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Ref: 10 CFR 50.55a(3)(i)
10 CFR 50.55a(g)(4)(iv)

CPSES-200300431
Log # TXX-03046

March 05, 2003

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446;
RELIEF REQUEST C-2 FOR THE SECOND 10 YEAR ISI INTERVAL FOR UNIT 1 AND C-7 FOR THE SECOND 10 YEAR ISI INTERVAL FOR UNIT 2 FROM 10 CFR 50.55a FOR THE PURPOSE OF INVOKING CODE CASE N-562-1.

(UNIT 1 SECOND INTERVAL START DATE AUGUST 2000
UNIT 2 SECOND INTERVAL START DATE: AUGUST, 2003.)

Pursuant to 10CFR50.55a, TXU Generation Company LP (TXU Energy) hereby requests NRC approval of the attached relief request. The relief from the ASME Code is being requested for the second interval of the inservice inspection program for Unit 1 and the second interval for Unit 2. The details of the 10CFR 50.55a request are attached.

Background:
On or about October 14, 2002, during the ninth refueling outage for Unit 1 (1RF09), Ultrasonic Testing (UT) data taken for the corrosion monitoring program (STA-730), indicated localized corrosion and/or pitting at a weld toe in line 10-SW-1-129-150-3. The corrosion is located in a 10-inch Schedule 40 carbon steel pipe with a nominal thickness of 0.365 inches. The weld is located in the pipe downstream of Check Valve 1-SW-0017 (internals removed) where it enters the elbow. UT data taken illustrates that the thin area is roughly elliptical with a 3-inch major axis and a 0.5-inch minor axis.

A047

UT readings within the thin area were typically between 0.10 and 0.12 inches except for one small spot (about 1/8" diameter) that measured 0.069 inches. Readings surrounding the thin area and in the remainder of the circumference showed the wall thickness to average approximately 0.360 inches. The pipe where the corrosion indication has been found is a 10-inch line that branches off of the 30-inch line that is flowing to the Component Cooling Water (CCW) Heat Exchanger. There are no valves available to isolate this line from the 30-inch line. There is also no location on the 10" line where a freeze seal could be placed to allow the breach of this piping. This corrosion was documented on Corrective Action Document SMF 2002-3634.

TXU Energy has been granted approval to utilize ASME Code Case N-597, "Requirements for Analytical Evaluation of Pipe Wall Thinning, Section XI, Division 1," reference NRC TAC NOS. MB2260 and MB2261 dated August 23, 2001[1]. TXU Energy when requesting the use of Code Case N-597 proposed the following alternative:

> The requirements of ASME Code Case N-597 may be used for the analytical evaluation of Class 2 and 3 carbon and low alloy steel piping components (e.g., piping and fittings) subject to wall thinning as a result of flow-accelerated or other corrosion phenomena where the thickness has been reduced below the minimum design thickness, instead of the requirements of IWA-3000.

CPSES Engineering completed analytical evaluation (per ASME Code Case N-597) for the piping where the corrosion indication was discovered and determined that the piping will perform its intended function for another cycle, if not repaired. However, TXU Energy may wish to take conservative actions and apply the guidance provided in ASME Code Case N-562-1 and repair this piping.

Hence, TXU Energy is requesting invoking Code Case N-562-1 for the subject/degraded piping as required. This request also includes other restoration of piping that would fall in the scope of N-562-1 that is discovered during the intervals mentioned.

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[1] NRC letter dated August 8, 2001 from David H. Jaffe to C. Lance Terry, Subject "Comanche Peak Steam Electric Station (CPSES), Units 1 and 2 – Request for Use of ASME Code Case N-597 as an Alternative Analytical Evaluation of Wall Thinning (TAC NOS. MB2260 and MB2261)

This code case is denoted in Draft Guide (DG)-1112[2] with the comment that "[N]either the ASME Code or the Code Case (N-562-1) have criteria for determining the rate or extent of degradation or the repair or the surrounding base metal. Reinspection requirements are not provided to verify structural integrity since the root cause may not be mitigated."

