TOMPKINS-BECKWITH, INC.
Waterford S.E.S. Unit 3
Louisiana Power & Light Co.
Killona, Louisiana

Proc. No. TBP-37 Rev. "E"

Page No. 0 of 10

Title: PIPING INSTALLATION

JB Gore PQT-1 Gorey Toups

TOMPKINS - BECKWITH, INC.
CONTROLLED DOCUMENT

JUN 30 1983

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INFORMATION ONLY

PROCEDURE COVER SHEET

DATE	COMMENTS	Changes Concurred By:
06/01/83	Paragraph 6.2.5 revised to correspond to code requirements.	
06/20/83	Added Reference 3.17 and paragraph ~~6.1.19.1~~ Added Exhibit 8.3.	RCS 6/21/83 JSG 6-21-83
06/29/83	Incorporated Ebasco Comments.	RCS 6/29/83 JRG 6/30/83

EBASCO SERVICES INCORPORATED
E. S. S. E. ENGINEERING
This Document is:
☒ Reviewed Without Comments
☐ Reviewed With Comments as Noted; Incorporate Comments and Resubmit; Proceed With Order.
☐ Rejected; Revise and Resubmit.
NOTE:
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By: W.R. Pierce 7/6/83
Date: 7/6/83

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QUALITY ASSURANCE ENGINEERING
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By: R Clawson
Date: 6/30/83

PREPARED BY:

H. Mills — 6-1-83 — Welding Supervisor
APPROVED BY: SIGNATURE — DATE — TITLE

SIGNATURE — 6/1/83 — Project Engineer
DATE — TITLE

J B Gore — 6-3-83 — Q.A. Site Manager
SIGNATURE — DATE — TITLE

DATE — TITLE

TOMPKINS-BECKWITH, INC.
Jacksonville, Florida

Proc. No. TBP-37
Rev. "E"
Page 1 of 10

TITLE:

PIPING INSTALLATION

1.0 PURPOSE

1.1 The purpose of this procedure is to delineate code and contractual requirements for the installation of process piping.

2.0 SCOPE

2.1 This procedure applies to all safety and non-safety piping systems installed per Contract W3 NY-11.

3.0 REFERENCES

3.1 Contract No. W-NY-11

3.2 ASME Section III (through Summer 1976 Addenda)

3.3 ANSI B 31.1 (through Summer 1976 Addenda)

3.4 TBP-3, Weld Material Control Procedure

3.5 TBP-7, Welder Qualification Procedure

3.6 TBP-10, Measuring and Test Equipment Calibration and Control

3.7 TBP-12, Nonconformances and Discrepancies

3.8 TBP-15, Handling Procedure

3.9 TBP-19, Part Identification Procedure

3.10 TBP-21, Equipment Connection Procedure

3.11 TBP-26, Visual Inspection Procedure

3.12 TBP-29, Piping System Cleanliness Procedure

3.13 TBP-30, Preheating and Interpass Temperature Requirements

3.14 TBP-32, Tools - Color Coding for use on Stainless Steel

3.15 TBP-35, Preparation and Control of Process Piping Travelers

3.16 TBP-43, General Welding Repair Procedure

3.17 ASP-IV-130, Seal and Wrap Removal, Rework and Reinstallation

4.0 DEFINITIONS

4.1 Engineer-Ebasco Services, Inc.

5.0 RESPONSIBILITIES

5.1 It is the responsibility of the Project Engineer to prepare implementing procedures, instructions, drawings, etc. as necessary to support the piping installation effort. The Project Engineer shall also provide clarifications and interpretations of applicable Codes and Contract documents.

5.2 It is the responsibility of the Project Superintendent to implement the requirements of this procedure.

5.3 It is the responsibility of the QC Engineer to provide the required inspection to insure that the installation of Process Piping Systems is in accordance with the applicable procedures.

6.0 INSTRUCTIONS

6.1 Installation of piping - General requirements.

6.1.1 The handling of all piping shall conform to the requirements of TBP-15, Handling Procedure.

6.1.2 Special precautions shall be taken during handling of stainless steel piping and components to prevent contact with carbon steel. Nylon slings or tape covered cable shall be used to handle stainless steel material.

6.1.3 All piping and components shall be stored on wood dunnage. Dunnage shall raise the material at least six (6) inches if on clam shell, two (2) inches if on concrete slabs and ten (10) inches if on earth surfaces.

6.1.4 Special attention shall be directed to pipe cleanliness during storage, handling and installation. End caps shall be kept on all piping and components to seal the interior against dirt intrusion. End caps shall only be removed for inspection and installation. All piping subassemblies shall be QC inspected for cleanliness prior to transport to the point of installation. Certain piping systems shall receive QC inspection for cleanliness prior to weld fitup as delineated in TBP-29, Piping System Cleanliness Procedure.

6.1.5 Prior to the transport of piping to the point of installation, each sub-assembly must have a Tompkins-Beckwith QC accept tag or an Ebasco Conditional Release tag attached.

6.1.6 Temporary attachments (lifting lugs, etc.) on piping and structural steel shall be removed by grinding or cutting operations, not by hammer blows. After the remaining weld material has been ground flush, structural steel on the nuclear plant island and category 1 and 2 and MC piping shall be inspected by liquid penetrant or magnetic particle methods. Temporary attachments shall be documented on Form GP-723-94.

6.1.7 Piping shall be connected to mechanical equipment in accordance with TBP-21, Equipment Connection Procedure.

6.1.8 Pipe shall be aligned to equipment nozzles and containment penetrations to a tolerance of ± 1/8" in a free hanging position. No cold spring of pipe shall be allowed unless specified by the Engineer.

6.1.9 Category 1 and 2 piping sub-assemblies and components should be installed in such a way that the code data plate remains visible for subsequent inspection. If it is unavoidable that the code data plate will be concealed after installation, adequate traceability must be maintained by records traceable to that particular item.

6.1.10 All pipe flanges and contact surfaces shall be concentric with axis of piping and bolt holes shall straddle vertical center lines, except when otherwise directed by the Engineer.

6.1.11 All Bolts shall be engaged so that there is visible evidence of complete threading through the nut.

6.1.12 Washers, when used under nuts, shall be forged or rolled type material matching the nut.

6.1.13 Application of bolt torque on flanged joints shall be in accordance with the following steps:

Step 1. Align flanges.

Step 2. Lubricate stud (or bolt) threads in area of nut engagement and face of nuts using an approved lubricant.

Step 3. Install all bolts and nuts finger tight.

Step 4. Apply torque in 25% steps of required final torque, loading all bolts prior to proceeding to final torque value rating.

Step 5. Tighten bolts in a 180° opposite, clockwise sequence until all bolts are stable at the required torque level.

