Independent Oversight Review of the Hanford Waste Treatment and Immobilization Plant Black-Cell and Hard-To-Reach Pipe Spools Procurement Process and the Office of River Protection Audit of That Process

January 2013

Office of Safety and Emergency Management Evaluations
Office of Enforcement and Oversight
Office of Health, Safety and Security
U. S. Department of Energy

Table of Contents

Acronyms

ASME	American Society of Mechanical Engineers
BC	Black-Cell
BNI	Bechtel National, Inc.
CAQ	Condition Adverse to Quality
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
FBE	Fusion Bonded Epoxy
HSS	Office of Health, Safety and Security
HtR	Hard-to-Reach
LP	Liquid Penetrant
MAP	Material Acceptance Plan
MRA	Material Requisition
MRR	Material Receiving Report
NDE	Non-Destructive Examination
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement
ORP	Office of River Protection
PIER	Project Issues Evaluation Report
QVD	Quality Verification Document
RIR	Receiving Inspection Report
SDDR	Supplier Deviation Disposition Request
SVR	Supplier Verification Report
WTP	Waste Treatment and Immobilization Plant

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1.0 PURPOSE

The Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security (HSS), conducted a concurrent independent review with the U.S. Department of Energy (DOE) Office of River Protection (ORP) of selected aspects of the Bechtel National, Inc. (BNI) Hanford Site Waste Treatment and Immobilization Plant (WTP) procurement processes for WTP black-cell (BC) and hard-to-reach (HtR) pipe spools. The Independent Oversight review was performed by the HSS Office of Safety and Emergency Management Evaluations and included assessment of the more detailed and broader-scope ORP audit, which was performed by a six-member ORP team that assessed the same BNI procurement processes. The purpose of this Independent Oversight activity was to assess the adequacy of the contractor's procurement processes for safety-related pipe spools fabricated from quality and commercial grade materials, and to assess the adequacy of the DOE site office's audit processes and performance in oversight of the contractor's procurement program, activities, and documentation. Independent Oversight conducted the review from March 12 through August 26, 2012, in coordination with ORP. Supplemental information about the Independent Oversight review is provided in Appendix A.

2.0 SCOPE

The Independent Oversight concurrent review of the BNI procurement process focused on procurement-related documentation associated with a subset of the ORP audit team's selected WTP BC and HtR pipe spools (coaxial and some small stainless steel and nickel-bearing pipe spools). The scope of the review included assessing the adequacy of BNI's documented procurement program, Material Requisitions (MRAs), Technical Specifications, Engineering Document Requirements (G-321-E), Quality Verification Document (QVD) Requirements (G-321-V), Supplier Deviation Disposition Requests (SDDRs), Material Acceptance Plans (MAPs), Surveillance Verification Reports (SVRs), Receipt Inspection Reports (RIRs), Material Receiving Reports (MRRs), Non-Conformance Reports, and Project Issues Evaluation Reports (PIERs). The Independent Oversight review also facilitated assessment of the adequacy and effectiveness of all aspects of the ORP audit team activities, including audit planning, team composition, auditing, coordination, reporting, and factual accuracy validation.

The ORP audit team addressed additional procurement-related areas, including personnel training and qualifications and radiographic film and reader sheets, as well as the adequacy of positive material identification, weld filler material traceability, and fusion bonded epoxy (FBE) coating documentation. The ORP vertical slice audit report findings also took into account: 1) the findings and observations identified during the vertical slice audit; 2) the results of a separate ORP assessment titled *Review of WTP Vendor Submittals*; 3) previous and ongoing results of third-party assessments; 4) ORP surveillances of BNI suppliers and BNI's oversight of its suppliers; and 5) current and ongoing results of receipt and extent-of-condition activities associated with deficiencies identified for BC and HtR vessels.

