4/23/84

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of TEXAS UTILITIES GENERATING COMPANY, et al. (Comanche Peak Steam Electric Station Station, Units 1 and 2)	Docket Nos. 50-445-1 and 50-446-1

CASE'S RESPONSE TO BOARD'S REQUEST
REGARDING SATISFACTORY/UNSATISFACTORY
CHECK LISTS IN CYGNA REPORT

Pursuant to the Licensing Board's verbal request to both CASE and Cygna, CASE (Citizens Association for Sound Energy) hereby files this Response to Board's Request Regarding Satisfactory/Unsatisfactory Check Lists in Cygna Reports. The information contained herein covers only those items reviewed by CASE Witness Jack Doyle; we anticipate supplementing our response regarding those items reviewed by CASE Witness Mark Walsh at a later time.

It should be noted that of the ten calculations reviewed, all ten are included here. They are all from Volume 2 of Cygna's Independent Assessment Program, Appendix H, Pipe Supports Check Lists.

PS-07

Under Item 2, Design Assumptions and Design Methods, we would have marked this as unsatisfactory and the reason is we have a 6" diameter pipe stanchion which is about 4" long. Therefore, standard flexural calculations are not applicable without a multiplier.

Under Item 10, Base Plates and Anchor Bolts, we would have again marked that as unsatisfactory because:

PS-07 (continued):

Item 10, Base Plates and Anchor Bolts (continued):

(1) The bolt holes are not standard; therefore, two bolts take the total load until deflecting 1/8". Then all the bolts share in the loading. Note: This make the 14 kip inch moment itemized under Cygna comments become more critical and may not be discounted as was done by Cygna.

(2) The bimetallic weld must include the effects of thermal constraint or at a minimum address the problem.

PS-08

Item 2, Design Assumptions and Design Methods. We would have marked this unsatisfactory because:

(1) The mass of the hardware and the box frames, U-bolts, etc., were not added to design loads.

(2) Clamping force required to develop U-bolt friction will fail clip angles.

(3) Constraint of pipe by the box frame causes stresses in the box frame which exceed yield.

(4) Approximate 20,000# reaction load effects on pipe were not considered. By a rough calculation utilizing Table 31, CASE 9B, page 496, from FORMULAS FOR STRESS AND STRAIN, Fifth Edition, by Raymond J. Roark and Warren C. Young, Published by McGraw/Hill (CASE Exhibit 983), stresses are indicated in the vicinity of ultimate capacity of the tube without considering internal design loads. Bearing surface far too short in length for load indicated.

Item 5, Restraints. We would have marked this unsatisfactory, because

PS-08 (continued):

Item 5, Restraints (continued):

the entire support is not in compliance with MSS-SP69 (CASE Exhibit 920) which indicates pipes supported from below require rigid supports.

Item 8, Design Input. We would have marked this unsatisfactory, because a 1,000# kick load is induced in the pipe, basically by frictional resistance (which we considered to be an illegal method of transferring loads in view of ASME Section XVII and MSS-SP69, CASE Exhibit 920) which is not accounted for although it will be picked up by the first axial restraint (or several axial restraints, depending on stiffness).

Item 10, Anchor Bolts and Base Plates. We would have marked this unsatisfactory, because plate stresses in the calculations (page 9 of 9) are in conflict. While the FUB II calculation shows the plate stresses as 21,750 psi, the designer's calculation uses 18,741 psi.

PS-09

Item 1, Design Input Data. We would have marked this unsatisfactory, because the weld calculation for the quarter inch fillet weld (the original weld) is based on weld 3" long.

Item 2, Design Assumptions. We would have marked this unsatisfactory, because:

(1) The statement that flare welds were stronger than fillet welds is not justified without addressing the point (actually 10% stronger).

(2) Flexural analysis of 4" deep beam which is only 3" long is not applicable without a multiplier (actually the structure involved in transmitting the loads is a plate with a stiffener effectively a T-section).

PS-09 (continued):

Item 2, Design Assumptions (continued):

(3) Load acts principally on lower flange and weld at lower flange.