6.1.14 Required torque valves for bolted connections utilizing flexitallic, grafoil or compressed asbestos gaskets shall be in accordance with Contract No. W3-NY-11. Torque values for all bolted connections on category 1, 2 and 3 piping systems shall be verified and documented per TBP-35, Preparation and Control of Process Piping Travelers.

6.1.15 Torque wrenches used to verify torque values on bolted connections shall be controlled per TBP-10, Measuring and Test Equipment Calibration and Control.

6.1.16 Any compound or lubricant used on threaded joints shall be of a type approved by the Engineer. Care shall be taken to minimize thread sealant contact on pipe flow path surfaces. Threaded joints which are to be seal welded shall be made up without thread compound or lubricant. "Backing Off" to permit alignment of pipe threaded joints shall not be permitted.

6.1.17 Carbon steel and stainless steel pipe may be cold formed or cold bent by any method providing that:

1) The wall thickness is 5/8" or less (any size pipe).
2) The nominal pipe size is 6 inches in diameter or less (any wall thickness).
3) If a pipe bender is utilized, bending shoes which correspond in size to the size of the pipe to be bent shall be used to produce a bend of approximately 5 nominal pipe diameters radius.
4) Bends shall be smooth and free of wrinkles, cracks and surface defects, except as within Code or Contract tolerances.
5) No bending of carbon steel pipe shall be performed at metal temperatures less than 50°F.

6) Any bending or forming of pipe shall not reduce the wall thickness below minimum wall.
7) Bending shall not produce flattening of the pipe as specified by code.

6.1.18 Tools to be used on stainless steel material shall be controlled as per TBP-32, Tools - Color Coding for use of Stainless Steel.

6.1.19 Openings in wall or floors shall not be cut without the approval of the Engineer.

6.1.19.1 Where penetrations have been sealed by the insulating contractor and must be removed for access, the requirements of Reference 3.17 (ASP-IV-130) must be followed. Attachment A (Exhibit 8.3) will be used to initiate seal removal, rework and reinstallation for Penetration Radiation Shields, Fire Stops and Air Seals for Electrical, Mechanical, and HVAC Systems and Interface Material. Q.C. Engineer to verify that "Attachment A", if required, (with parts 1, 2, & 3 completed) is contained in the traveler package prior to release for construction. Verification will be by signature on space provided in 3rd part of "Attachment A". Q.C. Inspectors will monitor field activity on surveillance basis to ensure compliance with this procedure.

6.1.20 Below Grade Yard Piping shall be installed in accordance with Contract No. W3-NY-11 requirements.

6.1.21 Traceability of material shall be maintained as per TBP-19, Part Identification Procedure.

6.1.22 Items sent to be painted with special RCB coatings shall be stenciled with an "R" and T-B code number as required by Table "A" before painting.

6.1.22.1 Material to be painted shall be released by the T-B Materials Engineer.

6.1.22.2 The Materials Department shall keep a log of "R" code numbers and release dates.

TRACEABILITY REQUIREMENTS AND RESPONSIBILITIES
FOR
LEVEL I COATING SYSTEMS

TABLE "A"

	CATEGORY	EXAMPLES: INCL. BUT NOT LIMITED TO	ITEMS FABRICATED BY SHOP		ITEMS FABRICATED IN BCB	
			PAINTING RESPONSIBILITY	INSTALLING CONTRACTORS RESP.	PAINTING RESPONSIBILITY	INSTALLING CONTRACTOR RESP.
1	Items that are identified with stamped ID and are shown on drawings	Prefab Steel 2½" & pipe supports	Assure that item is adequately stamped Record identification	Assure that item is adequately stamped prior to delivery to paint shop	Record identification as shown on item. Assure that item is adequately stamped.	Maintain identification.
2	Items that are identified with ID shown on drawing but ID not stamped on item	IEM Steel Fld. fab item support embedded plates	Assure that item is adequately stamped Record identification	Stamp identification on item as shown on drawings. Maintain ID and install in design location.	Record identification as shown on drawing and drawing number	Note 6
3	Items that are identified with stamped ID but are not shown on drawings	Conduit supports 3" and under pipe supports (safety)	Assure that item is adequately stamped Record identification	Maintain identification. Assure that only items coated with Level I coating are installed in BCB	Record identification as shown on item. Assure Assure that item is adequately stamped	Maintain identification.
4	Items that do not have identification either on item or on drawings	Conduit supports 3" and under pipe supports (non-safety)	Assure that item is adequately stamped for items designated to be installed in the BCB. Record identification.	Establish and maintain identification on items to be installed in the BCB. Assure that only items coated with Level I coating are installed in BCB.	Establish log and/or field sketch giving location and description of item.	Note 6
5	Stock Material	Beams, bar, angle, channel, unistrut, plate, etc. for fabrication of pipe, HVAC, pipe, supports	Record code number for items designated for the BCB and quantity and general description for all items	Establish coding system, transfer code to each cut piece to be installed in the BCB and assure that only items coated with Level I coating are installed in BCB	Not applicable.	DOT APPLICABLE.

NOTES:

1) An item may consist of an individual piece, a subassembly, or a complete assembly.
2) Each component of a welded assy. need not be individually marked.
3) Minor items such as weld clips, small pipe clamps, plates, etc. do not require unique individual piece marks. Coating Contractor is to record description. These items will be considered to be in Category 5 above.
4) Coating Contractor is not responsible to locate individual items in the plant that have been shop coated.
5) All shop coatings of Category 3, 4 and 5A as identified above shall receive Level I coatings.
6) For BCB items, if it becomes necessary to modify, change identification, or to mark an item whether stamped with an ID or not, after coating has been applied. prime or finish, modifying Contractor is to advise Painting Contractor of such change.

6.1.22.3 The Superintendent shall be responsible for utilizing only "R" coded material in the RCB.

6.1.22.4 The "R" code number when required will be transferred prior to any division of the item.

6.1.22.5 QC will verify that shuch "R" code numbers exist on items which are inspected. Acceptance of the items mean that such "R" code numbers exist if required.

6.1.22.6 Items without the required "R" code numbers shall be recorded on DN's and reported by Engineering on IR's to Ebasco for evaluation.

6.1.23 DN's which record Base Metal Defects shall specify the required disposition. Documentation requirements mandated by Code shall be recorded on a Base Metal Repair Sheet (Form GP-723-95).

6.2 Installation of piping - fitup and welding requirements.

6.2.1 All welding shall be performed in accordance with approved procedures. Welders shall be qualified per TBP-7, Welder Qualification Procedure.

6.2.2 Fitup and welding shall be in accordance with the requirements of the applicable welding procedure and the applicable Code (ASME Section III for categories 1, 2 and 3 piping or ANSI B31.1 for categories 4 thru 8 piping).