3.0 BACKGROUND

ORP was established in 1998 to manage the 53 million gallons of liquid and semi-solid radioactive and chemical waste stored in 177 underground tanks at the Hanford Site. ORP serves as DOE line management for WTP and the Tank Farms and is responsible for retrieval, treatment, and disposal of the waste stored in the underground tanks. The WTP is an industrial complex for separating and vitrifying the radioactive and chemical waste stored in those tanks. The WTP complex's capability and reliability in fulfilling its mission depend on the quality of procured components and their compliance with the design and technical specifications. The WTP is currently in the design, component procurement, and construction phase, and procurement of BC and HtR pipe spools is of particular interest because they will be in areas where repairs will be very difficult after radioactive waste operations begin. The safety significance of WTP facilities and the importance of the procurement process in ensuring that WTP can reliably meet mission expectations led Independent Oversight to conduct this concurrent review of the BNI procurement program.

4.0 METHODOLOGY

The Independent Oversight review of the adequacy of BNI's documented procurement program and procurement activity records for WTP BC and HtR pipe spools used the acceptance criteria and references outlined in HSS Criteria, Review and Approach Document (CRAD) 45-12, Nuclear Safety Component and Services Procurement. The Independent Oversight review assessed documents and records associated with the ORP audit team's selected BC and HtR steel coaxial pipe spools and a sample of procurement records for small stainless steel and nickel bearing pipe spools. Reviewed procurement program documentation and procurement activity records are listed in Appendix B.

Finally, to support assessment of the adequacy and effectiveness of the ORP audit, Independent Oversight also reviewed the ORP audit plan, participated in selected periodic audit team conference calls (including meetings with BNI and separate meetings with the audit team), interviewed audit team members, observed the review of radiographs and radiograph reader sheets, and reviewed the draft and final audit team reports.

5.0 RESULTS

The ORP team's "vertical slice" audit evaluated the procurement process for the selected pipe spools from initial preparation of the procurement contract through receipt inspection and final acceptance of the items by BNI. The ORP vertical slice audit of the BNI WTP BC and HtR pipe spools was found to be well planned, staffed, coordinated, and led; effectively implemented; and appropriately documented.

The December 12, 2012 ORP audit team report identified six findings and six observations (the latter including two opportunities for improvement identified by Independent Oversight, documented in Section 7 of this report). The six ORP findings are repeated verbatim below:

U-12-ESQ-RPPWTP-002-F0l (Priority Level 2): Conflicting engineering specification requirements were identified for weld filler test reports and material traceability for BC and HtR pipe spools.

U-12-ESQ-RPPWTP-002-F02 (Priority Level 3): In 2004, BNI accepted pipe spools without the required coating documentation provided from the supplier.

U-12-ESQ-RPPWTP-002-F03 (Priority Level 2): Welds with unacceptable Nondestructive Examination (NDE) results were accepted by BNI and their supplier. Specifically, radiography results for permanent plant piping did not meet minimum Code film quality requirements, or did not meet specified weld acceptance criteria.

U-12-ESQ-RPPWTP-002-F04 (Priority Level 3): Some visual inspection records did not comply with the requirements of ASME [American Society of Mechanical Engineers] NQA [Nuclear Quality Assurance]-1. Inspection records contained in Material Receiving Report (MRR) 24590-WTP-MRR-PROC-0013558 did not reflect all NQA-1 required acceptance criteria such as inspection dates for all inspections completed and type of observation, or specifically state items were acceptable.

U-12-ESQ-RPPWTP-002-F05 (Priority Level 3): A labeling discrepancy for film representing one weld in MRR-13237 existed. For spool 24590-PTF-PWD- WS0540002-A (vendor spool 5368), the radiographic inspection report (identified as the "reader sheet"), the spool fabrication/inspection summary sheet, and the shop drawing showed welds Wl, W2, and W3. The film packet for this spool, however, contains Radiographic Test (RT) film labeled W2, W2, and W3.