(4) Flange bending due to welds must be combined with other normal stresses to determine actual stress in this member (current analysis indicates that just checking bending in the flange 70% of stress ratio is used).

PS-12

Item 1, Design Input Data. We would have marked this unsatisfactory, because:

(1) Support was moved 2'7-3/4" east out of tolerance; therefore, it is not in compliance with the provisions of IE Bulletin 79-14 (NRC Staff Exhibit 201C, being supplied to Cygna with CASE's 4/23/84 pleadings).

(2) Flexural analysis for 5,000# load on tube wall (.5 ratio) was not considered.

Item 2, Design Assumptions. We would have marked this unsatisfactory, because:

(1) U-bolt is locked on the pipe; therefore, manufacturer's qualification for allowable loads is no longer applicable. U-bolt therefore has to be requalified.

(2) Stresses on the pipe wall have not been determined.

(3) This application of a U-bolt with or without gaps is not in compliance with MSS-SP69 (CASE Exhibit 920).

Item 4, Gap. We would have marked this unsatisfactory, because:

(1) No gap is provided.

PS-12 (continued):

Item 4, Gap (continued):

(2) Support becomes unstable if gap is present either intentionally or if pretension is lost due to permanent deformation or localized yielding.

Item 10, Base Plates and Anchor Bolts. We would have marked this unsatisfactory, because:

(1) Sheet 3 of 4 of the weld calcs fails to consider one component of the torsion and a 15,000 inch pound moment about the local X axis of the pipe.

(2) Anchor bolts analyzed without including tension induced due to coupling of 20,000 inch pound moment caused by local X moment mentioned in Item 1 (moment increased due to base plate thickness).

PS-13

Item 2, Design Assumptions. We would have marked this unsatisfactory, because:

(1) U-bolts on insulated lines are not in compliance with MSS-SP69 (CASE Exhibit 920), manufacturers' standard practices developed and approved by the Manufacturers Standardization Society of the Valve and Fitting Industry.

(2) Manufacturer's approved loading is based on design loads only. For this application of a U-bolt, qualification is required which includes the effects of pretensioning and thermal restraint loads.

(3) Instability will result if pretensioning of the U-bolts is lost. Therefore, there is no positive means of engagement.

Item 4, Gap. We would have marked this unsatisfactory, because no gap is considered.

Item 9, Strut. We would have marked this unsatisfactory, because:

PS-13 (continued):

Item 9, Strut (continued):

(1) Angle of strut is actually 5.01 degrees, which is greater than the allowable 5 degrees. The designer shows the angle as 4.9 degrees, which is less than 5 degrees and therefore accepted.

(2) Component of 5 degree incline must be considered in pipe stress analysis or by some means transferred to the supports which it will affect.

Item 10, Base Plate and Anchor Bolts. We would have marked this unsatisfactory, because due to oversized holes and in this case, the full load may be taken by the two bolts which are in tension and will include a coupled moment.

PS-16

Item 10, Anchor Bolts and Base Plates. We would have marked this unsatisfactory, because the bolt holes are oversized in violation of the Code, and the probability in this case is that only two bolts of the 8 bolts shown could be active in shear until such time as the deflections bring the remaining 6 bolts into activity.

PS-21

Item 8, Snubbers. We would have marked this unsatisfactory, because:

(1) Two snubbers positioned as designed will restrain the moment in the pipe during seismic lock-up. This increase in loading is not considered in the support calculations.

(2) With variable acceleration, there is no indication that simultaneous lock-up will occur for the two snubbers.

PS-26

Item 1, Design Input. No calculations were included in our package; therefore, our comments are limited to visual observations of the drawings. However, at two design assumptions we find that it probably is unsatisfactory because:

(1) The Beta ratio for the stiffeners is .12, far below the .4 suggested by Korol and Mirza (tube wall 3/8" thick and 6x4"; therefore this will present punching shear problems and flexural problems in the tube walls).

(2) The pipe thermal growth is restrained due to the configuration of the support.