6.2.3 Pipe that is to be joined by welding may be fit, aligned and retained in position during the welding operation by the use of temporary attachments. Temporary attachments must be removed in accordance with paragraph 6.1.6.

6.2.4 Welding shall not be performed without the addition of filler metal.

6.2.5 Arc strikes shall not be purposely made on piping base metal outside of weld preps. Any arc strikes found on safety related items, outside of the weld prep. shall be documented and identified on a Discrepancy Notice, per the requirements of TBP-12, Nonconformances and Discrepancies. The arc strikes shall be removed by buffing and/or grinding and the resultant surface examined by M.T. or P.T. unless the pipe wall thickness has been reduced below the minimum required. Under these conditions weld metal shall be added to the area of violated minimum wall thickness until the area is built up to the approximate contour of the surrounding base metal surface. The repaired area shall then be examined by M.T. or P.T. and then an R.T. shall be required for final acceptance. The welder who performed the repair shall apply his identification stamp adjacent to the repaired area. E

6.2.6 Weld repairs shall be in accordance with TBP-43, General Welding Repair Procedure.

6.2.7 Preheat and interpass temperatures shall be as per TBP-30, Preheating and Interpass Temperature Procedure.

6.2.8 Ground leads from welding machines shall be run back to the work so that uncontrolled return current pathways through structural or reinforcing steel will not develop unintentional arc strikes.

6.2.9 Power leads to preheating and stress relieving equipment shall be isolated from vulnerable components by use of insulating blankets or other Engineer approved method in order to prevent arc damage. QC shall monitor this requirement for compliance.

6.2.10 Where longitudinally seam welded pipe or fittings are used longitudinal welds in adjoining sections shall be staggered a minimum of 90° during fabrication or installation.

6.2.11 Welding material shall be controlled as per TBP-3, Weld Material Control Procedure.

6.3 Installation of Valves

6.3.1 All valves shall be in the open position during welding into the pipeline (unless otherwise recommended by valve vendor or Engineer).

6.3.2. Temporary valve spacers may be used for valves that will not be delivered in time to maintain installation.

6.3.3 Grinnel Diaphragm Valves will be shipped in sealed plastic bags containing a desiccant. Prior to installation, the bonnet nuts shall be removed to permit separation of the body and diaphragm from the rest of the valve. The bonnet nuts and parts shall be returned to the plastic bag and kept sealed until ready for installation after the valve is welded in place. The valve seats shall be protected at all times.

6.3.4 Valves shall be installed with the flow from under the seat, or per the flow arrow on the valve, and with valve stems inclined above the horizontal unless otherwise shown on the erection drawings, with the exception being gate valves.

6.3.5 The Engineer shall be notified of any identifiable valve interference with any structure or of any case which would render the valve inaccessible for operation or repair. This notification shall preceed valve installation in those cases where the interference is identifiable prior to installation.

6.3.6 If a valve must be disassembled, the Project Engineer must be notified if any locking devices are disturbed during disassembly. The Project Engineer shall determine if special instructions are required for reassembly.

6.4 Installation of specialty items.

6.4.1 Penetration assemblies, expansion bellows, and other specialty items shall be installed in accordance with the installation drawings and the Manufacturer's instructions, and CMI's (Care and Maintenance Instructions).

6.4.2 Expansion bellows shall normally be installed with the Manufacturer's shipping braces attached. The braces shall be removed after installation. If the shipping braces are removed prior to installation, the bellows shall be braced and handled so as to prevent it from expanding, contracting or bending. No welding to the bellows convolutions is permitted, and they shall be covered and protected from arc strikes and other damage.

6.5 Welding to Embedded Plates.

6.5.1 Welds to embedded plates which meet the following three conditions must be welded such that the interpass temperature does not exceed 150°F. This temperature is to be checked by the welder by means of suitable temperature crayon or surface thermometer or pyrometer.

a. Weld $\geq$ 3/8".
b. Embed plates within 3" of concrete edges.
c. Embed plates < 1½" thick.

6.5.2 If one of the above conditions is not met, the 150°F temperature limitation does not apply.

6.5.3 For removal of weldments the attachment shall be arc-gouged to within ½"-1" of the embedded plate surface. Removal of the remainder of the weldment shall be by grinding. Surface temperature of the plate at a location between the area being worked on and the edge should be limited to 150°F maximum and shall be monitored by a Tempil stick mark, surface thermometer or pyrometer.

6.6 Hot bending of carbon steel pipe (A.S.M.E. P-1 material) to achieve alignment. Applies only to A.N.S.I. B31.1 systems, category 4 through 8 and sets of 5° or less at any one point.

6.6.1 Restrain the pipe on at least one side of the bend area so that it remains fixed in the direction the bending force is applied. Use brackets, braces, opposing come-a-longs, etc. Avoid welding to pipe whenever possible.

6.6.2 Attach four thermocouples at 90° with thermocouple attachment unit near center of heat band and connect these to recorder.

6.6.3 Install electric resistance heater pads or elements in the bend band. Position heaters so that they generally cover the entire circumference of the pipe. The minimum width of the heated band shall be one nominal pipe diameter through 8" pipe and one half the nominal pipe diameter for pipe over 8" but not less than 8" wide. Do not place pads over thermocouples. Insulate over pads and pipe as required.

6.6.4 For pipe through 2" thick, the heating rate shall not exceed 600°F per hour and for pipe over 2" thick the heating rate shall be 600°F per hour divided by half the thickness in inches.

6.6.5 Heat the pipe bend area to a minimum temperature of 1650°F. Pipe bending shall only be done when this area is at or over 1650°F. Turn off power to heaters but retain thermocouple readout during bending operation. Caution - Do not overbend. Little or no allowance is required for spring back. If bending operation is not completed prior to cooldown under 1650°F cease bending and reheat as required.

6.6.6 After bending, allow the pipe to cool in still air under insulation blanket. Do not force cool with air, water, etc.

6.6.7 After cooling remove heaters, thermocouples, fixtures, etc.

6.6.8 Wire brush bent section to remove loose scale, etc.

6.6.9 Perform a visual inspection of bent section. There shall be no cracks, arc strikes or linear discontinuities. P. T. areas of thermocouple removal.

6.6.10 Postweld heat treatment under above conditions is not required.

7.0 AUDITS

7.1 The implementation of this procedure will be audited by Quality Assurance in accordance with Tompkins-Beckwith, Inc. Procedure TBP-8.