U-12-ESQ-RPPWTP-002-F06 (Priority Level 2): BNI's implementation of receipt inspection and source verification methods, and review of supplier submittals by BNI responsible engineers for acceptance of items and or services from a supplier was not fully effective in assuring the products met the procurement requirements. The method used for acceptance did not adequately implement a level and rigor of internal interface control that assured a cohesive review and acceptance of supplier submittals, items, and components.

The ORP audit team also found that BNI's processes for MAPs, Source Verifications, Supplier Submittals, QVD, Receiving Inspection documentation, and Quality Personnel Training and Qualification were generally adequate and satisfactory in the implementation of applicable procedures, except as documented in their findings and observations.

However, as stated in the final ORP audit report, “Overall, based upon all considered information and the results of the audit team's evaluation, the audit team concluded that BNI's programs implementing procurement process requirements were less than adequate, were not acceptably implemented, and not fully effective. Specifically, for Finding **U-12-ESQ-RPPWTP-002-F06** the audit team concluded BNI's implementation of receipt inspection and source verification methods, and review of supplier submittals by BNI responsible engineers for acceptance of items and or services from a supplier was not fully effective in assuring the products met the procurement requirements. The method used for acceptance did not adequately implement a level and rigor of internal interface control that assured a cohesive review and acceptance of supplier submittals, items, and components.”

Independent Oversight reviewed selected activities associated with procurement of fabricated BC and HtR coaxial pipe spools. These included BNI/WTP procurement program procedures for developing, revising, and approving MRAs; MAPs; source initial, in-process, and final verification plans and reports; SDDRs; and MRRs. The BNI/WTP procurement program procedures were found to be compliant with the applicable requirements of 10 CFR 830, DOE Order 414.1C, NQA-1-2000, and the BNI/WTP Quality Assurance Manual, and no concerns or observations were identified.

Independent Oversight reviewed a sample of the MRAs for procurement of fabricated coaxial pipe spools and applicable revisions, MRA Supplements, Global Requisition Change Notices, Technical Change Notices, and Engineering Document Reviews for technical adequacy and compliance with procurement program procedures. These documents were a subset of the BC and HtR pipe spools procurement documents reviewed by the ORP audit team. The MRAs reviewed by Independent Oversight

demonstrated compliance with procurement program requirements; contained a clear statement of work, technical specifications with amplifying notes, supplier instructions for developing SDDRs, and supplier requirements for providing drawings and data; and specified engineering and quality verification documentation, BNI source verification plans, quality assurance program requirements, and documentation of appropriate reviews and approvals. No concerns or observations were identified.

Eight SDDRs applicable to the MRAs for fabrication of coaxial pipe spools were reviewed for technical adequacy and compliance with procurement program procedure requirements for their review and approval. No concerns or observations were identified.

Two revisions of the MAPs applicable to the MRAs for fabrication of coaxial pipe spools were reviewed for technical adequacy and compliance with procurement program procedure requirements for their development, content, review, and approval. Revision "0" of the MAP, dated March 18, 2004, reflects the source verification requirements of revision "3" of the MRA, dated September 3, 2003, and was used to accept fabricated HtR coaxial pipe spools in late 2004 and early 2005. Revision "5" of the MAP, dated November 29, 2010, reflects the source verification requirements of revision "5" of the MRA, dated October 19, 2009, and has not yet been used to accept fabricated coaxial pipe spools. No concerns or observations were identified in revision "0" of the MAP; however, revision "5" of the MAP, which has not yet been used to accept supplied pipe spools, does not accurately reflect the source verification requirements of revision "5" of the MRA. (See **OFI-1**.)