In response to this concern, the TXU Energy plans to implement Code Case N-562-1 through the industry standard NSAC-202L-R2, "Recommendations for an Effective Flow Accelerated Corrosion (FAC) Program," for calculating the wear rates, forecasting remaining life, and conducting inspections of FAC degradation at CPSES, Units 1 and 2. This process is proceduralized in STA-730, "Corrosion Monitoring Program."

This aforementioned program was utilized to address a similar concern when implementing Code Case N-597, reference TAC Nos., MB2260 and MB2261. The same definitions of "shall" and "should" described in that letter would be applicable.

A similar relief request was approved at Southern Nuclear Operation Company's Hatch Plant, Units 1 and 2 (Reference SER dated May 31, 2000, TAC Nos. MA6123 and MA 6124).[3]

This communication contains no new licensing basis commitments regarding Comanche Peak Steam Electric Station (CPSES) Units 1 and 2.

[2] Draft Regulatory Guide DG-1112 "ASME CODE CASES NOT APPROVED FOR USE"
[3] NRC Letter dated May 31, 2000 From Richard L. Emch, Jr. to H. L. Sumner, Jr. Subject "Edwin I. Hatch Nuclear Plant, Unit 1 and 2 – Third Ten-Year Interval Inservice Inspection Program, Relief Request NOS. RR-25 and RR-26 (TAC NOS. MA6123 and MA6124)

TXU Energy requests approval of this relief request by August of 2003. The approval date was administratively selected to allow for NRC review. If you have any questions regarding this request, please contact Douglas W. Snow at (254) 897-8448 or Obaid Bhatty at (254) 897-5839.

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC,
Its General Partner

C. L. Terry
Senior Vice President and Principal Nuclear Officer

By: Roger D. Walker
Roger D. Walker
Regulatory Affairs Manager

DWS/dws
Attachment/Enclosure

c - E. W. Merschoff, Region IV
W. D. Johnson, Region IV
D. H. Jaffe, NRR
Resident Inspectors, CPSES
Terry Parks, Chief Inspector, TDLR
J.C. Hair ANII, CPSES

TXU GENERATION COMPANY LP
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1
SECOND TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. C-2 AND UNIT 2
SECOND TEN YEAR INTERVAL FOR ISI RELIEF NO. C-7

PROPOSED USE OF SUBSEQUENT ASME CODE EDITION AND ADDENDA PURSUANT TO 10 CFR 50.55a(g)(4)(iv) AND INVOKING CODE CASE N-562-1 Cont.

I. ASME System/Component(s) Affected:

All ASME Class 3 Moderate Energy (i.e. less than or equal to 200°F or less than or equal to 275 psig maximum operating conditions) Carbon Steel Piping Systems.

II. Applicable Code Edition and Addenda:

ASME Code 1986 Edition (No Addenda), Section XI, IWD-4120 requires that the defect be removed or reduced in size in accordance with Article IWA.

III. Proposed Subsequent Code Edition and Addenda and Code Case:

TXU Energy proposes to use 1998 Edition, ASME Section XI IWA 4000 and invoke Code Case N-562-1, to repair the piping section or similar conditions found in other Class 3 piping during the corrosion monitoring program (STA-730).

Relief is requested from removing defects and repairing in accordance with the design specification or the original construction code for internal wall thinning or pitting resulting from conditions such as, but not limited to, microbiological corrosion; cavitation induced pitting; erosion/corrosion and/or localized pitting corrosion.

The ASME Section XI Code Committee recognized that an alternative existed for internal wall thinning of Class 3 piping systems which have experienced degradation mechanisms such as flow-assisted corrosion (FAC) and/or microbiological corrosion that would provide an acceptable repair configuration. This alternative repair technique involves the application of additional weld metal on the exterior of the piping system, which restores the wall thickness requirement. Code Case N-562-1 was approved by the ASME Section XI Code Committee on July 30,1998. However, it has not been incorporated into NRC Regulatory Guide 1.147 (or Draft Guide (DG) 1091) and thus is not presently available for application at nuclear power plants.