8.0 EXHIBITS

8.1 Form No. GP-723-94, Temporary Attachment Authorization (with Forms Guide).

8.2 Form No. GP-723-95, Base Metal Repair Sheet (with Forms Guide).

8.3 Attachment A (ASP-IV-130) - Seal and Wrap Removal, Rework and Reinstallation Form. E

TOMPKINS-BECKWITH, INC.
WATERFORD SES UNIT 3

TEMPORARY ATTACHMENT AUTHORIZATION

(Category 1, 2 and MC Piping Systems)

ANI REVIEW_____

Component Identification (1)

Location of Attachment on Component (2)

Component Material (3) Attachment Material (4)

Preheat Requirements (5)

Postweld Heat Treatment Requirements (6)

Welding Procedure (7) NDE Requirements: PT (8) MT (8)

Welding Engineer (9) Date (10)

Welder Identification (11)

Weld Material (12) Req. # (13)

QC Inspector (14) Date (15)

NDE Report Number (16)

Form GP-723-94

Forms Guide for GP-723-94

TEMPORARY ATTACHMENT AUTHORIZATION

Items 1-10 to be Completed by Welding Engineer

(1) Self-Explanatory

(2) Description of Attachment Location

(3) Type and Grade, as Required

(4) Type and Grade, Including Heat Number or Code

(5) As Required by the Base Metal

(6) As Required

(7) Procedure to be Used for Welding

(8) As Required by Contract

(9) Welding Engineer Who Authorized Items 1-8 (Signature)

(10) Date of 9

Items 11-16 to be Completed by QC Inspector

(11) Self-Explanatory

(12) Type of Filler Material Used

(13) Requisition Number for 12

(14) Signature after Final Visual is Complete and NDE is Positive

(15) Date of 14

(16) Self-Explanatory

TOMPKINS-BECKWITH, INC.

BASE METAL REPAIR SHEET

BRS Number (1)

DN Number (When Applicable) (2)

System (3) ISO or Drawing Number (4)

Component ID (5)

Location of Defect (6)

Weld Procedure (7)

Welding Engineer (8) Date (9)

ANI Review (when applicable) (10) Date (11)

QC VERIFICATIONS

Welder Symbol (12) Rod Stip Entry (13)

Acceptable Visual (14)

Acceptable PT or MT Report Number (15)

Acceptable Radiography Report Number (16)

Final QC Acceptance:

(17)
QC Inspector

(18)
Date

Form GP-723-95

~~Forms Guide for GP-723-95~~

BASE METAL REPAIR SHEET

Items 1-9 to be Completed by the Welding Engineer

(1) ~~Base Metal~~ Repair Sheet Number

(2) Self-Explanatory

(3) Self-Explanatory

(4) Self-Explanatory

(5) Self-Explanatory

(6) Description of Defect Location on Component

(7) Procedure to be Used for Welding

(8) Welding Engineer Who Authorized Items 1-7 (Signature)

(9) Date of 8

(10) Class 1, 2 & MC Items Only; ANI Signs After Review

(11) Date of 10

Items 12-18 to be Completed by QC Inspector

(12) Welder Who Made the Repair

(13) Rod Slip Number

(14) QC Inspector Initials and Dates Upon Acceptable Visual

(15) Self-Explanatory

(16) Self-Explanatory

(17) Signature of QC Inspector Upon Final Acceptance

(18) Date of 17

SEAL AND WRAP REMOVAL, REWORK AND REINSTALLATION FORM

1st Part (Originator to fill)

For Ebasco Use only.
Log No. _____

TO: _____ (LDE) FROM: _____ (Originator)

Description of Work: _____ (Remove, Rework, Reinstall, etc.)

Identification: _____ (Seal Tray or Conduit No, Location, Elev. etc.)

Date Requested: _____ Date Required: _____

To: _____ (Contractor) Ebasco approval for Contractor to do the work: _____ (Signature, Date)

2nd Part (Contractor to fill)

Date Work Accomplished: _____ Verified by: _____ (Signature, Date)

To: _____ (LDE) Date: _____

3rd Part (LDE to fill)

To: _____ (Originator) From: _____ (LDE)

Your requested work has been done by Contractor. You may proceed with your work.

_____ (LDE Signature, Data) _____ (T-B Q.C. Engr. Signature, Date

4th Part (Originator to fill)

To: _____ (LDE) From: _____ (Originator)

Our work has been completed. Please arrange for final sealing.

_____ (Signature, Date)

5th Part (LDE to fill)

To: _____ (Contractor) From: _____ (LDE) Date: _____

Please complete the sealing work and QC3 verified.

6th Part (Contractor to fill)

To: _____ (LDE) From: _____ (Contractor) Date: _____

QC3# _____ Work has been completed. _____ (Signature)

TOMPKINS-BECKWITH, INC.
Waterford S.E.S. Unit 3
Louisiana Power & Light Co.
Killona, Louisiana

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[redacted] JB Gore

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TBP-FQT-1 Barry Toups

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By: R Culverson
Date: 6/30/83

Package Dupe

PREPARED BY:

H. Mills — 6-1-83 — Welding Supervisor
SIGNATURE — DATE — TITLE

APPROVED BY:

SIGNATURE — 6/1/83 — DATE — Project Engineer
TITLE

J B Gore — 6-3-83 — Q.A. Site Manager
SIGNATURE — DATE — TITLE

SIGNATURE — DATE — 8502090524 TITLE

TITLE:

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5.3 It is the responsibility of the QC Engineer to provide the required inspection to insure that the installation of Process Piping Systems is in accordance with the applicable procedures.

6.0 INSTRUCTIONS

6.1 Installation of piping - General requirements.

6.1.1 The handling of all piping shall conform to the requirements of TBP-15, Handling Procedure.

6.1.2 Special precautions shall be taken during handling of stainless steel piping and components to prevent contact with carbon steel. Nylon slings or tape covered cable shall be used to handle stainless steel material.

6.1.3 All piping and components shall be stored on wood dunnage. Dunnage shall raise the material at least six (6) inches if on clam shell, two (2) inches if on concrete slabs and ten (10) inches if on earth surfaces.

6.1.4 Special attention shall be directed to pipe cleanliness during storage, handling and installation. End caps shall be kept on all piping and components to seal the interior against dirt intrusion. End caps shall only be removed for inspection and installation. All piping subassemblies shall be QC inspected for cleanliness prior to transport to the point of installation. Certain piping systems shall receive QC inspection for cleanliness prior to weld fitup as delineated in TBP-29, Piping System Cleanliness Procedure.

6.1.5 Prior to the transport of piping to the point of installation, each sub-assembly must have a Tompkins-Beckwith QC accept tag or an Ebasco Conditional Release tag attached.

6.1.6 Temporary attachments (lifting lugs, etc.) on piping and structural steel shall be removed by grinding or cutting operations, not by hammer blows. After the remaining weld material has been ground flush, structural steel on the nuclear plant island and category 1 and 2 and MC piping shall be inspected by liquid penetrant or magnetic particle methods. Temporary attachments shall be documented on Form GP-723-94.

