-23

B.



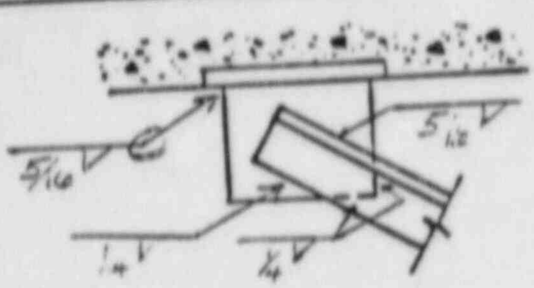
136-16 TO Embed
PC. MK. — PC. MK.

136-16 — KC2-23

Oversize per FCR-AS-292 R1

Extra welds per FCR-AS-349 R1

C.

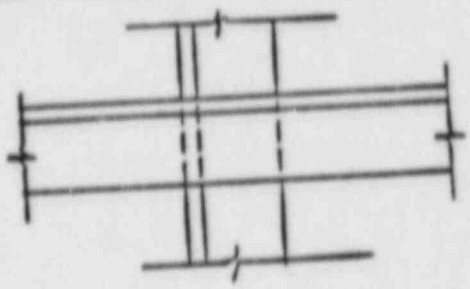


[illegible] TO [illegible]
PC. MK. — PC. MK.

136-15 — KC2-23

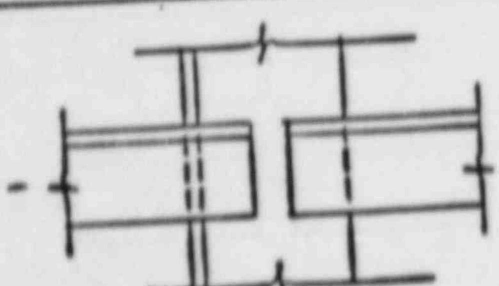
001

D.



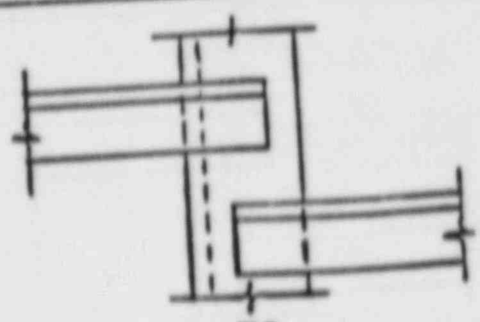
TO
PC. MK. — PC. MK.

E.



TO
PC. MK. — PC. MK.

F.



TO
PC. MK. — PC. MK.

22.256

No. HR- 054

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1089

Hanger Ispection Report # 33

Detail rework required listed below:

1. Problem 001 - Pc MK 45K9 TO K2e35 - add 3/16" fillet to 4th side — D. Mon[illegible] QA Accept

X 2. Pc MK 45K4 to gusset 13G15 - Add 3/16" fillet to fourth side — D. Mon[illegible] QA Accept

3. ~~Pc MK 45K5 to gusset - Add 3/16" fillet to fourth side~~ Not Req'd EET — N/R QA Accept

4. ~~Pc MK 45K6 to gusset - Add 3/16" fillet to fourth side~~ Not Req'd EET — N/R QA Accept

X 5. Pc MK 45K6 to K2e35 - Add 3/16" fillet to fourth side — D. Mon[illegible] QA Accept

6. Problem 002 - Pc MK 45K5 to K2e35 Add 3/16" fillet to fourth side — D. Mon[illegible] QA Accept

7. Pc MK 45K3 to 13G15 (gusset) - add 3/16" fillet to fourth side — D. Mon[illegible] QA Accept

8 ______ QA Accept

Completed by ______ Date ______

R Rohletter (Issued To) — 4/1/81 (Date) — D. Mon[illegible] (QA Accepted By) — 4/23/81 (Date)

No. HR- 014

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1089

Hanger Ispection Report # 33

Detail rework required listed below:

1. Problem 77,78,79,80 - Pc MK 45K5 to KZ e35 - add 3/16" fillet weld to 2 sides - Weld all around/required.

QA Accept

~~1.~~ Insufficient throat - add weld metal to correct

QA Accept

2. ~~3.~~ Pc MK BG15 (Gusset Plate) to embed - increase fillet weld size to 5/16"

QA Accept

3 ~~4.~~ Pc MK 45K5 to 3/8" plate - grind out slag and reweld correct size.

QA Accept

4 ~~5.~~ Pc MK 45K6 to 3/8" plate - add weld metal to correct undercut

QA Accept

5 ~~6.~~ Problem 82-83-84 - Pc MK 45K5 to KZe35 - grind and/or reweld area of lack of fusion to provide correct weld size

QA Accept

6 ~~7.~~

QA Accept

7 ~~8~~

QA Accept

R Franklin
Completed by

Date / /

Issued To

Date / /

QA Accepted By

Date 3/27/81

HANGER WELD INSPECTION FORM

F-1089 — HANGER NUMBER

1364-16318 — EMDRAC DWG. NO.

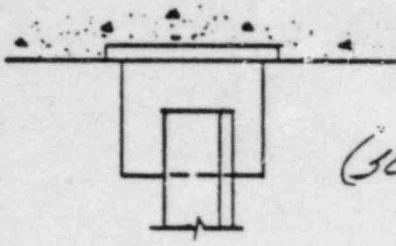
1 — REV.

CAB — BLDG.

236 — ELEVATION

[signature] — INSPECTOR

A.

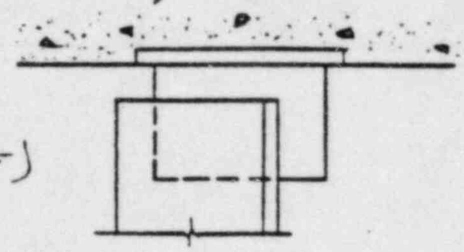


(SEE NEXT SHEET)

SB 75

______ TO ______
PC. MK. PC. MK.

B.

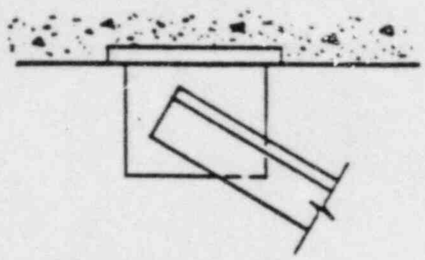


______ TO ______
PC. MK. PC. MK.

All OK

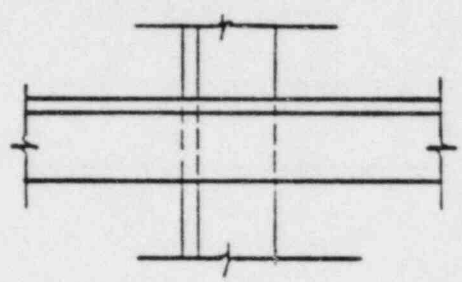
Oversize per FCR-HS-342 R1
Extra welds per FCR-HS-349 R1

C.



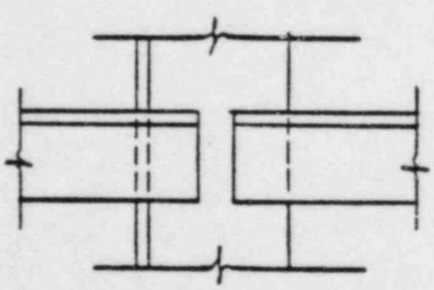
______ TO ______
PC. MK. PC. MK.

D.



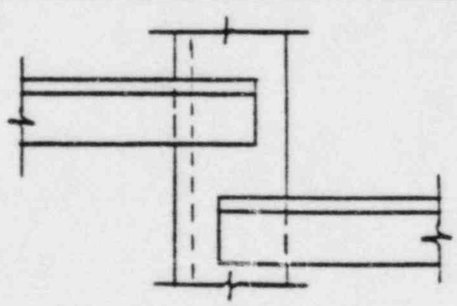
______ TO ______
PC. MK. PC. MK.

E.



______ TO ______
PC. MK. PC. MK.

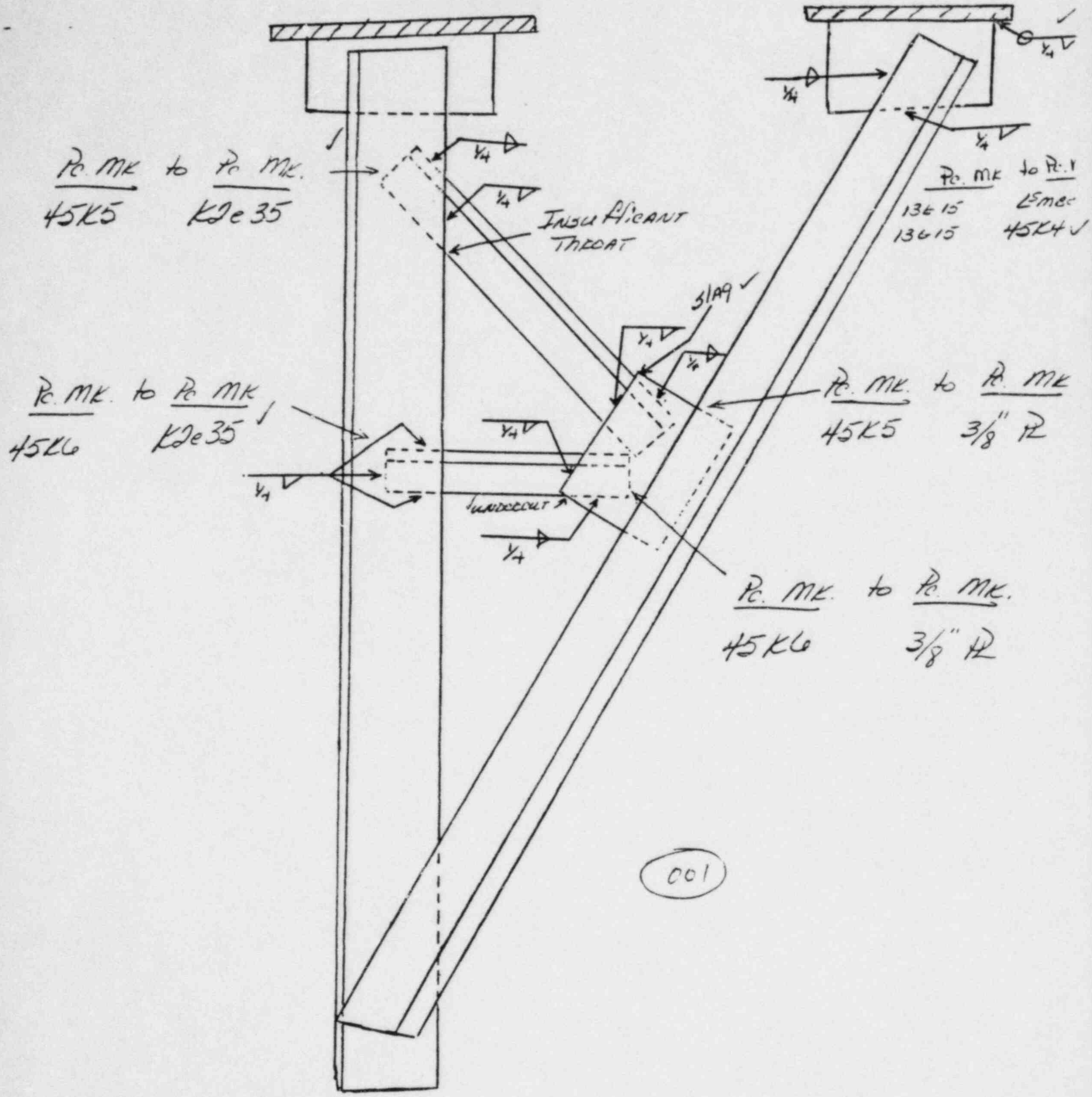
F.



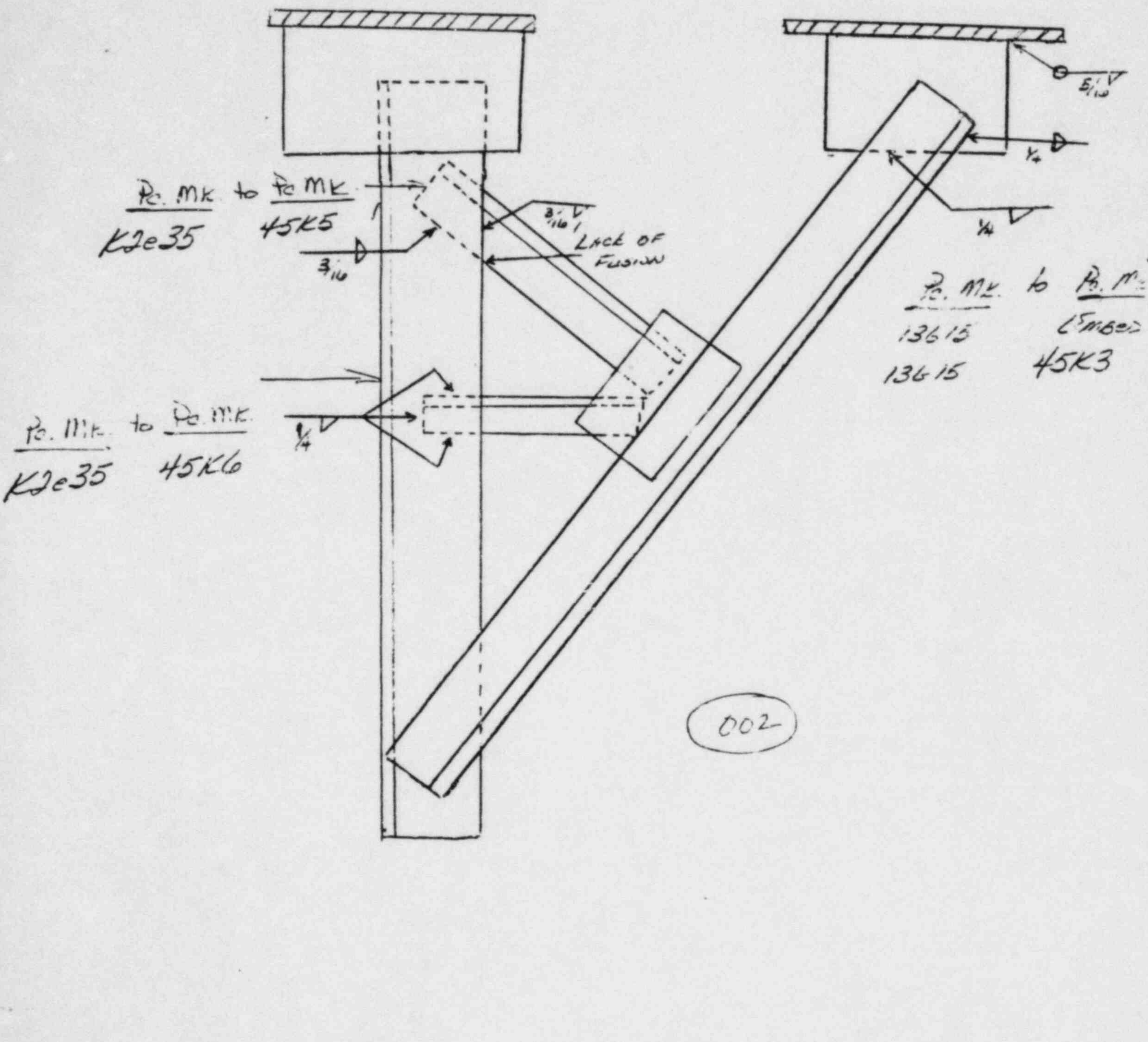
______ TO ______
PC. MK. PC. MK.

Reviewed and Accepted
By QA 4/27/81

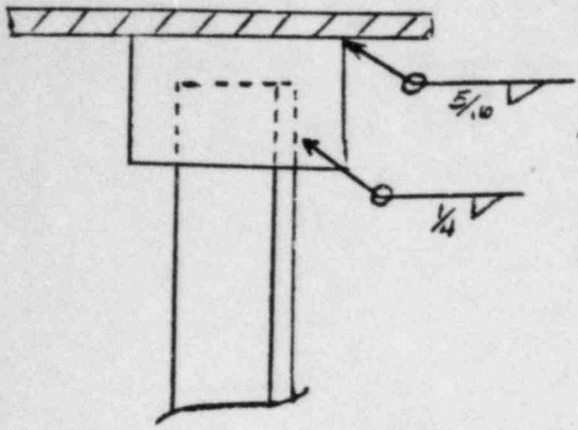
EAST DETAIL C



WEST DETAIL C

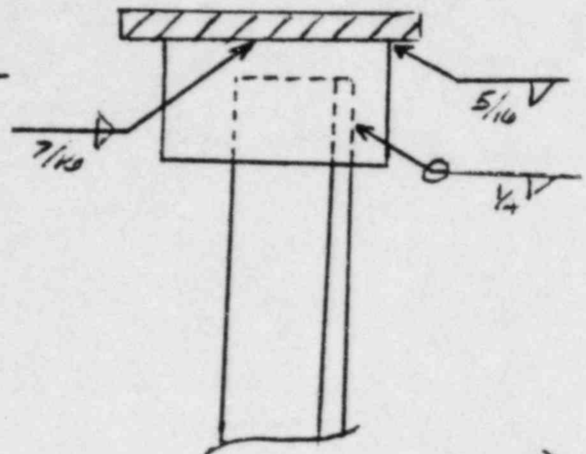


EAST PC.



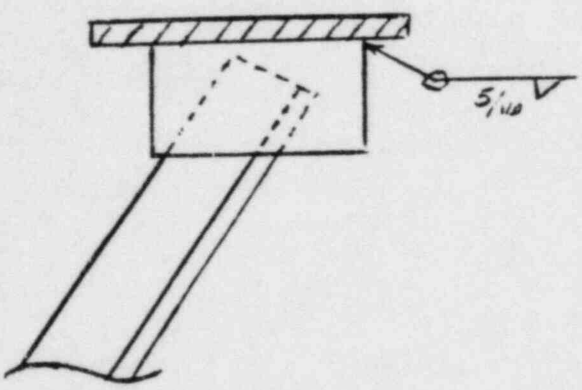
Pc. Mk.	to	Pc. Mk.
13G16		EMBED
13G16		K2e35

WEST PC.



Pc. Mk.	to	Pc. Mk.
13G16		EMBED
13G16		K2e35

WEST DIA BRACE



Pc. Mk.	to	Pc. Mk.
13G19		EMBED

·EL 190 South

No. HR- 041

Corrective Action & Disposition of Hanger Reinspection

Hanger No. F-1930

Hanger Ispection Report # 82

Detail rework required listed below:

1. ✓Problem 249 - Pc MK 6917 to 395 - correct undercut by adding weld metal — D. [signature] QA Accept

2. Problem 250 - Pc MK 6918 to 395 - add 3/16" fillet to fourth side — D. [signature] QA Accept

3. ✓Problem 251 - Pc MK 6918 to 395 - add 3/16" fillet weld to fourth side — D. [signature] QA Accept

4. — QA Accept

5. — QA Accept

6. — QA Accept

7. — QA Accept

8 — QA Accept

R. Franklin — Completed by

4/2/81 — Date

R. Rohletter — Issued To

3/24/81 — Date

D. [signature] — QA Accepted By

4/10/81 — Date

Reviewed and Accepted By P.F. [initials] 4/9/81

HANGER WELD INSPECTION FORM

F1930 — HANGER NUMBER

1364-12756 — EMDRAC DWG. NO.

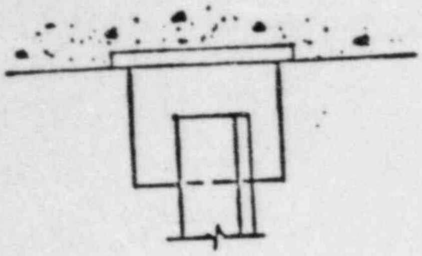
5 — REV.

RAB — BLDG.

190 — ELEVATION

[illegible signature] — INSPECTOR

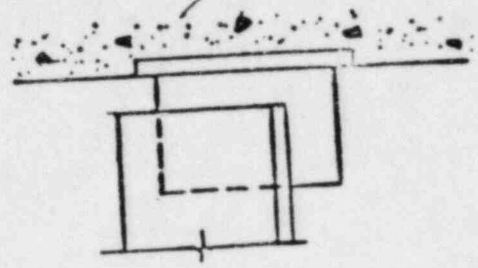
A.



SA68

SEE OTHER SIDE

B.



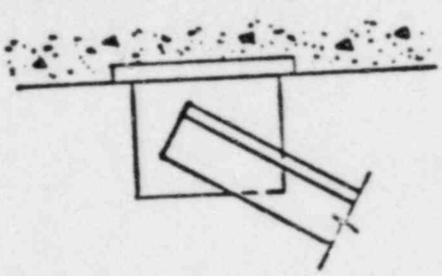
PC. MK. TO PC. MK.

PC. MK. TO PC. MK.

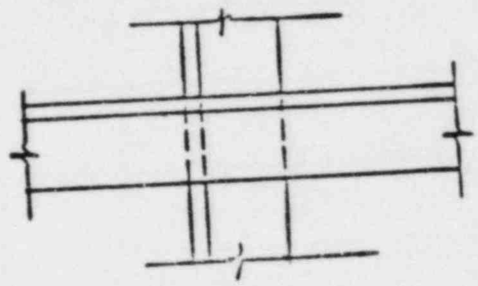
extra welds per FCR-HS-349R1

Oversize per FCR-HS-392R1

C.



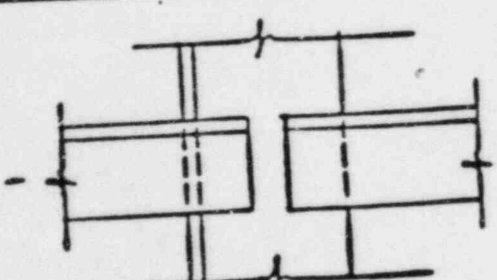
D.



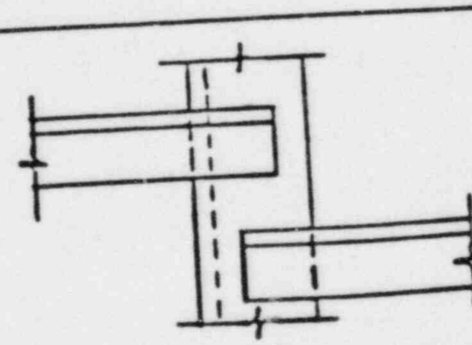
PC. MK. TO PC. MK.

PC. MK. TO PC. MK.

E.



F.

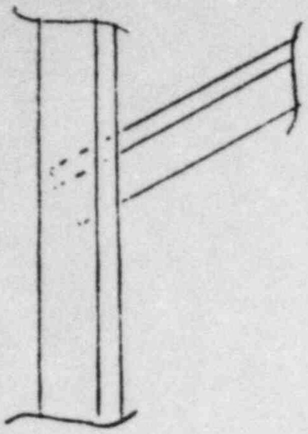


PC. MK. TO PC. MK.

PC. MK. TO PC. MK.

SA68

A.

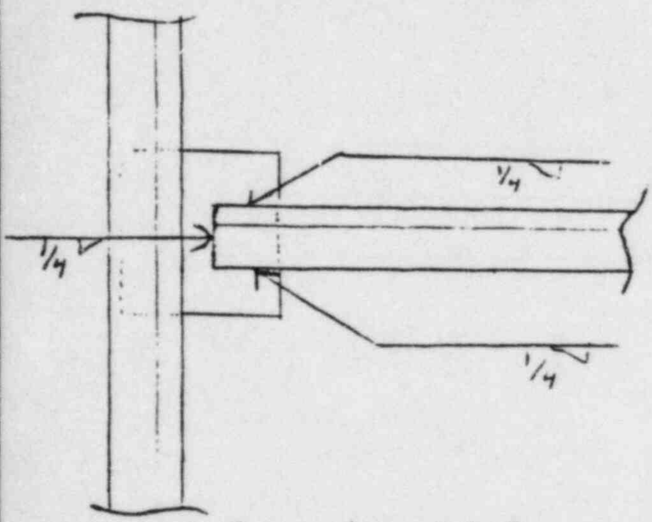


6G17 to 3G5

to

Undercut Oversize

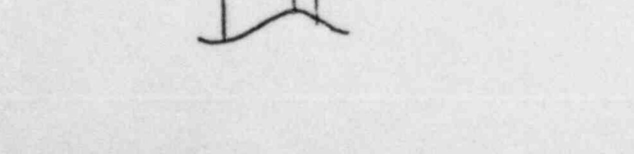
B



6G18 to 3G5

to

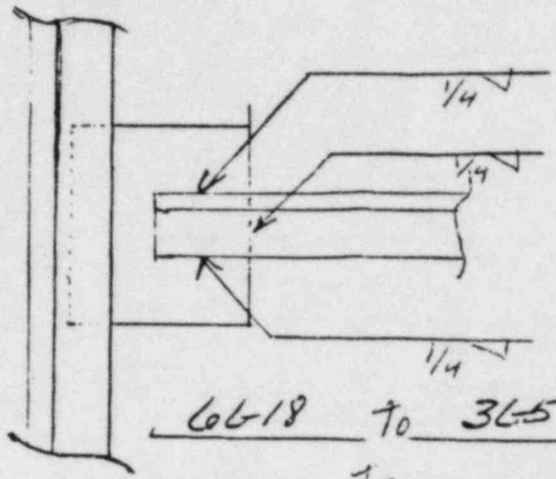
D



13G16 to Embed

to

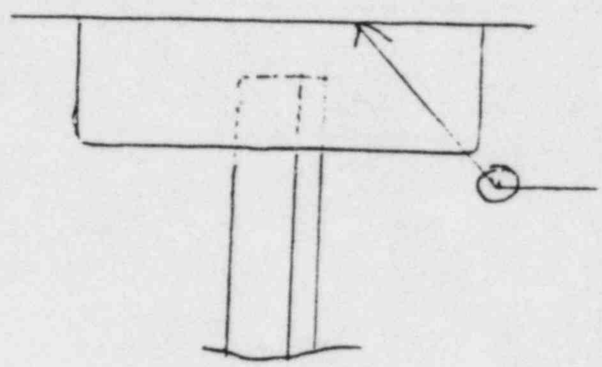
C



6G18 to 3G5

to

E



13G16 to Embed

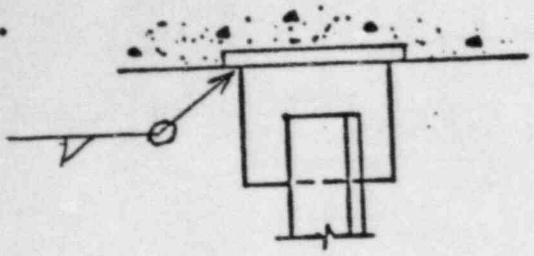
HANGER WELD INSPECTION FORM

F-1012 — HANGER NUMBER

1804-4536 — EMDRAC DWG. NO. — 5 — REV.

RAB — BLDG. — 140 — ELEVATION — [illegible] — INSPECTOR

A.

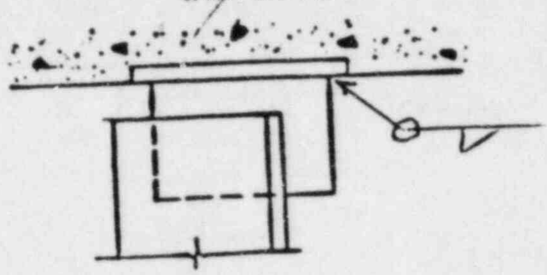


3B20

13G16 TO Embed
PC. MK. PC. MK.

1 - oversize weld

B.

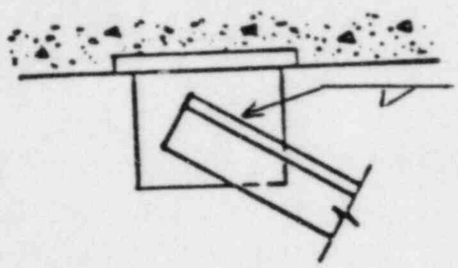


13G16 TO Embed
PC. MK. PC. MK.

1 - oversize weld

Extra weld per FCR-AS-349R1
Oversize per FCR-AS-392R1

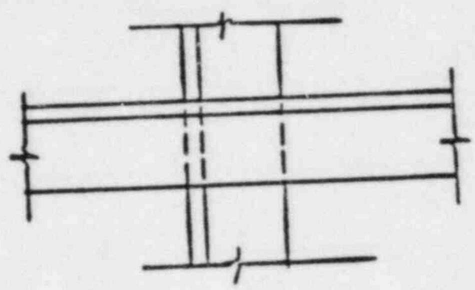
C.



16G1 TO 13C-15
PC. MK. PC. MK.

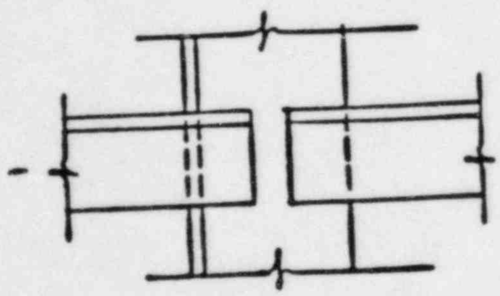
1 - oversize weld

D.



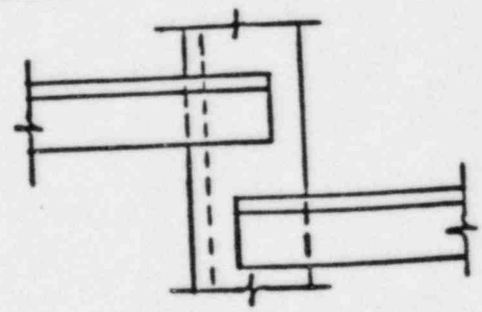
TO
PC. MK. PC. MK.

E.



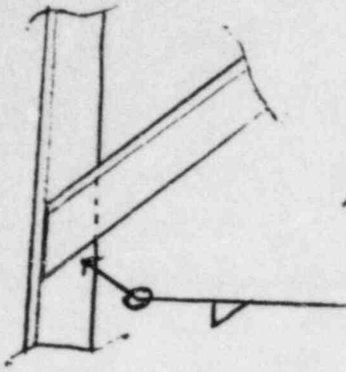
TO
PC. MK. PC. MK.

F.



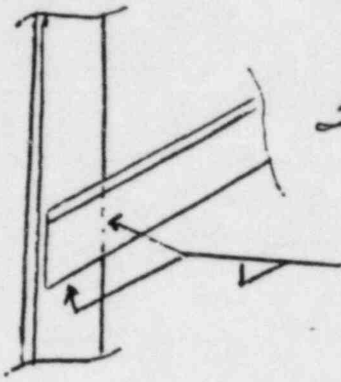
TO
PC. MK. PC. MK.