This code case is denoted in NRC Draft Guide (DG)-1112 with the comment that, "[N]either the ASME Code or the Code Case have criteria for determining the rate or extent of degradation or the repair or the surrounding base metal. Reinspection requirements are not provided to verify structural integrity since the root cause may not be mitigated."

TXU GENERATION COMPANY LP
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1
SECOND TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. C-2 AND UNIT 2
SECOND TEN YEAR INTERVAL FOR ISI RELIEF NO. C-7

PROPOSED USE OF SUBSEQUENT ASME CODE EDITION AND ADDENDA PURSUANT TO 10 CFR 50.55a(g)(4)(iv) AND INVOKING CODE CASE N-562-1 Cont.

In response to this concern, the TXU Energy plans to implement Code Case N-562-1 through the industry standard NSAC-202L-R2, "Recommendations for an Effective Flow Accelerated Corrosion (FAC) Program," for calculating the wear rates, forecasting remaining life, and conducting inspections of FAC degradation at CPSES, Units 1 and 2. This is proceduralized in STA-730, "Corrosion Monitoring Program."

Pursuant to 10 CFR 50.55a(a)(3)(i), relief is requested to use Code Case N-562-1 on the basis that the proposed alternative will provide an acceptable level of quality and safety. This relief request applies to ASME Class 3 moderate energy piping system (i.e., less than or equal to 200°F and/or less than or equal to 275 psig maximum operating conditions) carbon steel piping.

IV. Basis of Using Subsequent Code Editions and Addenda and Code Case:

A number of alternatives (e.g., Generic Letter GL 90-05 "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1,2, and 3 Piping", Code Cases N-513 "Evaluation Criteria for Temporary Acceptance of Flaws in Class 3 Piping, Section XI, Division 1" and N-523-1 "Mechanical Clamping Devices for Class 2 and 3 Piping, Section XI, Division 1") are currently available and approved by the NRC for evaluating and repairing of piping wall thinning and pitting (including through wall leaks). Nonetheless, these alternatives have limitations and do not always encompass the specific situations that arise from a piping leak.

While the guidance provided by GL 90-05 and Code Case N-513 could be used to evaluate and accept the leaking condition, if the structural integrity of the piping can be ascertained, the leak would most likely continue to increase in size over time and would pose more significant housekeeping difficulties. On the other hand, if the flaw exceeds the acceptance criteria provided by GL 90-05 or Code Case N-513, an emergency code repair (which may include up to full piping replacement of the affected sections) would be warranted. Therefore this would pose a significant hardship on plant operations to isolate and drain the affected piping sections (some of which are not isolable and would require extended plant shutdown). For that reason, TXU Energy requests that relief be granted to use a weld overlay in lieu of a code weld repair on Class 3 moderate energy piping. This would provide additional insurance that an unscheduled plant shutdown could be avoided.

TXU GENERATION COMPANY LP
COMANCHE PEAK STEAM ELECTRIC STATION UNIT 1
SECOND TEN-YEAR INTERVAL ISI RELIEF REQUEST NO. C-2 AND UNIT 2
SECOND TEN YEAR INTERVAL FOR ISI RELIEF NO. C-7

PROPOSED USE OF SUBSEQUENT ASME CODE EDITION AND ADDENDA PURSUANT TO 10 CFR 50.55a(g)(4)(iv) AND INVOKING CODE CASE N-562-1 Cont.

Code Case N-562-1 provides an additional alternative to the IWA-4000 requirements for the repair of internal piping system defects or degradation. Please note that the ASME XI Code Committee determined that such a weld overlay would restore the minimum piping wall thickness at the flawed location and would ensure that an adequate level of quality and safety is maintained.

The primary purpose for implementing this alternate repair method (installation of a weld overlay) is to avoid the need to extend an outage to perform code repair and possibly piping replacement. It also allows for adequate time to perform additional evaluation of adjacent piping so that pipe replacement can be properly identified and scheduled to reduce impact on system availability, increase safety of plant operations, and reduce cost for replacement materials and labor.