6.1.7 Piping shall be connected to mechanical equipment in accordance with TBP-21, Equipment Conrection Procedure.

6.1.8 Pipe shall be aligned to equipment nozzles and containment penetrations to a tolerance of + 1/8" in a free hanging position. No cold spring of pipe shall be allowed unless specified by the Engineer.

6.1.9 Category 1 and 2 piping sub-assemblies and components should be installed in such a way that the code data plate remains visible for subsequent inspection. If it is unavoidable that the code data plate will be concealed after installation, adequate traceability must be maintained by records traceable to that particular item.

6.1.10 All pipe flanges and contact surfaces shall be concentric with axis of piping and bolt holes shall straddle vertical center lines, except when otherwise directed by the Engineer.

6.1.11 All Bolts shall be engaged so that there is visible evidence of complete threading through the nut.

6.1.12 Washers, when used under nuts, shall be forged or rolled type material matching the nut.

6.1.13 Application of bolt torque on flanged joints shall be in accordance with the following steps:

Step 1. Align flanges.

Step 2. Lubricate stud (or bolt) threads in area of nut engagement and face of nuts using an approved lubricant.

Step 3. Install all bolts and nuts finger tight.

Step 4. Apply torque in 25% steps of required final torque, loading all bolts prior to proceeding to final torque value rating.

Step 5. Tighten bolts in a 180° opposite, clockwise sequence until all bolts are stable at the required torque level.

6.1.14 Required torque valves for bolted connections utilizing flexitallic, grafoil or compressed asbestos gaskets shall be in accordance with Contract No. W3-NY-11. Torque values for all bolted connections on category 1, 2 and 3 piping systems shall be verified and documented per TBP-35, Preparation and Control of Process Piping Travelers.

6.1.15 Torque wrenches used to verify torque values on bolted connections shall be controlled per TBP-10, Measuring and Test Equipment Calibration and Control.

6.1.16 Any compound or lubricant used on threaded joints shall be of a type approved by the Engineer. Care shall be taken to minimize thread sealant contact on pipe flow path surfaces. Threaded joints which are to be seal welded shall be made up without thread compound or lubricant. "Backing Off" to permit alignment of pipe threaded joints shall not be permitted.

6.1.17 Carbon steel and stainless steel pipe may be cold formed or cold bent by any method providing that:

1) The wall thickness is 5/8" or less (any size pipe).
2) The nominal pipe size is 6 inches in diameter or less (any wall thickness).
3) If a pipe bender is utilized, bending shoes which correspond in size to the size of the pipe to be bent shall be used to produce a bend of approximately 5 nominal pipe diameters radius.
4) Bends shall be smooth and free of wrinkles, cracks and surface defects, except as within Code or Contract tolerances.
5) No bending of carbon steel pipe shall be performed at metal temperatures less than 50°F.

6) Any bending or forming of pipe shall not reduce the wall thickness below minimum wall.
7) Bending shall not produce flattening of the pipe as specified by code.

6.1.18 Tools to be used on stainless steel material shall be controlled as per TBP-32, Tools - Color Coding for use of Stainless Steel.

6.1.19 Openings in wall or floors shall not be cut without the approval of the Engineer.

6.1.19.1 Where penetrations have been sealed by the insulating contractor and must be removed for access, the requirements of Reference 3.17 (ASP-IV-130) must be followed. Attachment A (Exhibit 8.3) will be used to initiate seal removal, rework and reinstallation for Penetration Radiation Shields, Fire Stops and Air Seals for Electrical, Mechanical, and HVAC Systems and Interface Material. Q.C. Engineer to verify that "Attachment A", if required, (with parts 1, 2, & 3 completed) is contained in the traveler package prior to release for construction. Verification will be by signature on space provided in 3rd part of "Attachment A". Q.C. Inspectors will monitor field activity on surveillance basis to ensure compliance with this procedure. I

6.1.20 Below Grade Yard Piping shall be installed in accordance with Contract No. W3-NY-11 requirements.

6.1.21 Traceability of material shall be maintained as per TBP-19, Part Identification Procedure.

6.1.22 Items sent to be painted with special RCB coatings shall be stenciled with an "R" and T-B code number as required by Table "A" before painting.

6.1.22.1 Material to be painted shall be released by the T-B Materials Engineer.

6.1.22.2 The Materials Department shall keep a log of "R" code numbers and release dates.

TABLE "A"

TRACEABILITY REQUIREMENTS AND RESPONSIBILITIES FOR LEVEL I COATING SYSTEMS

	CATEGORY	EXAMPLES: INCL. BUT NOT LIMITED TO	ITEMS PAINTED IN SHOP		ITEMS PAINTED IN DCB	
			PAINTERS RESPONSIBILITIES	INSTALLING CONTRACTORS RESP.	PAINTERS RESPONSIBILITIES	INSTALLING CONTRACTOR RESP
1	Items that are identified with stamped ID and are shown on drawings	Prefab Steel 2½" ϕ pipe supports	Assure that item is adequately stamped Record identification	Assure that item is adequately stamped prior to delivery to paint shop	Record identification as shown on item. Assure that item is adequately stamped.	Maintain identification.
2	Items that are identified with ID shown on drawing but ID not stamped on item	IPN Steel Pld, fab tray support embedded plates	Assure that item is adequately stamped Record identification	Stamp identification on item as shown on drawings. Maintain ID and install in design location.	Record identification as shown on drawing and drawing number	Note 6
3	Items that are identified with stamped ID but are not shown on drawings	Conduit supports 3" and under pipe supports (safety)	Assure that item is adequately stamped Record identification	Maintain identification. Assure that only items coated with Level I coating are installed in DCB	Record identification as shown on item. Assure Assure that item is adequately stamped.	Maintain identification.
4	Items that do not have identification either on item or on drawings	Conduit supports 3" and under pipe supports (non-safety)	Assure that item is adequately stamped for items designated to be installed in the DCB. Record identification.	Establish and maintain identification on items to be installed in the DCB. Assure that only items coated with Level I coating are installed in DCB.	Establish log and/or field sketch giving location and description of item.	Note 6
5	Stock Material	Beams, bar, angle, channel, miscellaneous plate, etc. for fabrication of pipe, HVAC, misc. supports	Record code number for items designated for the DCB and quantity and general description for all items	Establish coding system, transfer code to each cut piece to be installed in the DCB and assure that only items coated with Level I coating are installed in DCB	Not applicable.	NOT APPLICABLE.