Item 10, Base Plates and Anchor Bolts. We would have marked this unsatisfactory, because bolt holes are oversized and therefore not in compliance with the codes.

PS-28

Item 2, Design Assumptions. We would have marked this unsatisfactory, because:

(1) Moment from base plate induces punching at the top of the tube adjacent to the run pipe for the 5/16" weld.

(2) The note on the drawing, sheet 1 of 2, indicates full penetration weld; since this is not done with backing bars, it is only a groove weld (effective throat of groove weld = t -1/8" maximum). AWS 4.10.8 (regardless of applicable code, this is a standard practice).

(3) The tube used in this support is a TS8x8x1/2" approximately 6-1/2" long completely locked in by stiffeners along the tube wall. This support therefore cannot be analyzed as a flexural member either with or without the

PS-28 (continued):

Item 2, Design Assumptions (continued):

stiffeners. The analysis in reality should contain the elements of the structure involved, including base plate, stiffeners, and tube elements which are the actual members that in combination react the loads

Item 10, Base Plates and Anchor Bolts. We would have marked this unsatisfactory, because bolt holes are oversized and not in compliance with codes. Therefore, only two bolts are active, not the 6 assumed active in the calculation as relates to shear loads.

PS-30

Item 2, Design Assumptions. We would have marked this unsatisfactory, because the pipe constrains the thermal growth which will induce stresses into the pipe, support, and welds which have not been considered in the calculation.

This information is not in affidavit form, because it was taken from CASE Witness Jack Doyle by telephone, and we wanted to get it into the hands of the Board and parties as quickly as possible. We ask that the Board advise if it is necessary to supply it in affidavit form, and we will do so.

Respectfully submitted,

Juanita Ellis

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	}{	
	}{	
TEXAS UTILITIES ELECTRIC	}{	Docket Nos. 50-445-1
COMPANY, et al.	}{	and 50-446-1
(Comanche Peak Steam Electric	}{	
Station, Units 1 and 2)	}{	

CERTIFICATE OF SERVICE

By my signature below, I hereby certify that true and correct copies of CASE'S RESPONSE TO BOARD'S REQUEST REGARDING SATISFACTORY/UNSATISFACTORY CHECK LISTS IN CYGNA REPORT; and Copies of Exhibits for Cross-Examination** (** Exhibits hand delivered to Board and parties only) have been sent to the names lilsted below this 23rd day of April, 1984, by: ~~Express Mail~~ Hand delivered where indicated by * and First Class Mail elsewhere.

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DATE SENT TO CYGNA	CASE EXHIBIT NO.	
2/29/84	---	1/27/84 Letter from George W. Knighton, Chief, Licensing Branch No. 3, Division of Licensing, NRC, Washington, to Earl J. Woolever, VP, Duquesne Light Company (Beaver Valley-2, Hope Creek, and Limerick), with Attachment: "Staff Evaluation of the Effect of Overthickness in Pipe Fittings" (see also CASE Exhibit 956)
2/22/84	---	Brief Summary of Cross-Examination Questions from Messrs. Walsh and Doyle to Cygna
2/29/84	---	Affidavit of Mark Walsh (Attached to CASE's 2/29/84 Motion Regarding CASE's Summary of Cross-Examination Areas Supplied to Cygna on February 22, 1984)
3/10/84	---	Handwritten Answer to 3/5/84 Comments by Jack Doyle
3/13/84	---	Further clarification by Messrs. Walsh and Doyle
3/15/84	---	Further clarification by Mark Walsh
3/29/84	---	Further clarification by Messrs. Walsh and Doyle, and requests for additional information
3/31/84	---	Further clarification by Jack Doyle regarding Doyle #16
4/11/84	---	Proposed Stipulations -- CASE to Cygna 4/11/84
4/11/84	---	Matrix of Exhibits and Documents, 2/22/84 Revised 4/5/84 (Re: CASE Exhibits 891-902, 928-938)
4/11/84	---	Examples of items which CASE will be briefly addressing in hearings and in proposed findings (based on the Cygna Report itself, which is now in evidence and therefore subject to findings)
4/23/84	---	NRC Staff Exhibit 201C, IE Bulletin No. 79-14 (original and Revision 1), "Seismic Analyses for As-Built Safety-Related Piping Systems"
-------	---	(During Hearings) -- may be cross-examining on Transcript pages 9391-9420, 9709-9724, 9783-9844, 9896-9905 -- during the hearings, we will provide copies of the pages actually used