Two MRRs and their supporting SVRs applicable to the 2004 and 2005 received and accepted fabricated coaxial pipe spools were reviewed for technical adequacy and compliance with procurement program procedure requirements for their content, review, and approval. Together, these MRRs listed the pipe spools received and contained the reviewed and approved MAP, the receiving inspection sampling data plan and record, the "kick & count" record, the supplier bill of lading (including piece count), the supplier packing list, the applicable and approved SDDRs, and the BNI record confirming that the QVD requirements were met by the documents included with the MRR. Independent Oversight also reviewed the listed QVDs included in the MRR for conformance to the requirements of the MRA. These documents included surface preparation and coating/shrink sleeve inspection reports, certified material test reports, material certificates of compliance reports, NDE reports, hydrostatic test reports, SDDRs, positive material identification reports, bent pipe wall thickness and ovality measurement reports, weld filler metal approval addendum, individual pipe spool sketches, material safety data sheets, and felt tip paint marker chemical analysis report. With the exception of two wall thickness measurements (discussed below) that appeared not to meet minimum wall thickness specifications, no concerns were identified in the reviewed documents.

MRA 24590-QL-MRA-PS02-00008, Section 2.2, lists the technical specification requirements for pipe spool fabrication – coaxial steel pipe and fittings. The list includes specification 24590-WTP-3PS-PS02-T0002, Rev. 1, "Cold Bending of Pipe," and specification 24590-WTP-3PB-P000-TS32B, Rev. 3, "Piping Material Classification – Pipe Class S32b." Section 2.4 of the MRA lists technical notes applicable to the technical specifications, including note 2.4.4, which states that "Cold Bending shall be in strict compliance with specification 24590-WTP-3PS-PS02-T0002, Specification for Cold Bending of Pipe." MAP 24590-WTP-MAP-AS-04-00282, Rev 0, dated March 18, 2004, included in MRR 24590-WTP-MRR-PROC-0013558, lists the acceptance criteria for cold bending of pipe as: "Per vendor submitted Code 1 procedure; 24590-WTP-3PS-PS02-T0001, Section 3.1.3; and 24590-WTP-3PS-PS02-T0002". Specification 24590-WTP-3PS-PS02-T0002, Rev. 2, Section 3, Materials, states in part that "The wall thickness after bending shall not be less than the minimum allowed thickness of the straight pipe, 87% t nominal…" However, the "Final Inspection Report for APB [American Pipe Bending Company] Bends," page 228 of MRR 24590-WTP-MRR-PROC-0013558, listed two cold bend pipe wall ultrasonic thickness measurements at 0.132 inches or 0.857% of the nominal 0.154 inches pipe wall size,

which initially appeared to be a violation of the minimum pipe wall criteria. In response to this concern, BNI appropriately determined in accordance with ASME B31.1 and as documented in a recent revision of Technical specification 24590-WTP-3PS-PS02-T0002, "Engineering Specification for Cold Bending of Pipe," that a 70% nominal minimum wall thickness was acceptable. Further, subsequent Independent Oversight review determined that Rev 1 of the Specification for Cold Bending of Pipe, which was applicable in 2004 at the time the MAP was implemented, did not include a minimum wall thickness criterion. Further, BNI/WTP's 2004 approved "Vendor Submitted Code 1 Procedure," 24590-QL-POA-PS02-00008-10-01, Rev. 00F, lists the minimum wall thickness criterion as 80%. Although application of the acceptance criteria current in 2004 resolved the original concern about wall thickness, information developed during investigation of this issue showed that the current minimum wall thickness acceptance criterion has inconsistent values of 87%, 80% and 70%. (See **OFI-2**.)

The Independent Oversight assessment outlined above concluded that the documented BNI procurement program requirements are consistent with the applicable requirements of 10 CFR 830, DOE Order 414.1C, NQA-1-2000, and the BNI/WTP Quality Assurance Manual. Further, the MRAs, Technical Specifications, Engineering Document requirements, QVD requirements, SDDRs, MAPs, SVRs, RIRs, and MRRs reviewed by Independent Oversight are generally compliant, appropriate, and effective in meeting BNI/WTP and DOE procurement program requirements. Although the results of the Independent Oversight review outlined above did not identify significant deficiencies and were used in the ORP vertical slice audit report, Independent Oversight agrees with the concerns identified in the ORP report.