Reviewed and Accepted
By QA SM 4/22/81



1-weld oversize

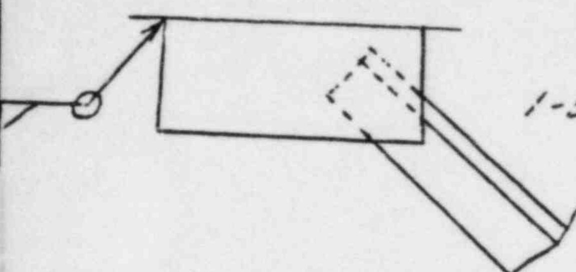
Pc. Mk.	to	Pc. Mk.
16G11		16G10



2-welds oversize

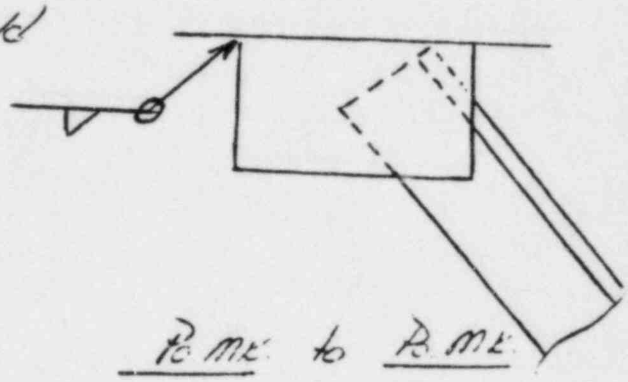
Pc. Mk.	to	Pc. Mk.
16G11		16G10

001

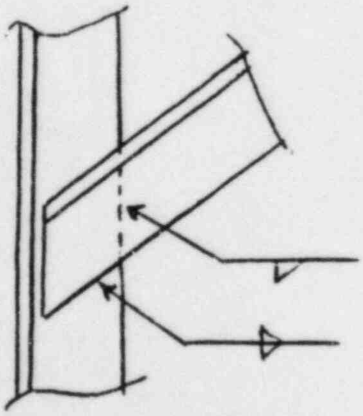


1-oversize weld

Pc. Mk.	to	Pc. Mk.
13G15		Embed



Pc. Mk.	to	Pc. Mk.
13G15		Embed



3-oversize welds

002

Pc. Mk.	to	Pc. Mk.
16G10		16G1

HANGER WELD INSPECTION FORM

F 1931 — HANGER NUMBER

1364-12756 — EMDRAC DWG. NO.

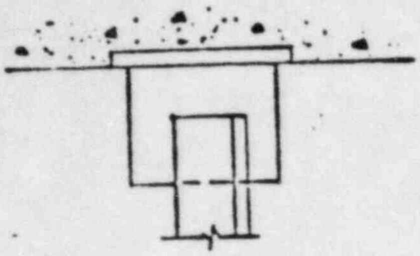
5 — REV.

RAB — BLDG.

190 — ELEVATION

[illegible signature] — INSPECTOR

A.



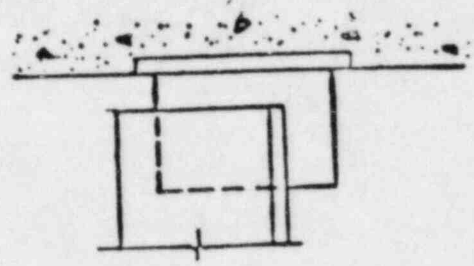
SB54

SEE OTHER SIDE

TO

PC. MK. PC. MK.

B.

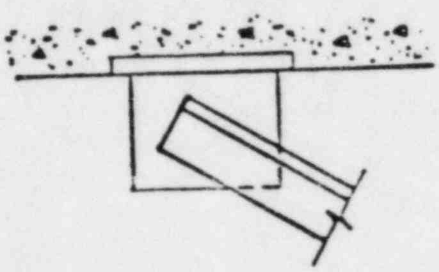


TO

PC. MK. PC. MK.

Extra welds per FCR-HS-349 R1

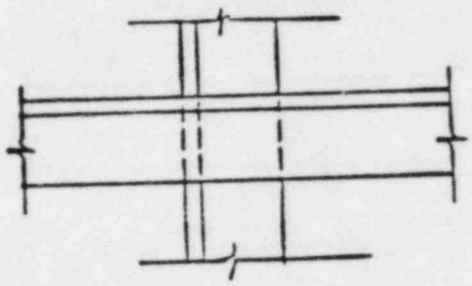
C.



TO

PC. MK. PC. MK.

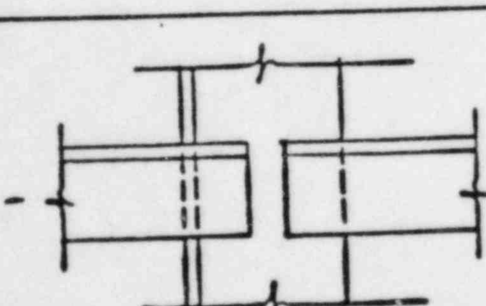
D.



TO

PC. MK. PC. MK.

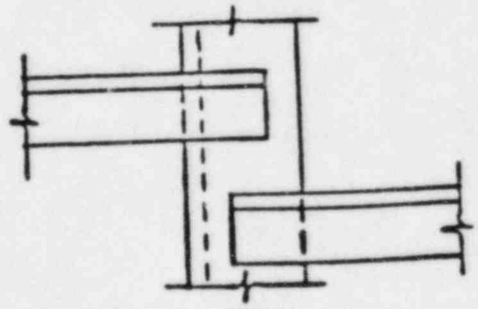
E.



TO

PC. MK. PC. MK.

F.



TO

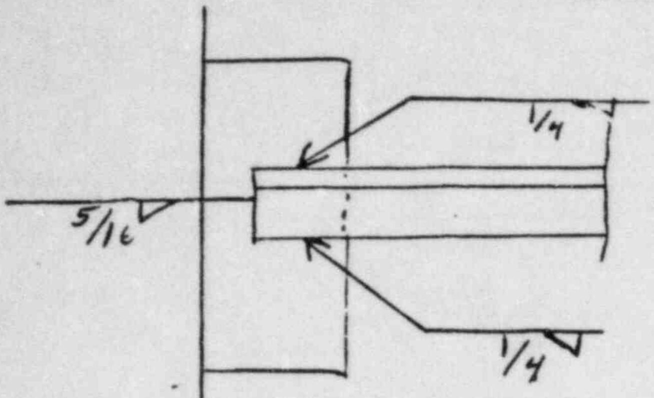
PC. MK. PC. MK.

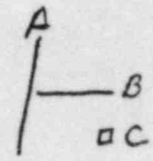
Reviewed and accepted by QA.
SM 4/10/81

B

F1931

SB54





2G22 To 13G19

~~13G19~~ To

ORIGINAL

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

FCR/PW -H- 863

Type of Request: ☐ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☑ Field Change ☑ See Recommended Action ☑ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: RAB 1 PIPE HANGER ☑ Q ☐ Non-Q
LOCATION CHANGE

Conflict/Condition

Reference Documents or Attachment A-1-216-1-SI-H-1011 2/C
INTERFERENCE BETWEEN MEMBER 4 AND INSTALLED PD LINE NECESSITATES RELOCATING HANGER 1 3/4" WEST OF DESIGN — INCORRECT WELD SYMBOL FOR CLEVIS —

Recommended Action: ☑ Please Investigate and Resolve
☐ Please Resolve as Follows

DOCUMENT CONTROL
RECEIVED
SEP 2 1981
SHEARON HARRIS N. P. P.

Justification: NECESSARY TO AVOID INTERFERENCE WITH INSTALLED LINE ——

Requested by: TOP
[signature] 24 JUL '81
Discipline Engineer Date

Site Approval:
[signature] 7-28-81
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy)
(Copy)
(Copy)
(Copy)

000382

FCR-H-863

Design Organization Approval (AE)☐ (NSSS)☐ (N/A) ☑ (Other) ☐

Telephone Resolution ☐ Yes ☑ No

☐ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed ______

Comments:

Signature Title Date Signature Title Date

CP&L Harris Plant Engineering Approval Required ☑ Yes ☐ No

Telephone Resolution ☐ Yes ☑ No

☐ Approved as Recommended ☐ Rejected ☒ Conditional Approval

SEE ATTACHED SKETCH.

CHK'D: JM 9-19-81

S. V. AS 8-31-81

Discipline Engineer Date

[signature] 9/19/81

MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

[signature] 9-21-81

Senior Resident Engineer Date

Second Distribution:

(Original) Document Control
(Copy) ERABCO
(Copy)

(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☑ Yes ☐ No

Comments:

Larry Coble 21 SEPT 81

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control
(Copy)
(Copy)

(Copy)
(Copy)
(Copy)

000333

HPES ATTACHMENT
FCR-H-863
SHT. 1 OF 3

DOCUMENT CONTROL
RECEIVED
FEB 1 1980
SHEARON HARRIS N. P. P.

DESIGN				DISCIPLINE	ENGINEERING			
FOR		NC	C		FOR		NC	C
INFO	COMM				INFO	COMM		
				MECHANICAL	X			
				CIVIL				
				ARCH				
				ELECTRICAL				
				INSTR'N				
				CONTROLS				
				PLUMBING				
				HVAC				
				APPLIED PHYSICS				
				WTR TREAT				
				RADWASTE				
				SHIELDING				
				MATERIALS				
				STRESS SUPP & RESTRAINTS				
				CONST				
				QAE				
				PQAF				
				MODEL FACILITIES				
				CP&L SITE	X			
				EXPEDITER	X			

	REPRODUCIBLE ILLEGIBLE
	ADDRES
	STANDARD DISTRIBUTION

426 B/7-75

DFS 1365-/5361 R2 | DATE REC 1-24-80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
3600 MW(e) - UNITS 1-4 - 1984-1990

PO S SI/147 ITEM

A	DRAWING REVIEW	NO COMMENTS, PRINT TO VENDOR	1	
		COMMENTS AS NOTED, PRINT TO VENDOR	2	
		DRAWING NOT APPLICABLE, PRINT TO VENDOR	3	
		NO COMMENTS, NO PRINT TO VENDOR	4	X
		FOR INFORMATION ONLY	5	
B	FABRICATION PROCEED	NO FURTHER REPRODUCIBLE REQUIRED	1	X
		SUBMIT REVISED REPRODUCIBLE	2	
	FABRICATION DO NOT PROCEED	NO FURTHER REPRODUCIBLE REQUIRED	3	
		SUBMIT REVISED REPRODUCIBLE	4	

B-P HANGER
H-1-316-1-SI-H-1011
ECH-251

REVIEWED BY	DATE	ORIG DIV	REPLY TO MFR BY:
N. R.		M	N/A

REVIEW OF THIS DOCUMENT WITH OR WITHOUT COMMENTS IS ONLY FOR GENERAL CONFORMANCE WITH EBASCO PREPARED SPECIFICATIONS AND FOR CONFIRMATION OF PHYSICAL INTERFACE OF ITEMS SHOWN WITH RELATED SYSTEMS. SUCH REVIEW SHALL IN NO WAY RELIEVE CONTRACTOR FROM ENTIRE RESPONSIBILITY FOR ENGINEERING, DESIGN, WORKMANSHIP, MATERIAL, PERFORMANCE OF EQUIPMENT AND MATERIAL AND ALL OTHER LIABILITY UNDER THE CONTRACT.

EBASCO SERVICES INCORPORATED
AGENT
2 RECTOR ST. NEW YORK, NY 10006

426 A/2-75

8 1/2 x 11"

ITEM	QUAN	PART NO.	SIZE	DESCRIPTION	WGT
1	1	CS	TS 3"×3"×1/4"×4'LG (ASTM A500 GR B) FIELD REV.		35
2	1	2000	1.5 RIGID ROD STRUT P-P (1'-5 5/8" LG)		5
3	1	2600	1.5-2" PIPE CLAMP		5
4	1	CS	TS 2×2×.25×4'-6" LG. A500 GR·B		25
5	1	CS	R 1/2"×2 3/4×2 1/2 SA-36		1

FIELD TO MODIFY — FIELD REV

TOTAL 69 #

HPES ATTACHMENT FCR-H-863 SHT. 2 of 3

INTERFERENCE CHECK

REF. D.P. COMPOSITE DWG C-1-157

BY ______ DATE 7-14-79 8-14-79

MODEL CHECK

BY. MF. . DATE. 8-17-79

(std/spec) PAINT

BUNDLE & TAG

TOTAL

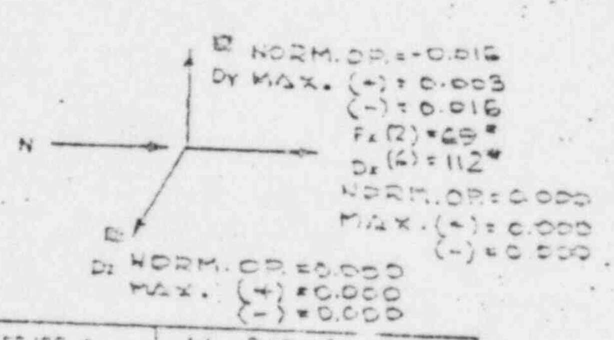
SAFETY CLASS 3

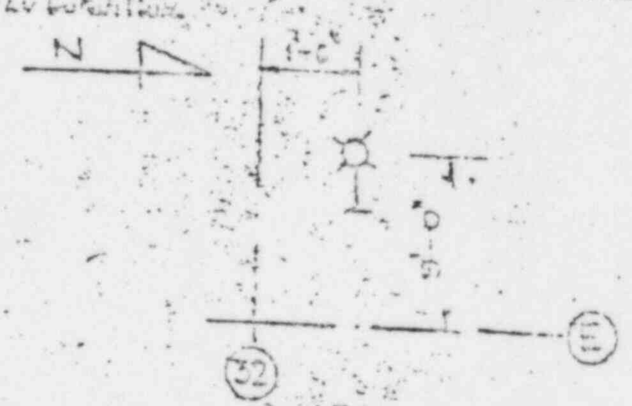
SEISMIC CLASS I

ONE WAY RESTRAINT

		Fx - DR (LB) EQ# 2	EQ# 6	EQ#	EQ#	EQ#	EQ#
OPERATING WT	LD	-4	-4				
THERMAL	LD	-22	-22				
VIBRATION	LD						
LOCA	LD						
2 (OBE RESPONSE)	LD	± 19 #	± 36				
2 (OBE DISPL.)	LD	± 0 #	± 0				
2 (SSE DISPL.)	LD	± 24 #	± 45				
2 (WATER & STM. HAMMER)	LD						
RELIEF VALVE THRUST	LD	0 #	0				
WIND	LD						
HYDRO	LD						
HANGER WGT.							
FRICTION FORCE		Fx		69 # Fy 92 #		Fz 92 #	

INDICATED LOADS ARE INDICATED ARE THE MAX OF LISTED CONDITIONS





LOCATION PLAN

STRESS ISO. #	1A-216-SI-4	REV. 1
STRESS CALC. #	3064-1	REV. 1
STRESS PT. #	B115	

P.O. NO. 3201 - 1 UNIT NO. 1

SOUTHWEST FABRICATING & WELDING CO.

EBASCO SERVICES INC. (CAR-SH-M-30)

CAROLINA PWR. & LT. CO. - SHEARON HARRIS

NO. 3/8 NC ENG. MK. ___ DATE 7-28-79

BERGEN-PATERSON PIPESUPPORT CORP.

PIPING SYSTEM: SAFETY INJECTION

REF DWGS: PIPING 5-G-153 R/55 STRUCTURAL 7-G-1161 R/56

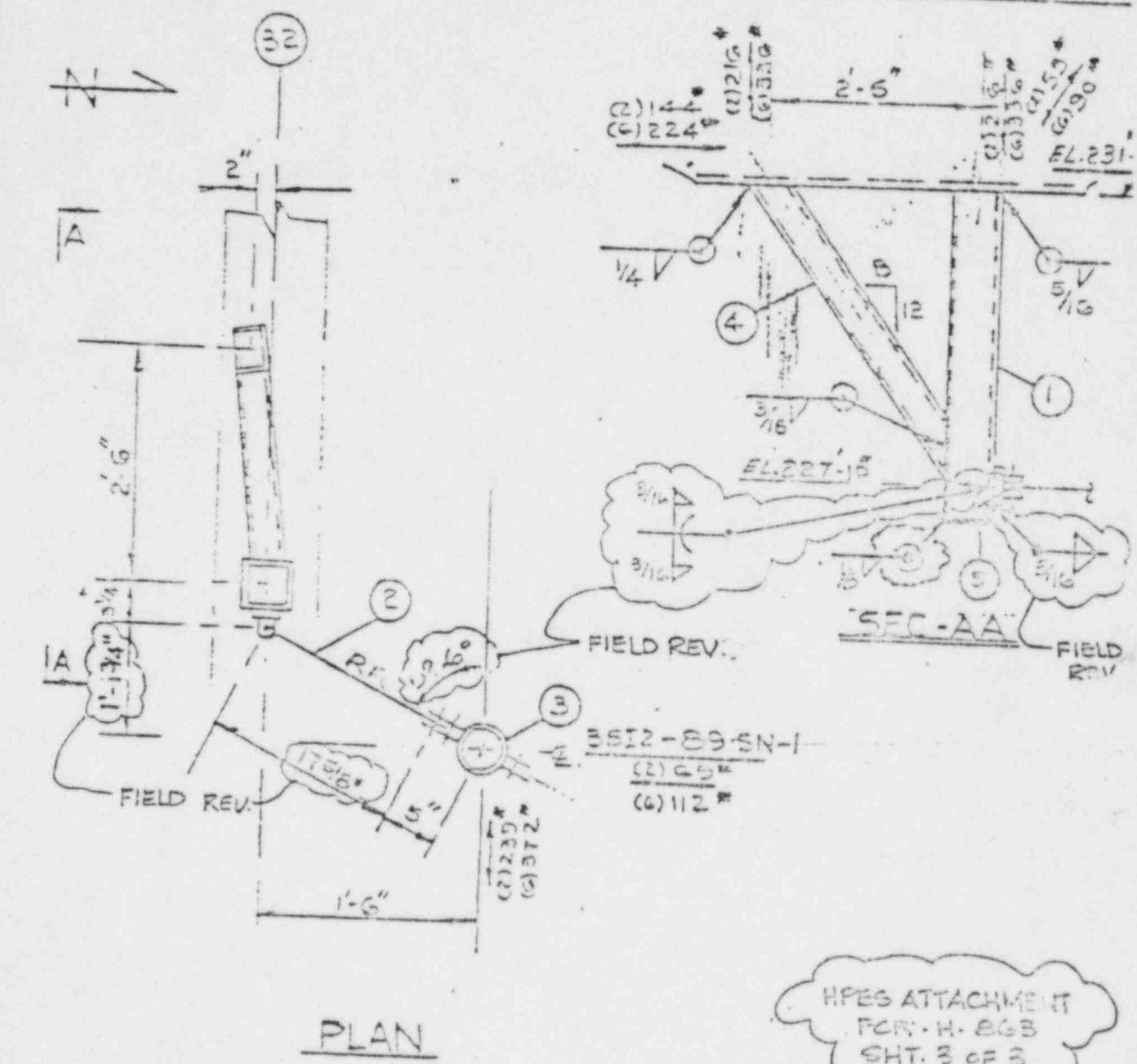
PO. NO. 2291 FAB NO. 1142 REQ'D 1

MARK & DWG NO. 1-1-216-1-SI-H-1011 SHEET 1 of 2 REV. 3/2

REV	DATE	BY	CHK	APP	DESCRIPTION	INVOICE CODE
1	8-7-79				REV. & ADD. PER SHOP COMMENT	SI-H-1011 R/1/3
2	9-4-79				RE DESIGN PER INTERFERENCE CONCERNS	SI-H-1011
3					FOR FINAL REV. BEFORE RELEASE TO SHOP	N/A

FORM BP-23F R 7/78

ITEM	QUAN	PART NO	SIZE	DESCRIPTION	WGT.



HPES ATTACHMENT
FCR-H-863
SHT. 3 OF 3

REV	DATE	BY	CHK	APP	DESCRIPTION
	7-18-79				SEE SHT. 1
					SEE SHT. 1
					SEE SHT. 1

BERGEN-PATERSON PIPESUPPORT CORP.

PIPING SYSTEM: SAFETY INJECTION

PIPING 5G-153-R/83 STRUCTURAL 7G-1161-2/4

JOB NO. 2281

DATE 7-28-79

DWG. NO. A-1-216-1-SI-H-1011

APF-001
Rev. 18
2/4/82

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER
~~FCR~~/PW – AS – ~~1515~~ 1528

AP-IX-05
Exhibit 1

Page 1 of 2

Type of Request: FWD 5/6/82

☑ Permanent Waiver to "use-as-is"
☐ Field Change
☑ See Recommended Action

ORIGINAL

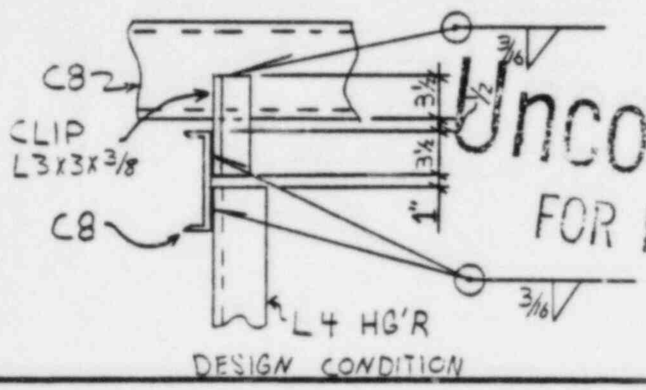
☑ Non-ASME
☐ ASME Section III Division 1
☐ ASME Section III Division 2
☑ Q ☐ Non-Q

Nonconformance ☑ No ☐ Yes Report No.__________

Identification of Area and Item: RAB EL. 236 UNIT #1
HVAC HANGER F-1957 (S-185)
(FIELD FITUP) – DESIGN DIMENSIONS CANNOT BE MAINTAINED.

Conflict/Condition

Reference Documents or Attachment DCN-650-518



DESIGN CONDITION

THE 3½" FITUP BETWEEN THE L4 HANGER MEMBER AND C8 WAS NOT MET.

Uncontrolled Copy
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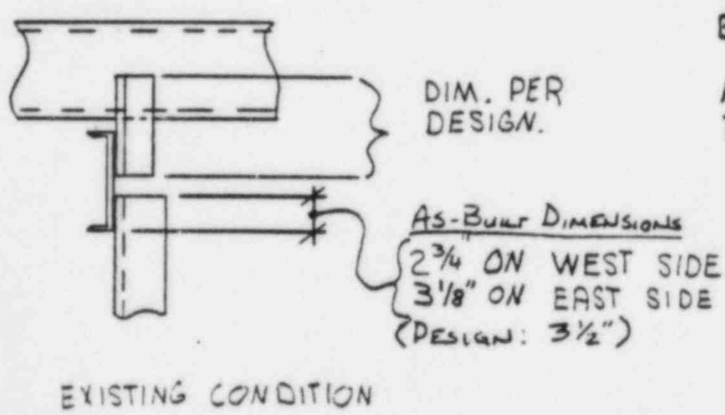
RECEIVED
JUN 0 9 1982
PROJECT ENGINEERING

Recommended Action:

☐ Please Investigate and Resolve
☑ Please Resolve as Follows



EXISTING CONDITION

ACCEPT THE FITUP AS SHOWN TO THE LEFT.

NOTE: WELDING IS AS-DESIGNED EXCEPT FOR VERTICAL LEGS OF THE L4 HANGER MEMBERS (DECREASED LENGTHS).

Justification: RECOMMENDED ACTION WILL PROVIDE ADEQUATE CONNECTION OF SUPPORT.

000485

Requested by: JTP 5/6/82

C. W. Dolson — 5-5-82
Discipline Engineer — Date

Site Approval:

[signature] for RML — 5-6-82
Senior Resident Engineer — Date

1528
~~PCR~~/PW - AS - ~~1515~~ - Fnd 5/6/82

Design Organization Approval ☑ AE ☐ NSSS ☐ NPED Only ☐ Other

Telephone Resolution ☑ Yes ☐ No

Design Organization Attachments ☐ Yes ☑ No

☑ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed

Comments:

PER TELECON BETWEEN FRED DEAN AND NICK TASSOULAS

[signature] 6/3/82

Nicholas C. Tassoulas SAE 6/10/82 | Francis S. Verdibello APE 6/17/82

Signature Title Date | Signature Title Date

CP&L Harris Plant Engineering Approval

HPES Attachments ☐ Yes ☑ No

☑ Approved as Recommended ☐ Rejected ☐ Conditional Approval

HLW

Fred M. Dean 6/2/82 6/2/82 | [signature] 6/3/82

Discipline Engineer Date | MHPE or/PPE Date

Site Concurrence: Recommend ☒ Implementation

☐ Alternate Resolution

☐ Rejected

Bill Hayler for ATM 6/3/82

Senior Resident Engineer Date

Distribution:

(Original) Document Control

(Copy)

(Copy)

(Copy)

(Copy)

(Copy)

Implementation Completed as Approved? ☑ Yes ☐ No

Comments:

C.W. Solomon 10-29-82

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control

(Copy)

(Copy)

(Copy)

(Copy)

(Copy)

APF-GC?
Rev. 1
2/4/82

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1

#192
#195

FCR/~~PW~~ - AS-1924

Page 1 of 5

ORIGINAL

Type of Request:

- ☐ Permanent Waiver to "use-as-is"
- ☑ Field Change
- ☑ See Recommended Action

☑ Non-ASME
☐ ASME Section III Division 1
☐ ASME Section III Division 2
☑ Q ☐ Non-Q

Nonconformance ☑ No ☐ Yes Report No.________

Identification of Area and Item: RAB EL. 305 UNIT #1
HVAC HANGERS F-6470 + F-6841 (S-241)
INTERFERENCE - DESIGN

Conflict/Condition

Reference Documents or Attachment 2168-G-818R6, 2168-G-179S06R5

1) THE NORTH + SOUTH VERTICAL LEGS OF F-6470 MISSES THE CENTER LINE OF THE EMBED. SEE PAGE 3+4 OF 5.

2) THE DIAGONAL BRACE ON F-6841 (SECT. AF 2168-G-179S06) CAN NOT BE INSTALLED BECAUSE OF A CONFLICT WITH F-6461.

RECEIVED
OCT 12 1982
PROJECT ENGINEERING

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FOR INFORMATION ONLY

RECEIVED
DOCUMENT CONTR.
OCT 26 1982
SHEARON HARRIS N.P.

Recommended Action:

☑ Please Investigate and Resolve
☐ Please Resolve as Follows

1) INSTALL A 10X7X1 PLATE AS SHOWN ON PAGE 3 OF 5 FOR THE NORTH VERT. LEG. USE A 6X8X½ GUSSET PLATE FOR THE SOUTH VERT. LEG AS SHOWN ON PAGE 4 OF 5.

2) INSTALL TWO DIAGONAL BRACES INSIDE THE HANGER AS SHOWN ON PAGE 5 OF 5.