4/18/84	743	Regulatory Guide 1.124, "Service Limits and Loading Combinations for Class 1 Linear-Type Component Supports," Revision 1, January 1978
4/23/84	851	Board Notification 82-105, Alleged Design Deficiency, in ASME Class 1 piping.
3/10/84	891	Expanded and renumbered CASE Exhibit 928
3/10/84	892	Expanded and renumbered CASE Exhibit 929
3/10/84	893	Expanded and renumbered CASE Exhibit 930
3/10/84	894	Expanded and renumbered CASE Exhibit 931
3/10/84	895	Expanded and renumbered CASE Exhibit 932
3/10/84	896	Expanded and renumbered CASE Exhibit 933
3/10/84	897	Expanded and renumbered CASE Exhibit 934
3/10/84	898	Expanded and renumbered CASE Exhibit 935
3/10/84	899	Expanded and renumbered CASE Exhibit 936
4/11/84	899	Additional pages 3 through 8, to be added to Exhibit
3/10/84	900	Expanded and renumbered CASE Exhibit 937
3/10/84	901	Expanded and renumbered CASE Exhibit 938
3/10/84	906	Seismic Acceleration Study, by Applicants
3/10/84	920	Standard Practice SP-69, 1976 Edition, MSS, "Pipe Hangers and Supports - Selection and Application," Developed and Approved by the Manufacturers Standardization Society
3/10/84	921	FORMULAS FOR STRESS AND STRAIN, Fifth Edition, by Raymond J. Roark and Warren C. Young, pages 220, 221, 226, and 227
3/10/84	922	STRUCTURAL STEEL DESIGN, Fritz Engineering Laboratory, Department of Civil Engineering, Lehigh University
3/10/84	923	MANUAL OF STEEL CONSTRUCTION, Seventh Edition, American Institute of Steel Construction, Inc. (AISC), pages 5-12, 5-13, 5-192 through 5-195
3/10/84	924	(formerly erroneously marked CASE Exhibit 906), of 4 bolts and holes
3/10/84	925	STEEL STRUCTURES, Design and Behavior, by Charles G. Salmon and John E. Johnson, University of Wisconsin

3/13/84	926	Inspection Report 83-52 (see especially pages 4 and 5 of Appendix, item 4. Discussion, re: 10 CFR Part 50.55(e) construction deficiency report identifying a generic problem with cable tray clamps
3/15/84	927	FORMULAS FOR STRESS AND STRAIN, by Roark and Young, pages 184-188
3/19/84	928	(Formerly CASE Exhibit 891) Support SI-1-325-002-S32R, calcs, etc.
3/19/84	929	(Formerly CASE Exhibit 892) Support SI-1-038-013-S22A, calcs, etc.
3/19/84	930	(Formerly CASE Exhibit 893) Support SI-1-079-001-S42S, calcs, etc.
3/19/84	931	(Formerly CASE Exhibit 894) Support RH-1-064-010-S22R, calcs, etc.
3/19/84	932	(Formerly CASE Exhibit 895) Support SI-1-075-001-S22R, calcs, etc.
3/19/84	933	(Formerly CASE Exhibit 896) Support RH-1-010-004-S22K, calcs, etc.
3/19/84	934	(Formerly CASE Exhibit 897) Support RH-1-064-011-S22R, calcs, etc.
3/19/84	935	(Formerly CASE Exhibit 898) Support SI-1-037-005-S32A, calcs, etc.
3/19/84	936	(Formerly CASE Exhibit 899) Support RH-1-024-011-S22A, calcs, etc.
3/19/84	937	(Formerly CASE Exhibit 900) Support SI-1-030-003-S32A, calcs, etc.
3/19/84	939	Support RH-1-010-003-S22R, calcs, etc.
3/19/84	940	Cygna's Response to Walsh #1 (same as contained in Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)
3/19/84	941	ANSI A58.1-1972, American National Standard, building code requirements for minimum design loads in buildings and other structures, pages 7 through 10