TXU will implement Code Case N-562-1 through the industry standard NSAC-202L-R2, "Recommendations for an Effective Flow Accelerated Corrosion (FAC) Program," for calculating wear rates, forecasting remaining life, and conducting inspections of FAC degradation at CPSES, Units 1 and 2.

Therefore, the proposed alternative is justified per 10CFR50.55a(a)(3)(i) as the proposed repair will provide an acceptable level of quality and safety.

V. Duration of Proposed Alternative:

This relief is requested for the Comanche Peak Steam Electric Station Unit 1, second 10-year interval, and for Unit 2 second 10-year interval.

Granting of this relief request will not have an impact on plant quality or safety and will not adversely impact the health and safety of the public.

VI. Precedents:

1) A similar relief request was approved at Southern Nuclear Operation Company's Hatch Plant, Units 1 and 2 (Reference SER dated May 31, 2000, TAC Nos. MA6123 and MA 6124).

CASE
N-562-1

CASES OF ASME BOILER AND PRESSURE VESSEL CODE

Approval Date: July 30, 1998
See Numeric Index for expiration and any reaffirmation dates.

Case N-562-1
Alternative Requirements for Wall Thickness Restoration of Class 3 Moderate Energy Carbon Steel Piping
Section XI, Division 1

Inquiry: As an alternative to replacement or internal weld repair, what requirements may be applied for wall thickness restoration of Class 3 moderate-energy carbon steel piping systems that have experienced internal wall thinning or pitting from conditions such as, but not limited to, flow-assisted corrosion and microbiological corrosion?

Reply: It is the opinion of the Committee that areas of Class 3 moderate energy (i.e., less than or equal to 200°F or and less than or equal to 275 psig maximum operating conditions) carbon steel piping experiencing internal thinning or pitting may have the wall thickness restored externally by means of a weld-deposited carbon or low-alloy steel reinforcement on the outside surface of the piping in accordance with the following requirements. Excluded from these provisions are conditions involving corrosion-assisted cracking or any other form of cracking

1.0 GENERAL REQUIREMENTS

(a) The wall thickness restoration shall be performed in accordance with a Repair/Replacement Plan satisfying the requirements of IWA-4150.[1]

(b) The wall thickness restoration shall meet the requirements of IWA-4000,[2] except as stated in this Case.

(c) If the minimum required thickness of deposited weld metal necessary to satisfy the requirements of para. 3.0 is greater than the nominal thickness for the size and schedule of the piping, the provisions of this Case shall not apply. In addition, the total thickness of filler metal applied over multiple repairs shall not exceed the original nominal thickness of the piping.

2.0 INITIAL EVALUATION

The material beneath the surface to which the weld overlay is to be applied shall be evaluated to establish the existing average wall thickness and the extent and configuration of degradation to be reinforced by the weld overlay. Consideration shall be given to the cause of degradation. The extent of degradation in the piping, and the effect of the repair on the piping, shall be evaluated in accordance with IWA-4160.[3]

3.0 DESIGN

3.1 General Design Requirements

(a) Unless otherwise established by theoretical or experimental analysis, or by proof testing as provided for in para. 3.3 or para. 3.4, the full thickness of the weld overlay shall extend a distance of at least s in each direction beyond the area predicted, over the design life of the restoration to infringe upon the required thickness.[4]

where

$s = \geq 3\sqrt{Rt_{nom}}$

R = outer radius of the component

t_{nom} = nominal wall thickness of the component

Edges of the weld overlay shall be tapered to the existing piping surface at a maximum angle ("α" in Fig. 1) of 45 deg. Final configuration of the reinforcement shall permit the examinations and evaluations required herein, including any required preservice or inservice examinations of encompassed or adjacent welds.

[1] IWA-4140 in the 1989 Edition with the 1991 Addenda through 1995 Edition IWA-4130 (Repair Program) in the 1989 Edition with the 1990 Addenda and earlier Editions and Addenda

[2] IWA-4000/7000 and IWC/IWD-4000/7000, as applicable, in the 1989 Edition with the 1990 Addenda and earlier Editions and Addenda.

[3] IWA-4150 in the 1989 Edition with the 1991 Addenda through 1995 Edition. IWA-4130 (Repair Program) in the 1989 Edition with the 1990 Addenda and earlier Editions and Addenda.