NOTES:

1) An item may consist of an individual piece, a subassembly, or a complete assembly.
2) Each component of a welded assy. need not be individually marked.
3) Minor items such as weld clips, small pipe clamps, plates, etc. do not require unique individual piece marks. Coating Contractor is to record description. These items will be considered to be in Category 5 above.
4) Coating Contractor is not responsible to locate individual items in the plant that have been shop coated.
5) All shop coatings of Category 3, 4 and 5A as identified above shall receive Level I coatings.
6) For DCB items, if it becomes necessary to modify, change identification, or to move an item whether stamped with an ID or not, after coating has been applied (prime or finish), modifying Contractor is to advise Painting Contractor of such change.

6.1.22.3 The Superintendent shall be responsible for utilizing only "R" coded material in the RCB.

6.1.22.4 The "R" code number when required will be transferred prior to any division of the item.

6.1.22.5 QC will verify that shuch "R" code numbers exist on items which are inspected. Acceptance of the items mean that such "R" code numbers exist if required.

6.1.22.6 Items without the required "R" code numbers shall be recorded on DN's and reported by Engineering on IR's to Ebasco for evaluation.

6.1.23 DN's which record Base Metal Defects shall specify the required disposition. Documentation requirements mandated by Code shall be recorded on a Base Metal Repair Sheet (Form GP-723-95).

6.2 Installation of piping - fitup and welding requirements.

6.2.1 All welding shall be performed in accordance with approved procedures. Welders shall be qualified per TBP-7, Welder Qualification Procedure.

6.2.2 Fitup and welding shall be in accordance with the requirements of the applicable welding procedure and the applicable Code (ASME Section III for categories 1, 2 and 3 piping or ANSI B31.1 for categories 4 thru 8 piping).

6.2.3 Pipe that is to be joined by welding may be fit, aligned and retained in position during the welding operation by the use of temporary attachments. Temporary attachments must be removed in accordance with paragraph 6.1.6.

6.2.4 Welding shall not be performed without the addition of filler metal.

6.2.5 Arc strikes shall not be purposely made on piping base metal outside of weld preps. Any arc strikes found on safety related items, outside of the weld prep. shall be documented and identified on a Discrepancy Notice, per the requirements of TBP-12, Nonconformances and Discrepancies. The arc strikes shall be removed by buffing and/or grinding and the resultant surface examined by M.T. or P.T. unless the pipe wall thickness has been reduced below the minimum required. Under these conditions weld metal shall be added to the area of violated minimum wall thickness until the area is built up to the approximate contour of the surrounding base metal surface. The repaired area shall then be examined by M.T. or P.T. and then an R.T. shall be required for final acceptance. The welder who performed the repair shall apply his identification stamp adjacent to the repaired area.

6.2.6 Weld repairs shall be in accordance with TBP-43, General Welding Repair Procedure.

6.2.7 Preheat and interpass temperatures shall be as per TBP-30, Preheating and Interpass Temperature Procedure.

6.2.8 Ground leads from welding machines shall be run back to the work so that uncontrolled return current pathways through structural or reinforcing steel will not develop unintentional arc strikes.

6.2.9 Power leads to preheating and stress relieving equipment shall be isolated from vulnerable components by use of insulating blankets or other Engineer approved method in order to prevent arc damage. QC shall monitor this requirement for compliance.

6.2.10 Where longitudinally seam welded pipe or fittings are used longitudinal welds in adjoining sections shall be staggered a minimum of 90° during fabrication or installation.

6.2.11 Welding material shall be controlled as per TBP-3, Weld Material Control Procedure.

6.3 Installation of Valves

6.3.1 All valves shall be in the open position during welding into the pipeline (unless otherwise recommended by valve vendor or Engineer).

6.3.2 Temporary valve spacers may be used for valves that will not be delivered in time to maintain installation.

6.3.3 Grinnel Diaphragm Valves will be shipped in sealed plastic bags containing a desiccant. Prior to installation, the bonnet nuts shall be removed to permit separation of the body and diaphragm from the rest of the valve. The bonnet nuts and parts shall be returned to the plastic bag and kept sealed until ready for installation after the valve is welded in place. The valve seats shall be protected at all times.

6.3.4 Valves shall be installed with the flow from under the seat, or per the flow arrow on the valve, and with valve stems inclined above the horizontal unless otherwise shown on the erection drawings, with the exception being gate valves.

6.3.5 The Engineer shall be notified of any identifiable valve interference with any structure or of any case which would render the valve inaccessible for operation or repair. This notification shall preceed valve installation in those cases where the interference is identifiable prior to installation.

6.3.6 If a valve must be disassembled, the Project Engineer must be notified if any locking devices are disturbed during disassembly. The Project Engineer shall determine if special instructions are required for reassembly.

6.4 Installation of specialty items.

6.4.1 Penetration assemblies, expansion bellows, and other specialty items shall be installed in accordance with the installation drawings and the Manufacturer's instructions, and CMI's (Care and Maintenance Instructions).

6.4.2 Expansion bellows shall normally be installed with the Manufacturer's shipping braces attached. The braces shall be removed after installation. If the shipping braces are removed prior to installation, the bellows shall be braced and handled so as to prevent it from expanding, contracting or bending. No welding to the bellows convolutions is permitted, and they shall be covered and protected from arc strikes and other damage.

6.5 Welding to Embedded Plates.

6.5.1 Welds to embedded plates which meet the following three conditions must be welded such that the interpass temperature does not exceed 150°F. This temperature is to be checked by the welder by means of suitable temperature crayon or surface thermometer or pyrometer.

a. Weld $\geq$ 3/8".
b. Embed plates within 3" of concrete edges.
c. Embed plates < 1½" thick.

6.5.2 If one of the above conditions is not met, the 150°F temperature limitation does not apply.

6.5.3 For removal of weldments the attachment shall be arc-gouged to within ½"-1" of the embedded plate surface. Removal of the remainder of the weldment shall be by grinding. Surface temperature of the plate at a location between the area being worked on and the edge should be limited to 150°F maximum and shall be monitored by a Tempil stick mark, surface thermometer or pyrometer.

6.6 Hot bending of carbon steel pipe (A.S.M.E. P-1 material) to achieve alignment. Applies only to A.N.S.I. B31.1 systems, category 4 through 8 and sets of 5° or less at any one point.

6.6.1 Restrain the pipe on at least one side of the bend area so that it remains fixed in the direction the bending force is applied. Use brackets, braces, opposing come-a-longs, ets. Avoid welding to pipe whenever possible.

6.6.2 Attach four thermocouples at 90° with thermocouple attachment unit near center of heat band and connect these to recorder.

6.6.3 Install electric resistance heater pads or elements in the bend band. Position heaters so that they generally cover the entire circumference of the pipe. The minimum width of the heated band shall be one nominal pipe diameter through 8" pipe and one half the nominal pipe diameter for pipe over 8" but not less than 8" wide. Do not place pads over thermocouples. Insulate over pads and pipe as required.

