# Independent Oversight Review of the Hanford Site Waste Treatment and Immobilization Plant Construction Quality


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

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# Acronyms

| | |
|---|---|
| ASME | American Society of Mechanical Engineers |
| AWWA | American Water Works Association |
| BOF | Balance of Facilities |
| BNI | Bechtel National, Incorporated |
| CDR | Construction Deficiency Report |
| CGD | Commercial Grade Dedication |
| CM | Commercial Grade Material |
| CRAD | Criteria Review and Approach Document |
| DDR | Deficiency and Disposition Report |
| DOE | U.S. Department of Energy |
| DOE-WTP | ORP WTP Project Office |
| HLW | High-Level Waste Facility |
| HVAC | Heating, Ventilation, and Air Conditioning |
| LAB | Analytical Laboratory |
| LAW | Low-Activity Waste Facility |
| NCR | Nonconformance Report |
| NQA | Nuclear Quality Assurance |
| ORP | Office of River Protection |
| P&ID | Piping and Instrumentation Diagram |
| PTF | Pretreatment Facility |
| PVC | Polyvinyl Chloride |
| Q | Quality |
| QA | Quality Assurance |
| QC | Quality Control |
| SCAR | Supplier Corrective Action Report |
| SSC | Structures, Systems, and Components |
| WTP | Waste Treatment and Immobilization Plant |

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## 1.0 PURPOSE

The U. S. Department of Energy (DOE) Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security, conducted an independent review of selected aspects of construction quality at the Hanford Site Waste Treatment and Immobilization Plant (WTP). The review, which was performed August 6-10, 2012, was the latest in a series of ongoing quarterly assessments of construction quality performed by Independent Oversight at the WTP construction site.

## 2.0 BACKGROUND

The DOE Office of River Protection (ORP) was established in 1998 to manage the 56 million gallons of liquid or semi-solid radioactive and chemical waste stored in 177 underground tanks at the Hanford Site. ORP serves as DOE line management for two functions: the Tank Farms, which maintain the 177 underground storage tanks; and the WTP, which 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 radioactive and chemical waste stored in the underground tanks. The WTP complex consists of five major components: the Pretreatment Facility (PTF) for separating the waste; the High-Level Waste Facility (HLW) and Low-Activity Waste Facility (LAW), where the waste will be immobilized in glass; the Analytical Laboratory (LAB) for sample testing; and the balance of facilities (BOF) that will house support functions. The WTP is currently in the design and construction phase. Design and construction activities at WTP are managed by Bechtel National, Incorporated (BNI) under contract to ORP. Construction oversight is provided by the ORP WTP Project Office (DOE-WTP) staff, specifically by the DOE-WTP Construction Oversight and Assurance Division. Because of the safety significance of WTP facilities, Independent Oversight has scheduled quarterly reviews to assess the quality of ongoing construction.

## 3.0 SCOPE

The scope of this review encompassed various topics, including observation of two hydrostatic pressure tests, review of material condition and protection of facilities and equipment in the HLW and PTF, and review of the results of quality control (QC) tests performed on samples of concrete placed in the HLW and PTF. Independent Oversight examined nonconformance reports (NCRs) and construction deficiency reports (CDRs) identified by BNI under its corrective action program, as well as a sample of BNI's quality assurance (QA) audits and surveillances.

In addition, Independent Oversight reviewed various construction quality documents and conducted several construction site walkthroughs, concurrent with DOE-WTP staff. During the walkthroughs, Independent Oversight observed hydrostatic pressure tests and activities related to the protection of equipment, components and hardware in the PTF and HLW. Independent Oversight also examined drawings, specifications, and procedures that control concrete placement activities, structural steel erection, installation of piping and pipe supports, and pressure testing of piping systems. Independent Oversight also followed up on site activities to address previously identified opportunities for improvement.