[4] Design thickness as prescribed by the Construction Code.

CASE (continued)

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(b) The thickness shall be sufficient to maintain required thickness for the predicted life of the repair, and, except for the tapered edges, the overlay shall have a uniform thickness.

(c) The tensile strength of the weld filler metal for the reinforcement shall be at least that specified for the base metal to which it is applied.

(d) The predicted maximum degradation of the overlaid piping and the overlay over the design life of the restoration shall be considered in the design. The predicted degradation of the piping shall be based upon in-situ inspection and established data for similar base metals. If the weld overlay is predicted to become exposed to the corroding medium, the predicted degradation of the overlay shall be based upon established data for base metals or weld metals with similar chemical composition to that of the filler metal used for the weld overlay.

(e) The effect of weld overlay application on interior coating shall be addressed in the Repair/Replacement Plan [Repair Program].

3.2 Design

The design of weld overlays not prequalified by paras. 3.3, 3.4, or 3.5 shall be in accordance with the applicable requirements of the Construction Code or ND-3100 and ND-3600 (including Appendix II), and shall consider the weld overlay as an integral portion of the piping or component upon which it is applied (not as a weld). The allowable stress values of the base metal shall apply to the design of the deposited weld metal. The following factors shall be considered, as applicable, in the design and application of the reinforcement:

(a) The shrinkage effects, if any, on the piping.

(b) Stress concentrations caused by application of the overlay or resulting from existing and predicted piping internal surface configuration.

3.3 Proof Test Qualification as a Piping Product

As an alternative to design, the configuration of weld overlays may be qualified by performance of proof testing of a mockup in accordance with the following requirements:

(a) A satisfactory mockup burst test shall qualify the design or configuration for application in the same orientation on the same type of item, and the same location on fittings, when the following conditions are satisfied (see Fig. 1).

(1) the base metal is of the same P-No. and Group Number when impact properties are applicable, as the base metal tested;

(2) the specified minimum tensile strength of the item does not exceed that specified for the base metal tested;

(3) the average thickness of the overlay areas is at least the thickness of the mockup plug, u;

(4) the overlap on the full thickness of base metal, s, is at least that of the mockup;

(5) the transition angle at the outer edges of the overlay, α, is not greater than that of the mockup;

(6) the overlay surface finish is similar to or smoother than that tested;

(7) the maximum proportionate axial dimension, L/D, is not more than that tested;

(8) the maximum proportionate circumferential dimension, C/D, is not more than that tested;

(9) the nominal diameter is not less than one-half nor more than two times the diameter tested;

(10) the nominal thickness/diameter ratio, t/D, is not less than one-half nor more than three times the t/D, ratio tested.

(b) The mockup base shall consist of new base material of similar configuration, or type of item, as the item to be overlaid. A rounded-corner segment of the base material shall be removed to represent the maximum proportionate size (axial dimension of L and circumferential dimension of C) and location of thinning or pitting to be compensated for by the weld overlay. A plug of the same base metal and of uniform thickness u, which shall not exceed the smallest average thickness on which the overlays will be permanently applied, shall be full-penetration welded around the opening and flush with the outside surface of the piping. Alternatively, an equivalent volume of base metal may be removed from the inside surface of the mockup by machining or grinding, without need for welding in a closure plug.

(c) The mockup weld overlay shall be applied in accordance with the design or specified configuration using the specified weld filler metal. Maximum section thickness at the overlaid opening (weld metal plus base metal plug, $u + w$) shall not exceed 87½% of the nominal thickness of the piping.

(d) Straight pipe equivalent to a minimum of one pipe diameter, or one-half diameter for piping over NPS 14, shall be provided (butt-welded to the mockup, if necessary) beyond both ends of the overlay. The piping shall be capped and the completed mockup assembly shall be thoroughly vented and hydrostatically

pressure tested to bursting. To qualify the design for general application within the limits of para. 3.3(a), burst pressure shall not be less than:

$$P = \frac{2tS_{act}}{D_o}$$

where

P = minimum acceptable burst pressure, psi
t = minimum specified thickness (excluding manufacturing tolerance) of the base metal being tested, in.
S_{act} = reported actual tensile strength of the base metal being tested, psi
D_o = outside diameter of the pipe, in.