3/19/84	943	Cygna's 3/7/84 Response to Walsh #7 (erroneously marked #6)(same as Response to Walsh #7, correctly numbered, in 3/18/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)
3/19/84	944	CPSES/FSAR Table 3.7B-1, "Damping Values"
3/19/84	945	WITHDRAWN -- Same as Cygna's Response to Walsh #6, 4/12/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services
3/19/84	946	CASE's Proposed Stipulations Between Cygna and CASE
3/19/84	947	WITHDRAWN -- (ASME, NF-1000 Introduction; NF-1213 - NF-1223) -- see CASE Exhibit 993, which includes same page
3/19/84	948	MSS, Standard Practice SP-58, 1975 Edition, "Pipe Hangers and Supports -- Materials, Design and Manufacture, page 1
3/19/84	951	Cygna's Response to Walsh #8 (same as contained in 3/18/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)
3/19/84	952	Cygna's 3/13/84 Response to Walsh #12 (same as contained in 4/12/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services, except 3/13/84 response includes 5 pages of calcs, etc. not attached to 4/12/84 Testimony)
3/19/84	953	WITHDRAWN -- (same as Cygna's Response to Walsh #9, 4/12/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)
3/19/84	954	WITHDRAWN -- (same as Cygna's Response to Walsh #10, 4/12/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)
3/19/84	955	Cygna's Response to Walsh #11 (same as Cygna's Response to Walsh #11 contained in 3/18/84 Testimony of Nancy H. Williams in Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)

3/19/84	956	1/27/84 letter from George W. Knighton, Chief, Licensing Branch H. 3, Division of Licensing, NRC, Washington, to Earl J. Woolever, Vice President, Duquene Light Company, re: Evaluation of the Effect of Overthickness in Pipe Fittings and attached "Staff Evaluation of the Effect of Overthickness in Pipe Fittings" (see also CASE's 2/29/84 Motion to which Mark Walsh affidavit and 1/27/84 Knighton letter were attached)
3/19/84	957	Portion of drawing ("Match Line See Dwg. E1-0700-01-S")
3/19/84	958	Cygna's Response to Walsh #2 (same as Cygna's Response to Walsh #2 contained in 3/18/84 Testimony of Nancy H. Williams In Response to CASE Questions of Feb. 22, 1984 to Cygna Energy Services)
3/19/84	959	Drawing portion showing Case B 1 and Case C 1
3/31/84	969	IE Bulletin No. 79-02 (Revision No. 1)
4/18/84	971	AWS D1.1-75, STRUCTURAL WELDING CODE, American Welding Society, Inc., pages 29 through 33
4/18/84	972	MANUAL OF STEEL CONSTRUCTION, Eighth Edition, American Institute of Steel Construction, Inc., pages 5-25 and 5-26
4/18/84	973	MANUAL OF STEEL CONSTRUCTION, Seventh Edition, American Institute of Steel Construction, Inc., pages 5-21 and 5-22
4/18/84	974	Supplement No. 3 to the Specification for the Design, Fabrication & Erection of Structural Steel for Buildings (Adopted February 12, 1969) Effective June 12, 1974, Revised Effective October 30, 1975, American Institute of Steel Construction (AISC), page 8
4/11/84	975	3/30/84 letter from Darrell G. Eisenhut, Director, NRC Division of Licensing, Washington, to M. D. Spence, President, TUGCO, and L. L. Kammerzell, Vice President, Cygna Energy Services, San Francisco, re: Independent Assessment Program (IAP) Performed by Cygna (with attached Request for Additional Information)
4/11/84	976	MANUAL OF STEEL CONSTRUCTION, Seventh Edition, American Institute of Steel Construction (AISC), pages 5-25 and 5-26