Justification: RECOMMENDED ACTION PROVIDES CONSTRUCTABILITY WITHOUT ALTERING THE DESIGN INTENT

000487

Requested by: CAZ 9-14-82 JTP 9/14/82

C.W. Solomon — Discipline Engineer — Date: 9-14-82

Site Approval: [signature] AM — Senior Resident Engineer — Date: 9-15-82

Design Organization Approval ☑ AE ☐ NSSS ☐ NPED Only ☐ Other (IDAGE)

Telephone Resolution ☑ Yes ☐ No Design Organization Attachments ☑ Yes ☐ No

☐ Approved as Recommended ☐ Rejected ☑ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments:

PER TELECON BETWEEN FRED DEAN AND NICK TASSOULAS

[signature] 10/19/82

Nicholos C. Tassoula ENGR 10/18/82
Signature Title Date

Mario E. Vertibello APE 10/19/82
Signature Title Date

CP&L Harris Plant Engineering Approval

HPES Attachments ☐ Yes ☑ No

☐ Approved as Recommended ☐ Rejected ☑ Conditional Approval

SEE EBASCO ATTACHMENT SHEET 1 of 1

Fred M. Dean 10-1-82
Discipline Engineer Date

[signature] 10/9/82
NHPE or PE Date

Site Concurrence: Recommend ☒ Implementation
☐ Alternate Resolution
☐ Rejected

Bill Snyder for AMZ 10/14/82
Senior Resident Engineer Date

Distribution:
(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☑ Yes ☐ No

Comments:

C.W. Dolomon 12-7-82
Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

FORM NO. 2001
7/81

CP&L
Carolina Power & Light Company

DATE ______
PAGE 3 OF 5

PURPOSE
- ☐ SKETCH
- ☐ CALCULATION
- ☐ COMMENT
- ☐ DATA
- ☐ OTHER ______

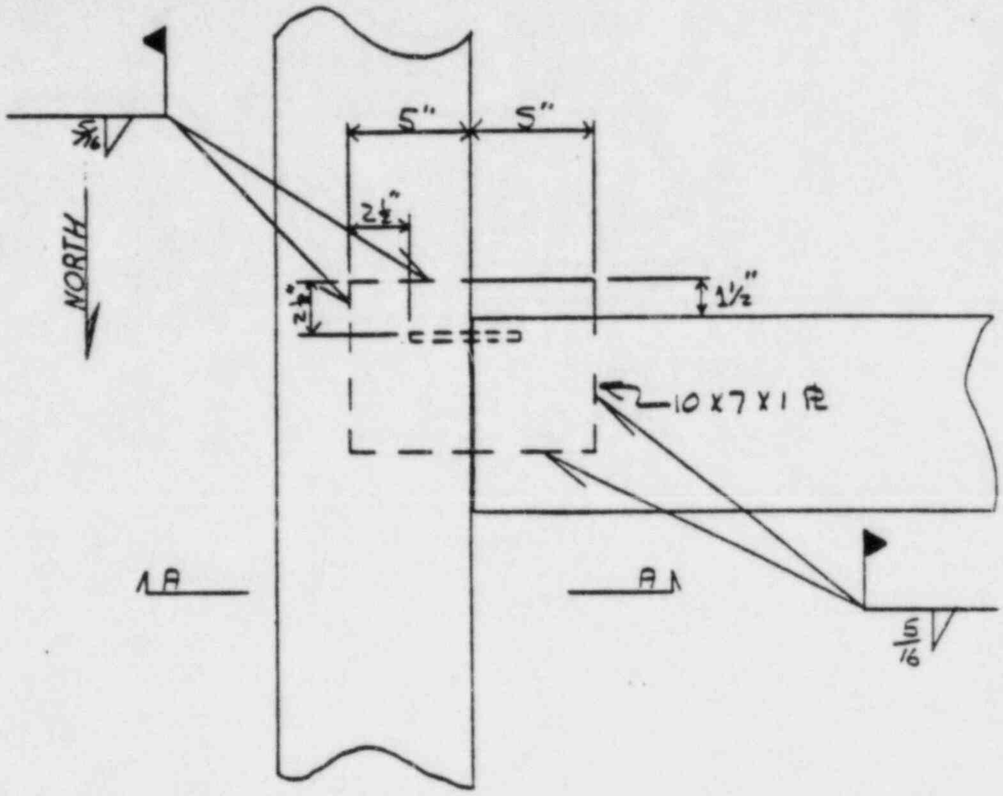
USER:
- ☐ FPPED
- ☐ CNSS
- ☐ CONST
- ☐ MAINT
- ☐ PPED
- ☐ OTHER ______

FILE NO. ______
PM NO. ______
WR & A NO. ______
LCO NO ______

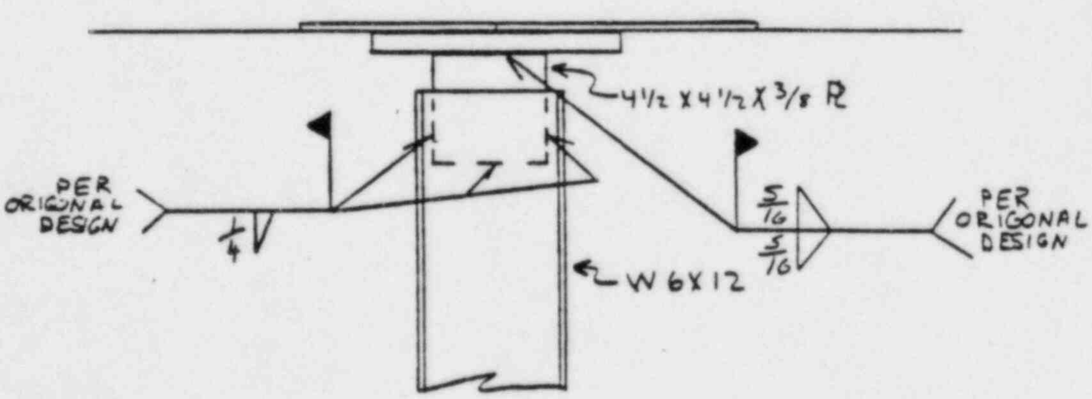
CS NO. ______
JR NO. ______
PT/MI NO. ______
LER NO. ______
OTHER ______

ORIGINATOR ______ NAME

~~CHECKED BY~~ FCR-AS-1924 NAME



PLAN VIEW
PROPOSED SOLUTION
F-6470 (S-241) (SECT 2 2168-G-179S06)



SECT A-A

FORM NO. 2001
7/81

CP&L
Carolina Power & Light Company

DATE ____________
PAGE 4 OF 5

PURPOSE
- ☐ SKETCH
- ☐ CALCULATION
- ☐ COMMENT
- ☐ DATA
- ☐ OTHER ____________

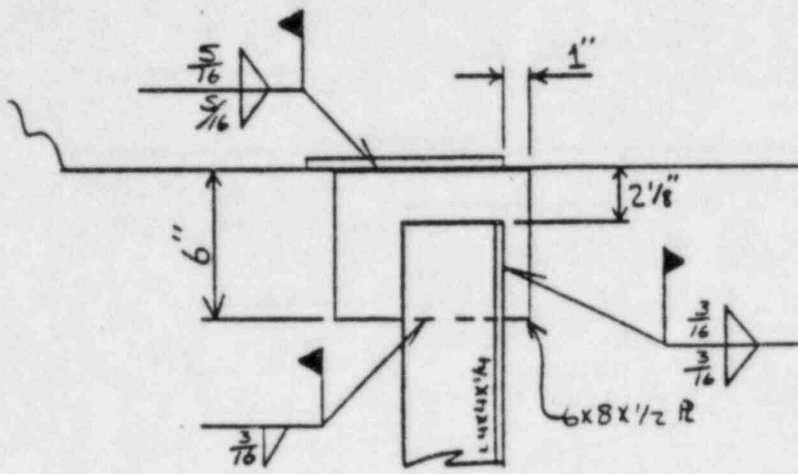
USER:
- ☐ FPPED
- ☐ CNSS
- ☐ CONST
- ☐ MAINT
- ☐ PPED
- ☐ OTHER ____________

FILE NO. ____________
PM NO. ____________
WR & A NO. ____________
LCO NO ____________

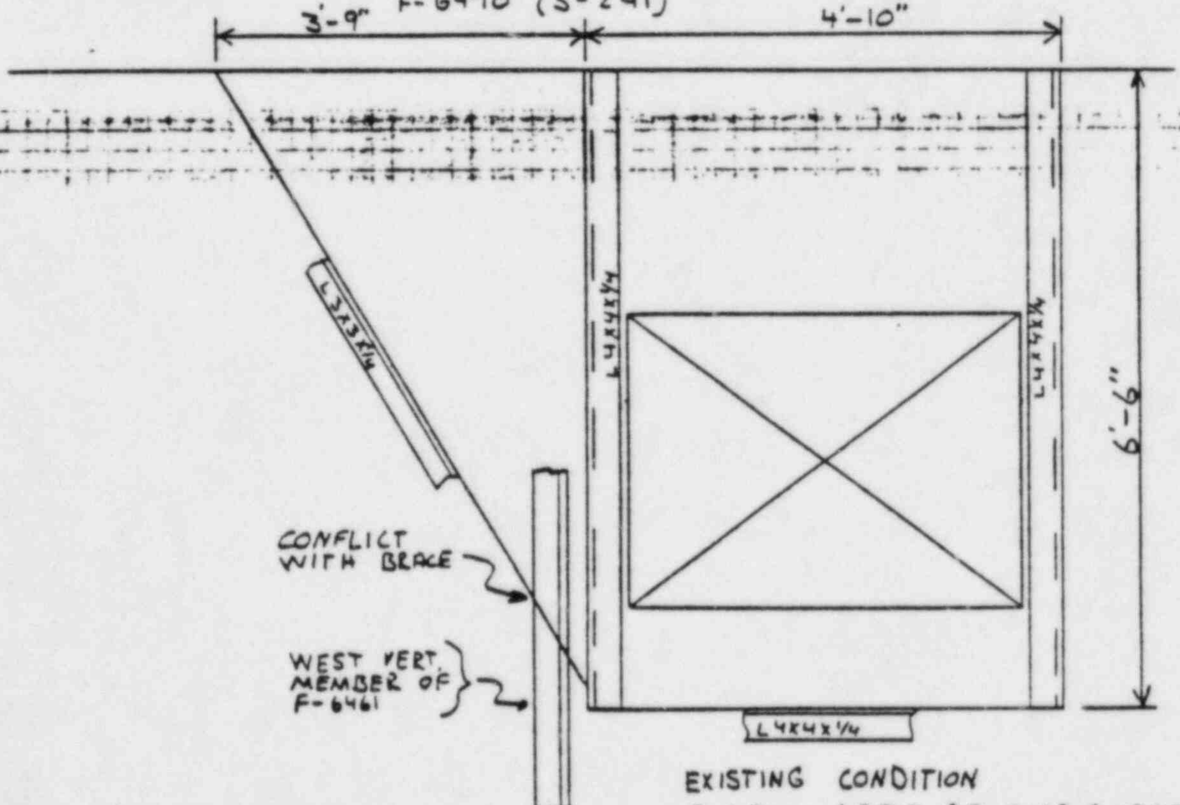
CS NO. ____________
JR NO. ____________
PT/MI NO. ____________
LER NO. ____________
OTHER ____________

ORIGINATOR ____________ NAME

~~CHECKED BY~~ FCR-AS-1924 NAME



VIEW LK SOUTH AT
VERT. L4 ON SECT. Z.
2168-G-179S06R5
PROPOSED SOLUTION
F-6470 (S-241)



EXISTING CONDITION
F-6841 (SECT. AF 2168-G-179S0_)
VIEW LK SOUTH

FORM NO. 2001
7/81

CP&L
Carolina Power & Light Company

DATE

PAGE 5 OF 5

PURPOSE
☐ SKETCH
☐ CALCULATION
☐ COMMENT
☐ DATA
☐ OTHER

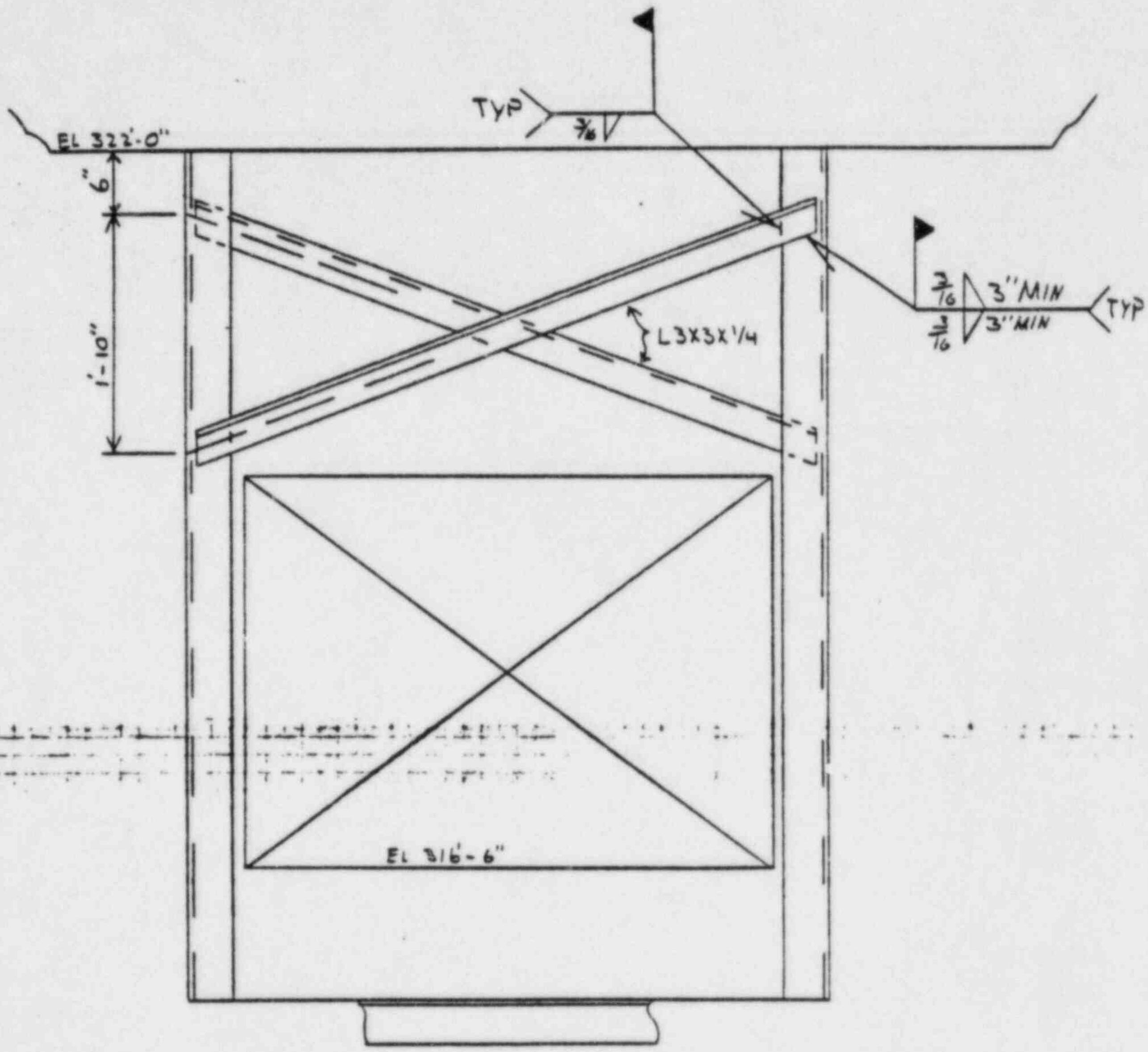
USER:
☐ FPPED
☐ CNSS
☐ CONST
☐ MAINT
☐ PPED
☐ OTHER

FILE NO.
PM NO.
WR & A NO.
LCO NO

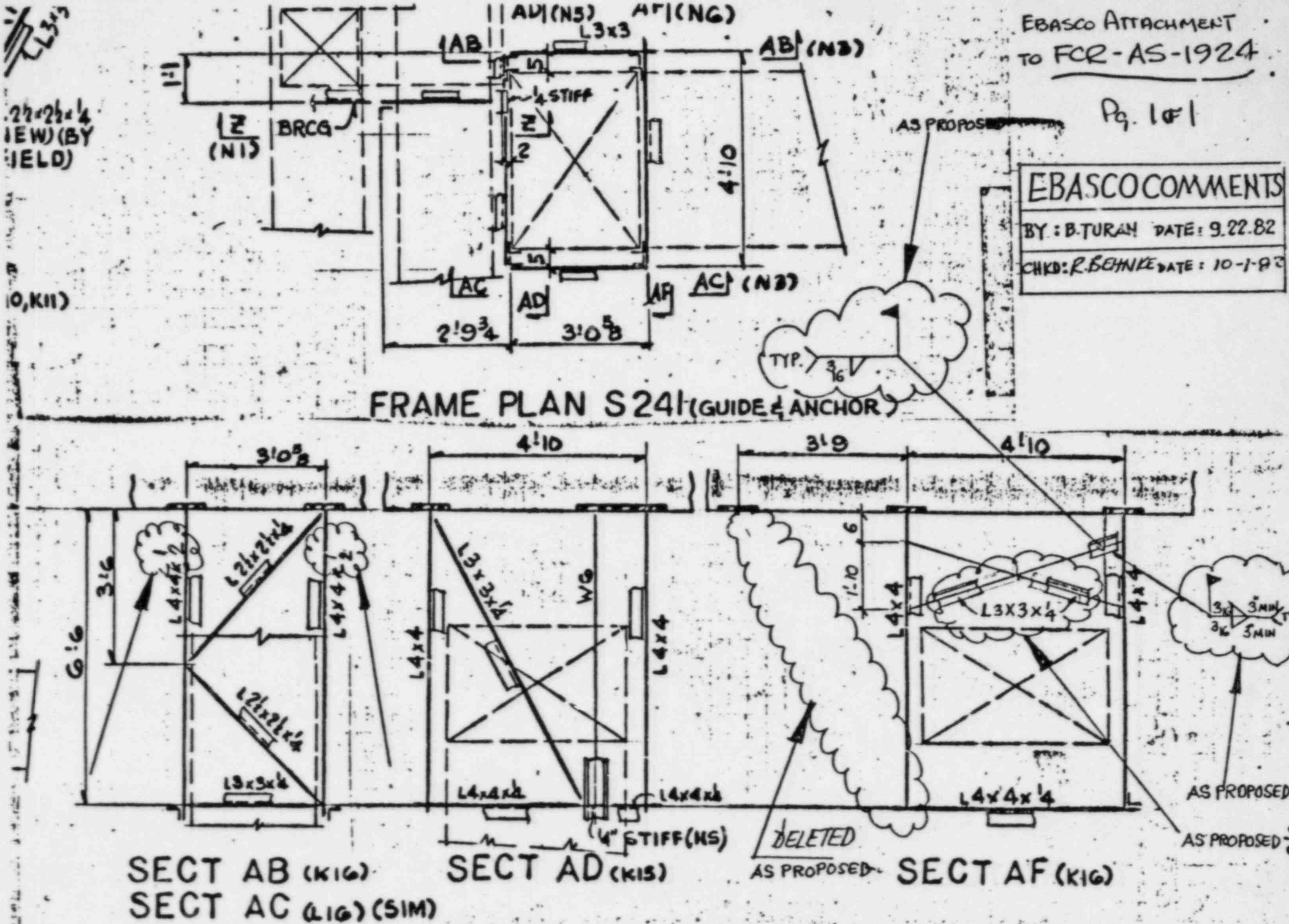
CS NO.
JR NO.
PT/MI NO.
LER NO.
OTHER

ORIGINATOR ______ NAME

~~CHECKED BY~~ FCR-AS-1924 NAME



PROPOSED SOLUTION
F-6841 (SECT AF 2168-G-179506)
VIEW LK SOUTH



EBASCO ATTACHMENT TO FCR-AS-1924
Pg. 1 of 1
EBASCO COMMENTS
BY: B. TURAN DATE: 9.22.82
CHKD: R. BEHNKE DATE: 10-1-82
AS PROPOSED
TYP.
3/16
AD (N5)
AF (N6)
L3x3
AB (N3)
AB
Z (N1)
BRCG
1/4 STIFF
2
4'-10
AC
AD
AF
AC (N3)
2'-9 3/4
3'-0 5/8
FRAME PLAN S241 (GUIDE & ANCHOR)
2 1/2x2 1/2x1/4
(EW) (BY FIELD)
(0,K11)
3'-0 5/8
4'-10
3'-9
4'-10
3'-6
6'-6
L4x4x1/2
L2 1/2x2 1/2x1/4
L4x4x1/2
L2 1/2x2 1/2x1/4
L3x3x1/4
L3x3x1/4
WG
L4x4
L4x4
L4x4x1/2
L4x4x1/2
1/4" STIFF (NS)
6
1'-10
L4x4
L3X3X1/4
L4x4
3/16
3 MIN
TYP
L4x4x1/4
DELETED
AS PROPOSED
AS PROPOSED
AS PROPOSED
SECT AB (K16)
SECT AC (L16) (SIM)
SECT AD (K15)
SECT AF (K16)

PF-001
ev. 16
/18/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

ORIGINAL

~~FCR~~/PW AS-215

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☐ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: ☒ Q
RAB# 1 EL 236 (≈ 6'N of 28 & 1'6 E of C) ☐ Non-Q

Conflict/Condition
Reference Documents or Attachment 2166-G-69950Z Rev 4

Cable Tray Support Type CSA1-Z is located to close to Beam Pocket as shown in plan View of the attachment to allow complete welding of Support to Tee Gussett Plate.

DOCUMENT CONTROL
RECEIVED
JUN 6 1980
SHEARON HARRIS N. P. P.

FOR INFORMATION ONLY
Uncontrolled Copy

Recommended Action: ☐ Please Investigate and Resolve
☐ Please Resolve as Indicated

Accept welded cable tray support to tee gussett plates as shown in section A-A

RECOMMENDED ACTION ABOVE IS NOT ACCEPTABLE SEE EBASCO ATTACHMENT FOR CORRECTIVE ACTION.

Justification:

see Ebasco; EBASCO RECOMMENDED ACTION, EBASCO ATTACHMENT SH. 1 OF 1, SATISFIES DESIGN REQUIREMENTS.

Requested by:		Site Approval:	
J. E. Bell	4/28/80	CSHinnant for AML	4-29-80
Discipline Engineer	Date	Senior Resident Engineer	Date

First Distribution:
(Original) Ebasco
(Copy)
(Copy)
(Copy)
(Copy)

000476

Design Engineering Approval (AE) (NSSS)

Telephone Resolution ☐Yes ☐No

☐Approved as Recommended ☐Rejected ☒Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments: FOR CORRECTIVE ACTION SEE EBASCO ATTACHMENT, THE RECOMMENDED ACTION AS SUBMITTED BY CP&L IS NOT ACCEPTABLE.

Signature	Title	Date	Signature	Title	Date
Nicholas C. Tomsoula	ASSOC. ENGR	5/30/80	Walt Fr[illegible]	[illegible]	[illegible]

CP&L Harris Plant Engineering Approval Required ☐Yes ☒No

Telephone Resolution ☐Yes ☐No

☐Approved as Recommended ☐Rejected ☐Conditional Approval

Discipline Engineer Date MHPE or PPE Date

Site Concurrence: Recommend ☒Implementation ☐Alternate Resolution

[signature] 6-5-80
Senior Resident Engineer Date

Second Distribution:

(Original)
(Document Control)
(Copy) Principal Q.A. Specialist

Implementation Completed as Approved? ☒Yes ☐No

Comments:

J. E. Bell 7-18-80
Discipline Engineer Date

Final Distribution:

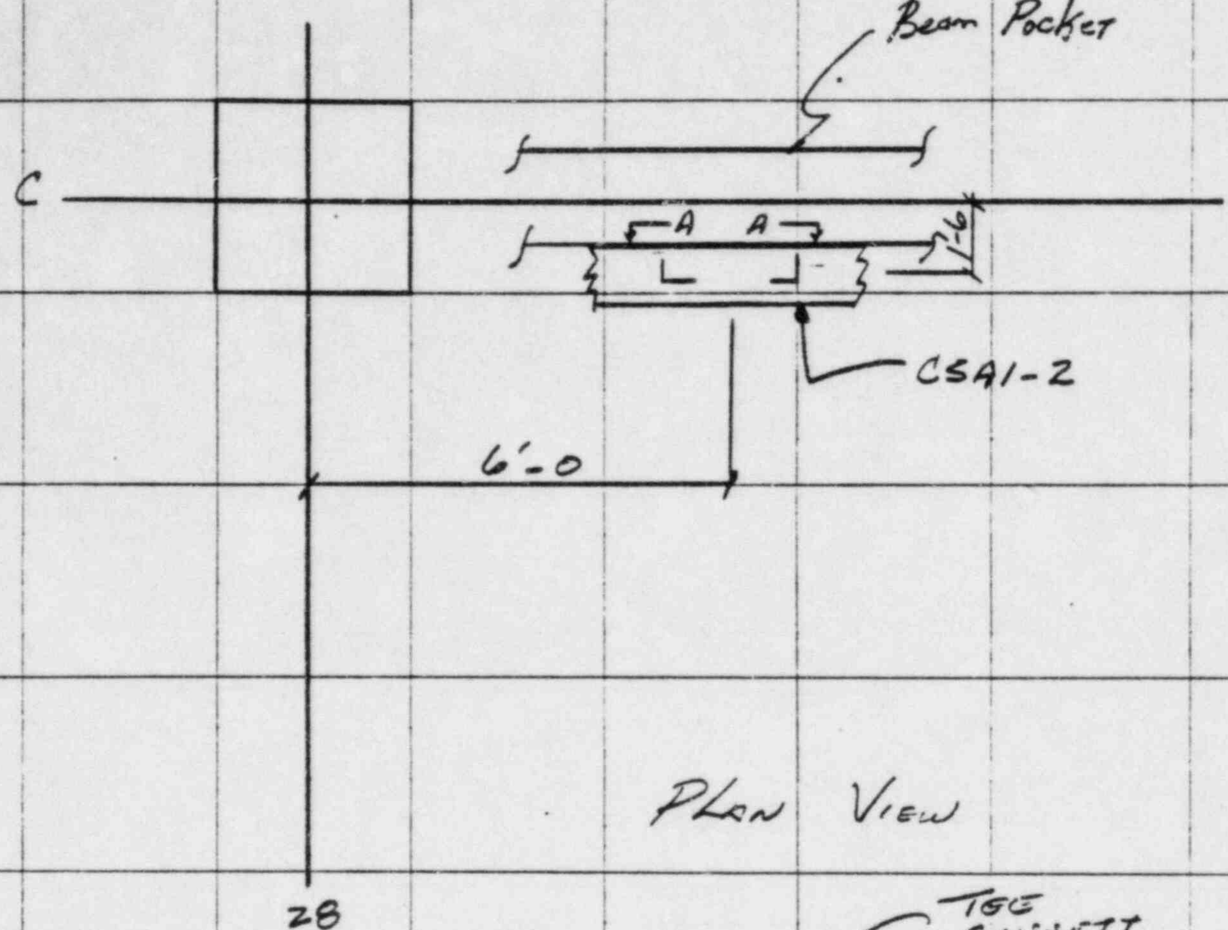
(Original) File in Doc. Control
(Copy) Ebasco
(Copy) PPED
(Copy) Principal Q.A. Specialist
(Copy)
(Copy)

BY__________ DATE ________ POWER PLANT CONSTRUCTION SHEET 3 OF 3

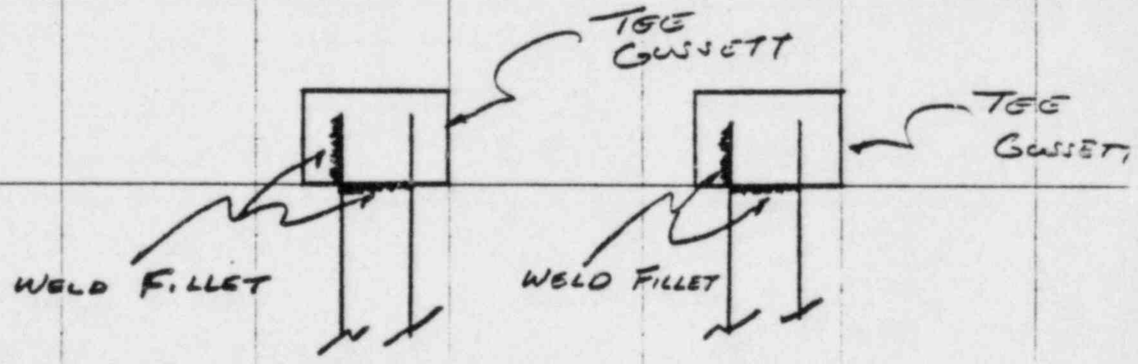
CHKD. BY______ DATE ________ COMPUTATION SHEET DEPT. ________

SUBJECT ______________________________ PW-AS-215

FORM NO. 1630



PLAN VIEW



SECTION A-A

EBASCO SERVICES INCORPORATED

NEW YORK

BY CC DATE 5-23-80 SHEET 1 OF 1

CHKD. BY SP DATE 5-28-80 OFS NO. DEPT. NO.

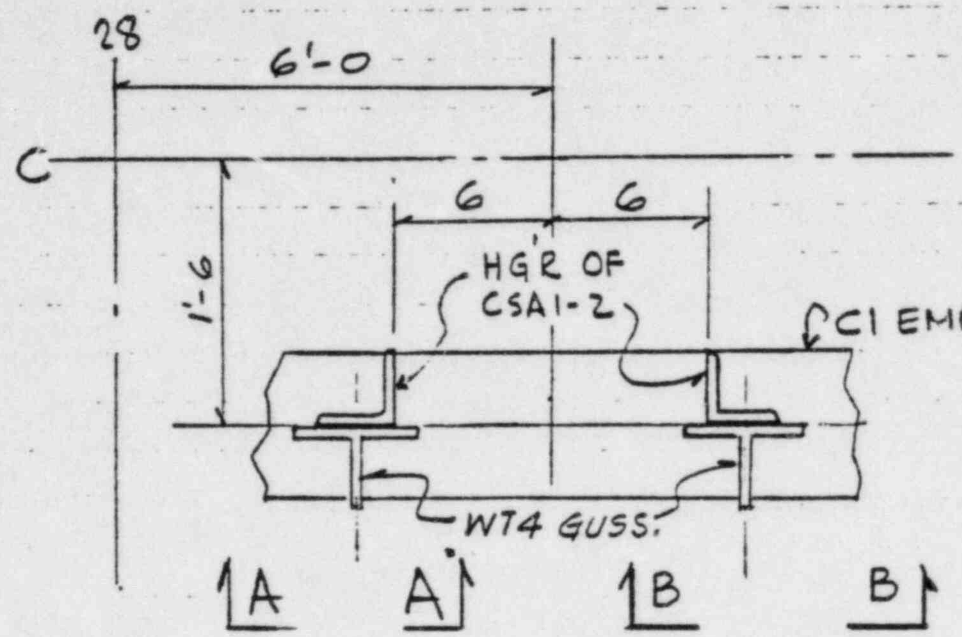
CLIENT CP & L

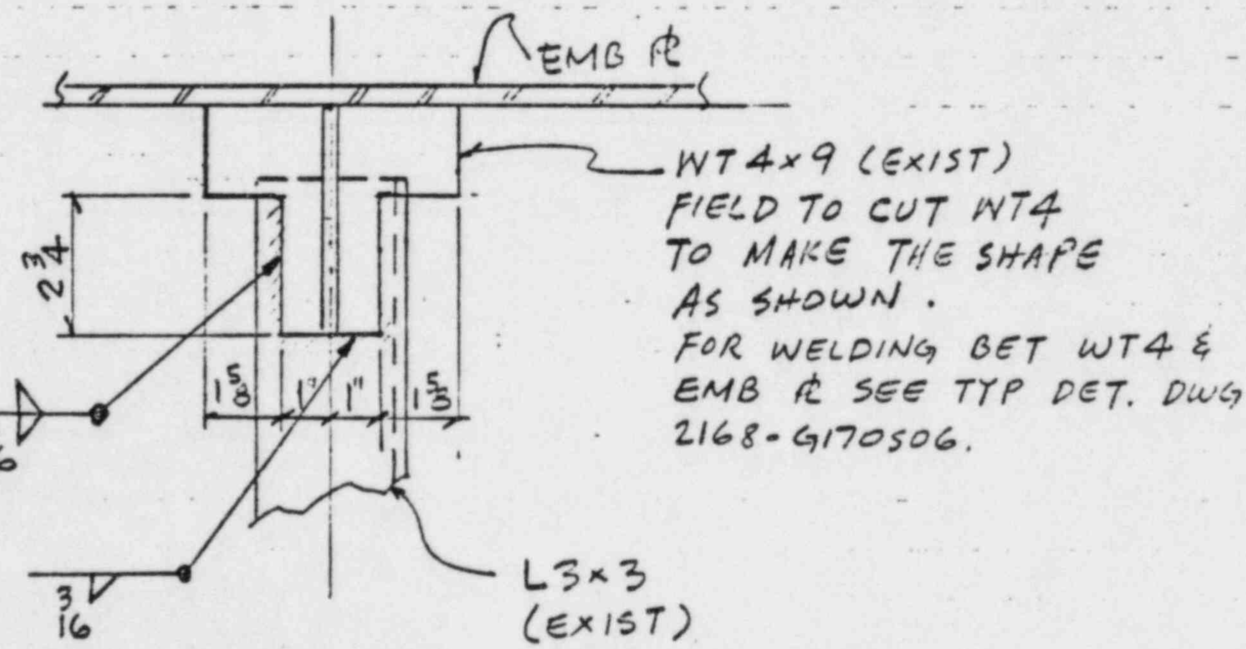
PROJECT SHNPP

SUBJECT CSA1-2 REVISED TEE GUSSET PW-AS-215

EBASCO ATTACHMENT

2168-G170S06 (SUP
2166-G699S02 (ELEC
2168-G155S02 (EMB





SECT A (AS SHOWN)

SECT B (OPP HAND)

?-001
ev. 17
1/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

ORIGINAL

AP-IX-05
Exhibit 1
Page 1 of 14

~~FCR~~/PW -AS- 467

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2

☐ Field Change ☐ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: RAB #1 EL.236 ☒ Q ☐ Non-Q

HVAC DUCT SEISMIC SUPPORT F-1292 (Frame B24)

Conflict/Condition

Reference Documents or Attachment 2168-G-171502 Rev 7
1364-16318 Rev 1
1364-16294 Rev 0

— See Continuation sheet Page 3 of 4 —
— See also Page 4 of 4 —

Uncontrolled Copy
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Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

USE AS IS

DOCUMENT CONTROL
RECEIVED
MAY 6 1981
SHEARON HARRIS N. P. P.