6.0 CONCLUSIONS

Based on a review of the effectiveness of a DOE/ORP audit of BNI procurement documents and activities for WTP BC and HtR pipe spools and the adequacy of a subset of the ORP audit team's selected procurement documents, the Independent Oversight review concluded that:

- The reviewed BNI/WTP BC and HtR pipe spool procurement documents and records are generally compliant with program requirements and appropriate as developed and used, except as documented in the ORP vertical slice audit findings and observations.
- The ORP vertical slice audit was effectively planned, staffed, coordinated, implemented, led, and documented.

Two opportunities for improvement identified by Independent Oversight were accepted by ORP and included in the ORP audit report. One identified the need to revise a MAP to accurately reflect the source verification requirements of revision "5" of the associated MRA, and the other identified the need to revise the minimum allowable pipe wall thickness criteria for cold bended pipe to ensure that it is specified correctly and consistently.

As noted in the Results section, the Independent Oversight review did not include consideration of the results of other WTP and ORP audits, surveillances, and assessments. Those considerations led to the ORP audit team's broader results presented in the final ORP vertical slice audit report, which indicated BNI's programs implementing procurement process requirements were not fully effective. Independent Oversight concluded that the ORP assessment was appropriately conducted and supports the ORP findings and conclusions.

7.0 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight review identified the following opportunities for improvement (OFIs). These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management organizations and accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities.

OFI-1: Consider revising MAP 24590-WTP-MAP-AS-04-00282, rev. 5, to accurately reflect the source verification requirements of revision "5" of the associated MRA. Specifically:

- MAP Line 5 requires verification of 100% volumetric NDE, but the acceptance criteria and related note appear to allow liquid penetrant (LP) examinations. LP is not a volumetric technique.
- MAP Line 16 requires verification that NDE conforms to requirements and that LP and magnetic particle examinations are witnessed during first operation, but the identified method does not include first operation.
- MAP Line 18 and Lines 18b through 18i require multiple verifications, in-process and final, of the adequacy of activities necessary to ensure the quality of the exterior surface coating of encasement piping. However, MRA Section 5 requires verification by visual inspection and witnessing that the dry film thickness is checked only during first operation. Further, several of the associated MAP lines include notes indicating that the first operations should be witnessed, not just in-process and final operations.
- MAP Line 24 requires verification that "Socket Welds are not allowed in the Black Cell or Hard-To-Reach Areas." However, the cited acceptance criterion is only related to NDE requirements for socket welds.
- MAP Line 27 does not indicate whether the activity of "Release for Shipment is Authorized" is a Witness Point or a Hold Point. Further, Supplier Quality is assigned to performed this activity as a receipt inspection, with a requirement to contact the Project Supplier Quality Supervisor prior to release. However, MRA Section 5 defines "Release for Shipment" as a Hold Point, and the context appears more appropriate as a final Supplier Quality Representative verification in the supplier's facility.

OFI-2: Consider revising the minimum allowable pipe wall thickness criteria for cold bended pipe to ensure that it is correctly and consistently specified in the following documents:

- Technical specification 24590-WTP-3PS-PS02-T0002, Rev. 002, "Engineering Specification for Cold Bending of Pipe" (87% nominal minimum wall thickness)
- Specification 24590-WTP-3PB-P000-TS32B, "Piping Material Classification – Pipe Class S32b, Rev. 024" (80% nominal minimum wall thickness)
- Procedure 24590-QL-POA-PS02-00008-10-01_Rev_00F, "Vendor Submitted Code 1 Procedure" (80% nominal minimum wall thickness)
- Technical specification 24590-WTP-3PS-PS02-T0002, "Engineering Specification for Cold Bending of Pipe," recent revision (70% nominal minimum wall thickness).