4/18/84	979	Regulatory Guide 1.61, "Damping Values for Seismic Design of Nuclear Power Plants," October 1973
4/18/84	980	Regulatory Guide 1.92, "Combining Modal Responses and Spatial Components in Seismic Response Analysis," Revision 1, February 1976
4/18/84	981	Regulatory Guide 1.100, "Seismic Qualification of Electric Equipment for Nuclear Power Plants," Revision 1, August 1977
4/18/84	983	FORMULAS FOR STRESS AND STRAIN, Fifth Edition, Raymond J. Roark and Warren C. Young, pages 474, 496, 508, 509
4/18/84	984	CPSES/FSAR, SEISMIC SUBSYSTEM ANALYSIS, pages 3.7B-58, -58a, -58b, -58c, -59, -60, -60a, -61, -62
4/18/84	985	CPSES/FSAR, 3.9B MECHANICAL SYSTEMS AND COMPONENTS, 3.9B.3.4 Component Supports, pages 3.9B-1, -27, -34, -35, -36, -37
4/18/84	986	3/19/82 letter to J. T. Merritt, Jr., TUSI, from Herman W. D'Errico, Project Manager, NPS Industries, Inc., re: Undersized Welds
4/18/84	987	Brown & Root Procedure CP-CPM 9.10, Revision 8, 9/21/82, pages 1, 3, 7, and 9 of 14, and Document Change Notice No. 1, Effective 10/8/82
4/23/84	988	ANSI/IEEE Std. 344-1975 (Reaffirmed 1980)(Revision of IEEE Std. 344-1971), "IEEE Recommended Practices for Seismic Qualification of Class 1E Equipment for Nuclear Power Generating Stations," pages 7 through 14, and 24
4/23/84	989	IEEE Std. 323-1983 (Revision of IEEE Std. 323-1974), "IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations," pages 9 through 13, and 20
4/23/84	990	Regulatory Guide 1.122, "Development of Floor Design Response Spectra for Seismic Design of Floor-Supported Equipment or Components," Revision 1, February 1978
4/23/84	991	Regulatory Guide 1.122, "Development of Floor Design Response Spectra for Seismic Design of Floor-Supported Equipment or Components," September 1976
4/23/84	992	ASME Appendix XVII-2461.2-XVII-2461.5, XVII-2461.5-XVII-2469; see especially XVII-2461.4 Slip Resistance - Friction Type Joints, equation

4/23/84	993	ASME Winter 1974 Addenda, Section III -- Division 1, Nuclear Power Plant Components, Subsection NF - Component Supports, Article NF-1000 Scope and General Requirements, Fig. NF-1211.4-1 Typical Component Standard Supports, and NF-1214 Component Standard Supports (pages 3, 6, and 7)
4/23/84	994	Regulatory Guide 1.89, "Environmental Qualification of Certain Electric Equipment Important to Safety for Nuclear Power Plants," Revision 1, March 1984, pages 1 through 6 and 9 through 15
4/23/84	995	CPSES/FSAR, 3.10B SIESMIC QUALIFICATION OF SEISMIC CATEGORY I INSTRUMENTATION AND ELECTRICAL EQUIPMENT, pages 3.10B-1 through 3.10B-7
4/23/84	996	4/18/84 letter to Darrell G. Eisenhut, NRC, from Homer C. Schmidt, TUGCO, re: CPSES Independent Assessment Program (advance notice provided to TUGCO of documentation needed to conduct Cygna's reaudit of Document Control system and whether Cygna followed NRC protocol attached to 9/23/83 NRC letter)
4/23/84	997	ENGINEERING JOURNAL, AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), Third Quarter, 1973, "Commentary on Highly Restrained Welded Connections," pages 61 through 73
4/23/84	998	4/17/84 Memorandum for B. J. Youngblood, NRC, from S. B. Burwell, NRC, re: Notice of Meeting with Cygna on Independent Assessment Program (IAP) for CPSES, on 4/19/84
4/23/84	999	IE Information Notice No. 83-80: "Use of Specialized 'Stiff' Pipe Clamps (resulting from Board Notifications 82-105 and 82-105A)