## 4.0 METHODOLOGY

This independent review of the WTP construction project was conducted in accordance with applicable sections of Nuclear Facility Construction Criteria Review and Approach Documents (CRADs) HSS-CRAD-64-15, Structural Concrete; HSS-CRAD-64-16, Structural Steel; HSS-CRAD-45-52, Piping and Pipe Supports; and HSS-CRAD-45-53, Mechanical Equipment Installation.

## 5.0 RESULTS

Activities examined by Independent Oversight during the review are discussed below. Each activity is briefly described, followed by a discussion of the review performed by Independent Oversight. Conclusions are summarized in Section 6, an Opportunity for Improvement is listed in Section 7, and items for follow-up are discussed in Section 8.

**NCRs and CDRs.** NCRs are issued to document and disposition nonconforming conditions involving quality (Q) structures, systems, and components (SSC). Q components, previously designated QL, are constructed or manufactured in accordance with the WTP QA program, American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA)-1. CDRs are issued to document and disposition nonconforming conditions for SSC that are constructed on site by the contractor, BNI, as non-Q, commercial grade, or that are purchased as commercial (CM) items from vendors who are qualified as commercial grade suppliers. Evaluation for listing as a CM supplier requires assessment of the vendor's QA program against selected QA criteria designated by the engineering organization. Independent Oversight reviewed the 53 NCRs issued by BNI from May 7, 2012, through August 8, 2012, and 37 of the CDRs issued by BNI in May and June 2012 to evaluate the type of nonconforming issues that were identified, subsequent corrective actions, and the apparent cause of the nonconforming conditions.

Approximately 60 percent of the NCRs and half of the CDRs were issued to resolve equipment and hardware procurement problems, such as: (1) hardware/components that were delivered to the site without the required supporting documentation demonstrating compliance with purchase specifications, (2) hardware/equipment that did not comply with project specification requirements, (3) improperly labeled hardware, and (4) missing parts or damage that occurred during transit. Independent Oversight found that the BNI engineering organization developed appropriate corrective actions to disposition the identified problems. Corrective actions usually involved rework performed on site, but in some cases the hardware was returned to the vendor. The remaining NCRs and CDRs were initiated to address construction, installation, or design/engineering issues. Examples of the issues identified in these CDRs and NCRs were damage to installed equipment during construction work, failure to follow construction procedures, personnel errors, installation errors, or engineering deficiencies. Independent Oversight determined that BNI developed appropriate corrective actions to disposition the identified problems. The NCR/CDR process and implementation were adequate to address and resolve procurement and construction quality deficiencies.

**Quality Assurance Audits and Surveillances.** Intermech, Inc., a subcontractor to BNI, is responsible for designing, fabricating, installing, and testing the heating, ventilation, and air conditioning (HVAC) systems in the PTF, HLW, LAW, and LAB. These systems are classified as either Q or CM, depending on their function and design basis requirements. Intermech also procures the materials used to fabricate the HVAC systems, including supports, sheet metal, ductwork, dampers, and other components.

A BNI QA supplier audit performed in 2009 identified deficiencies in the Intermech procurement program. Supplier Corrective Action Report (SCAR) 24590-WTP-SCAR-QA-09-083 was issued to

document the audit finding. The specific concerns were that Intermech supplier audits were not adequate to verify material traceability and to determine whether the flowdown of contract procurement requirements to Intermech supplier's sub-tier vendors were in accordance with NQA-1. In addition, Intermech procedures for commercial grade dedication (CGD) were not adequately documented. The BNI QA supplier audit concluded that the quality of materials supplied by Intermech for the HVAC systems was indeterminate and that Intermech had insufficient evidence to support qualifications of their suppliers to provide Q materials. Intermech issued Deficiency and Disposition Report (DDR) No. WTP-DDR-121 to correct the deficiencies identified in their procurement program. Corrective actions included an evaluation of all suppliers that Intermech procures Q materials from, development of a program to provide verification of Q materials installed in the WTP by Intermech, revision of the Intermech and Intermech supplier's CGD programs, and submittal of the revised CGD programs/procedures to BNI for review and approval.