(e) If flexibility analysis was required by the original Construction Code, the effect of the weld overlay shall be reconciled with the original analysis. In this case, for rectangular-shaped overlays on piping designed to ND-3650 and aligned parallel or perpendicular to the axis of the piping, unless a lower stress intensification factor (SIF or i) is established, an SIF (i) of 2.1 shall be applied for overlays on straight pipe and adjacent welds; a stress *multiplier* of 1.7 shall be applied to the SIF (i) for standard elbows; and an SIF (i) of 2.1 shall be applied for tees and branch connections when the toe of the overlay is not less than $2\frac{1}{2}\sqrt{Rt_{nom}}$ from any branch reinforcement in Fig. 1.

3.4 Proof Test Qualification for Specific Applications

As an alternative to design by analysis or proof test qualification as a piping product, the design or configuration of weld overlays may be qualified for limited service conditions using the provisions of ND-6900, "Proof Tests to Establish Design Pressure," except that component hydrostatic testing is not required (other than as required by IWA-4000[2]). The mockups shall be fabricated and tested in accordance with the provisions of para. 3.3(b), (c), and (d), and shall be applied in accordance with the provisions and conditions of para. 3.3(a). The provisions of para. 3.3(e) shall be met.

3.5 Prequalified Design

Application of weld overlays on straight pipe, portions of tees not less than $2\frac{1}{2}\sqrt{Rt_{nom}}$ from any branch reinforcement in Fig. 1 standard elbows, and associated welds to correct limited degradation shall be exempt from the requirements of para. 3.2 through para. 3.4, provided all of the following conditions are satisfied in Fig. 1:

(a) All of the requirements of para. 3.1 apply.

(b) The provisions of para. 3.3(e) shall be met.

(c) The full thickness of weld overlay shall not exceed a maximum axial length of the greater of six in. or the outside diameter of the piping.

(d) The finished overlay shall be circular, oval, full-circumferential, or rectangular in shape.

(1) For each repair, the maximum dimension compensated by a circular overlay shall not exceed $\frac{2}{3}$ the nominal outside diameter of the piping.

(2) Rectangular overlays shall be aligned parallel with or perpendicular to the axis of the piping, and corners shall be rounded with radii not less than the overlay thickness.

(3) For oval overlays, the end radii shall not be less than $\frac{3}{4}\sqrt{Rt_{nom}}$, and the axis of the overlay shall be aligned parallel with or perpendicular to the axis of the piping.

(e) The distance between toes of adjacent overlays shall not be less than t_{nom}.

4.0 Water-backed Applications

(a) Manual application of overlays on water-backed piping shall be restricted to P-No. 1 base materials. Welding of such overlays shall use the SMAW process and low-hydrogen electrodes. In addition, the surface examination required in para. 6.0 shall be performed no sooner than 48 hours after completion of welding. For such overlays consideration should be given to using a temper bead technique similar to that described in IWA-4650.[5]

(b) Piping with wall thickness less than the diameter of the electrode shall be depressurized before welding.

5.0 INSTALLATION

(a) The entire surface area to which the weld overlay is to be applied shall be examined using the liquid penetrant or magnetic particle method, with acceptance criteria in accordance with ND-2500/5300 for the product form (base metal or weld) involved.

(b) If through-wall repairs are required to satisfy the acceptance criteria, or result from application of the

[5] IWA-4540 in the 1989 Edition with the 1991 Addenda through the 1995 Edition. IWE-4200 in the 1986 Edition with the 1988 Addenda through the 1989 Edition with the 1990 Addenda. IWE-4320 in the 1986 Edition with the 1987 Addenda and earlier Editions and Addenda.

CASE (continued)

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weld overlay, they shall be accomplished by sealing with weld metal using a qualified weld procedure suitable for open-root welding. This weld shall be examined in accordance with para. 5.0(a). In addition, the first layer of overlay over the repaired area shall be examined in accordance with para. 5.0(a).