Justification: will not jeopardize integrity of the structure

Requested by: Ernie Felton 3-12-80
Discipline Engineer Date

Site Approval: E.E. Willett for 3-13-81
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy)

000478

(Copy)
(Copy)
(Copy)

6

PW-AS-467

Design Organization Approval (AE)☐ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments:

f.m. Nicholas C. Tassoulos SAE 4/27/81 — Walt [signature] AE 4/28/81

Signature Title Date — Signature Title Date

CP&L Harris Plant Engineering Approval Required ☐ Yes ☐ No

Telephone Resolution ☐ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

[signature] 5/5/81 — [signature] 5/5/81

Discipline Engineer Date — MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

Bill [signature] for AMS 5/6/81

Senior Resident Engineer Date

Second Distribution:

(Original) Document Control — (Copy)

(Copy) — (Copy)

(Copy) — (Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

Comments:

Ernie Felton 5-7-81

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control — (Copy)

(Copy) — (Copy)

(Copy) — (Copy)

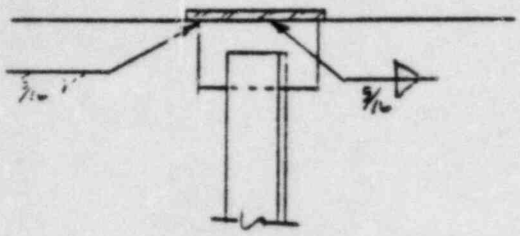
Continuation

Problem 017 - Gusset plate 13616 welded to embed plate on 3 sides - 2 sides required only

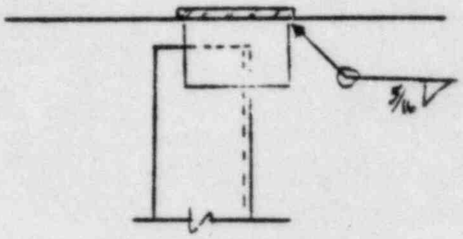
Problem 018 - Gusset plate 13616 welded all around to embed - 2 sides only required
Piece mark K4m18 improperly fit to Gusset plate 13616. 1364-16294 (C3936N SHT E23) gives typical connection detail for this hanger. The fitup was inaccordance with 2168-G-7047 CASE 1. This type connection (Case 1) is for hangers located in common building.

Problem 019 - Gusset plate 13615 was welded all around to the embed. 2 sides only required.

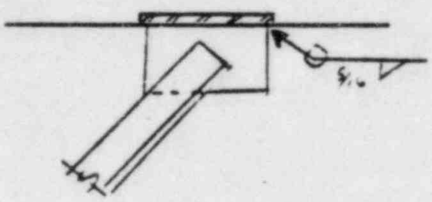
Problem 020 - Gusset Plate 13615 was welded to the embed plate on 3 sides. 2 sides only required.



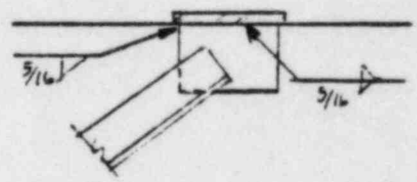
017



018



019



020

APF-002
Rev. 17
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of 25
FCR/PW AS - 541

ORIGINAL

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☐ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: Unit #1 RAB @ Col. Lines D-13 Elev. 259 ☒ Q
Inspection accessibility problem and insufficient weld detail ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment DCN560-083, FCR-AS-314
CAR 2166-G699S02 Rev 4

The field has implemented FCR-AS-314 and DCN560-083.
Problem #1 - Due to an accessibility problem, inspection personnel are unable to inspect the weld for attaching a gusset plate to an embed.
Problem #2 - In conjunction with the above stated problem, no detail has been shown for the weld connection revised from the design drawing to DCN-560-083.
See attachments and sketches for additional information. Conflict or questioned areas are designated by ⁰⁰⁰ on sheet 3 of 5.

Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

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See attachments for recommended action.

DOCUMENT CONTROL
RECEIVED
MAY 26 1981
SHEARON HARRIS N. P. P.

Justification: Recommended action will not compromise the structural integrity or the design intent.

Requested by: Site Approval:

Charles A. French 4-21-81 A. Boideill for AHL 4-22-81
Discipline Engineer Date Senior Resident Engineer Date

First Distribution:
(Original) Design Organization (Copy)
(Copy) Chuck French 000479 (Copy)
(Copy)

RECEIVED
APR 29 1981
PROJECT ENGINEERING

PW-AS-541

Design Organization Approval (AE) ☒ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments: PER TELECON BETWEEN NICK TASSOULAS AND JAMES NEVILL ON 4/23/81

J.N. 5-20-81
5-18-81

Nicholas C. Tassoulas SHE 5/18/81 | Francis S. Verdikelle APE 5/21/81

Signature Title Date | Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

4/23/81 | 4/23/81

Discipline Engineer Date | MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

for AHL 4-23-81
Senior Resident Engineer Date

Second Distribution:

(Original) Document Control
(Copy)
(Copy)

(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

Comments:

Charles S. French 5/8/81
Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control
(Copy)
(Copy)

(Copy)
(Copy)
(Copy)

~~FCR-AS-314~~ 8

EBASCO SERVICES INCORPORATED

NEW YORK

SHEET ~~7~~ 8 OF ~~7~~ 8

BY C.C. DATE 9/12/80

CHKD. BY S.J. DATE 9/18/80 WJ 9-22-80

OFS NO. 6418 DEPT. NO. 650

CLIENT C P & L

PROJECT SHNPP

SUBJECT RESOLUTION OF SHP-50

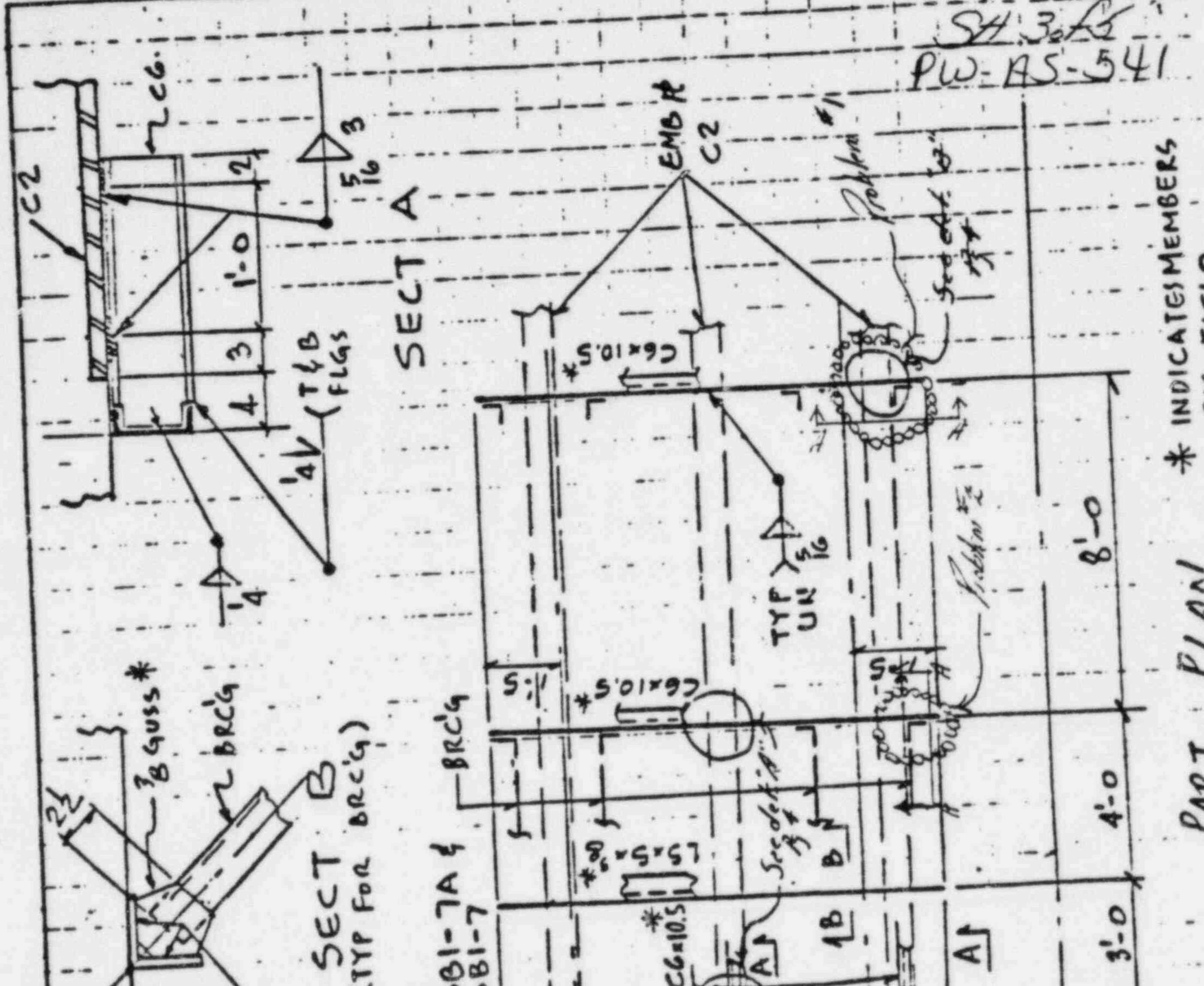
REF G170506

2166-G699502

2168-G155502

SH 3 & 5

PW-AS-541



ATTACH TO DCN D

560-083

Sh. 7 OF 7

BY.__________ DATE __________ POWER PLANT CONSTRUCTION SHEET 4 OF 5

CHKD. BY______DATE __________ COMPUTATION SHEET DEPT. ________

PW-AS-541

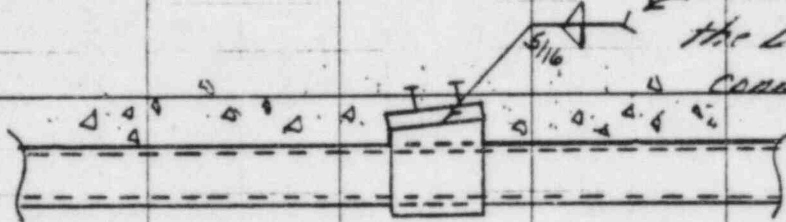
SUBJECT ______________________________

FORM NO. 1630

Problem #1

Existing field as built condition

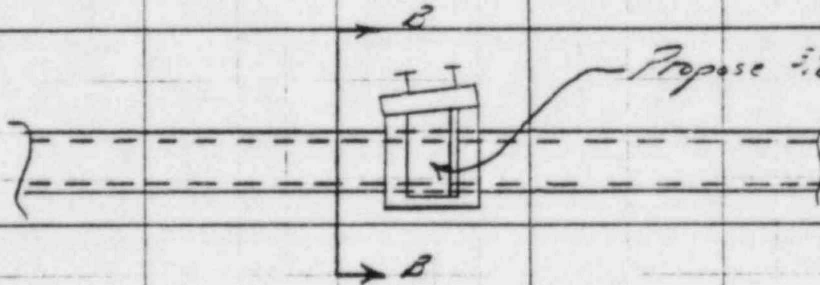
Due to accessibility problem, the back side of this web connection can not be inspected.

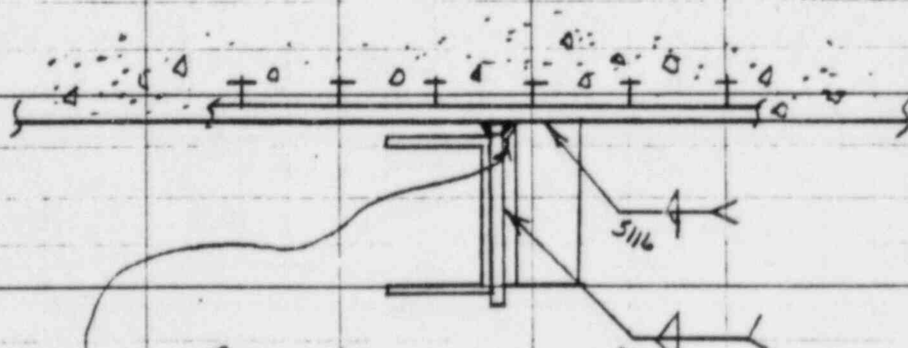


Sect A-A

Recommended Action:

Propose [illegible]/8 x 4x4x6" Long





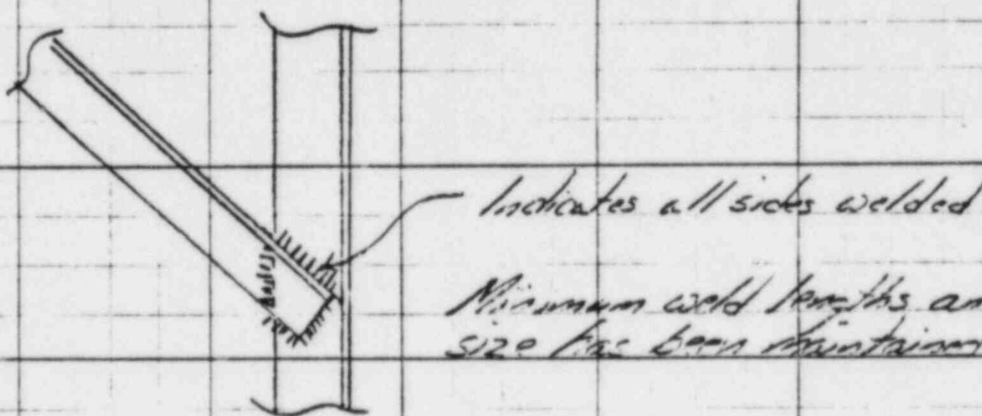
Cope this area to clear inter-ference of existing gusset plate to embed ceiling plate weld.

BY__________ DATE ________ POWER PLANT CONSTRUCTION SHEET 5 OF 5
CHKD. BY______ DATE ________ COMPUTATION SHEET DEPT. ______
SUBJECT ______ PW-AS-541

FORM NO. 1630

Problem #2

No design detail is given for the required type of weld connection for the attachment of the diagonal braces to the vertical legs. See sketch below for field as-built condition.



Recommended Action:

Allow the field to use as is.

APF-001
R. v. 17
11/6/80

ORIGINAL

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of ~~4~~ 3 CLF 9/11/81
FCR/~~PW~~ AS-~~806~~ 807

Type of Request: ☐ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☒ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: Unit #1 Containment Bldg. El. 236 Conduit Support Hanger #60 & Sect TX - Weld Design Change ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment CAR-2168-G 720251 Rev 5
1364-28236 R5, CAR-2168-G 720254 Rev 6, 1364-28241 R3
C4039N Attached RCI-AS-166 WITHOUT ATTACHMENTS

See page 3 for conflict condition.

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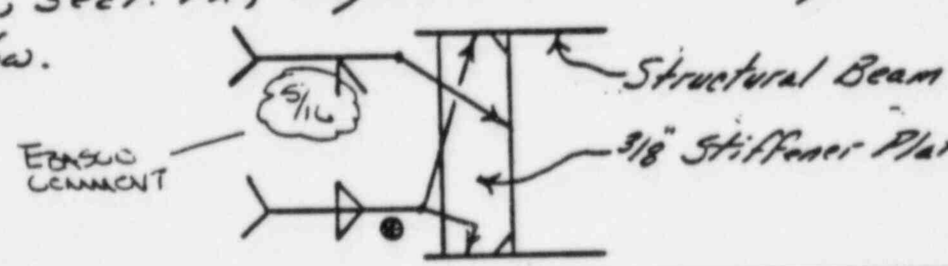
FOR INFORMATION ONLY

Recommended Action: ☐ Please Investigate and Resolve
☒ Please Resolve as Follows

In place of the fillet weld as is now designed for hanger #60, sect. TX, replace the weld symbol as shown below.



Justification:
The above recommended action will not compromise the structural integrity or the design intent.

Requested by: JHP
Charles A. Zerock 9/10/81
Discipline Engineer Date

Site Approval:
Bill Hyles for AMZ 9/11/81
Senior Resident Engineer Date

First Distribution:
(Original) Design Organization
(Copy)
(Copy)
(Copy)
(Copy)

OCT 1 1981

000480

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OCT 01 1981
PROJECT ENGINEERING

APF-001
Rev. 17
11/6/80

AP-IX-05
Exhibit 1
FCR-AS-846
Page 2 of 3 80

Design Organization Approval (AE) ☒ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments: PER TELECON BETWEEN RICK BEHNKE AND LEE WILLIAMS HLW 9/24/81
SEE EBASCO COMMENT (PAGE 1 OF 3) HLW

Richard G. Behnke ASST. ENG 10/6/81
Signature Title Date

Walt [signature] AE 10/7/81
Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☒ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval
SEE EBASCO COMMENT (PAGE 1 OF 3) HLW

H. Lee Williams 9/24/81
Discipline Engineer Date

W. [signature] 9/24/81
MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

Bill [signature] for AMI 9/24/81
Senior Resident Engineer Date

Second Distribution:
(Original) Document Control
(Copy) Chuck French
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

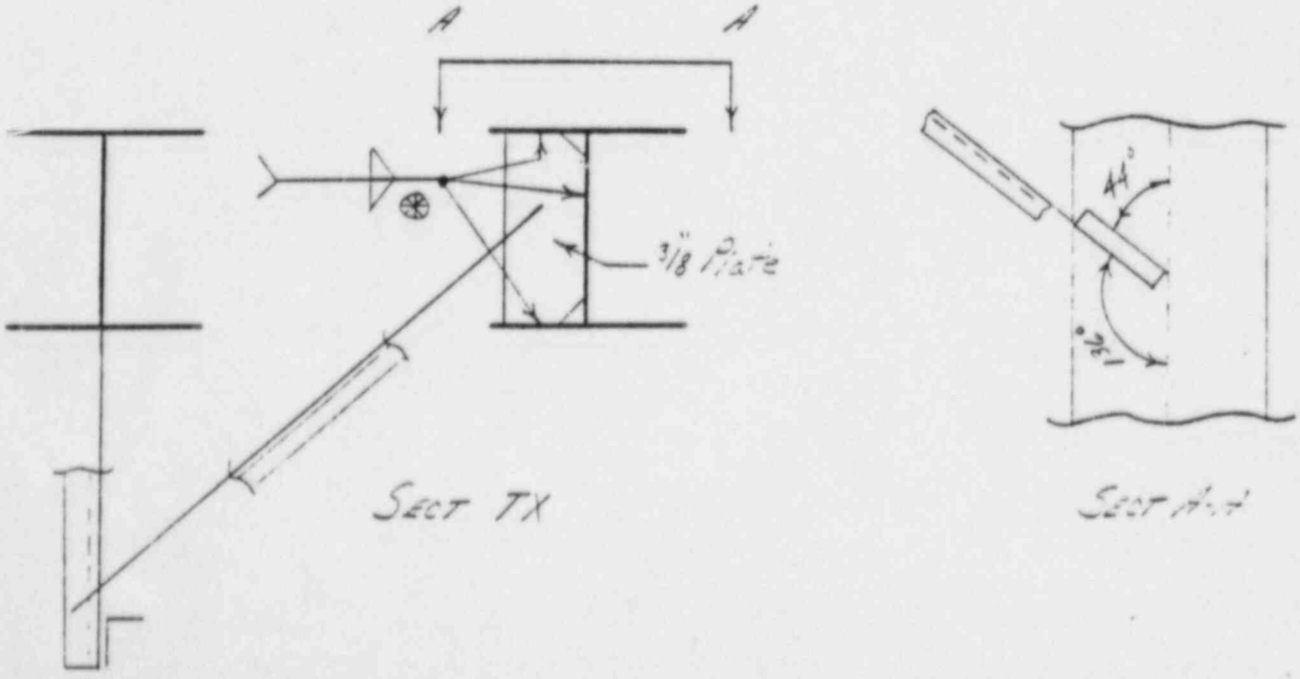
Comments:

Charles S. French 1/28/82
Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)

Conflict Condition

Hanger #60, a type K conduit support hanger, requires the use of a sect. TX detail for the attachment of diagonal braces going from the vertical support member to beam stiffener plates. The orientation of hanger #60 to a structural beam is so located that the proper weld to be used for the attachment of a stiffener plate to the web of a structural beam should be a partial penetration type weld in place of the fillet weld as shown in sect TX. See sketch below for field condition.



807

Attachment To FCR-AS-~~806~~

Rev. 6
3/79

CAROLINA POWER AND LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

AP-IX-04

Exhibit 1

REQUEST FOR CLARIFICATION OF INFORMATION (RCI)

Please Reply By: ASAP	**RCI -** AS - 166

Reference Documents: Attached FCR/~~PW~~-AS- ~~806~~ W/OUT ATTACHMENTS.
807 CAF 9/14/81

Description:
Unit #1 Cont. Bldg. El. 236 - Conduit Support Hanger #60 & Sect. TX — Weld Design Change

Inquiry:

Can the field proceed with the recommended action on the attached preliminary FCR/~~PW~~- AS-807 prior to engineering approval?

Originator	Title	Date	Approved	Title	Date
Fred Renegar	I.W.G.F.	9/14/81	Chuck French	Const. Sp.	9/11/81

Response:

Yes, with the following conditions:

1.) Preliminary FCR/PW can be worked only with specific direction by the Senior Resident Engineer.

2.) It is understood that if the FCR/PW is not approved as recommended, field rework may be required.

Response Signature	Title	Date	Approval	Title	Date
Charles S. French	Const. Sp.	9/11/81	John T. [illegible]		9/14/81

"Need-to-Know" Distribution	Chuck French		

Design Organization Approval (AE)☒ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments: PER TELECON BETWEEN RICK BEHNKE AND LEE WILLIAMS HLW 9/24/81
SEE EBASCO COMMENT (PAGE 1 OF 3) HLW

J.H. -
Richard P. Behnke ASST. ENG 10/6/81 — Walt [signature] AE 10/7/81

Signature Title Date — Signature Title Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☒ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

SEE EBASCO COMMENT (PAGE 1 OF 3) HLW

H. Lee Williams 9/24/81 — W. Parker Franklin 9/24/81

Discipline Engineer Date — MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

Bill Hughes for AMZ 9/24/81
Senior Resident Engineer Date

Second Distribution:

(Original) Document Control
(Copy) Chuck French
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

APF-001
Rev. 17
11/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of ~~3~~ 4

[redacted]/PW - AS - 1105

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☐ Field Change ☒ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: ALL BLDGS ELECTRICAL SUPPORT STRUCTURES - SHOP WELDED CONNECTIONS WHOSE CONFIGURATION DICTATES THAT A FLARE-BEVEL WELD IS APPROPRIATE (TUBE STEEL TO ANGLE OR TUBE STEEL TO TUBE STEEL).

☒ Q
☐ Non-Q

☒ NO ☐ YES

REPORT No.________

Conflict/Condition

Reference Documents or Attachment PW-AS-946, PEDEN STEEL SHOP DRAWINGS FOR CONTRACTS C-4029N, C-3977N (EXAMPLES).

THE REFERENCED PW ADDRESSES CONNECTIONS WHOSE CONFIGURATIONS DICTATE THAT A FLARE BEVEL WELD IS APPROPRIATE, BUT THE SHOP DRAWINGS INDICATE A SYMBOL FOR A 3/16" FILLET WELD. THE INTENDED WELD PER EBASCO DESIGN IS A FLARE-BEVEL WELD WITH A 3/16" FILLET WELD REINFORCEMENT (SYMBOL: 3/16). THE PROPER PROFILE FOR THIS WELD IS SHOWN BY THE SKETCH ON PAGE 3. AN INSPECTION HAS BEEN MADE OF A REPRESENTATIVE SAMPLING OF THE PROFILES OF THE SHOP WELDS FOR THESE TYPE CONNECTIONS. IN ALL CASES, THE FLARE-BEVEL PORTION OF THE WELD WAS NOT FLUSHED-OUT TO THE FLAT SURFACE OF THE TUBE STEEL. HOWEVER, IN ALL CASES IT WAS NOTED THAT THE FLARE-BEVEL PORTION WAS FLUSHED-OUT ENOUGH SUCH THAT THE 3/16" (MINIMUM) FILLET REINFORCEMENT WELD HAS BEEN DEVELOPED. A PROFILE OF THIS WELD CONDITION IS SHOWN ON THE SKETCH ON PAGE 4.

Recommended Action:

☐ Please Investigate and Resolve
☒ Please Resolve as Follows

ALLOW THE SUBJECT SHOP WELDS TO BE LEFT-AS-IS.

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DOCUMENT CONTROL
APR 13 1982
SHEARON HARRIS N.P.P.

RECEIVED
MAR 25 1982
PROJECT ENGINEERING

Justification: ADEQUATE STRENGTH IS DEVELOPED BY THESE WELDS FOR THE CONNECTIONS IN THEIR PRESENT CONDITION.

Requested by: ORT 1-8-82

John T. Peel
Discipline Engineer

1/8/82
Date

Site Approval:

[signature]
Senior Resident Engineer

1/8/82
Date

First Distribution:

(Original) Design Organization
(Copy)

000482

(Copy)
(Copy)
(Copy)

Design Organization Approval (AE)☒ (NSSS)☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ~~(initials) 3/4/82~~ ☐ Rejected ☒ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.)

to be changed CHANGES TO BE SHOWN ON AS-BUILT DWG.

Comments: PER TELECON BETWEEN B. STEPHENS AND D. CACOILO. SEE EBASCO ATTACHMENT. (initials) 3/4/82

(signature) 3/22/82

Signature	Title	Date	Signature	Title	Date
D. Cacoilo/NCT	SAE	4/2/82	(signature)	RE	4/2/82
(signature)	Prin. Engr	4/2/82			

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☐ Approved as Recommended ☐ Rejected ☒ Conditional Approval

SEE EBASCO ATTACHMENT. NOTE: EBASCO CONDITIONS 1&2 FOR APPROVAL HAVE BEEN VERIFIED BASED ON SH 3 OF 4 NOTES AND SKETCH ON SHEET 2 OF ATTACHMENT.

Discipline Engineer	Date	MHPE or PPE	Date
Beverly Stephens	3/19/82	(signature)	3/22/82

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

Bill (signature) for AMZ 3/22/82
Senior Resident Engineer Date

Second Distribution:

(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

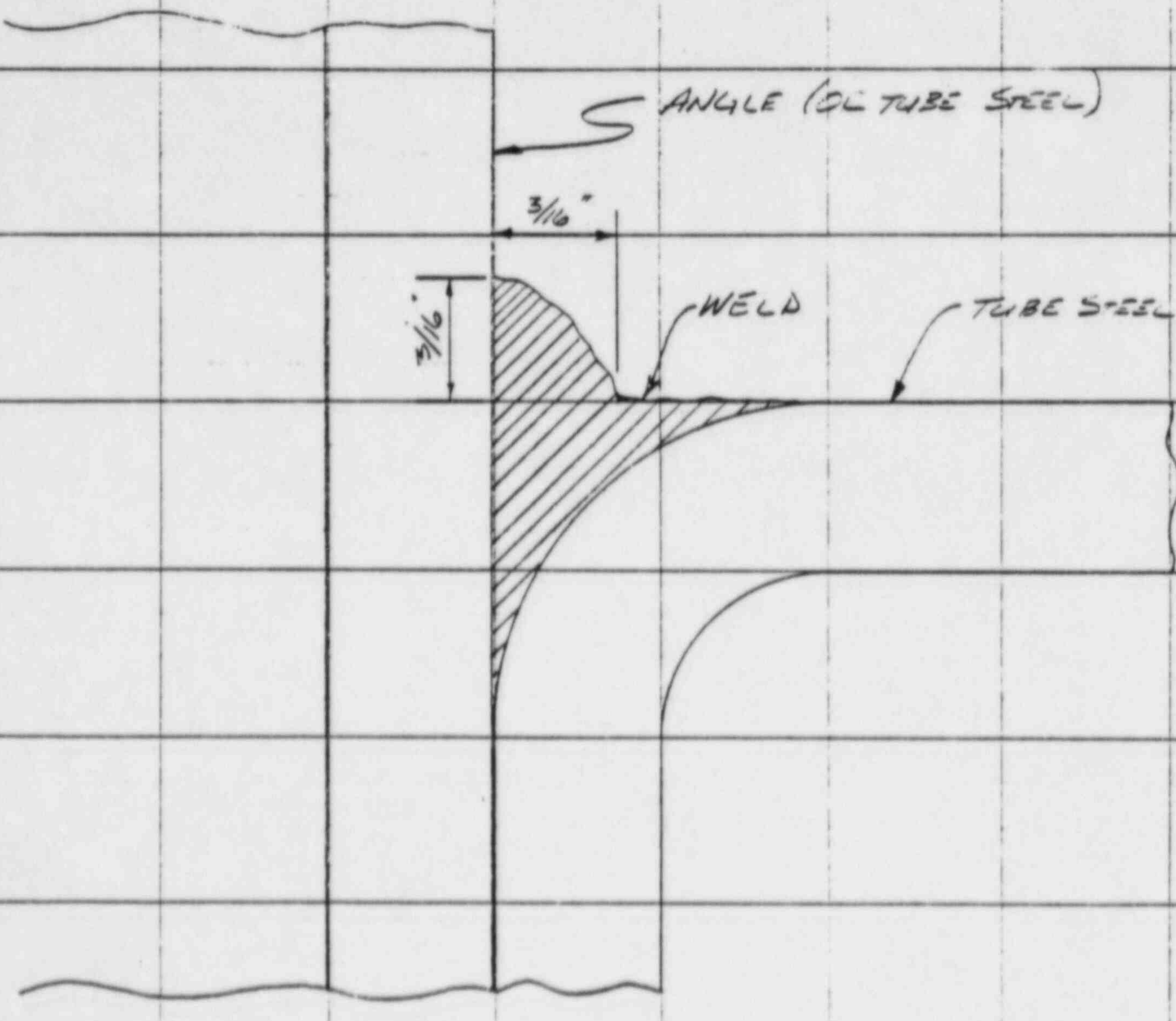
FW-AS-1105

BY: JTP DATE 1/3/91 **POWER PLANT CONSTRUCTION** SHEET 3 OF 4

CHKD. BY ____ DATE ____ **COMPUTATION SHEET** DEPT. ____

SUBJECT: WELD PROFILE FOR A FLARE-BEVEL WELD WITH A 3/16 FLUSH REINFORCEMENT - CONNECTION OF TUBE STEEL (STRUCTURAL TUBING) TO ANGLE (OR TUBE STEEL).