Independent Oversight reviewed the corrective actions performed by Intermech to disposition WTP-DDR-121. Intermech performed a survey to identify suppliers of Q materials for the WTP HVAC systems and found four who had provided Q HVAC materials. Intermech performed additional audits of these four suppliers, which were witnessed by WTP personnel and focused on CGD, vendor evaluation, and control of purchased materials. The supplemental audits determined that materials delivered by three of the four suppliers met quality requirements. An extent-of-condition review to determine areas in the WTP where materials from the one potentially unqualified supplier had been installed found that only a small quantity of materials from that supplier had been installed in Q HVAC systems. WTP-DDR-122 was issued to document the extent-of-condition review. Representative samples of suspect materials were tested by an independent testing laboratory to determine whether the materials met specification requirements. The physical, chemical, and mechanical properties of the materials were analyzed. If applicable, coatings type and thickness were also tested. All samples tested were found to be acceptable. Independent Oversight reviewed the summary of the test results documented in reference CCN 216333. BNI completed calculations validating that the HVAC ducts and duct supports would perform their required safety function. Duct leakage tests will also be performed by Intermech to demonstrate that the ductwork will maintain its confinement function. Intermech revised its CGD plans and procedures and submitted them to BNI Nuclear Materials and Services Engineering for review and approval.

Preventive actions to preclude the condition from recurring include annual evaluation of BNI/WTP suppliers, increased emphasis on CGD and supplier evaluation, revision of the Intermech supplier qualification and audit program, submittal of the revised program to BNI for approval, and training of Intermech auditors on the new programs.

Independent Oversight reviewed a QA supplier audit report and three QA surveillance reports documenting results of QA audits/surveillances performed by BNI QA personnel on Intermech. QA Supplier Audit Report 24590-WTP-AR-QA-11-042, Revision 1, documents the results of a detailed two-week audit performed by six BNI personnel in December 2011 of Intermech's implementation of its QA program. Areas examined during the audit included design, procurement, manufacturing/material control, control of special processes, inspection, and other QA program controls, such as independence of the Intermech QA organization, stop-work authority, training, and Intermech QA audits. The review of the procurement program included the CGD program, purchase orders, and the Intermech approved vendor's list. Ten SCARs were identified during the audit, most involving minor issues. The BNI auditors concluded that Intermech's program and its implementation were satisfactory but recommended that a separate surveillance be performed to witness Intermech performing an HVAC duct leakage test.

BNI completed QA Surveillance 24590-WTP-SUV-QA-12-034 in April 2012 to review Intermech's corrective actions and technical justification for closing five of the SCARs identified in the QA Supplier Audit (24590-WTP-AR-QA-11-042, Revision 1) discussed above. BNI determined that the corrective

actions had been completed and were sufficient to correct the deficiencies. QA Surveillance 24590-WTP-SUV-QA-12-017 was conducted in March 2012 to follow up on the recommendation in QA Supplier Audit Report 24590-WTP-AR-QA-11-042, Revision 1 to observe in-process HVAC duct leak testing at WTP. Since no duct leak or pressure testing was scheduled for six weeks, BNI reviewed the qualifications of Intermech test personnel, control and calibration of test equipment, and storage of records. No deficiencies were identified. QA Surveillance 24590-WTP-SUV-QA-12-010 was conducted in May 2012 to observe an HVAC duct negative pressure test and determine whether the test was performed in accordance with Intermech test procedures. No discrepancies were identified, and the test results met the acceptance criteria.

NCR 24590-WTP-NCR-CON-10-00089, Indeterminate Commercial Grade Dedication, Indeterminate Quality of Material, was initiated to document and disposition the deficiencies in the Intermech procurement program identified in SCAR 24590-WTP-SCAR-QA-09-083 and WTP- DDR-122. The reason for initiating the BNI NCRs was to track the Intermech DDR and have BNI Engineering approve the final disposition of the Intermech DDR. BNI Engineering has continued to provide approval of the final disposition for Intermech DDRs. During review of 2012 BNI NCRs, Independent Oversight noted that, as of August 8, 2012, 20 of 136 BNI NCRs were initiated to incorporate Intermech DDRs into the BNI NCR system for final approval by BNI Engineering. These DDRs document issues identified by Intermech, such as Intermech supplier procurement problems, Intermech QA audit findings, and fabrication errors.