The latter document was developed in response to PIER 24590-WTP-PIER-MGT-12-0884, Rev. 0, which was written to address the initial Independent Oversight review concern for the adequacy of two pipe wall thickness measurements documented in 2004. The four documents listed in OFI-2 incorrectly establish three different minimum allowable pipe wall thickness criteria for cold bended pipe.

8.0 ITEMS FOR HSS FOLLOW-UP

Future actions that Independent Oversight will consider include:

- Assessing the adequacy of BNI's corrective actions for the findings identified in the DOE/ORP vertical slice audit report (BC and HtR piping, both quality and commercial grade materials).
- Assessing the adequacy of the resulting BNI procurement activities associated with BC vessels.

Appendix A
Supplemental Information

Dates of Review

Onsite Review: May 7-11, 2012, and June 25-29, 2012
Offsite Review: March 12, 2012, through August 26, 2012

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Appendix B
Documents Reviewed

Project Issues Evaluation Report

24590-WTP-PIER-MGT-12-0884, Rev 0, Project Issues Evaluation Report, dated July 17, 2012

Non-Conformance Report

24590-WTP-NCR-CON-07-0267, PT Black Cell Spools Missing Required NDE

Source Verification Reports

24590-QL-YQA-PS02-20051 R0, Source Verification Report
24590-QL-YQA-PS02-80001, Rev 0, Quality Surveillance Report, Bristol Piping, 07/22-23/2003
24590-QL-YQA-PS02-80002, Rev 0, Quality Surveillance Report, American Pipe Bending, 09/2-3/2003
24590-QL-YQA-PS02-80003, Rev 0, Quality Surveillance Report, Shaw Pipe Protection, 09/15-19/2003
24590-QL-YQA-PS02-80004, Rev 3, Quality Surveillance Report, Bristol Piping, 09/24-27/2003
24590-QL-YQA-PS02-80029, Rev 0, Quality Surveillance Report, Bristol Piping, 11/16-18/2004
24590-QL-YQA-PS02-80030, Rev 0, Quality Surveillance Report, Bristol Piping, 11/22/2004

Material Acceptance Plans

24590-WTP-MAP-AS-04-00244, Rev-12, Material Acceptance Plan for MRA-PS02-00002
24590-WTP-MAP-AS-04-00282, Rev.-5, Material Acceptance Plan (MAP) Pipe, Spool Fabrication-Coaxial Steel Pipe and Fittings, dated 11/29/10

Material Receiving Reports

24590-WTP-MRR-PROC-0013558, Rev-0, Material Receiving Report, 12/02/2004
24590-WTP-MRR-PROC-0013805_Rev_000, Material Receiving Report for MRA –PS02-00002
24590-WTP-MRR-PROC-0014685, Rev-0, Material Receiving Report for MRA –PS02-00002
24590-WTP-MRR-PROC-0014888, Rev-0, Material Receiving Report, 03/22/2005
24590-WTP-MRR-PROC-0023774 R0, Material Receiving Report for MRA –PS02-00002
24590-WTP-MRR-PROC-0025069 R1, Material Receiving Report for MRA –PS02-00002
24590-WTP-MRR-PROC-0025069 R2, Material Receiving Report for MRA –PS02-00002

Material Requisitions

24590-QL-MRA-PS02-00002, Rev-4, Pipe, Spool Fabrication,- 316/316L Stainless Steel-(<=4" NPS) (QL)
24590-QL-MRA-PS02-00002, Rev-6, Pipe, Spool Fabrication, QL Stainless - NPS 4 and Smaller
24590-QL-MRA-PS02-00008, R3-Pipe, Spool Fabrication-Coaxial Steel Pipe & Fittings
24590-QL-MRA-PS02-00008, R4-Pipe, Spool Fabrication-Coaxial Steel Pipe & Fittings
24590-QL-MRA-PS02-00008, R5-Pipe, Spool Fabrication-Coaxial Steel Pipe & Fittings
24590-QL-MRA-PS02-00008-S0013, Material Requisition Supplement
24590-QL-MRA-PS02-00008-S0014, Material Requisition Supplement
24590-QL-MRA-PS02-00008-S0016, Material Requisition Supplement
24590-QL-MRA-PS02-00008-S0017, Material Requisition Supplement
24590-QL-MRA-PS02-00008-T0001, Technical Change Notice
24590-QL-MRA-PS02-00008-T0002, Technical Change Notice