6.6.4 For pipe through 2" thick, the heating rate shall not exceed 600°F per hour and for pipe over 2" thick the heating rate shall be 600°F per hour divided by half the thickness in inches.

6.6.5 Heat the pipe bend area to a minimum temperature of 1650°F. Pipe bending shall only be done when this area is at or over 1650°F. Turn off power to heaters but retain thermocouple readout during bending operation. Caution - Do not overbend. Little or no allowance is required for spring back. If bending operation is not completed prior to cooldown under 1650°F cease bending and reheat as required.

6.6.6 After bending, allow the pipe to cool in still air under insulation blanket. Do not force cool with air, water, etc.

6.6.7 After cooling remove heaters, thermocouples, fixtures, etc.

6.6.8 Wire brush bent section to remove loose scale, etc.

6.6.9 Perform a visual inspection of bent section. There shall be no cracks, arc strikes or linear discontinuities. P. T. areas of thermocouple removal.

6.6.10 Postweld heat treatment under above conditions is not required.

7.0 AUDITS

7.1 The implementation of this procedure will be audited by Quality Assurance in accordance with Tompkins-Beckwith, Inc. Procedure TBP-8.

8.0 EXHIBITS

8.1 Form No. GP-723-94, Temporary Attachment Authorization (with Forms Guide).

8.2 Form No. GP-723-95, Base Metal Repair Sheet (with Forms Guide).

8.3 Attachment A (ASP-IV-130) - Seal and Wrap Removal, Rework and Reinstallation Form. E

TOMPKINS-BECKWITH, INC.
WATERFORD SES UNIT 3

TEMPORARY ATTACHMENT AUTHORIZATION

(Category 1, 2 and MC Piping Systems)

ANI REVIEW_____

Component Identification (1)

Location of Attachment on Component (2)

Component Material (3) Attachment Material (4)

Preheat Requirements (5)

Postweld Heat Treatment Requirements (6)

Welding Procedure (7) NDE Requirements: PT (8) MT (8)

Welding Engineer (9) Date (10)

Welder Identification (11)

Weld Material (12) Req. # (13)

QC Inspector (14) Date (15)

NDE Report Number (16)

Form GP-723-94

Forms Guide for GP-723-94

TEMPORARY ATTACHMENT AUTHORIZATION

Items 1-10 to be Completed by Welding Engineer

(1) Self-Explanatory

(2) Description of Attachment Location

(3) Type and Grade, as Required

(4) Type and Grade, Including Heat Number or Code

(5) As Required by the Base Metal

(6) As Required

(7) Procedure to be Used for Welding

(8) As Required by Contract

(9) Welding Engineer Who Authorized Items 1-8 (Signature)

(10) Date of 9

Items 11-16 to be Completed by QC Inspector

(11) Self-Explanatory

(12) Type of Filler Material Used

(13) Requisition Number for 12

(14) Signature after Final Visual is Complete and NDE is Positive

(15) Date of 14

(16) Self-Explanatory

TOMPKINS-BECKWITH, INC.

BASE METAL REPAIR SHEET

BRS Number (1)

DN Number (When Applicable) (2)

System (3) ISO or Drawing Number (4)

Component ID (5)

Location of Defect (6)

Weld Procedure (7)

Welding Engineer (8) Date (9)

ANI Review (when applicable) (10) Date (11)

QC VERIFICATIONS

Welder Symbol (12) Rod Slip Entry (13)

Acceptable Visual (14)

Acceptable PT or MT Report Number (15)

Acceptable Radiography Report Number (16)

Final QC Acceptance:

(17) QC Inspector (18) Date

Form GP-723-95

Forms Guide for GP-723-95

BASE METAL REPAIR SHEET

Items 1-9 to be Completed by the Welding Engineer

(1) Base Metal Repair Sheet Number

(2) Self-Explanatory

(3) Self-Explanatory

(4) Self-Explanatory

(5) Self-Explanatory

(6) Description of Defect Location on Component

(7) Procedure to be Used for Welding

(8) Welding Engineer Who Authorized Items 1-7 (Signature)

(9) Date of 8

(10) Class 1, 2 & MC Items Only; ANI Signs After Review

(11) Date of 10

Items 12-18 to be Completed by QC Inspector

(12) Welder Who Made the Repair

(13) Rod Slip Number

(14) QC Inspector Initials and Dates Upon Acceptable Visual

(15) Self-Explanatory

(16) Self-Explanatory

(17) Signature of QC Inspector Upon Final Acceptance

(18) Date of 17

SEAL AND WRAP REMOVAL, REWORK AND REINSTALLATION FORM

1st Part (Originator to fill)

For Ebasco Use only.
Log No._____

TO: _____ , FROM: _____
(LDE) (Originator)

Description of Work: _____
(Remove, Rework, Reinstall, etc.)

Identification: _____
(Seal Tray or Conduit No, Location, Elev. etc.)

Date Requested:_____ Date Required:_____

To: _____ Ebasco approval for Contractor
(Contractor) to do the work: _____
(Signature, Date)

2nd Part (Contractor to fill)
Date Work Accomplished:_____ Verified by: _____
(Signature, Date)

To:_____ Date: _____
(LDE)

3rd Part (LDE to fill)

To:_____ From:_____
(Originator) (LDE)
Your requested work has been done by Contractor. You may proceed with your work.

_____ _____
(LDE Signature, Date) (T-B Q.C. Engr. Signature, Date

4th Part (Originator to fill)

To: _____ From: _____
(LDE) (Originator)
Our work has been completed. Please arrange for final sealing.

_____
(Signature, Date)

5th Part (LDE to fill)

To: _____ From: _____ Date:_____
(Contractor) (LDE)
Please complete the sealing work and QC3 verified.

6th Part (Contractor to fill)

To: _____ From: _____ Date:_____
(LDE) (Contractor)

QC3# _____ Work has been completed. _____
(Signature)

TOMPKINS-BECKWITH, Inc.
P. O. Box 390
Hahnville, Louisiana 70057

Phone 721-2306
721-2307

MEMORANDUM

TO: J. B. Gore, Site Q. A. Manager

FROM: Bob Caudel, Project Engineer

SUBJECT: Bending Procedure Qualification

DATE: September 20, 1982

-The attached qualification test record shows that 1 inch schedule 160 carbon steel pipe has been qualified for bending per TBP-37 using bending machine #ACIC.