FORM NO. 1630



SCALE: 1" = 1/4"

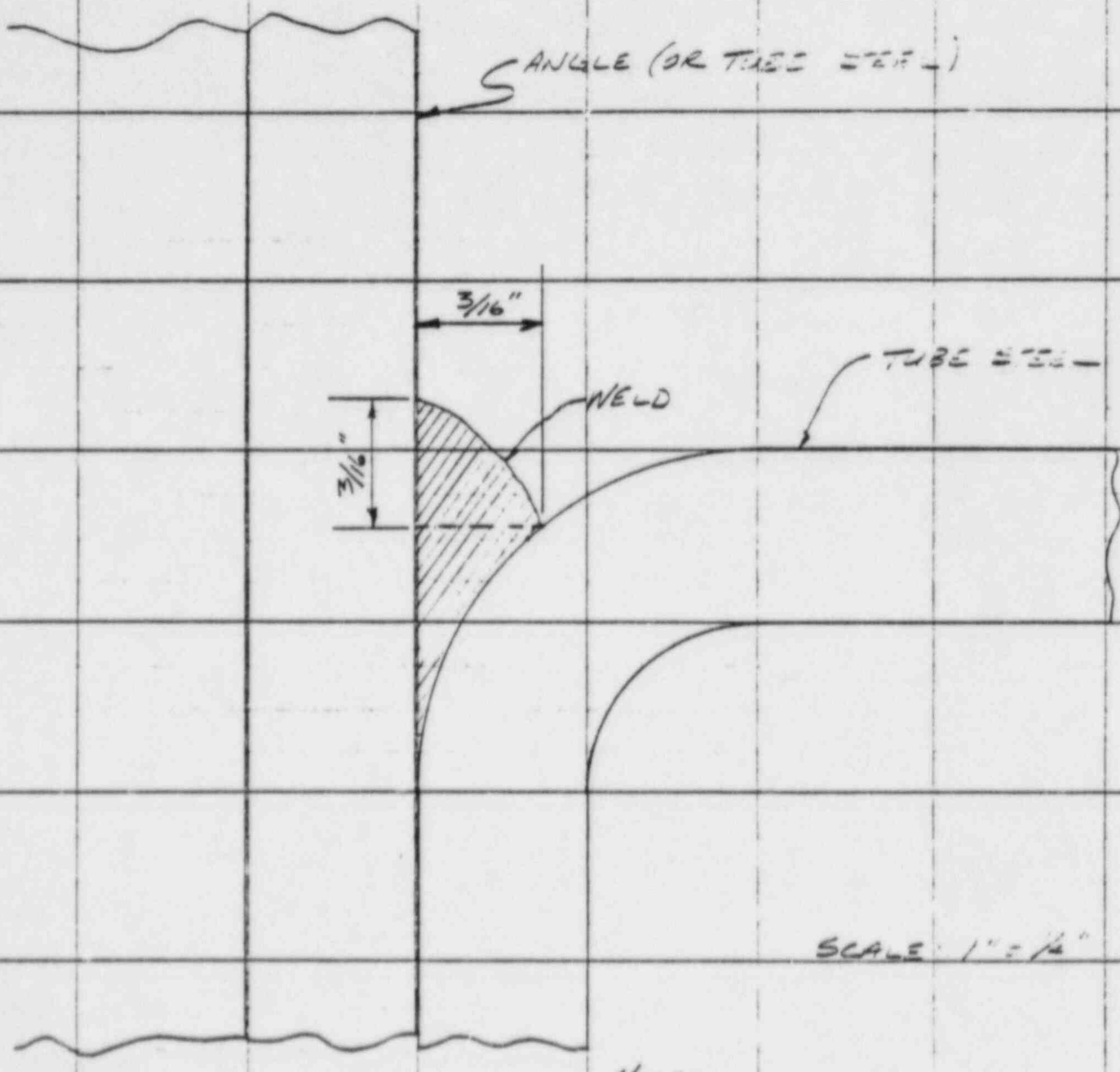
PW-AS-1105

BY TF DATE 1/7/82 **POWER PLANT CONSTRUCTION** SHEET 6 OF 6

CHKD. BY ____ DATE ____ **COMPUTATION SHEET** DEPT. ____

SUBJECT [illegible] PROFILE OF PEDEN STEEL SHOP WELDS WHERE APPROPRIATE WELD SHOULD BE A FLARE BEVEL WELD WITH A 3/16" FILLET REINFORCEMENT

FORM NO. 1630



SCALE: 1" = 1/4"

NOTES:

1. DIMENSIONS SHOWN ARE MINIMUM
2. [illegible]
3. APPX. 50 WELDS WERE VISUALLY INSPECTED, AND APPX. 1/2 OF THESE WERE PHYSICALLY MEASURED. OF THOSE MEASURED, APPX. 90% HAD FILLET REINFORCEMENTS GREATER THAN 3/16."

PEDEN SHOP WELDS INTENDED TO BE FLARE-BEVEL GROOVE WELDS, AS IDENTIFIED IN THIS PW, HAVE BEEN REVIEWED AND ARE CONSIDERED TO BE ACCEPTABLE, PROVIDED THAT:

1. ACTUAL FILLET WELD SIZE IS EQUAL TO OR GREATER THAN THE FILLET WELD SIZE SHOWN ON DRAWINGS
2. WELD HAS A SMOOTH TRANSITION WITH BASE METAL, AS SHOWN ON SKETCH TRANSMITTED BY J. PEEL ON FEB 2, 1982 (SEE EBASCO ATTACHMENT SHEET 2 OF 2).

BY JTP DATE 2/11/82 **POWER PLANT CONSTRUCTION** SHEET ___ OF ___

CHKD. BY ______ DATE ______ **COMPUTATION SHEET** DEPT. ______

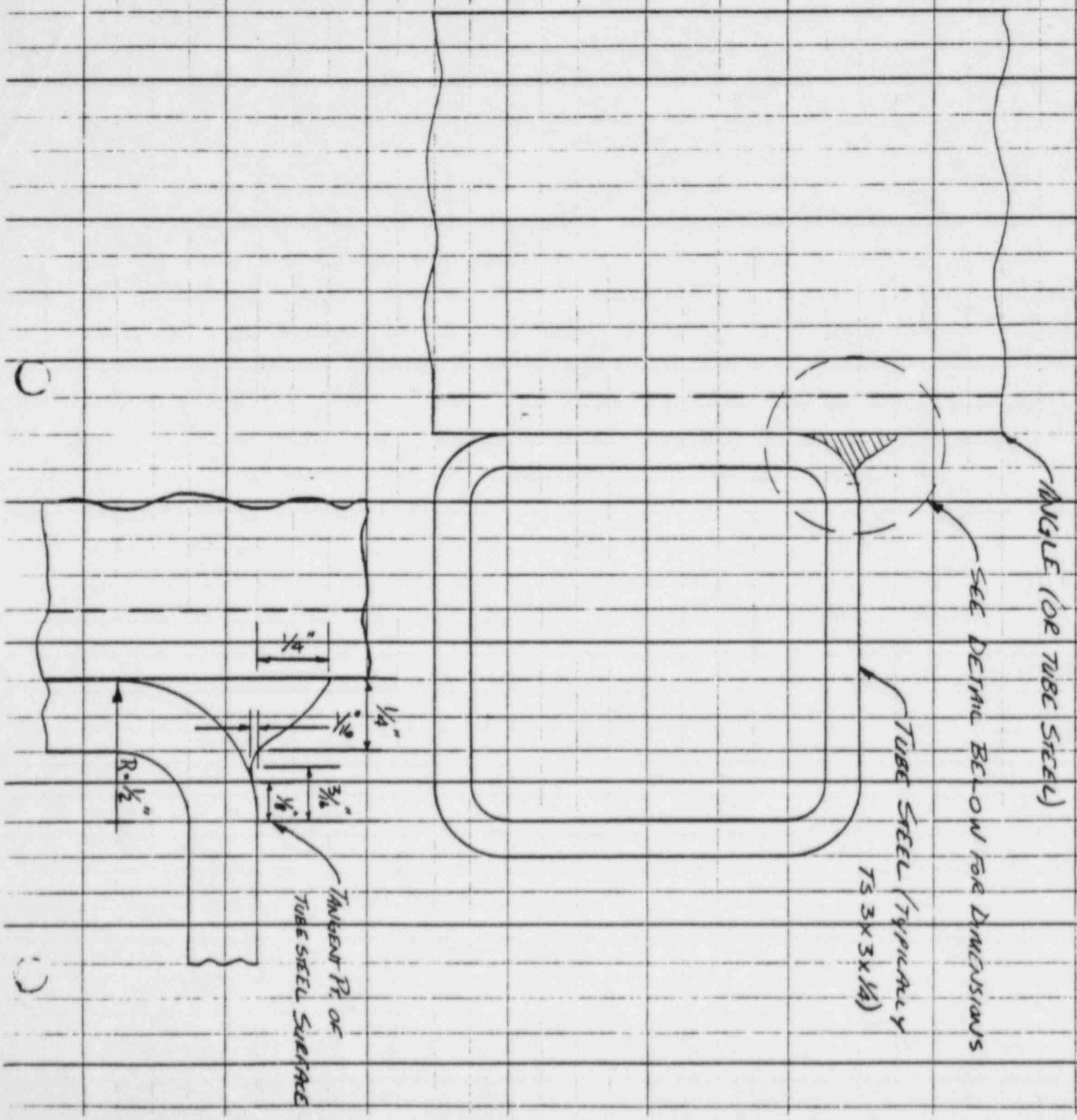
SUBJECT TYPICAL PROFILE OF PEDEN STEEL SHOP WELDS, TUBE STEEL TO ANGLE (OR TUBE STEEL)

REFERENCE FCR-AS-1105

FORM NO. 1630

EBASCO ATTACHMENT TO PW - AS-1105 Sheet 2 of 2

(ADDITIONAL INFORMATION PROVIDED BY CP&L)



CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

[redacted]/PW -AS - 1245

Type of Request:

- ☒ Permanent Waiver to "use-as-is"
- ☐ Field Change
- ☒ See Recommended Action

ORIGINAL

- ☒ Non-ASME
- ☐ ASME Section III Division 1
- ☐ ASME Section III Division 2
- ☒ Q ☐ Non-Q

Nonconformance ☒ No ☐ Yes Report No.__________

Identification of Area and Item: RAB #1 ELEVATION 248'
1/4" GAP PREVENTS REQUIRED WELD BETWEEN R6.4 ENGINEERED PL & BEAM 7A1 (CONTRACT 3836N)

Conflict/Condition

Reference Documents or Attachment 1364-9858 Rev. 1
AWS D1.1, Para. 3.3.1

RECEIVED
DOCUMENT CONTROL
MAR 16 1982
SHEARON HARRIS N.P.P.

A 1/4" GAP EXISTS BETWEEN R6.4 ENGINEERED PL & END PL ON BEAM 7A1. (SHOWN ON SHEET 3 of 4)
AWS D1.1, PARAGRAPH 3.3.1 STATES THAT GAPS BETWEEN PARTS, SHALL NOT EXCEED 3/16".
THIS CONDITION PREVENTS US FROM MAKING THE REQUIRED WELD.

Uncontrolled Copy
FOR INFORMATION ONLY

Recommended Action:

☐ Please Investigate and Resolve
☒ Please Resolve as Follows

LEAVE END PL "as is" & —
USE A SEAL WELD TO PREVENT MELT THROUGH AND INCREASE REQUIRED WELD FROM A 3/8 FILLET TO A 5/8" FILLET WELD.
(AS SHOWN ON SHEET 4 of 4)

RECEIVED
MAR 03 1982
PROJECT ENGINEERING

Justification:
RECOMMENDED ACTION WILL ENABLE CONNECTION TO MEET ITS DESIGN INTENT.

000483

Requested by:		Site Approval:	
Edison Glover	2/16/82	Bill Snyder for AMD	2/17/82
Discipline Engineer	Date	Senior Resident Engineer	Date

APF-001
Rev. 18
2/4/82

AP-IX-05
Exhibit

[redacted]/PW -AS -1245

Page 2 of 4

Design Organization Approval ☒ AE ☐ NSSS ☐ NPED Only ☐ Other

Telephone Resolution ☒ Yes ☐ No Design Organization Attachments ☐ Yes ☐ No

☑ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed CHANGES TO BE SHOWN ON AS-BUILT DWGS

Comments: PER TELECON BETWEEN DAVE CACOLO AND LEE WILLIAMS
2/25/82 HLW

David M. Cacolo	SAE	3/10/82	Walt		3/10/82
Signature	Title	Date	Signature	Title	Date

CP&L Harris Plant Engineering Approval

HPES Attachments ☐ Yes ☐ No

☑ Approved as Recommended ☐ Rejected ☐ Conditional Approval

H Lee Williams	2/25/82		2/25/82
Discipline Engineer	Date	MHPE or PPE	Date

Site Concurrence: Recommend ☒ Implementation
☐ Alternate Resolution
☐ Rejected

Bill for AMH 2/25/82
Senior Resident Engineer Date

Distribution:
(Original) Document Control
(Copy) EDISON GLOVER (UNCONTROLLED)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☒ Yes ☐ No

Comments:

Edison Glover 6/14/82
Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

FORM NO. 2001
7/81

PW-AS-1245

CP&L
Carolina Power & Light Company

DATE ______
PAGE ____ OF ____

PURPOSE
☐ SKETCH
☐ CALCULATION
☐ COMMENT
☐ DATA
☐ OTHER ______

USER:
☐ FPPED
☐ CNSS
☐ CONST
☐ MAINT
☐ PPED
☐ OTHER ______

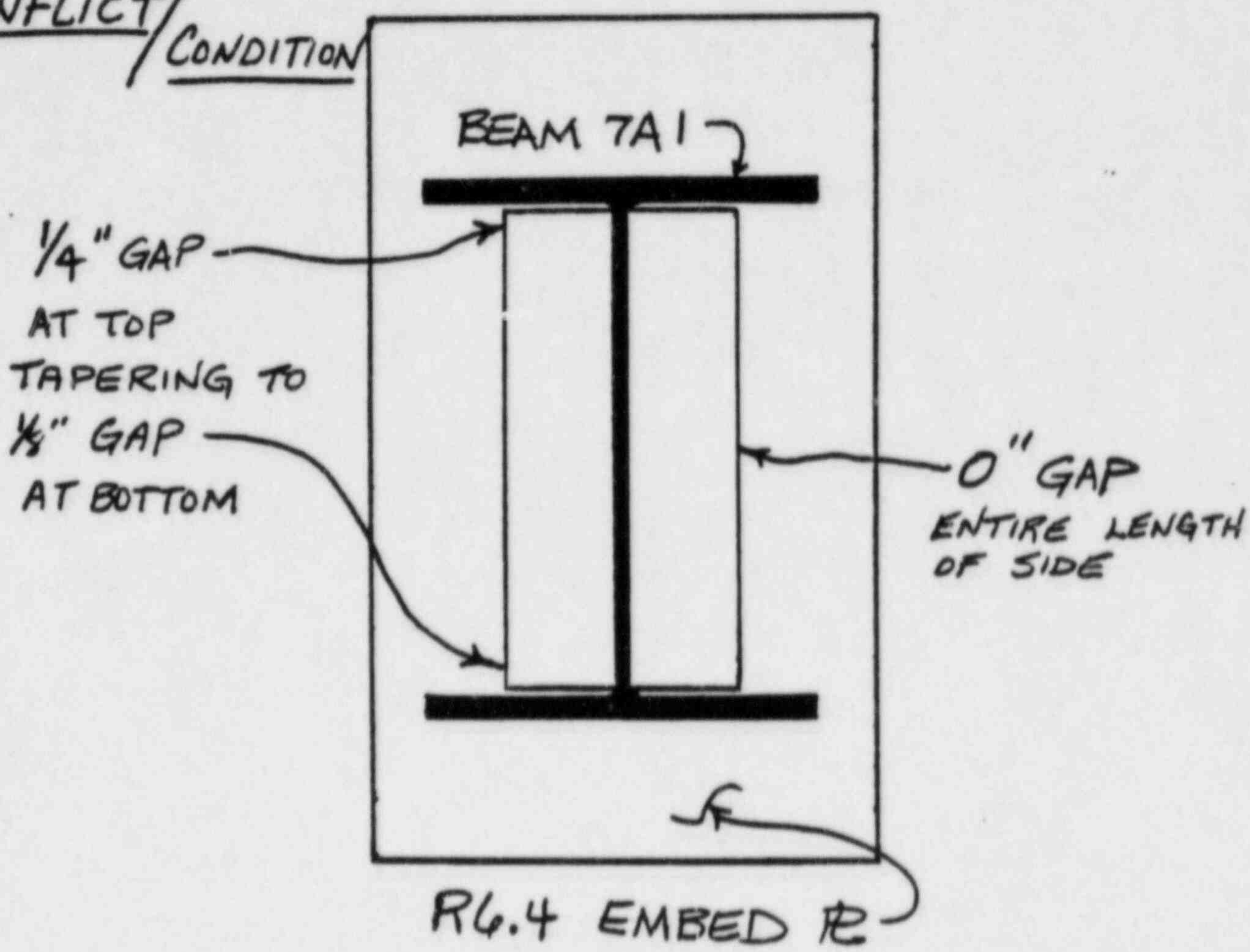
FILE NO. ______
PM NO. ______
WR & A NO. ______
LCO NO ______

CS NO. ______
JR NO. ______
PT/MI NO. ______
LER NO. ______
OTHER ______

ORIGINATOR ______ NAME

~~CHECKED BY~~ SHEET 3 of 4 NAME

CONFLICT/CONDITION



FORM NO. 2001
1/81

CP&L
Carolina Power & Light Company

DATE ______
PAGE ______ OF ______

PURPOSE
- ☐ SKETCH
- ☐ CALCULATION
- ☐ COMMENT
- ☐ DATA
- ☐ OTHER ______

USER:
- ☐ FPPED
- ☐ CNSS
- ☐ CONST
- ☐ MAINT
- ☐ PPED
- ☐ OTHER ______

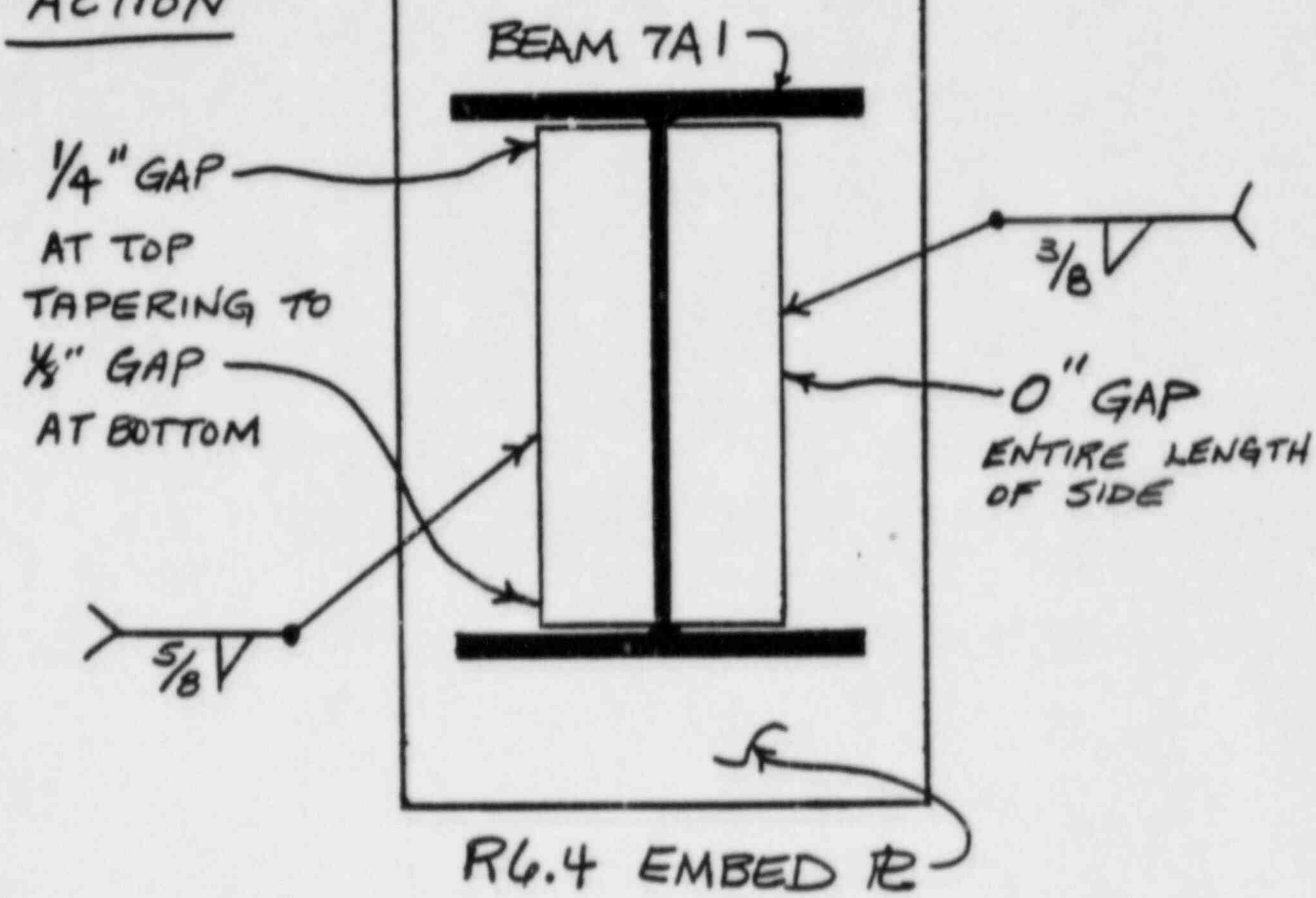
FILE NO. ______
PM NO. ______
WR & A NO. ______
LCO NO ______

CS NO. ______
JR NO. ______
PT/MI NO. ______
LER NO. ______
OTHER ______

ORIGINATOR ______ NAME

~~CHECKED BY~~ SHEET 4 of 4 NAME

RECOMMENDED ACTION



PF-001
ev. 17
1/6/80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

ORIGINAL

AP-IX-05
Exhibit 1
Page 1 of 2

~~FCR~~/PW - H - 338

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2

☐ Field Change ☐ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: PIPE HANGER ☒ Q ☐ Non-Q

A-2-236-1-CC-H-483 3/D

Conflict/Condition

Reference Documents or Attachment A-2-236-1-CC-H-483 3/D
PHP-1242

A 1/2" FILLET WAS WELDED ALL AROUND AT (5) TO EMBED. A 1/2" FILLET WELD WAS ALSO APPLIED BOTTOM SIDE OF (5) TO (2). FULL PENETRATION WELDS COULD NOT BE VERIFIED.

Recommended Action: ☐ Please Investigate and Resolve
☐ Please Resolve as Follows

~~ACCEPT AS IS - PERMANENT WAIVER~~
NEEDS TO BE RESOLVED BY 4/10/81
NOTE THAT PHP-1242 WAS WRITTEN 4/2/81.

Justification:

HANGER IS BUILT.

Requested by: AG7

PW Howard 4/3/81
Discipline Engineer Date

Site Approval:

E E Willett for 4-6-81
Senior Resident Engineer Date

First Distribution:

Original) Design Organization
(Copy) ALEX FULLER
(Copy)
(Copy)
(Copy)

DOCUMENT CONTROL
RECEIVED
APR 23 1981
SHEARON HARRIS N. P. P.

030328

APP-001
Rev. 17
11/6/80

RECEIVED
APR 16 1981
PROJECT ENGINEERING

TELECOPIED

AP-IX-05
Exhibit 1

Page 2 of 2

PW-H-338

Design Organization Approval (AE) ☒ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed A-2-236-1-CC-H-483 REV. 3/D

Comments: HANGER SKETCH REVISED REFLECTING AS BUILT CONDITIONS. SEE A-2-236-1-CC-H-483 REV. 6/6

Lead Piping Eng. 4-17-81
HANGER
A. Folkymonder RSSTD. ENG 04.17.81

Signature	Title	Date	Signature	Title	Date
			Walt	I.E.	4/17/81

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

Discipline Engineer	Date	MHPE or PPE	Date
	4/22/81	W. Parker	4/22/81

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

Senior Resident Engineer Date 4/23/81

Second Distribution:
(Original) Document Control
(Copy)
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(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:
(Original) File in Doc. Control
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(Copy)
(Copy)
(Copy)

SHEARON HARRIS NUCLEAR POWER PLANT

FIELD CHANGE REQUEST/PERMANENT WAIVER

PW - H - 303

ORIGINAL

Type of Request: ☒ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2

☐ Field Change ☐ See Recommended Action ☒ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: PIPE HANGER W-6-236-1-4-WG-H-712 Rev 3/D ☒ Q ☐ Non-Q

Conflict/Condition

Reference Documents or Attachment

REV. 3/D CALLS FOR PIECE (5) TO BE TUBE STEEL. HANGER WAS INSTALLED PER REV 1/B AND AS A RESULT PIECE (5) IS AN I-BEAM (W4 x 13 x 4' LG).

Recommended Action: ☒ Please Investigate and Resolve ☐ Please Resolve as Follows

LEAVE "AS BUILT". CHANGE WELD SYMBOLS, THE DRAWING [illegible] THE [illegible] OF MATERIALS TO REFLECT THE "AS-BUILT" CONDITION.

DOCUMENT CONTROL
RECEIVED
APR 13 1981
SHEARON HARRIS N. P. P.

Justification:

HANGER IS BUILT.

Requested by:		Site Approval:	
PW Howard	2-19-81	E.E. [illegible] for	2-24-81
Discipline Engineer	Date	Senior Resident Engineer	Date

First Distribution:

(Original) Design Organization

(Copy) WAYNE HARRIS

(Copy)

(Copy)

(Copy)

DW-H-3D3

Design Organization Approval (AE) ☐ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed W-6-236-1-4-WG-H-712 REV. 3/D

Comments: HANGER SKETCH REVISED REFLECTING AS BUILT CONDITIONS. SEE W-6-236-1-4-WG-H-712R. 5/F

Signature	Title	Date	Signature	Title	Date
[illegible]	Lead Piping Eng Hanger	3-31-81	Watt [illegible]	PE	4/1/81
A. Folgmowir	Rate Eng.	03-31-81			

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☐ Yes ☒ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

Robert S. Kunk GOW 4/10/81 4/8/81 — W. Parker Tomkins 4/10/81

Discipline Engineer Date MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

RMcLuin 4/13/81
Senior Resident Engineer Date

Second Distribution:

(Original) Document Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control
(Copy)
(Copy)
(Copy)
(Copy)
(Copy)

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. 17
/80

ORIGINAL

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
FIELD CHANGE REQUEST/PERMANENT WAIVER

AP-IX-05
Exhibit 1
Page 1 of 4

FCR-H-286

Type of Request: ☐ Permanent Waiver to "use-as-is" ☐ ASME Section III Division 2
☑ Field Change ☑ See Recommended Action ☑ Non-ASME ☐ ASME Section III Division 1

Identification of Area and Item: ☑ Q ☐ Non-Q

PIPE HANGER WELDING

Conflict/Condition

Reference Documents or Attachment 2165-G-107501, Rev. 1, FCR-258 (INCLUDING DRAFT R1), FCR-H-280, FCR-H-281, FCR-H-282, AND HANGER DRAWINGS.

HANGER INSPECTIONS HAVE REVEALED: 1. WELD SIZES LARGER THAN ALLOWED BY FCR-H-258 R0. 2. EXTRA WELDS NOT CALLED FOR ON DRAWINGS; E.G. DWG CALLS FOR WELDING ON TWO SIDES, BUT FIELD WELDED FOUR SIDES.

DOCUMENT CONTROL
RECEIVED
DEC 18 1980
SHEARON HARRIS N.P.P.

Recommended Action:

☐ Please Investigate and
☑ Please Resolve as Follows

I. THIS FCR VOIDS FCR-H-258, 280, 281, AND 282. APPLICATION OF FLEXIBLE CONNECTION IDENTIFICATION IS UNDER SEPARATE DIRECTIVE.

II. ADD A NOTE (OR NOTES) TO G-107 WHICH ACCOMPLISHES THE FOLLOWING FOR FILLET WELDS, FILLET WELD REINFORCEMENTS, AND FLARE BEVEL OR GROOVE BEVEL WELDING: (CONT'D ON PAGE 3)

Justification: CODE ONLY ADDRESSES WELD UNDER SIZE, AND TO CLARIFY WELD TOLERANCES.
THIS FCR IS REQUIRED TO PERMIT PROMPT CORRECTIVE ACTION TO RESOLVE OPEN NRC ITEMS.

Requested by:

Wayne T. Harris — 12-16-80
Discipline Engineer — Date

Site Approval:

E.E. [illegible] for AML — 12-16-80
Senior Resident Engineer — Date

First Distribution:

(Original) Design Organization
(Copy) WAYNE T. HARRIS
(Copy) R. HANFORD
(Copy)
(Copy)

000273

①
16

APF-001
Rev. 17
11/6/80

AP-IX-05
Exhibit 1

FCR-H-286

Design Organization Approval (AE) ☒ (NSSS) ☐ (N/A) ☐ (Other) ☐

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

This change requires the following Document(s) (Specification, Drawing, SAR, etc.) to be changed ______

Comments: Per Telecon among Fiala, G. White, W. Tomlinson, and E. Willett on 12-18-80

Signature	Title	Date	Signature	Title	Date

CP&L Harris Plant Engineering Approval Required ☒ Yes ☐ No

Telephone Resolution ☒ Yes ☐ No

☒ Approved as Recommended ☐ Rejected ☐ Conditional Approval

George O. White 12/18/80
Discipline Engineer Date

W. Parker Tomlinson 12/18/80
MHPE or PPE Date

Site Concurrence: Recommend ☒ Implementation ☐ Alternate Resolution

12-18-80
Senior Resident Engineer Date

Second Distribution:

(Original) Document Control	(Copy)
(Copy) R. HANFORD	(Copy)
(Copy) V. SAFARIAN	(Copy)

Implementation Completed as Approved? ☐ Yes ☐ No

Comments:

Discipline Engineer Date

Final Distribution:

(Original) File in Doc. Control	(Copy)
(Copy)	(Copy)
(Copy)	(Copy)

NOTES:

1. Weld sizes indicated on hanger drawings are nominal sizes.

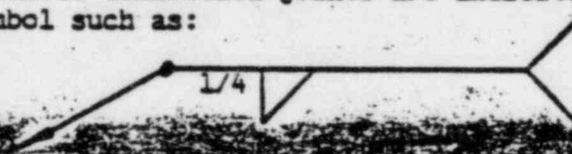
2. A fillet weld in any single continuous weld shall be permitted to underrun the nominal fillet weld size provided that the requirements of AWS D1.1, Paragraph 9.25.1.6 (1979 Edition) are satisfied.