24590-WTP-EDR-PL-ll-0013, Rev-0, Completed Engineering Document Review for MRA–PS02-00002, Rev-6

Supplier Deviation Disposition Requests

24590-WTP-SDDR-PL-05-00059, Process for Insulating Pipe Elbows
24590-WTP-SDDR-PL-11-00127, Rev-NA, Supplier Deviation Disposition Request for MRA-PS02-00002 supplement S002
24590-WTP-SDDR-PROC-03-0268, Allowable Dry FBE Film Thickness
24590-WTP-SDDR-PROC-03-0269, Revised FBE Coated Piping Bend Testing
24590-WTP-SDDR-PROC-03-0270, Modification of FBE Dry Film Maximum Overlap Thickness
24590-WTP-SDDR-PROC-03-0271, Authorize Air Cooling of FBE Coated Piping
24590-WTP-SDDR-PROC-03-0298, Modification of Sealing Tape Chemical Content Specifications
24590-WTP-SDDR-PROC-04-00657, Authorize Use of HDPE [high density polyethylene] Shrink Fit Insulation Jacket
24590-WTP-SDDR-PROC-04-00859, Authorize Use of Yellow Marker on Black HDPE Jacket

Program Documents

24590-WTP-3DP-G04B-00058, Rev 12A, Supplier Engineering and Quality Verification Documents
24590-WTP-3DP-G04B-00063, Rev 018, Supplier Deviation Disposition Request
24590-WTP-3DP-G06B-00001, Rev 23A, Material Requisitions
24590-WTP-3PS-G000-TP002, Rev 004, Positive Material Identification (PMI) for Shop Fabrication
24590-WTP-GPG-ENG-037, Rev_013, Supplier Document Request and Review
24590-WTP-GPP-MGT-013, Rev 17B, Acceptance of Procured Material
24590-WTP-GPP-MGT-051, Supplier QA [quality assurance] Audit
24590-WTP-GPP-MGT-066, Rev 000, Review of Project Documents
24590-WTP-GPP-PSQ-041, Rev 003, Source Verification Initial Visit
24590-WTP-GPP-PSQ-042, Rev 008, In-Process Source Verification
24590-WTP-GPP-PSQ-043, Rev 006, Source Verification Reporting
24590-WTP-GPP-PSQ-044, Rev 009, Final Source Verification
24590-WTP-GPP-PSQ-045, Rev 05D, Quality Verification Document Review
24590-WTP-GPP-PSQ-046, Rev 05A, Release for Shipment
24590-WTP-GPP-PSQ-050, Rev 13B, Receiving Inspections
24590-WTP-QAM-QA-06-001_Rev_010, Quality Assurance Manual

Technical Specifications

24590-QL-POA-PS02-00008-10-01_Rev_00F, Vendor Submitted Code 1 Procedure
24590-WTP-3PB-P000-TS32B_Rev_024, Pipe Class S32B Technical Specification
24590-WTP-3PN-PS02-00010_Rev_ADM, Specification Change Notice applicable to Rev-1 of the 3PS-PS02-T0001 specification
24590-WTP-3PS-PS02-T0001_Rev_010, Engineering Specifications for Shop Fabrication of Piping
24590-WTP-3PS-PS02-T0002, Rev 1, Engineering Specifications for Cold Bending of Pipe
24590-WTP-3PS-PS02-T0002, Rev-2, Engineering Specifications for Cold Bending of Pipe
ASME B31.3, Excerpt - Minimum Thickness from Bending