Bob Caudel
Project Engineer

BC/kap

cc: [redacted]
G. Fields
R. Sisson
Q. A. File

Attachment

TOMPKINS-BECKWITH, INC.
NONDESTRUCTIVE EXAMINATION REQUEST

Type of NDE: UT ☐ MT ☐ PT ☑
Acceptance Criteria: NB 5000 Year: 5 76
Iso, Hanger and/or Spool No. SPEC 1 Field Weld: N/A
Pipe Size: 1" Thickness: .260 Material Type: Carbon Steel
Surface Condition: Buffed
Reference Documents: PQT-1
Location: Building FAB SHOP Elevation N/A Area N/A
Column Lines: N/A
Requested by: Wallace O. Woods (QC INSPECTOR) Date: 9/20/82
Peabody: Accept ☑ Reject ☐
Remarks NAD Temp 90 SN# 190
NDE Performed by: David Clarke Level II Date: 9-20-82

FORM GP-723-14, REV.2

TOMPKINS-BECKWITH, INC.
NONDESTRUCTIVE EXAMINATION REQUEST

Type of NDE: UT ☐ MT ☐ PT ☑
Acceptance Criteria: NB 5000 Year: 5 76
Iso, Hanger and/or Spool No. SPEC. 2 Field Weld: N/A
Pipe Size: 1" Thickness: .260 Material Type: Carbon Steel
Surface Condition: Buffed
Reference Documents: PQT-1
Location: Building Fab Shop Elevation N/A Area N/A
Column Lines: N/A
Requested by: Wallace O Woods (QC INSPECTOR) Date: 9/20/82
Peabody: Accept ☑ Reject ☐
Remarks NAD Temp 90 SN# 190
NDE Performed by: David Clarke Level II Date: 9-20-82

FORM GP-723-14, REV.2

TOMPKINS-BECKWITH, INC.
NONDESTRUCTIVE EXAMINATION REQUEST

Type of NDE: UT ☐ MT ☐ PT ☑

Acceptance Criteria: NB 5000 Year: 5 76

Iso, Hanger and/or Spool No. Spec 5 Field Weld: N/A

Pipe Size: 1" Thickness: .260 Material Type: Carbon Steel

Surface Condition: Buffed

Reference Documents: PQT-1

Location: Building FAB SHOP Elevation N/A Area N/A

Column Lines: N/A

Requested by: Wallace O. Woods (QC INSPECTOR) Date: 9/20/82

Peabody: Accept ☑ Reject ☐

Remarks NAD 90°f

NDE Performed by: D Pyper LT Date: 9-20-82

FORM GP-723-14, REV.2

TOMPKINS-BECKWITH, INC.
NONDESTRUCTIVE EXAMINATION REQUEST

Type of NDE: UT ☐ MT ☐ PT ☑

Acceptance Criteria: NB 5000 Year: 5 76

Iso, Hanger and/or Spool No. Spec 4 Field Weld: N/A

Pipe Size: 1" Thickness: .260 Material Type: Carbon Steel

Surface Condition: Buffed

Reference Documents: PQT-1

Location: Building FAB SHOP Elevation N/A Area N/A

Column Lines: N/A

Requested by: Wallace O Woods (QC INSPECTOR) Date: 9/20/82

Peabody: Accept ☑ Reject ☐

Remarks NAD 90°f

NDE Performed by: D Pyper LT Date: 9-20-82

FORM GP-723-14, REV.2

TOMPKINS-BECKWITH, INC.
NONDESTRUCTIVE EXAMINATION REQUEST

Type of NDE: UT ☐ MT ☐ PT ☑

Acceptance Criteria: NB 5000 Year: S 76

Iso, Hanger and/or Spool No. Spec I Field Weld: NA

Pipe Size: 1" Thickness: .260 Material Type: Carbon Steel

Surface Condition: Buffed

Reference Documents: PQT-1

Location: Building FAB SHOP Elevation N/A Area N/A

Column Lines: N/A

Requested by: Wallace O. Woods (QC INSPECTOR) Date: 9/20/82

Peabody: Accept ☑ Reject ☐

Remarks: MP Temp 90 SN 190

NDE Performed by: David Webb Level II Date: 9-20-82

FORM GP-723-14, REV.2

TOMPKINS-BECKWITH, Inc.

P. O. Box 380
Jennings, Louisiana 70547

Phone [illegible]

PQT - 1

PROCEDURE QUALIFICATION TEST RECORD - PIPE BENDING

PIPE SIZE 1" NOMINAL WALL THICKNESS .250 (Sch 160)

MATERIAL A106 Gr B BENDING MACHINE ID AC 1C

BENDING SHOES ID AC 1C-Z12031

SPECIMEN #1

(a) WALL THICKNESS PRIOR TO BENDING .260

(b) WALL THICKNESS AFTER BENDING .255

(c) ACCEPTABLE WALL THICKNESS (.875 x NOMINAL) 0.219

(d) DMAX 1.314

(e) DMIN 1.280

(f) DO 1.315

(g) 100 x (DMAX - DMIN) /DO = 0.025 = 3%

SPECIMEN #2

(a) WALL THICKNESS PRIOR TO BENDING .260

(b) WALL THICKNESS AFTER BENDING .264

(c) ACCEPTABLE WALL THICKNESS (.875 x NOMINAL) 0.219

(d) DMAX 1.314

(e) DMIN 1.285

(f) DO 1.319

(g) 100 x (DMAX - DMIN) /DO = .022 = 2%

SPECIMEN #3

(a) WALL THICKNESS PRIOR TO BENDING .260

(b) WALL THICKNESS AFTER BENDING .240

(c) ACCEPTABLE WALL THICKNESS (.875 x NOMINAL) 0.219

(d) DMAX 1.314

(e) DMIN 1.284

(f) DO 1.318

(g) 100 x (DMAX - DMIN) /DO = ~~.02~~ .02 = 2%

TOMPKINS-BECKWITH, Inc.
P. O. Box 390
Hardwick, Louisiana 70087
Phone [illegible]

PROCEDURE QUALIFICATION TEST RECORD - PIPE BENDING
CONTINUED

SPECIMEN #4

(a) WALL THICKNESS PRIOR TO BENDING .260

(b) WALL THICKNESS AFTER BENDING .257

(c) ACCEPTABLE WALL THICKNESS (.875 x NOMINAL) 0.219

(d) DMAX 1.314

(e) DMIN 1.284

(f) DO 1.320

(g) 100 x (DMAX - DMIN) /DO = .023 = 2%

SPECIMEN #5

(a) WALL THICKNESS PRIOR TO BENDING .260

(b) WALL THICKNESS AFTER BENDING .260

(c) ACCEPTABLE WALL THICKNESS (.875 x NOMINAL) 0.219

(d) DMAX 1.314

(e) DMIN 1.282

(f) DO 1.319

(g) 100 x (DMAX - DMIN) /DO = .024 = 2%

PROJECT ENGINEER EVALUATION 1" CARBON STEEL PIPE, SCH. 160 IS ACCEPTABLE FOR BENDING ANY INCLUDED ANGLE UP TO 90° WITH THIS PROCEDURE

[signature] 9/20/82