3. Flare bevel or groove bevel welds may finish with a fillet weld reinforcement.

4. Welds in excess of that called for on the hanger details are acceptable ~~(excluding the flexible connection joints)~~ from the standpoint of the overall integrity of the structure and they do not require Ebasco's approval. Any detrimental effect on the weld or base material (revealed from the field visual inspection) that may be caused by overwelding is within CP&L scope of responsibility. ~~All fillet welds on flexible connection joints are permitted to be oversized by 1/8".~~

5. Extra welds are permitted except on joints designed for flexibility.

6. Flexible connection joints are indicated by notation in the weld symbol such as:



1/2" return, flexible joint connection

The requested notation for flexible connection joints will be included on all 43 hanger details identified by Bergen-Paterson (itemized list attached) from CP&L "Isometric Report" (status as of September 12, 1980). CP&L is to provide further directives regarding the review of flexible connection joints on remaining Bergen-Paterson hanger designs (installed after September 12 1980, and also all "un-installed" but designed or fabricated devices).

FLEXIBLE CONNECTIONS

TURBINE BUILDING

T-2-240-1-SW-H-292
293
294
295
296
297
298
299
300
331
332
333
334
335
336
337
338
339
801
815

REACTOR AUXILIARY BUILDING

A-2-236-1-CC-H-891
893
952

A-3-236-1-CC-H-386
273

A-5-236-1-SW-H-1425

A-1-190-1-CC-H-636
644
1284
1286
76
75
22
46
47
49
51
54
59

REACTOR AUXILIARY BUILDING (Cont'd)

A-3-236-1-CC-H-378
348
22

FUEL HANDLING BUILDING

F-1-236-1-4-SF-H-902

NO. 80121
/83

063.002

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

WP-110
EXHIBIT-1

PRIORITY 2

ATTENTION: GEORGE WHITE

PHP NO. 7126

HANGER NO. A - 2 - 261 - 1 - AF - H - 222

☑ SEISMIC ☐ NON-SEISMIC

REV. 3C

PROBLEM TYPE WELD SYMBOLS & SIZES

PROBLEM DESCRIPTION PLEASE CLARIFY THE FOLLOWING WELD SYMBOLS & SIZES.

1- ITEM # 2 TO ITEM # 1
2- ITEM # 6 TO EMBED PL
3- ITEM # 2 TO ITEM 4
4- ITEM # 3 TO ITEM 2 NO SYMBOL SHOWN

000434

PROBLEM REPORTED BY: DATE 8/30/83

E. E. WILLETT
C. G. WHITE
TOM TAYLOR
EBASCO

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1644
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-3-236-1-PD-H-1298 1/B
BUILDING: REACTOR AUXILIARY BUILDING
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: MISSING EMBED

- THE EMBED SHOWN ON THE HANGER SKETCH AT 8'-4" NORTH OF (36) DOES NOT EXIST. DRAWING # 2168G-155-S02 SHOWS NO EMBED AT THIS LOCATION EITHER.
- THERE IS AN EMBED LOCATED 7'-4" NORTH OF (36) WHICH THE HANGER MAY BE ATTACHED TO. IF THE HANGER ATTACHES TO THE EMBED 7'-4" NORTH OF (36) IT WILL HAVE TO BE RELOCATED 4" WEST TO AVOID INTERFERENCE WITH PIPE HANGER A-3-236-1-CC-H-464. IT SHOULD ALSO BE NOTED THAT PIPE HANGER A-3-236-1-CC-H-368 EXTENDS 7'-2" EAST OF (D).
- WELD FOR (1) TO EMBED IS CONFUSING.

RESOLVED AT SITE
EMG 3-9-82

000440

PROBLEM REPORTED BY: PAT CHRISCOE AGH

DATE 9-24-81

REV. 2
7/82

RFT # 1-4085.002
3/15/84

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

II-A

PRIORITY 2

ATTENTION : GEORGE WHITE

PHP NO. 5824

HANGER NO. A - 1 - 261 - 1 - CX - H - 1807

☑ SEISMIC ☐ NON-SEISMIC

REV. 1B

PROBLEM TYPE WELD SYMBOL

PROBLEM DESCRIPTION -MEMBER (4) TO (3) & MEMBER (1) TO (4) ARE BOTH SHOWN IN "SECTION-A-A" WITH 1/4" FILLET SHOP WELD, HOWEVER THESE WELDS ARE 1/16" UNDER SIZED. THEY ARE WELDED OUT WITH A 3/16" FILLET WELD. CHANGE THE WELD SYMBOL TO REFLECT THE AS-WELDED CONDITIONS.

RESOLVED
PHP 5824
RE 6/03/83
(151)

000453

Rest 5/9/83

PROBLEM REPORTED BY: J.A. Kirby DATE 5-9-83

To: E.E. Willett
CC: G.D. White
Tom Taylor
(Ebasco)

No. ~~[illegible]~~ 1382

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

Attention: ~~George White~~

Hanger/Support Vendor: BERGEN-PATERSON
Vendor Drawing No. & Rev.: F-2-236-1-4-SF-H-840 2/C
Endrac Drawing No. & Rev.:
Ebasco Drawing No. & Rev.:
Building: Elevation:

[X] Seismic
[ ] Non-Seismic

Weld Symbols

Problem Description:

(1) - WELDS CAN NOT BE MADE INSIDE "BOX" OF HANGER AT 4 TO 2.
Also weld ~~[illegible]~~ at 2 to 3 is incorrect.

RESOLVED SKETCH REV 251

000472

AG7

Problem reported by: Chase S. Thomas Date 8-3-81

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2389
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-2-261-1-SW-H-2350 0/4
BUILDING: RAB
ELEVATION: 261
EBASCO DRAWING NO. & REV. 2168-G-156 S02 REV. 12

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: MISSING EMBED

THERE IS NO EMBED AT 8'-0" EAST OF C ON EMBED DRAWING 2168-G-156 S02 AND NO EMBED INSTALLED IN THE FIELD THERE. THERE IS AN EMBED INSTALLED AT 9'-6" EAST OF C. DELETE BOTH ITEM 10s AND MOVE HANGER LOCATION TO 9'-6" EAST OF C. THE WELD SYMBOL BETWEEN 8 AND 10 IS INCORRECT. THE FLARE BEVEL WELD BETWEEN 8 AND 10 CANNOT HAVE A FILLET REINFORCEMENT.

~~Resolved per Site Rev. 051~~

~~RHC 2/19/82~~

RHC 3/5/82

000361

H7

PROBLEM REPORTED BY: William C. Stantley

DATE 2-15-82

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

1-1065.004 5/25/83

PRIORITY 1

ATTENTION: GEORGE WHITE

PHP NO. 6015

HANGER NO. Y D - 2 - 261 - 1 - SW - H - 3044

☑ SEISMIC ☐ NON-SEISMIC

REV. 0 D

PROBLEM TYPE Bad Weld Symbol

PROBLEM DESCRIPTION

Weld Symbol from #5 to Hgr # SW-H-3042 is bad

Please Correct

Hgr is tacked on location, SW-H-3042 is okay w/

exception of TS thickness change - 3/8" → 1/2" (PHP Written)

RESOLVED PER FLD REV 051

JCD 6-9-83

000450

PROBLEM REPORTED BY: Phil Williams AG 6/6 DATE 6/6/83

81.

Ib

To: E. E. WILLETT
CC: G. O. WHITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

①

WP-110

PHP # 4413
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. F-Z-236-1-4-MO-H-134 001
BUILDING: FHB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROPLEM DESCRIPTION: WELD SYMBOL

WELD SYMBOL @ # 5 TO # 7 SHOULD BE A FILLET
PLEASE CHANGE
* WELD @ INSIDES OF BOTH # 7's TO EMBED CAN NOT BE
MADE DUE TO LACK OF ACCESS. PLEASE CHANGE TO 3 SIDED
WELD IF POSSIBLE.
WELD @ # 5 TO EMBED IN SECTION A-A SHOULD NOT BE TYPICAL

RESOLVED PER SITE
REV 052

L. H. DELL
11/17/82

NOTE: ITEM ABOVE REQUESTING
CHANGE TO 3 SIDED WELD REQUIRED
RE-ANALYSIS OF FRAME-TO-EMBED JOINT,
AND COULD HAVE BEEN AVOIDED BY CAREFUL
WORK (A LITTLE FORESIGHT!) THIS IS
COSTING CP&L MONEY. GOW

000423

PROBLEM REPORTED BY: PHIL WILLIAMS 11/8

DATE 11/8/82

Rev. 1
10/81

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

Exhibit 1 1
WP-110

PHP # 3069
PAGE 1 OF 1

1-CT-64

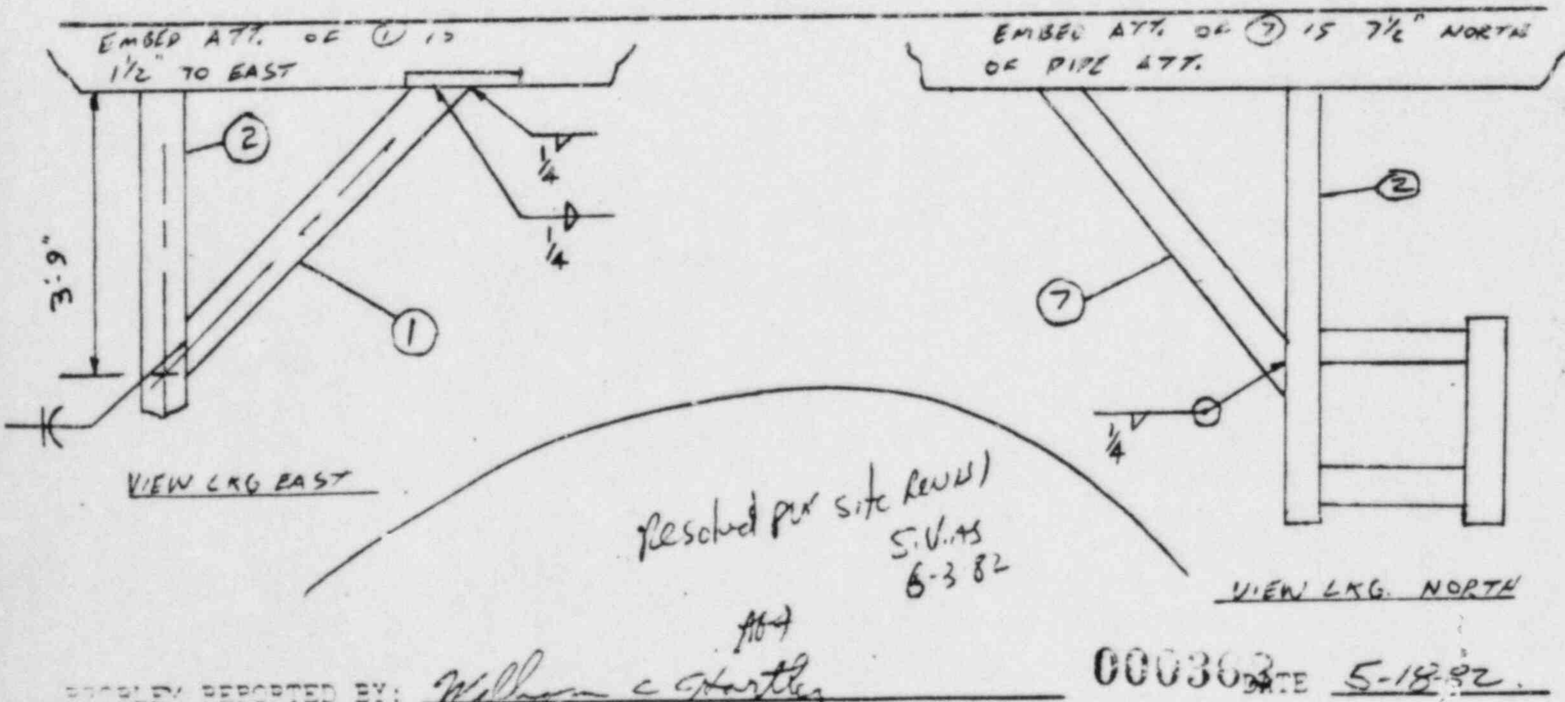
ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-236-1-CT-H-522 1/B
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV. ____

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: ITEM 7 SKEWED, DIMENSION CHANGE AND INCORRECT WELD SYMBOL.

IN THE VIEW LOOKING EAST ADD THE 3'-9" DIMENSION, TAKE TYPICAL OFF THE FLARE BEVEL WELD SYMBOL AND CHANGE ITEM 1 TO EMBED WELD SYMBOL AS SHOWN BELOW. IN THE VIEW LKG. NORTH, ADD A FILLET SYMBOL BETWEEN ITEM 2 AND 7. ITEM 7 IS SKEWED 7½" TO THE NORTH DUE TO HVAC INTERFERENCE. SHOW A SECTION OR ADD A NOTE FOR THIS.



Resolved per site Review
S. Vias
6-3-82

PROBLEM REPORTED BY: William C Hartley DATE 5-18-82

000363

Exhibit 1
WP-110

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 3392
PAGE ___ OF ___

6/8 E. WILLETT
G. O. WHITE
TOM TAYLOR (EBASCO)

(2)

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. C-1-221-1-FP-H-1307 Rev 3/D
BUILDING:
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC [✓]
NON-SEISMIC [ ]

PROPLEM DESCRIPTION: GEOMETRY
WELD SYMBOL.

FROM ℄ #3 @ BEAM TO ℄ #2 @ BEAM SHOULD BE 2'-0", BUT IS 2'-3 3/8".

℄ NORTHERN #3 SHOULD INTERSECT W/ ℄ #6 & ℄ #1, BUT IS 5/8" HIGH.

℄ SOUTHERN #3 SHOULD INTERSECT W/ ℄ #2 & ℄ #1, BUT IS 1 1/16" HIGH.

PLEASE ACCEPT AS BUILT.

DOES #3 TO #7 CONNECT LIKE DETAIL A; IF NOT, WELD SYMBOL IS INCORRECT.

INCORRECT WELD SYMBOLS @ #3 TO #2, #1 TO #6, & #4 TO #5.

#9 TO BEAM, REMOVE "TYP."

MISSING WELD SYMBOL @ #4 TO #1.

WELDS INSIDE WINDOW CANNOT BE MADE.

℄ OF WINDOW IS @ 231.955 & SHOULD BE @ 232.00.

PLEASE ACCEPT AS BUILT.

Resolved in Field
Rev 3SJ
MB 7-1-82

C00410

PROBLEM REPORTED BY: G. E. Bullard HG7 6/22

DATE 17 June 82

ev. 1
10/81

G. G. WHITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

Exhibit 1 (1)
WP-110

PHP # 4041
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

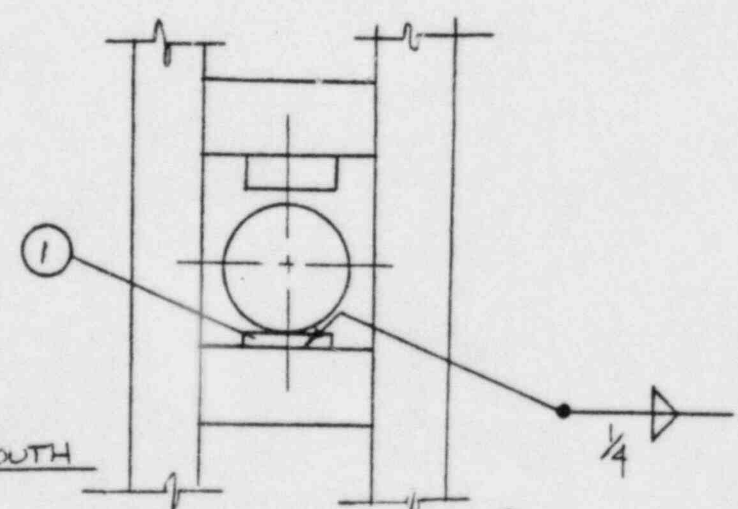
HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A5-236-1-SA-H-169 251
BUILDING: RAB
ELEVATION: 236'
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: WELD SYMBOL CHANGE

ITEM (1) CAN NOT BE WELDED ON THE EAST AND WEST SIDES BECAUSE OF THE SMALL WORKING AREA. CHANGE THE WELD TO THE NORTH AND SOUTH SIDES OF ITEM (1). HANGER CAN BE COMPLETED WITH THIS CHANGE.

RESOLVED PER SITE REV 252
C. H. DELL
9/23/82



ELEV. LKG. SOUTH

000118

PROBLEM REPORTED BY: [signature] AC-7 9/21

DATE 9/21/82

Rev. 1
0/8-1

TO: E. E. WILLEY
CC: G. O. WHITE
TOM TAYLOR
(EBASCO)

II a

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

WP-110

PHP # 4312
PAGE ___ OF ___

(3)

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. C-1-236-1-RC-H-459 Rev 1/B
BUILDING: ___
ELEVATION: ___
EBASCO DRAWING NO. & REV. ___

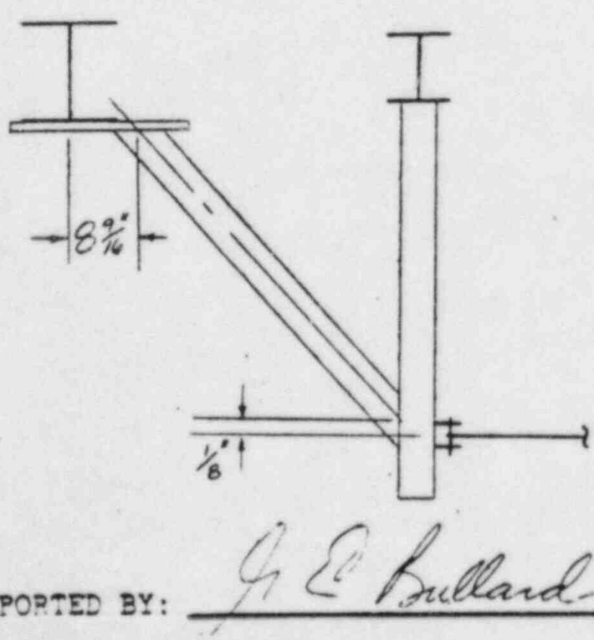
SEISMIC ☑
NON-SEISMIC ☐

PROPLEM DESCRIPTION: GEOMETRY
WELD SYMBOL

HANGER IS BUILT AS SHOWN BELOW. ACCEPT AS BUILT; & EMPHASIZE LINES OF INTERSECTION ON PRINT.

CHANGE #8's & #7's TO 3" LENGTH TO ENABLE WELD TO BE MADE @ #9.

DARKEN WELD SYMBOL LINE & ARROW @ #5 TO W24



RESOLVED @ SITE
11/3/82

SECTION A-A

000391

PROBLEM REPORTED BY: G E Bullard GWH 11/23/82

DATE 28 Oct 82

Rev. 10/81

CC: G. O. [illegible]
TOM TAYLOR
(EBASCO)

Exhibit 1
WP-110

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

(2)

PHP # 3985
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-6-261-1-CH-H-1196(0S1)
BUILDING: REACTOR AUXILIARY BLDG
ELEVATION: 261
EBASCO DRAWING NO. & REV. ______

SEISMIC ☑
NON-SEISMIC ☐

PROPLEM DESCRIPTION: WELD SYMBOL

- MEMBER (3) PLATE WAS CUT & INSTALLED 1/2"X4 3/8"X4 3/8".
THE BILL OF MATERIAL SHOWS MEMBER (3) TO BE 1/2"X4 1/2"X4 1/2".
CHANGE THE WELD SYMBOL FROM 1/4" FILLET ALL AROUND
TO READ 3/16" FILLET ALL AROUND FOR MEMBER (3) TO (2).
THIS HANGER IS WELDED OUT & THE PIPE IS NOT INSTALLED.

RESOLVED PER SITE
REV 0S2
C. H. DELL
9/15/82

000410

PROBLEM REPORTED BY: J. Kirby PWH KK 9/10

DATE 9-1-82

Rev. 1
10/81

Exhibit 1
WP-110

2

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 3464
PAGE 1 OF 1

To: E. E. WILLETT
cc: G. O. WHITE
TOM TAYLOR
(EBASCO)

ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-7-236-1-BR-H-1253 4/E
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: BASE PLATE DESIGN

ADD THE BASE PLATE DESIGN. ALSO REMOVE NOTE ABOUT INCREASING WELD SIZES AND THE (MIN) FROM THE FLARE BEVEL WELD SYMBOL

RESOLVED PER FLD REV 4&5
JCD 7-16-82

contains 2 parts

000409

PROBLEM REPORTED BY: William C. Hartley AC7 6/28

DATE 6-28-82

(1)

A POWER & LIGHT COMPANY
ARPIS NUCLEAR POWER PLANT
IPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1966
PAGE 1 OF 1

E.E. Willett
cc: G.O. White
Tom Taylor
(Ebasco)

~~ATTENTION: G.O. WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-3-236-1-CC-14-1309 3/0
BUILDING: REACTOR AUXILIARY BUILDING
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROBLEM DESCRIPTION: WELD SYMBOLS

- WELD SYMBOL FOR 1 TO 3 IS INCORRECT. CAN NOT MAKE FILLET REINFORCEMENT WELD.
- WELD SYMBOL FOR 3 TO 4 IS INCORRECT. STEEL WHICH ATTACHES TO 3 FROM 4 IS 3" x 5". (3" IN HORIZONTAL DIRECTION AND 5" IN VERTICAL) MEMBER 3 IS 3" x 3".
- PART NO. 96003 IS NOT LISTED IN BERGEN-PATERSON CATALOG.

Resolved per site Rev 351

S. Vias
11-23-81

000122

AG7

PROBLEM REPORTED BY: PAT CHRISCOE

DATE 11-9-81

ELECON
TO: FD
GERBT

REINSPECTION

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

No. PHP-1306
Page 1 of 1

EB-B-3794
TO N.J. NICOLICH
B&R
FROM: JOE CAFFERTY

[illegible]: PETE FIALA

er/Support Vendor: BERGEN-PATERSON
er Drawing No. & Rev. A-2-236-1-FP-H-888 2/C
at Drawing No. & Rev.
te Drawing No. & Rev.
ding: RAB Elevation 236

[X] Seismic
[ ] Non-Seismic

lem Description:

A 3/16" SHOP WELD (FILLAT) HAS BEEN APPLIED AT (3) to (2). PLEASE INVESTIGATE AND RESOLVE

RESOLUTION: SEE HANGER SKETCH A-2-236-1-FP-H-888 R. 3/D

A. Foltynowicz 04-21-81

000471

lem reported by: PW Howard Date 4/17/81

ECOPY
EO
TERET

REINSPECTION

No. PHP-1246

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

EB-B-3747
TO. NJ NICOLICH
B-P
FROM. J LAFFERTY

ntion: PETE FIALA

ar/Support Vendor BERGEN-PATERSON
or Drawing No. & Rev. TK-1-236-1-PM-H-300 4/E
ac Drawing No. & Rev.
cc Drawing No. & Rev.
ding: TANK Elevation 236

[X] Seismic
[ ] Non-Seismic

blem Description:

IN REFERENCE TO PHR-895 AND PHP-1146, PUT THE FLARE BEVEL ON THE EAST & WEST SIDES OF 3 to 4

PUT THE FILLETS ON THE TOP AND BOTTOM OF 3 TO 4

A 5/16" FILLET WELD HAS BEEN APPLIED ALL AROUND AT 4 TO EMBED

NOTE: HANGER IS BUILT.

RESOLUTION: SEE HANGER SKETCH TK-1-236-1-PM-H-300 R. 5/F

A. Folkynowla 04-08-81

000469

blem reported by: PW Howard AGT Date 4-3-81

No. [illegible] 1135

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

[illegible]: PETE FIALA

nger/Support Vendor BERGEN-PATERSON
ndor Drawing No. & Rev. A-2-236-1-SW-H-355 R4/E
trac Drawing No. & Rev.
ssco Drawing No. & Rev.
ilding: RAB Elevation 236

☒ Seismic
☐ Non-Seismic

oblem Description: WELD SYMBOLS AT ③ TO ① AND ④ TO ① ARE UNCLEAR. OUR INTERPRETATION FROM AWS WELD SYMBOL GUIDE GIVES NO DEFINITION TO THE 1/4" SIZE INCLUDED IN THE SYMBOL. WE INTERPRET A SIZE INCLUDED WITH A CONVEX TYPE SYMBOL AS REFERING TO SURFACE WELDING INDICATING A BUILT UP SURFACE RATHER THAN THE HEIGHT OF A CONVEX CAP. THE SYMBOL SHOWS A STRAIGHT LINE OVER THE FLARE-BEVEL AND A CONVEX CAP. IS THIS WELD TO BE A FLARE-BEVEL WELDED FLUSH WITH AN ADDED CONVEX CAP? PLEASE ADVISE.

RESOLUTION: SEE HANGER SKETCH A-2-236-1-SW-H-355 R. 5/F

H. Folkymowitz 04-17-81

.000463

oblem reported by: Gary A. Pollard ~~[illegible]~~ 2-24-81 Date 2-24-81

REINSPECTION

No. PHP- 1104

Page 1 of ______

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

Attention: PETE FIALA

Hanger/Support Vendor BERGEN-PATERSON
Vendor Drawing No. & Rev. A-2-236-1-SW-H-347 1/3
Indrac Drawing No. & Rev. ______
Ebasco Drawing No. & Rev. ______
Building: ______ Elevation ______

[X] Seismic
[ ] Non-Seismic

Problem Description:

WELD SYMBOLS JOINING 3 TO 4 AND 4 TO 1 IS NOT SHOWN. PLEASE REVISE THIS DRAWING.

RESOLUTION: SEE HANGER SKETCH A-2-236-1-SW-H-347 R. 2/C

A. Foltynowicz 03-27-91

000467

Problem reported by: Chas Thomas 2-10-91 Date 2-16-91

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2050
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. SF-H-659 2/C (F-2-236-1-4)
BUILDING:
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROBLEM DESCRIPTION: WELD SYMBOL

(1.) ~~(7) TO EMBED SHOULD HAVE ONE ARROW ON THE SYMBOL ONLY. ALSO, MAKE "6 SIDES TYP." MORE LEGIBLE.~~

(2.) INDICATE THE OVERLAP BTWN (7) AND (11).

(3.) CLARIFY WELD SYMBOL FOR (7) TO EMBED. (WHICH 6 SIDES ARE TYPICAL)

(4.) INDICATE ORIENTATION OF (7).

RESOLVED BY FIELD DRAWING REV. 2S1.
JW Starling
12/9/81

000448

AG-7

PROBLEM REPORTED BY: [signature]

DATE 11-17-81

CC: G. C. WHITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

PHP # 1401
Page 1 of 1

Attention: ~~GEORGE WHITE~~

Hanger/Support Vendor Bergen-Paterson
Vendor Drawing No. & Rev. A-3-236-1-CS-H-30 2/C
Endrac Drawing No. & Rev.
Ebasco Drawing No. & Rev.
Building: RAB Elevation 236

[X] Seismic
[ ] Non-Seismic

MISLOCATED EMBEDS

Problem Description: - THE HANGER SKETCH SHOWS EMBEDS LOCATED AT 5'-0" WEST OF D AND 6'-6" WEST OF D AT AN ELEVATION OF 248'-3." THERE IS AN EMBED 5'-0" WEST OF D BUT ITS BOTTOM ELEVATION IS 248'-8." IT IS AN 8" EMBED 3'-0" LONG. THERE IS AN EMBED 6'-6" WEST OF D BUT ITS TOP ELEVATION IS 244'-9." THERE IS ALSO AN EMBED LOCATED 2'-4" WEST OF D WITH A TOP ELEVATION OF 249'-7". IT IS 3'-0" LONG AND 8" WIDE.

WELD SYMBOL FOR 2 TO 6 IS NOT CLEAR IN ITS MEANING.

RESOLVED PER SITE REV. 251
W. C. Lewis 3/5/82

000447

A47

Problem reported by: PAT CHRISCOE Date 8-7-81

E. E. Willett
G. O. White
Tom Taylor
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1515
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-6-236-1-CS-H-264 R 0/A
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV. ______

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: NO EMBED AT LOCATION SHOWN ON HANGER SKETCH.

HANGER SKETCH LOCATES EMBED 1'-7 1/2" SOUTH OF 41y.
EMBED IS INSTALLED 2'-3" SOUTH OF 41y AS SHOWN ON EMB'D PL DWG 86-163501
Also improper weld symbol from 2 to 1.

Resolved per site req. 051

000443

PROBLEM REPORTED BY: Gary Pollard

DATE 8-25-81

To: E. E. Willett
CC: C. C. White
Tom Taylor
(Ebasco)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1644
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-3-236-1-PD-H-1298 1/B
BUILDING: REACTOR AUXILIARY BUILDING
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: MISSING EMBED

- THE EMBED SHOWN ON THE HANGER SKETCH AT 8'-4" NORTH OF 36 DOES NOT EXIST. DRAWING # 2168G-155-S02 SHOWS NO EMBED AT THIS LOCATION EITHER.
- THERE IS AN EMBED LOCATED 7'-4" NORTH OF 36 WHICH THE HANGER MAY BE ATTACHED TO. IF THE HANGER ATTACHES TO THE EMBED 7'-4" NORTH OF 36 IT WILL HAVE TO BE RELOCATED 4" WEST TO AVOID INTERFERENCE WITH PIPE HANGER A-3-236-1-CC-H-464. IT SHOULD ALSO BE NOTED THAT PIPE HANGER A-3-236-1-CC-H-368 EXTENDS 7'-2" EAST OF D.
- WELD FOR 1 TO EMBED IS CONFUSING.

RESOLVED AT SITE
EMG 3-9-82

000440

AGH

PROBLEM REPORTED BY: PAT CHRISCOE

DATE 9-24-81

REINSPECTION

No. PHP- 1004
Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

From: PETE FIALA

Hanger/Support Vendor: BERGEN-PATERSON
Hanger Drawing No. & Rev. A-2-236-1-CX-H-391 REV. 3/D
Drawing No. & Rev.
Drawing No. & Rev.
Bldg: RAB   Elevation 236

[X] Seismic
[ ] Non-Seismic

Problem Description: NO WELD SYMBOL WAS GIVEN FOR JUNCTION OF 6 to embed & 6 TO 4. ALSO, THERE IS A DIMENSIONED FLARE-BEVEL AT 3 TO EMBED AND 1 TO 2.