Independent Oversight also reviewed an internal audit performed by BNI QA personnel of the BNI WTP receiving inspection program. The internal audit showed that BNI receipt inspection personnel satisfactorily implemented the receipt inspection program. Three findings were identified and were documented in three Project Issues Evaluation Reports.

The QA audits and surveillances performed by BNI were effective in identifying deficiencies in the Intermech QA program. The BNI Nuclear Services and Materials Engineering group was effective in reviewing Intermech procurement program deficiencies, corrective actions, and revisions to the Intermech procurement program. BNI QA was effective in performing follow-up audits to assure implementation and completion of corrective actions.

**Concrete Placement Activities.** There were no Q concrete placements during the current review. Concrete placement activities have been deferred in the PTF due to design and process questions, and concrete placement continues in the HLW at a slow pace due to reductions in construction craft staffing. Independent Oversight reviewed the results of QC tests performed on concrete samples from nine Q concrete pours placed in the HLW and PTF between March and June 2012. These included three placements in the base mat for the PTF control building and six placements in the HLW.

The tests included slump, temperature, and unit weight testing performed on the freshly mixed concrete and unconfined compression tests performed on concrete cylinders cured in the concrete laboratory for 3 to 28 days. The concrete design strength is based on the unconfined compression strength of concrete cylinders, and the concrete strength is determined by first casting samples of concrete in cylindrical molds either 4 inches in diameter and 8 inches high or 6 inches in diameter and 12 inches high. These are moist cured in a field laboratory for a specified period and then subjected to an unconfined compression test. Typically the design strength at WTP is based on concrete test cylinders cured in the laboratory for 28 days. The results of the unconfined compression tests are used to verify the concrete quality and demonstrate that the concrete meets design strength requirements. The methods for sampling the concrete, casting and curing the cylinders, and performing the unconfined compression tests are specified in ASTM International standards. At WTP, the unconfined compression strength of the concrete at 28

days generally exceeds the specified design strength by 1000 psi or more for all classes of structural concrete. The quality of concrete for the WTP project has been very good.

**Pressure Testing of Piping.** Independent Oversight observed two hydrostatic pressure tests performed on CM piping in the LAB HVAC chilled water system and on the CM domestic water system piping at the connection to the BOF glass-former facility. No pressure tests on Q piping were scheduled during the current review. The WTP site work process for conducting leak testing is specified in Construction Procedure 24590-WTP-GPP-CON-3504, Rev. 7D, *Pressure Testing of Piping, Tubing and Components*.

Independent Oversight attended the pre-test briefings, reviewed drawings and test data sheets, observed pressurization of the systems to the specified test pressure, observed the minimum hold times, and witnessed the system walkdown and inspection of piping within the test boundary. During the pre-job briefings, the following items were discussed: safety guidelines, emergency plan, the size and setting of the pressure relief valve, test sequence, test boundaries, test pressure, system pressurization and de-pressurization, inspection activities, and work completion. The pressure test and inspection boundaries were shown on marked-up piping and instrumentation diagrams (P&IDs), and the attached valve lineup sheets listed the test valve position and referenced test plug or blind flange locations. Limited access/safety barriers were located in accordance with procedure requirements by calculating stored energy.