(c) Overlay weld metal shall be deposited using a grove-welding procedure qualified in accordance with Section IX and the Construction Code, Section X and Section III, or IWA-4610 and either IWA-4620 or IWA-4650.[6] The qualified minimum thickness specified in the weld procedure does not apply to the weld overlay or associated base metal repairs.[7]

(d) The surface of the weld overlay shall be prepared by machining or grinding, as necessary, to permit performance of surface and volumetric examinations required by para. 6.0. For ultrasonic examination, a surface finish of 250 RMS or better is required.

6.0 EXAMINATION

(a) The completed weld overlay shall be examined using the liquid penetrant or magnetic particle method and shall satisfy the surface examination acceptance criteria for welds of the Construction Code or ND-5300

(b) The weld overlay, including the existing piping upon which it is applied, shall be examined to verify acceptable wall thickness.

(c) Weld overlays shall be volumetrically examined as base metal repairs when required by the Construction Code, except as follows:

(1) Weld overlays not exceeding 10 in.^{2} surface area are exempt from volumetric examination.

(2) Other weld overlays shall be exempt from volumetric examination when the finished applied thickness (w in Fig. 1) does not exceed.

(a) $\frac{1}{3}t$ for $t \leq \frac{3}{4}$ in.

(b) $\frac{1}{4}$ in. for $\frac{3}{4}$ in. $< t \leq 2\frac{1}{2}$ in.

(c) The lesser of $\frac{5}{8}$ in. or 10% of t for $t > 2\frac{1}{2}$ in.

where

t = finished full-section thickness of compensated area (e.g., $w + u$, in Fig. 1)

When volumetric examination is required, the full volume of the finished overlay, excluding the tapered edges, but including the volume of base metal required for the design life of the overlay, shall be examined using either the ultrasonic or radiographic method, and shall, to the depth at the surface of the existing piping, satisfy the acceptance criteria for weldments of the Construction Code or ND-5300. The volume of the existing piping, beneath the weld overlay, taken credit for in the design, shall satisfy the volumetric acceptance criteria of ND-2500/5300 for the product form, or IWA-3000.[8]

(d) Follow-up inspection shall be scheduled as necessary to confirm any design assumptions relative to rate or extent of future degradation.

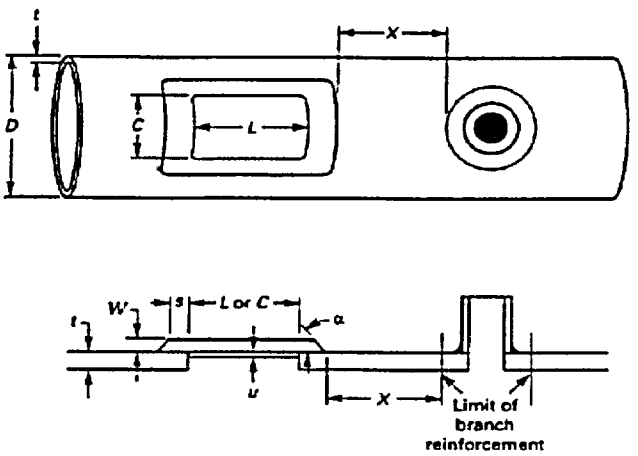
7.0 DOCUMENTATION

Use of this Case shall be documented on an NIS-2 Form.

[6] IWA-4500 and either IWA-4510 or IWA-4540 in the 1989 Edition with the 1991 Addenda through 1995 Edition, IWA-4510 or IWE-4200 in the 1986 Edition with the 1988 Addenda through 1989 Edition with the 1990 Addenda, IWB-4320 or IWE-4320 in the 1986 Edition with the 1987 Addenda or earlier Editions and Addenda.

[7] Exception to IWA-4000

[8] IWA-3000 and IWB-3514 in the 1989 Edition with the 1990 Addenda and earlier Editions and Addenda.



$X \geq 2^1/_2 \sqrt{Rt_{nom}}$

FIG. 1