RESOLUTION: SEE HANGER SKETCH A-2-236-1-CX-H-391 REV. 5/E

P. Folkmann 02-25-81

000483

Problem reported by: Gary A. Pollard 1-29-81   Date 1-28-81

REINSPECTION

No. PHP- 1004
Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

ention: PETE FIALA

ger/Support Vendor BERGEN-PATERSON
ndor Drawing No. & Rev. A-2-236-1-CX-H-391 REV. 3/D
rac Drawing No. & Rev.
aste Drawing No. & Rev.
lding: RAB Elevation 236

[X] Seismic
[ ] Non-Seismic

blem Description: NO WELD SYMBOL WAS GIVEN FOR JUNCTION OF (6) to embed & (6) TO (4). ALSO, THERE IS A DIMENSIONED FLARE-BEVEL AT (3) TO EMBED AND (1) TO (2).

RESOLUTION: SEE HANGER SKETCH A-2-236-1-CX-H-391 REV. 5/E

P. Follynowin 02-25-81

000453

blem reported by: Gary A Pollard 1.29.81 Date 1-28-81

REINSPECTION

No. PHP-1055

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

...tion: PETE FIALA

...er/Support Vendor Bergen-Paterson
...er Drawing No. & Rev. T-2-240-1-SW-H-292 9/K
...an Drawing No. & Rev.
...ce Drawing No. & Rev.
...ding: TURBINE Elevation 240

[X] Seismic
[ ] Non-Seismic

...lem Description:

4 to 1 NEEDS A WELD SYMBOL

NOTE: THIS HANGER REQUIRES REWORK.
PLEASE EXPEDITE.

RESOLUTION: SEE HANGER SKETCH T-2-240-1-SW-H-292 R. 11/M

H. Folkmowin 02-25-81

000486

...lem reported by: Date ~/5/8

: E.E. Willett
CC: G.O. White
Tom Taylor
(Ebasco)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1548
PAGE 1 OF 1

ATTENTION: ~~GEORGE~~ WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-4-236-1-PD-H-1804 Rev 0/A
BUILDING: RAB
ELEVATION: 254'
EBASCO DRAWING NO. & REV. ______

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: MISSING WELD SYMBOLS

WELD SYMBOLS NEED TO BE PROVIDED
1 AND 2 TO 6

Resolved per site Rev. 051

Reviewed 11-10-81 PWH

000442

PROBLEM REPORTED BY: PW Howard AG7

DATE 8-31-81

E. Willett
G. O. White
Tom Taylor
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1515
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-6-236-1-CS-H-264 R0/A
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: NO EMBED AT LOCATION SHOWN ON HANGER SKETCH.

HANGER SKETCH LOCATES EMBED 1'-7 1/2" SOUTH OF 41y. EMBED IS INSTALLED 2'-3" SOUTH OF 41y AS SHOWN ON EMB'D PL DWG 86-163501
Also improper weld symbol from 2 to 1.

Resolved per site rev. 051

000448

PROBLEM REPORTED BY: Gary Pollard AG7

DATE 8-25-81

TO: E. [illegible]
cc: G D White
Tom Tayler
(Ebasco)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1484
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-216-1-PD-H-605 1/B
BUILDING: RAB
ELEVATION: 216
EBASCO DRAWING NO. & REV. ______

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: WELD SYMBOL

THE WELD BETWEEN MEMBER 1 AND THE EMBED IS ONLY ON ONE SIDE.

RESOLVED-
SKETCH REV 1S1

000444

PROBLEM REPORTED BY: William Hartley AE7

DATE 8-24-81

.., E. E. W[illegible]
CC: G.O. White
Tom Taylor
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

PHP #: 1461
Page 1 of 1

[Att]ention: ~~GEORGE~~ WHITE

[Han]ger/Support Vendor: Bechtel-Peterson
[Ven]dor Drawing No. & Rev. A-1-216-1-PD-H-913 REV 1/B
[Eba]sco Drawing No. & Rev. ______
[Eba]sco Drawing No. & Rev. ______
[Bui]lding: RAB Elevation 216

☒ Seismic
☐ Non-Seismic

WELD SYMBOL, DIMENSIONS

[Pro]blem Description: THE WELD SYMBOL BETWEEN MEMBER (1) AND THE EMBED SHOULD BE A FLARE BEVEL SO THE WELDS CANNOT BE MADE INSIDE THE BOX FRAME AND THE DIMENSIONS BETWEEN THE TWO MEMBER (2)s AND TWO MEMBER (3)s ARE NEEDED.

RESOLVED
SKETCH REV 1S1

OK 7 OCT '81
MS

AG7

000440

[Pro]blem reported by: William Hartly Date 8-19-81

CC: C. D. [illegible]
CC: G. O. WHITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

PHP # 1401
Page 1 of 1

[Atte]ntion: ~~GEORGE WHITE~~

[Han]ger/Support Vendor Bergen-Paterson
[Ven]dor Drawing No. & Rev. A-3-236-1-CS-H-30 2/C
[Eb]rac Drawing No. & Rev.
[Eba]sco Drawing No. & Rev.
[Bu]ilding: RAB Elevation 236

☒ Seismic
☐ Non-Seismic

MISLOCATED EMBEDS

[Pro]blem Description: - THE HANGER SKETCH SHOWS EMBEDS LOCATED AT 5'-0" WEST OF D [A]ND 6'-6" WEST OF D AT AN ELEVATION OF 248'-3". [T]HERE IS AN EMBED 5'-0" WEST OF D BUT ITS [B]OTTOM ELEVATION IS 248'-8". IT IS AN 8" EMBED [?]-0" LONG. THERE IS AN EMBED 6'-6" WEST OF D [BU]T ITS TOP ELEVATION IS 244'-9". THERE IS ALSO [A]N EMBED LOCATED 2'-4" WEST OF D WITH A TOP [EL]EVATION OF 249'-7". IT IS 3'-0" LONG AND 8" WIDE.

[W]ELD SYMBOL FOR 2 TO 6 IS NOT CLEAR IN [I]TS MEANING.

RESOLVED PER SITE REV. 251.
W. C. Lewis 3/5/82

000147

AG7

[Pro]blem reported by: PAT CHRISCOE Date 8-7-81

(1)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2050
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. SF-H-659 2/C (F-2-236-1-4)
BUILDING:
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROPLEM DESCRIPTION: WELD SYMBOL

(1.) ~~7 TO EMBED SHOULD HAVE SHE ARROW ON THE SYMBOL ONLY. ALSO, MAKE "6 SIDES TYP" MORE LEGIBLE.~~

(2.) INDICATE THE OVERLAP BTWN 7 AND 11.

(3.) CLARIFY WELD SYMBOL FOR 7 TO EMBED. (WHICH 6 SIDES ARE TYPICAL)

(4.) INDICATE ORIENTATION OF 7.

RESOLVED BY FIELD DRAWING REV. 2S1.
JW Starling
12/9/81

030443

AG-7

PROBLEM REPORTED BY: [signature]

DATE 11-17-81

E. Willet
G.U. White
Tom Taylor (EBASCO)

SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2005
PAGE ___ OF ___

~~ATTENTION: GEORGE WHITE~~

NGER VENDER: BERGEN-PATERSON
NGER DRAWING NO. & REV. A-1-216-1-SW-H-1716 (FCR-666)
ILDING:
EVATION:
ASCO DRAWING NO. & REV.

SEISMIC ☑
NON-SEISMIC ☐

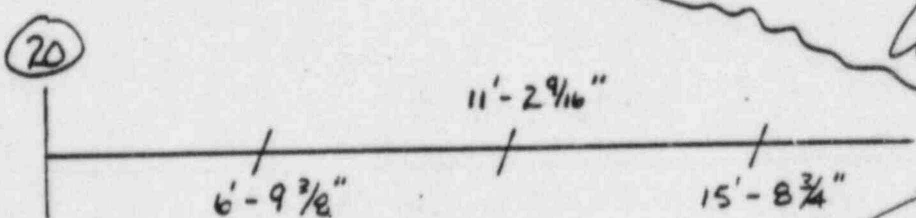
OBLEM DESCRIPTION:

SEE ℄ DIMENSIONS OF EXISTING EMBEDS FROM COLUMN 20 BELOW — CHANGE DIMENSIONS AS REQUIRED —
NEED DETAIL INDICATING WHERE 5 ATTACHES TO 1, AND TO WHICH 1 —
NEED TO TRIM 1" OFF NORTH SIDE OF NORTHERN MOST 8 TO ALLOW BETTER ACCESS FOR WELDING —
NEED MINIMUM WELD LENGTH FOR 8 TO EMBED —

OVERALL CLARITY OF DRWG IS POOR — HOW ABOUT A NEW DRWG —

RESOLVED PER SITE REV 251.
W. [signature]
11-23-81

16 DEC '81
[initials]



PLAN N →

also involved SW-H-1718 AS1

Contains 2 parts

000440

AG7

PROBLEM REPORTED BY: Larry Coble

DATE 12 NOV '81

REV. 2 7/82 E. E. WILLETT G. O. WHITE TOM TAYLOR

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

IIa RFT. #

PRIORITY 1

ATTENTION: GEORGE WHITE

PHP NO. 5453

HANGER NO. A - 5 - 236 - 2 - SW - H - 1756

☒ SEISMIC ☐ NON-SEISMIC

REV. 0/4

PROBLEM TYPE WELD SYMBOL

PROBLEM DESCRIPTION PLEASE CLARIFY THE WELDS SYMBOLS PIECE ④ TO THE EMBED AND FOR THE CLIP TO PIECE ③. Also change the weld symbol for piece ③ to piece ④ to a flare bevel and make it typ.

PHP RESOLVED BY MF 4/14/83 (051)

000451

RW 7/21/83

PROBLEM REPORTED BY: RODNEY TURNER DATE 3/25/83

RFT # 1-3020.002

To: E. E. WILLETT
REV. 2 G. O. WHITE
7/82 TOM TAYLOR
E. E. GOOD

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY
PHP TRANSMITAL SHEET

PRIORITY 1

ATTENTION: GEORGE WHITE

PHP NO. 5562

HANGER NO. C - 1 - 286 - 1 - MS - H - 16

☒ SEISMIC ☐ NON-SEISMIC

REV. 853

PROBLEM TYPE WELD SYMBOLS

PROBLEM DESCRIPTION ON SHEET 7 OF 14, ITEM 32 REQUIRES A 5/8" FILLET ALLAROUND WELD WHICH CANNOT BE MADE BUT ON THREE SIDES DUE TO ITEM 10 ONLY HAVING A 1/2" GAP TO THE STRUCTURAL MEMBER. CHANGE TO A THREESIDED WELD. ALSO ON SHEET 7 OF 14, SECTION C-C, GIVE THE TORQUE REQUIREMENTS FOR THE BOLTS SHOWN ITEM 32.

Resolved at Site
RRJ 5-3-83

000456

PROBLEM REPORTED BY: [signature] AGT 4/18 DATE 4/18/83

To: E. E. WILLET
CC: G. O. WHITE
NO. 80121
/83 TOM TAYLOR
EBASCO

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY

IIa PHP TRANSMITAL SHEET

RFT. # 1-4080.001 PRIORITY 1

ATTENTION: GEORGE WHITE

PHP NO. 5677

HANGER NO. A - 3 - 236 - 1 - CC - H - 579

☒ SEISMIC ☐ NON-SEISMIC

REV. 152

PROBLEM TYPE Missing Weld Symbol

PROBLEM DESCRIPTION The weld symbol for piece 3 to piece 4 is missing. On rev 151 it was a 3/16 fillet on two sides.

- Also clarify legibility on sketch of dimensions and BOM

THIS PHP HAS BEEN RESOLVED FOR 153 BY D.T. CHEN

000457

PROBLEM REPORTED BY: Rodney Turner GG7 5/2 DATE 5/2/83

RFT=1-4085-003

REV. 2
7/82

To: E. E. WILLETT
CC: G. C. WHITE
TOM ...
(EBASCO)

IIa

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

PRIORITY 1

ATTENTION: GEORGE WHITE

PHP NO. 5196

HANGER NO. A - 02 - 261 - 1 - CK - H - 1599

☑ SEISMIC ☐ NON-SEISMIC

REV. 04

PROBLEM TYPE Missing weld symbol

PROBLEM DESCRIPTION

The weld symbol between item # 4 and 3 is not given as shown on sheet 2 of 3 of this hanger

Please correct and revise

PHP RESOLVED BY M. F 3/10/83

000400

PROBLEM REPORTED BY: [signature] 3/4

DATE 3/4/83

RFT = N/A

REV. 2
7/82

TOM TAYLOR
(EBASCO)

IIa

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY
PHP TRANSMITAL SHEET

PRIORITY 1

ATTENTION: ~~GEORGE~~ WHITE

PHP NO. 5279

HANGER NO. A - 2 - 261 - 1 - PD - H - 4252

☑ SEISMIC ☐ NON-SEISMIC

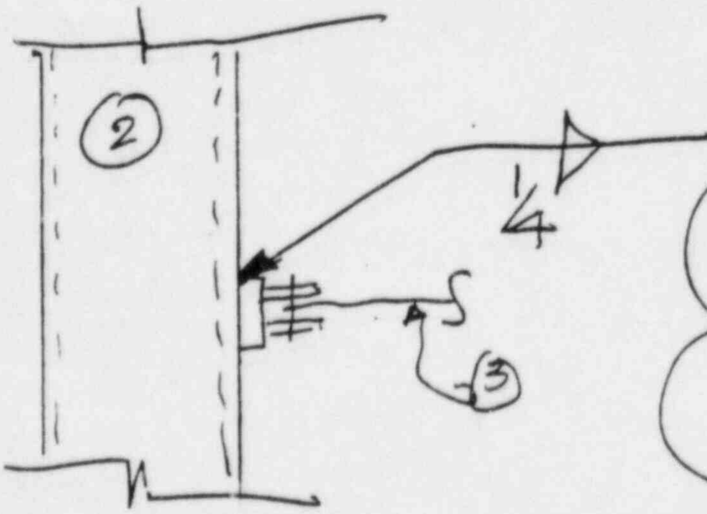
REV. 0A

PROBLEM TYPE Weld symbol

PROBLEM DESCRIPTION

The weld symbol between welded attachment of item #3 and #2 cannot welded all around as designed, because item #2 is 6x6x.5, and welded attach of item #3 is $5\frac{5}{8}$".

Please correct and revise as shown below to agree with as built condition.



PHP RESOLVED BY FIELD REVISION OS1
JM 3.18.83

000401

PROBLEM REPORTED BY: [signature] DATE 3/11/83

To: E. E. WILLETT
CC: G. O. WHITE
NO. 83121
3/83 TOM TAYLOR
(EBASCO)

RFT 1.4085.002

9/2 12:30

WP-110
EXHIBIT-I

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

PRIORITY 1

ATTENTION: GEORGE WHITE

PHP NO. 6958

HANGER NO. A - 2 - 261 - 1 - CH - H - 1771

☒ SEISMIC ☐ NON-SEISMIC

REV. 154

PROBLEM TYPE WELD SYMBOLS DDR #994

PROBLEM DESCRIPTION CORRECT THE FOLLOWING WELD SYMBOLS:

PC#1 TO EMBED SHOULD BE TYPICAL

PC#5 TO PC#2 SHOULD BE TYPICAL

PC#3 TO PC#6 SHOULD BE FILLET 2SIDES

FLARE BEVEL 2SIDES

CLEAN UP SOME OF THE REVISION CLOUDS SO THE PRINT IS ~~[illegible]~~ LEGIBLE.

RESOLVE AT SITE PER FIELD REV. 155.

8/24/83

PCWR 8/12/83

000402

PROBLEM REPORTED BY: DATE 8/16/83

REINSPECTION

No. PHP- 977

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

ention: PETE FIALA.

ger/Support Vendor BERGEN-PATERSON
dor Drawing No. & Rev. A-3-236-1-CX-H-378 R 4/E
rac Drawing No. & Rev.
ste Drawing No. & Rev.
lding: RAB Elevation 236

☒ Seismic
☐ Non-Seismic

blem Description: NO WELD SYMBOL WAS GIVEN FOR JOINTS ① TO EMBED OR ①. TO ⑥ — NOTE: MEMBER ① WAS WELDED TO THE EMBED USING A 5/16" FILLET AND MEMBER ⑥ WAS ATTACHED TO ① USING A 3/16" FILLET. ALSO THERE IS NO SYMBOL FOR THE ATTACHMENT OF ⑦ TO ①. — NOTE: A FLARE-BEVEL WAS INSTALLED ON BOTH SIDES AND A 3/16" FILLET ON TOP AND BOTTOM. PLEASE RESOLVE.

RESOLUTION: SEE HANGER SKETCH A-3-236-1-CX-H-378 R. 6/F

A. Folkrowin 02-12-81

000463

blem reported by: Gary A Pollard HMA 1-19-81 Date 1-16-81

REINSPECTION

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

No. PHP-1104
Page 1 of ______

ention: PETE FIALA

nger/Support Vendor Bergen-Paterson
ndor Drawing No. & Rev. A-2-236-1-SW-H-347 1/3
trac Drawing No. & Rev. ______
aste Drawing No. & Rev. ______
ilding: ______ Elevation ______

[X] Seismic
[ ] Non-Seismic

oblem Description:

WELD SYMBOLS JOINING 3 TO 4 AND 4 TO 1 IS NOT SHOWN. PLEASE REVISE THIS DRAWING.

RESOLUTION: SEE HANGER SKETCH A-2-236-1-SW-H-347 R. 2/C

A. Folkmann 03-27-91

000467

oblem reported by: Chas Thomas 2/10/91 Date 2-16-91

ECOPY
EO
ERET

REINSPECTION

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

No. PHP- 1246
Page 1 of 1

EB-B- 3747
TO. NJ NICOLICH
B-P

...tion: PETE FIALA.

FRM. J LAFFERTY

...er/Support Vendor BERGEN-PATERSON
...er Drawing No. & Rev. TK-1-236-1-PM-H-300 4/E
...ac Drawing No. & Rev.
...ce Drawing No. & Rev.
...ding: TANK Elevation ±36

☒ Seismic
☐ Non-Seismic

...lem Description:

IN REFERENCE TO PHP-895 AND PHP-1146, PUT THE FLARE BEVEL ON THE EAST & WEST SIDES OF (3) to (4)

PUT THE FILLETS ON THE TOP AND BOTTOM OF (3) TO (4)

A 5/16" FILLET WELD HAS BEEN APPLIED ALL AROUND AT (4) TO EMBED.

NOTE: HANGER IS BUILT.

RESOLUTION: SEE HANGER SKETCH TK-1-236-1-PM-H-300 R. 5/F

A. Folkynowin 04-08-81

000409

...lem reported by: PW Howard AG7 Date 4-3-81

E.E. LOM
FD
GERET

REINSPECTION

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

No. PHP-1306
Page 1 of 1

EB-B-3794
TO N.J. NICOLICH
B&R

...ment: PETE FIALA

FROM: JOE CAFFERTY

...er/Support Vendor: Bergen-Paterson	[X] Seismic
...er Drawing No. & Rev.: A-2-236-1-FP-H-888 2/C	[ ] Non-Seismic
...n Drawing No. & Rev.:	
...o Drawing No. & Rev.:	
...ding: RAB Elevation 236	

...lem Description:

A 3/16" SHOP WELD (FILLAT) HAS BEEN APPLIED AT (3) to (2). PLEASE INVESTIGATE AND RESOLVE

RESOLUTION: SEE HANGER SKETCH A-2-236-1-FP-H-888 R. 3/D

A. Foltynowicz 04-21-81

000471

...lem reported by: PW Howard Date 4/17/81

REINSPECTION

No. PHP- 636

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

ttention: PETE FIALA

anger/Support Vendor BERGEN-PATERSON
endor Drawing No. & Rev. A-2-236-1-CC-H-102 R 5/E
ndrac Drawing No. & Rev.
basco Drawing No. & Rev.
uilding: RAB Elevation 236

☒ Seismic
☐ Non-Seismic

Problem Description: WELD SYMBOLS ARE NEEDED FOR THE JOINTS PARTS ② & ④ AND ④ & EMBED. PLEASE INVESTIGATE AND RESOLVE. THE FIELD INSTALLED USING 1/4" FILLETTS TOP & BOTTOM FOR THE ABOVE DESCRIBED JOINTS

RESOLUTION: SEE HANGER SKETCH A-2-236-1-CC-H-102 R. 6/G

A. Folkgrowitz 12-24-80

000473

Problem reported by: Christopher A. Dell 12-4-80 Date 12-4-80

2

SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2576
PAGE 1 OF 1

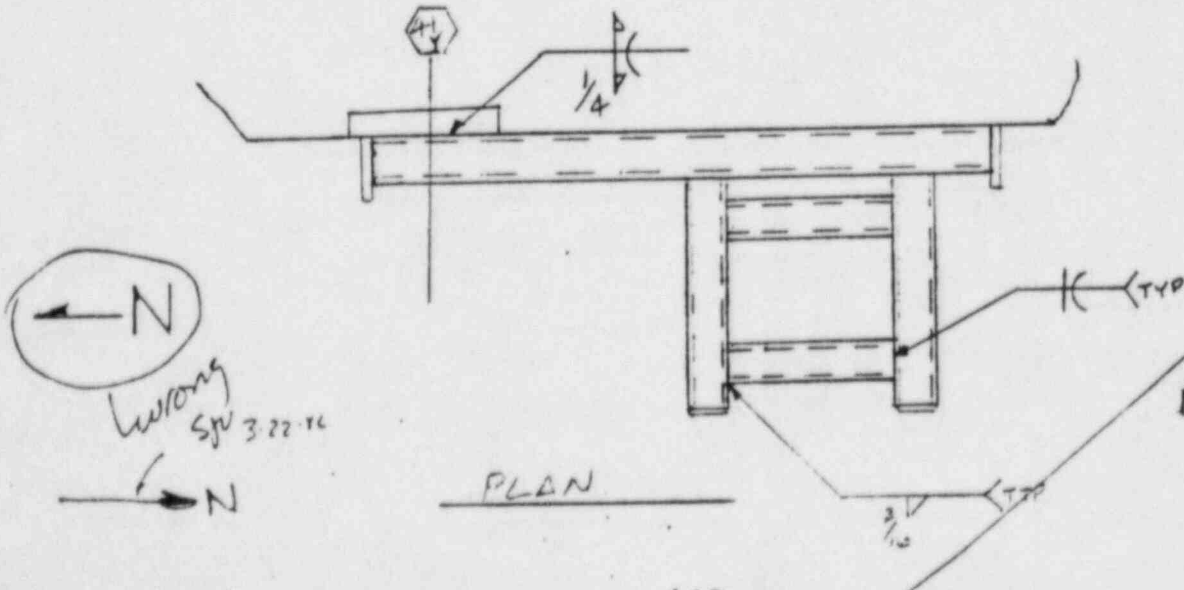
ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-6-236-1-BR-4-1506 0/A
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: ORIENTATION IS INCORRECT, INCORRECT WELD SYMBOL AND CANNOT MAKE WELDS INSIDE OF WINDOW

HANGER WILL WORK IF DRAWN AS SHOWN BELOW, THE WELD SYMBOL BETWEEN ① AND EMBED IS INCORRECT, WELDS CANNOT BE MADE INSIDE WINDOW.



Resolved per SiteRev 051 S.Vias 3.22.82.

000358

PROBLEM REPORTED BY: William C. Giarratte (?)

DATE 3-11-82

SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2510
PAGE 1 OF 1

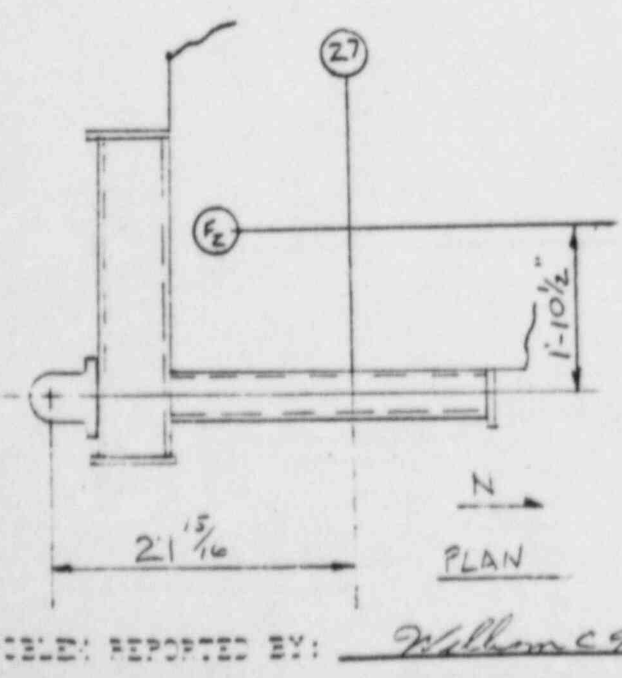
ATTENTION: ~~GEORGE WHITE~~

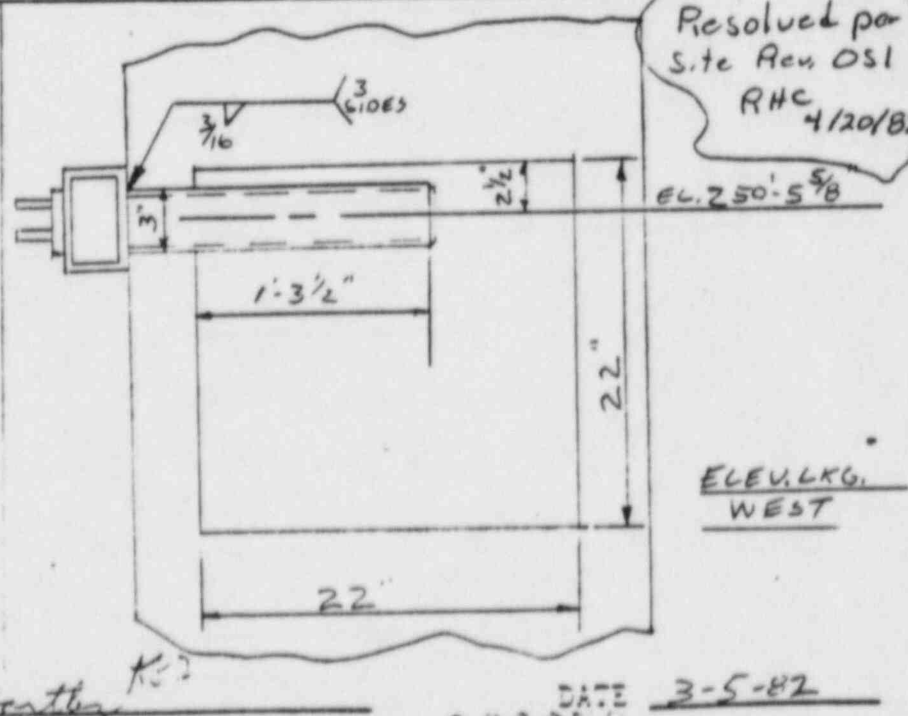
HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-236-1-WL-H-4451 0/2
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: NO STRIP PLATE, WELD SYMBOL AND LOCATION CONFLICT.

THERE IS NO 8" STRIP PLATE FOR ITEM 2 AT ELEV. 251'-0." THERE IS A EMB PLATE BELOW THIS LOCATION AND STEEL IS TACKED TO IT AS SHOWN BELOW. CHANGE WELD SYMBOL BETWEEN 1 AND 2 TO 3 SIDES BECAUSE OF INTERFERENCE WITH WALL. LOCATION PLAN SHOWS HANGER AT 2'-0" EAST OF F_2, DRAWING SHOWS IT 1'-9" EAST OF F_2. CHANGE STEEL ATTACHMENT LOCATION AND PIN TO PIN DIMENSION TO MATCH DIMENSIONS SHOWN BELOW.





Resolved per Site Rev. 0S1 RHC 4/20/82

ELEV. LKG. WEST

PROBLEM REPORTED BY: William C Hartley KCJ

DATE 3-5-82

000359

Rev. 1
10/81

Exhibit 1
WP-110

(3)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 3025
PAGE 1 OF 1

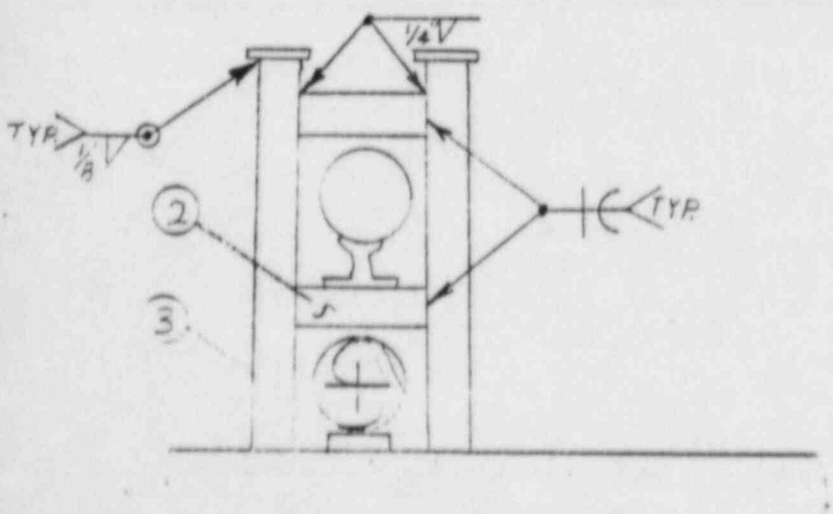
ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-5-236-1-IA-H-203 351
BUILDING: RAB
ELEVATION: 236'-0"
EBASCO DRAWING NO. & REV. ____

SEISMIC [X]
NON-SEISMIC [ ]

PROBLEM DESCRIPTION: Weld symbols.

Welds can not be made inside window. No weld symbol given for end caps to #3. Change weld symbols as shown in sketch below. Add symbol for end caps.



RESOLVED PER SITE REV 352
PLB 6/1/82

000303

PROBLEM REPORTED BY: Johnny Jackson HG

DATE 5-11-82

①

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2989
PAGE 1 OF 1

ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-216-1-SI-H-403-4/E
BUILDING: ______
ELEVATION: ______
EBASCO DRAWING NO. & REV. ______

SEISMIC ☑
NON-SEISMIC ☐

PROPLEM DESCRIPTION: WELD SYMBOLS

① END ATTACHMENT MEMBER #3 TO MEMBER #4 SHOULD BE A FILLET WELD ALL AROUND (REASON NEW REVISION OF END ATTACHMENT)
② MEMBER #5 TO EMBED INCORRECT
③ MEMBER #5 TO #4 NO SYMBOL

O.K.
MJT 5-21-82

RESOLVED BY FIELD DRAWING REV. 4S1.
JW Starling
5/11/82

000364

REPORTED BY: [signature] AC-7

DATE 5-6-82

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

(1)

PHP # 3953
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-216-1-CH-H-633-051
BUILDING: ______
ELEVATION: ______
EBASCO DRAWING NO. & REV. ______

SEISMIC ☑
NON-SEISMIC ☐

PROPLEM DESCRIPTION: WELD SYMBOL

NEED FLARE BEVEL WELD SYMBOL FOR #2 TO #1
3" T.S TO 3" T.S.

RESOLVED PER FLD REV 052
JCD 5-7-82

O.K.
[illegible] 5-14-82

000365

[illegible signature] #G?

DATE 4.30.82

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2272
PAGE 1 OF 1

ATTENTION: ~~GEORGE WHITE~~

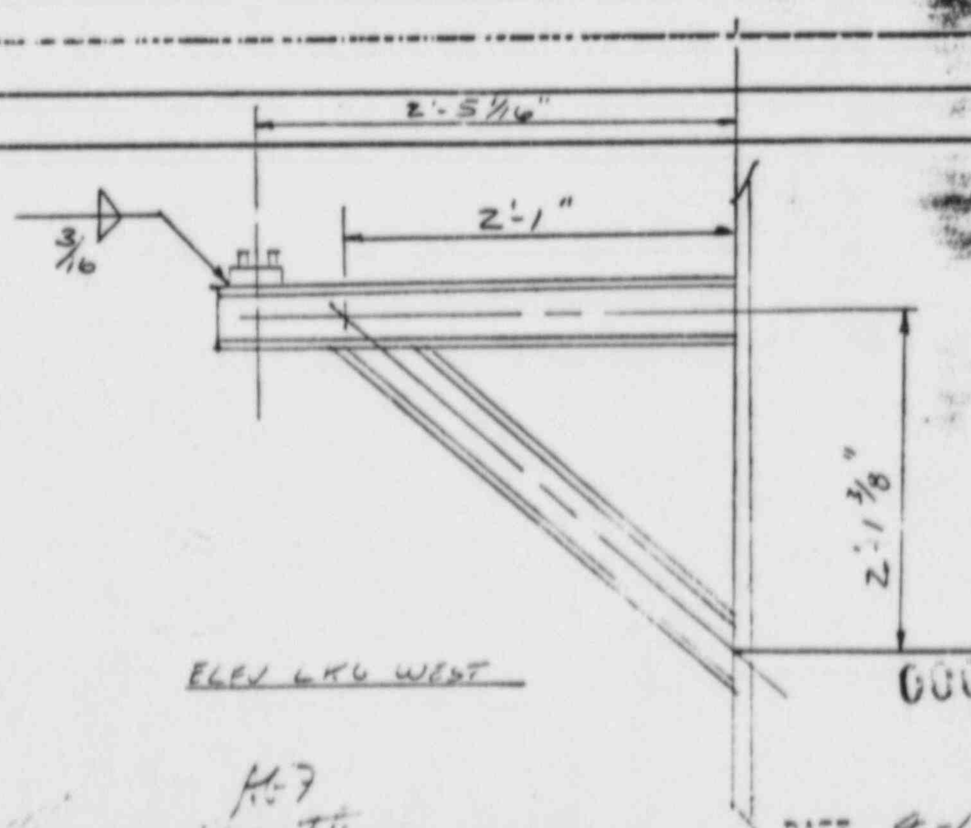
HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-4-236-1-BD-H-190 0/4
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: MISSING DIMENSIONS AND WELD SYMBOL

THIS HANGER IS TACKED UP AS SHOWN BELOW. ADD DIMENSIONS AND CHANGE WELD SYMBOL AT 3 TO 1.

PHBC-40



Resolved per site Rev 051
S. Vias
5.10.82

000369

PROBLEM REPORTED BY: H-7 ... [illegible]

DATE 4-13-82

To: E. E. WILLETT
CC: G. C. WHITE
TOM TAYLOR
(EBASCO)

(2)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1932
PAGE 1 OF 1

ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-6-236-1-CS-H-2452 0/A
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☑
NON-SEISMIC ☐

PROBLEM DESCRIPTION: WELD SYMBOL.

INCORRECT WELD SYMBOL AT 2 TO 3. SHOULD BE A FLARE-BEVEL. PIPE OR HANGER NOT INSTALLED. ALSO, PLEASE CLARIFY DIMENSION LINES LOCATING 3.

Resolved per site Rev 0S1
S. Jias
12-4-81

000370

AS7 KMB

PROBLEM REPORTED BY: Gary Pollard

DATE 2 NOV '81

(2)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1871
PAGE ___ OF ___

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-216-1-PD-H-995 3/D
BUILDING: ______
ELEVATION: ______
EBASCO DRAWING NO. & REV. ______

SEISMIC ☑
NON-SEISMIC ☐

PROBLEM DESCRIPTION: WELD SYMBOL

ADD WELD SYMBOL AT JOINTS OF MEMBERS 2 & 3 —
DELETE 5 —

NOTE: FLOOR PENETRATION LOCATED 1'-8" N of 22
AND 1'-10" E of Fx —

TO DATE, PIPE STILL NOT INSTALLED.
PER CONVERSATION WITH EUGENE MONROE
OF CONSTRUCTION, PIPE WILL BE KEPT AT
PRESENT DESIGN LOCATION FOR THIS HGR
AND ANGLED OVER TO PENETRATION BELOW
ELEV. 218'-0".

RESOLVED PER SITE REV 3&1
JMM 3-26-82

OK
[illegible]
4-2-82

000872

PROBLEM REPORTED BY: Gary Coble

DATE 29 OCT '81

O.K. 2

To: E.E. Willett
cc: G.O. White
Tom Taylor (Ebasco)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1824
PAGE 1 OF 1

ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-2-236-1-SW-H-514 2/C
BUILDING: REACTOR AUXILIARY BUILDING
ELEVATION: 236
EBASCO DRAWING NO. & REV.

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: MISLOCATED EMBED

- THE EMBED TO WHICH MEMBER 7 ATTACHES IS LOCATED 4" EAST OF D IN THE FIELD. THE BERGEN-PATERSON HANGER SKETCH SHOWS THE EMBED LOCATED ON THE ℄ OF D AS DOES G DRAWING 21686-156501.
- WELD SYMBOL FOR 3 TO 6 IS CONFUSING. SOUTH 3 TO 6 HAS AN ALL AROUND FILLET SYMBOL TYPICAL AND NORTH 3 TO 6 HAS A FILLET ON TWO SIDES.
- INTERSECTING POINT OF 8 TO 6 IS UNCLEAR.
- INCORRECT WELD SYMBOL FOR 2 TO 4.
- WELD FOR 7 TO 6 IS NOT TYPICAL.

Resolved per site Rev 2S1
S. Vias
11-4-81

000373

~~AB7~~

PROBLEM REPORTED BY: PAT CHRISCOE

DATE 10-23-81

3

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2325
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-236-1-FP-H-497 1/B
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV. 2168-G-158 S01 R9

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: NO EMBED.

2168-G-158 S01 SHOWS NO EMBED AT HANGER LOCATION. NO EMBED IS INSTALLED AT HANGER LOCATION ALSO THERE ARE NO WELD SYMBOLS BETWEEN ②s AND ⑤s

HANGER VOID PER REV. 2/C
JSW 2/11/82

000377

AC

To: E. B...
CC: G. C...
TOM ...
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

① * * *
PHP # 2293
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. FW-H-61 1/A (T-1-261-1)
BUILDING:
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROBLEM DESCRIPTION: WELD SYMBOL & MATERIAL

1.) ITEM 1 WILL HAVE TO BE REPLACED ON SITE. BECAUSE WE DO NOT HAVE ANY W8x21 ON SITE PLEASE ALLOW W8x24 TO BE SUBSTITUTED.

2.) PLEASE CORRECT WELD SYMBOLS @ ~~SOUTH~~ CLIPS IN ACCORDANCE W/ FCR-H-1006

SEE FW-H-61 REV. 1S1

JSH 1/29/82

000378

PROBLEM REPORTED BY: [signature] #67

DATE 1-29-82

②

TOM E. GILLETT
GEORGE WHITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 2198
PAGE 1 OF 1

ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. FW-H-318 9/A
BUILDING: T-2-261-1
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROBLEM DESCRIPTION: WELD SYMBOL MISSING - MAT'L LIST INCORRECT.

1) WELD SYMBOL MISSING @ 7 TO 1
2) BILL OF MAT'L CALLS FOR FOUR OF ITEM 6 - 8 ARE REQUIRED.
(IF IT IS FEASIBLE TO HAVE ONE AT EACH JOINT, THEN LEAVE AS IS.)
3) SECT A-A SHOULD BE TYPICAL
4) IF TWO ITEMS 6 ARE REQUIRED @ EACH JOINT, THEN THE WELD SYMBOL FOR 6 TO EXISTING STL. SHOULD BE TYPICAL.
5) THERE SHOULD BE A WELD SYMBOL SHOWING AN END RETURN FOR 6 TO EXISTING STL.
6) ANGLE AND SLOPE OF ITEM 7 DO NOT AGREE.

Resolved per site Rev 051
S. Vias
1-20-82

000380

A67

Rev. 1
10/81

Exhibit 1
WP-110

TO: L.E. WILLETT
CC: G. WHITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

(2)

PHP # 3801
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

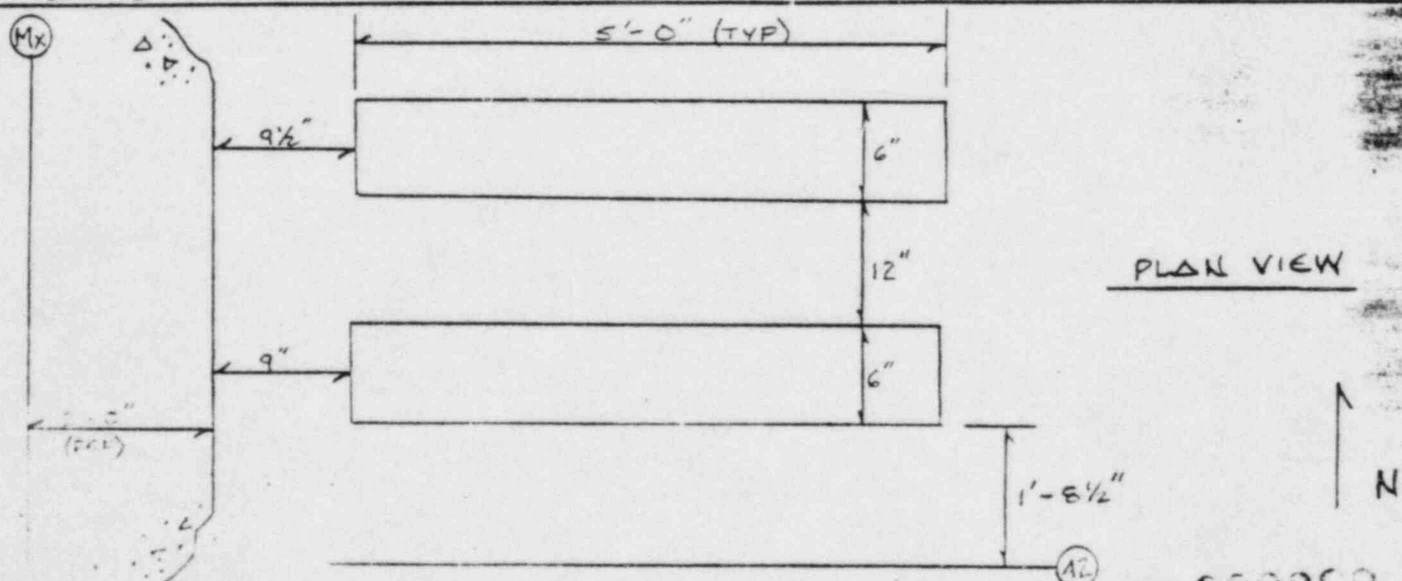
HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. F-2-261-1-4-CK-H-1167 2/C
BUILDING: FUEL HANDLING
ELEVATION: 261
EBASCO DRAWING NO. & REV.

SEISMIC [X]
NON-SEISMIC [ ]

PROPLEM DESCRIPTION: BASE PLATE DETAILS MISSING

PLEASE PROVIDE DETAILS FOR BASE PLATE, SEE SHEET 2 OF 2.
(IS IT NOT POSSIBLE TO USE EMBEDS, SHOWN BELOW?)
FOR POSSIBLE INTERFERENCES, SEE BELOW.
PLEASE DELETE "MIN" COMMENT FOR WELD @ #2 TO BASE PLATE.
PLEASE DELETE COMMENTS TO AVOID CONFUSION IN THE FIELD (NOTE 1 COMMENTS AND BASE PLATE COMMENTS)

RESOLVED PER SITE REV. 251 RDH 4-6-83



000362

AG7 8/16 PWH

PROBLEM REPORTED BY: Paul Williams

DATE 8/12/82

REINSPECTION

No. ~~PHP-605~~ 605
Page 1 of 1

CHD 11-25-80

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

Attention: PETE FIALA

Hanger/Support Vendor BERGEN-PATERSON
Vendor Drawing No. & Rev. A-3-216-1-PD-H-697 R4/E
Endrac Drawing No. & Rev.
Ebasco Drawing No. & Rev.
Building: RAB Elevation 216

☒ Seismic
☐ Non-Seismic

Problem Description: THE 3/16" FILLET WELD FOR JOINTS OF PARTS ① AND TOP PART ② IS UNCLEAR. DOES THE TYPICAL DETAIL MEAN WELD THE TOP JOINTS OF PARTS TOP ② & ① OR WELD THE BOTTOM JOINTS OF PARTS TOP ② & ①. PLEASE CLARIFY W/ ADDITION WELD SYMBOLS.

RESOLUTION: SEE HANGER SKETCH A-3-216-1-PD-H-697 REV. 5/F

A. Fellingmouton 12-17-80

000001

Problem reported by: Christopher H. Dell 11-25-80 Date 11-25-80

REINSPECTION

No. PHP-582

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

Attention: PETE FIALA

REINSPECTION

Hanger/Support Vendor: BERGEN-PATERSON
Vendor Drawing No. & Rev.: A-1-190-1-RH-H-64 REV 7/D
Endrac Drawing No. & Rev.:
Ebasco Drawing No. & Rev.:
Building: RAB Elevation: 190

☒ Seismic
☐ Non-Seismic

Problem Description: THERE IS NO WELD SYMBOL BETWEEN MEMBER 3 AND MEMBER 4. IT HAS BEEN WELDED ALL THE WAY AROUND WITH A 1/4" FILLET. THERE IS ALSO NO WELD SYMBOL BETWEEN MEMBER 6 AND MEMBER 4. PLEASE ADD CORRECT WELD SYMBOLS. IT HAS BEEN WELDED ALL THE WAY AROUND WITH A 1/4" FILLET. ALSO MEMBER 6 HAS BEEN INSTALLED ACCORDING TO SECTION AA SO ITS POSITION IN THE ELEV. LKG WEST NEEDS TO BE CORRECTED

RESOLUTION: SEE HANGER SKETCH A-1-190-1RH-H-64 R. 8/F

A. Filtzgerald 12-24-80

000385

Problem reported by: William Hartley [initials] 12-3-80 Date 11-21-80

REINSPECTION

No. PHP- 562

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

Attention: PETE FIALA

Hanger/Support Vendor BERGEN-PATERSON
Vendor Drawing No. & Rev. A-1-190-1-PD-4-64 R 2/c
Emtrac Drawing No. & Rev.
Ebasco Drawing No. & Rev.
Building: RAB Elevation 190

[X] Seismic
[ ] Non-Seismic

Problem Description: NEED WELD SYMBOL FOR JOINT OF MEMBERS 8 & 7. PLEASE REVISE.

RESOLUTION: SEE HANGER SKETCH A-1-190-1-PD-H-69 R. 3/D

A. Felkyoscwitz 12-08-80

000366

Problem reported by: [signatures] 11-19-80 Date 11-19-80

REINSPECTION

No. PHP-540

Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

Attention: TED FEIGENBAUM

Hanger/Support Vendor BERGEN-PATERSON
Vendor Drawing No. & Rev. A-1-190-1-CT-H-797 REV 9A
Emdrac Drawing No. & Rev.
Ebasco Drawing No. & Rev.
Building: RAB Elevation 190

☒ Seismic
☐ Non-Seismic

Problem Description: MEMBER 3 IS A 2000-1.5 RIGID STRUT ASSLY. THE PART THAT ATTACHES TO THE 4" SIDE OF THE TUBE STEEL IS 3 3/4" WIDE SO WHERE MEMBER 3 WELDS TO MEMBER 2 ON THE NORTH AND SOUTH SIDE IT NEEDS A FILLET WELD AND ON THE EAST AND WEST SIDE IT NEEDS A FLARE BEVEL. THE FIELD HAS WELDED MEMBER 3 WITH A 1/4" FILLET ON THE NORTH AND SOUTH SIDE AND A FLARE BEVEL ON THE EAST AND WEST SIDE. IF ACCEPTABLE PLEASE CHANGE THE DRAWING

RESOLUTION: SEE HANGER SKETCH A-1-190-1-CT-H-797 R. 1/B

A. Follymonte 12-08-80

000367

Problem reported by: William Hartley Date 11-18-80

FFT 0000.000

ORM NO. 80121
REV. 3/83

WP-110
EXHIBIT-I

OI6

CAROLINA POWER & LIGHT COMPANY

PHP TRANSMITAL SHEET

PRIORITY 2

ATTENTION: GEORGE WHITE

PHP NO. ~~4398~~ 7398

HANGER NO. A - 5 - 236 - 1 - PD - H - 1338

☑ SEISMIC ☐ NON-SEISMIC

REV. 052

PROBLEM TYPE WELDING

PROBLEM DESCRIPTION REQUIRED WELD SIZE CANNOT BE MADE AT (2) TO (1) ON THE NORTH SIDE AT THE EAST END OF THE HANGER WELD IS NOW UNDERSIZE AND CANNOT BE INCREASED DUE TO MATERIAL SIZE PLEASE DECREASE WELD SIZE OR ENLARGE PLATE MEMBER (1) @ THIS END

000394

PROBLEM REPORTED BY: [signature] DATE [illegible]

Rev. 1
10/81

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

(3)

Exhibit 1
WP-110

PHP # 3449
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-3-236-1-MS-H-761 1/B
BUILDING: REACTOR AUXILIARY BUILDING
ELEVATION: 236
EBASCO DRAWING NO. & REV. ______

SEISMIC ☒
NON-SEISMIC ☐

PROPLEM DESCRIPTION: WELD SYMBOL

- WELD LAP IS NOT DIMENSIONED FOR (3) TO EMBED AND (6) TO EMBED. LAP ON NORTH EMBED FOR (3) IS 2 7/8". LAP ON SOUTH EMBED FOR (6) IS 4".

ESOLVED BY
ITE REV 1&1
DWW 07/28/82
P.CHRISCOE 8-5-82

000396

PROBLEM REPORTED BY: PAT CHRISCOE KG7 6/28

DATE 6-25-82

REINSPECTION

No. PHP-903
Page 1 of 1

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

ttention: PETE FIALA

anger/Support Vendor BERGEN-PATERSON
endor Drawing No. & Rev. A-3-236-1-DW-H-84 0/A
drac Drawing No. & Rev.
asco Drawing No. & Rev.
uilding: RAB Elevation 236

☒ Seismic
☐ Non-Seismic

roblem Description:

Please provide a weld symbol for 3 to 7 + 7 to 4. Member 7 was installed with a 1/4" fillet "all around" at both joints.

Please clarify "TYP" at 4 to 3

RESOLUTION; SEE HANGER SKETCH A-3-236-1-DW-H-84 R. 1B

A. Folkgnowin 02-05-81

000101

Problem reported by: PW Howard 1-15-81 Date 1-15-81

Rev. 10/81

To: E. [illegible]LIETT
CC: G. [illegible]HITE
TOM TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

Exhibit 1 (2)
WP-110

PHP # 3179
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-7-236-1-BR-H-1645 1/8
BUILDING: RAB
ELEVATION: 236'
EBASCO DRAWING NO. & REV. ______

SEISMIC [X]
NON-SEISMIC [ ]

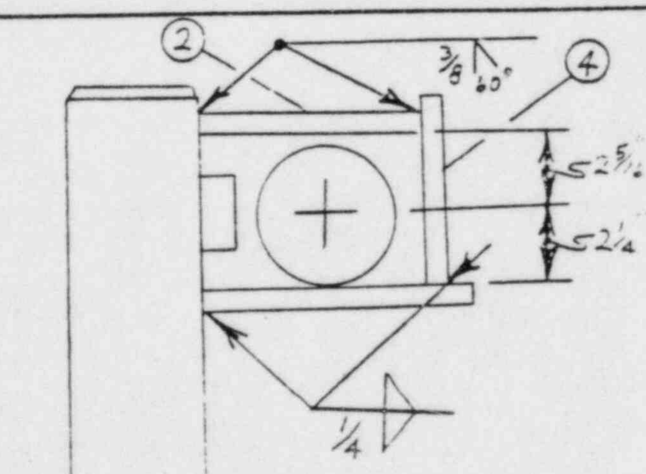
PROBLEM DESCRIPTION: Can not weld item 2

Hanger is designed to install in trench and can not be welded as designed. Hanger can be welded as shown below by cutting 2 & making 4 longer as shown below. Weld 2 after pipe is installed.

Ref. PHBC# 123

ENG TIME: 2HRS. JCD

RESOLVED PER FLD REV 1&1
JCD 6-8-82



E-E LOOKING SOUTH

000465

PROBLEM REPORTED BY: Johnny Jackson

DATE 5-27-82

Rev. 1
10/81

Exhibit 1 ③
WP-110

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 3134
PAGE 1 OF 1

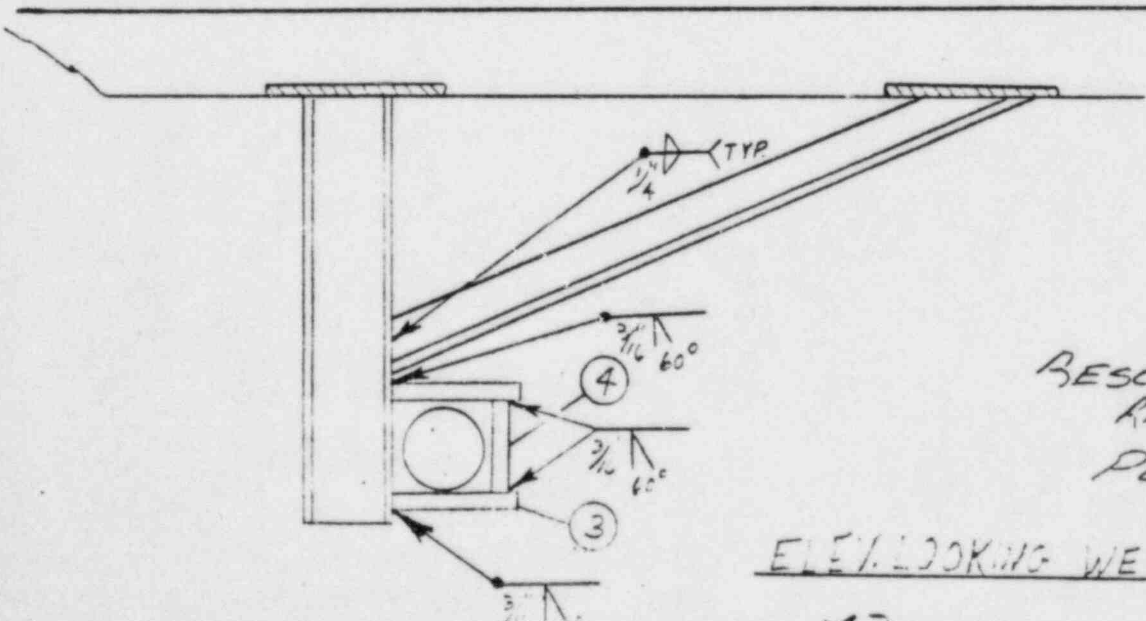
ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-4-236-1-FP-H-981 OS2
BUILDING: RAB
ELEVATION: 236'-0"
EBASCO DRAWING NO. & REV. ______

SEISMIC [X]
NON-SEISMIC [ ]

PROPLEM DESCRIPTION: Weld change.

Item ④ is shop welded to ③. Pipe is installed. Fillet weld can not be made inside window. Change weld symbols as shown in sketch below.



RESOLVED PER SITE
REV OS3
PLB 6/3/82

ELEV. LOOKING WEST

000403

KG7

PROBLEM REPORTED BY: Johnny Jackson

DATE 5-24-82

Rev. 1
10/81

Exhibit 1
WP-110

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

(1)

PHP # 3593
PAGE 1 OF 1

ATTENTION: ~~GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-216-1-CX-H-729-151
BUILDING:
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC ☑
NON-SEISMIC ☐

PROPLEM DESCRIPTION: WELD SYMBOL

CHANGE WELD SYMBOL FOR #1 TO EMBED TO 1/4 FILLET
2SIDE AS SHOWN BELOW.

OK
MJT 7.29.82

RESOLVED PER SITE
REV 152
PLB 7/20/82

DWH
AGF

000403

PROBLEM REPORTED BY: [signature]

DATE 7-15-82

Rev. 1
10/81

TO: [illegible]
CC: G. O. [illegible]
TO: [illegible] TAYLOR
(EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

(2)

Exhibit 1
WP-110

PHP # 3946
PAGE 1 OF 1

~~ATTENTION: GEORGE WHITE~~

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-216-1-SW-H-110-7/E
BUILDING:
ELEVATION:
EBASCO DRAWING NO. & REV.

SEISMIC ☑
NON-SEISMIC ☐

PROPLEM DESCRIPTION: GEOMETRY DISCREPANCIES

1) DIMENSION FROM THE ℄ of #3 TO THE ℄ of #9 @ #6 IS 3'-7 1/4"
2) DIMENSION FROM ℄ of PIN TO THE TOE of #9 IS 6 5/8"
3) DIMENSION FROM ℄ of PIN TO THE TOE of #4 IS 7"
4) CLARIFY WELD LENGTH FOR #3 TO #6 AS PART of WELD WILL BE FLARE BEVEL.

RESOLVED AT SITE
REV 751
MB 9-9-82

OK
MJT
9-10-82

000411

PROBLEM REPORTED BY: Michael [illegible] KH 9/7

DATE 8-30-82

v. *:
/81

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

②

Exhibit 1
WP-110

PHP # 4184
PAGE 1 OF 1

ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-3-216-2-SW-H-968 151
BUILDING: RAB
ELEVATION: 216
EBASCO DRAWING NO. & REV. ______

SEISMIC [X]
NON-SEISMIC [ ]

PROBLEM DESCRIPTION: MEMBER ORIENTATION & FILLER PLATE

HANGER IS TACKED UP WITH A 9" x 7" x 1" THICK FILLER PLATE BETWEEN # 3 AND LOWER # 2. PLEASE SHOW THIS CHANGE.
SHOW ORIENTATION OF ITEM # 3

WELD SYMBOLS @ TOP OF SECTION A-A ARE NOT CLEAR. ARROWS ARE POINTING TOWARDS THE CORNER OF MEMBERS RATHER THAN A SIDE.

Engineered plates are: S 6.1 for 6 + 9 attachments
S 7.3 for west 1 attachments
S 8.5 for 7 "
S 9.5 for east 1 "

RESOLVED AT SITE
Rev 152
MB 10/25/82

000417

GWF ΔG7 10/11

PROBLEM REPORTED BY: Phil Williams

DATE 10/4/82

REINSPECTION

No. PHP- 775

Page 1 of

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

ttention: PETE FIALA.

anger/Support Vendor BERGEN-PATERSON

endor Drawing No. & Rev. A-2-236-1-CC-H-125- 1/B

drac Drawing No. & Rev.

basco Drawing No. & Rev.

uilding: Elevation

☒ Seismic

☐ Non-Seismic

roblem Description:

JOINT 2 TO EMBED SHOWS A FLARE BEVEL WELD WITH A DIMENSION. DOES THIS WELD REQUIRE A FILLET WELD FOR REINFORCEMENT? PLEASE ADVISE.

RESOLUTION: SEE HANGER SKETCH A-2-236-1-CC-H-1254 REV. 2/C

A. Folkmowic 01-24-81

000128

Problem reported by: Chase Thomas 1-2-81 Date 1/2/81

REINSPECTION

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

-tion: PETE FIALA

er/Support Vendor BERGEN-PATERSON
or Drawing No. & Rev. A-4-216-1-PD-H-301 3/D
ac Drawing No. & Rev.
te Drawing No. & Rev.
ding: Elevation

☒ Seismic
☐ Non-Seismic

lem Description:

WELD SYMBOLS THAT SHOULD JOIN ITEMS 3 TO 4; 2 TO 1; AND, 2 TO 4 ARE MISSING. PLEASE REVISE THIS DRAWING.

RESOLUTION: SEE HANGER SKETCH A-4-216-1-PD-H-301 R. 4/E

A. Folkmonte 02-05-81

000150

blem reported by: Chas Thomas [initials] 1-2-81 Date 1/2/81

REINSPECTION

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
HANGER/SUPPORT PROBLEM
TRANSMITTAL SHEET

ttention: PETE FIALA

anger/Support Vendor BERGEN-PATERSON
endor Drawing No. & Rev. A-3-236-1-DW-H-87 1/B
drac Drawing No. & Rev.
asco Drawing No. & Rev.
uilding: Elevation

[X] Seismic
[ ] Non-Seismic

roblem Description:

ITEM (5) IN SECTION A-A IS JUST AS WIDE AS THE EMBED. BECAUSE OF THIS THE WELD CAN NOT BE MADE.

RESOLUTION : SEE HANGER SKETCH A-3-236-1-DW-H-87 R. 2/C

A. Folkmonin 02-04-81

000430

Problem reported by: Chas. Thomas [signature] 1-10-81 Date 1/10/81

2

To: E. E. Willett
cc: G. O. White
Tom Taylor (EBASCO)

CAROLINA POWER & LIGHT COMPANY
SHEARON HARRIS NUCLEAR POWER PLANT
PIPE HANGER PROBLEM
TRANSMITTAL SHEET

PHP # 1778
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ATTENTION: GEORGE WHITE

HANGER VENDER: BERGEN-PATERSON
HANGER DRAWING NO. & REV. A-1-236-1-CX-H-648
BUILDING: RAB
ELEVATION: 236
EBASCO DRAWING NO. & REV. ______

SEISMIC ☒
NON-SEISMIC ☐

PROBLEM DESCRIPTION: WELD PROBLEM

MEMBER 1 CANNOT BE WELDED ON BOTH SIDES DUE TO LACK OF ROOM. CHANGE WELD TO PARTIAL PEN.

RESOLVED PER SITE REV. 051. FOR WELD CALC, SEE PHP-1727. JAM 10-21-81

000374

CS

PROBLEM REPORTED BY: William McCarthy EEW

DATE 10-20-81