The applicable code for the hydrostatic pressure test performed on the domestic water system polyvinyl chloride (PVC) piping at the connection to the BOF glass-former facility is specified in American Water Works Association (AWWA) Code C 605, *AWWA Standard for Underground Installation of PVC or PVCO Pressure Pipe and Fittings*. The required hold time was 15 minutes at a pressure of 105 psi. Since the test pressure gauges were located at the high point of the portion of the system being tested, it was not necessary to adjust the test pressures to compensate for the elevation (head) difference between the location of the pressure gauge and highest elevation of the piping being tested. Independent Oversight verified that the calibration stickers on the test pressure gauges were current and that whip restraints were installed on pressure hoses. The walkdowns and inspections of the piping were performed by field engineering personnel. Independent Oversight reviewed the test data sheets, which recorded the test information, test requirements, required signoffs for pre-test reviews, documentation of measuring and test equipment used, and test results. No leaks were detected, and the test was declared acceptable. The section of the piping that was tested was buried after the test was completed, using a controlled density fill concrete mix classified as a CDF-B mix, with a specified strength of 50 to 200 psi. This is a non-structural concrete mix which is used as backfill in pipe trenches.

The applicable code for the hydrostatic pressure tests performed on the LAB HVAC chilled water system piping is specified in ASME Code B31.3, Section 345, Testing. The elevation difference between the gauge and high point on the system being tested was 32 feet. The required test pressure was increased to account for the elevation (head) difference by adding 0.433 psi per foot of head to the required system test pressure of 262.5 psi. The calculated test pressure was 276.36 psi, with a specified hold time of 10 minutes. One of the twelve valve/component data sheets (Data Sheet 13), which listed the valve/component positions (open, closed, or N/A) for Items 68 through 84, had not been completed before the pre-test walkdown. However, the valve positions for all valves/components within the pressure test boundary were identified on marked-up P&IDs as required by Section 5.2 of Procedure 24590-WTP-GPP-CON-3504, Rev. 7D. The BNI field engineer completed valve/component lineup for Items 68 through 84 on Data Sheet 13 during a pre-test walkdown and recorded the positions (open, closed, N/A) on the valve/component data sheet. Independent Oversight verified that the test positions for items 68 through 84 indicated on Data Sheet 13 by the BNI field engineer were as specified on the marked P&IDs. Independent Oversight also performed a pre-test walkdown, examined the valve/component positions for approximately 50 of the 200 items within the test boundary, and verified that they were in the correct test

position and tagged as required by the test procedure. Independent Oversight identified a tag on one valve that incorrectly showed the valve position was N/A instead of open; however, the valve was in the correct position, (i.e., open). The BNI field engineer corrected this tag during his pre-test walkdown. Independent Oversight verified that the calibration stickers on the test pressure gauges were current and that whip restraints were installed on pressure hoses. The walkdowns and inspections of the piping were performed by field engineering personnel. A few leaks were detected in mechanical connections and were repaired by tightening fittings and/or flanges. There were no leaks in welded joints. The test was declared acceptable.

The pressure tests witnessed by Independent Oversight were completed in accordance with the requirements of Construction Procedure 24590-WTP-GPP-CON-3504, Rev. 7D, with the exception of the data sheet, discussed above, that had not been completed before the pre-test walk down.

**Follow-Up Review of Structural Steel Installation Procedure.** Procedure 24590-WTP-GPP-CON-3206, *Structural Steel Installation and On-Site Fabrication*, was revised and re-issued as Revision 4A, with an effective date of February 28, 2012. During the review of Revision 4A of Procedure 24590-WTP-GPP-CON-3206 in May 2012, Independent Oversight identified several discrepancies in the instructions for completing several of the data sheets in the appendices of the procedure; correction of these discrepancies was identified as an opportunity for improvement during that review. During this August 2012 review, Independent Oversight noted that the discrepancies in this procedure have not been corrected. Although structural steel erection activities have been deferred in the PTF, structural steel is currently being erected in the HLW. Failure to correct the discrepancies in the procedure could result in errors in the QC records for structural steel erection, or possibly a missed or incorrectly performed QC inspection step.

**Material Condition and Protection of Installed Equipment and Facilities.** Independent Oversight, accompanied by DOE-WTP personnel, toured the PTF and HLW to examine ongoing construction activities and protection provided for installed equipment. The overall material condition of installed equipment was good. Instrumentation and instrument panels were wrapped in protective covers, and mechanical equipment, such as cranes, motors, and gloveboxes, were covered and protected from construction activities. During a walkdown inspection to examine material condition in May 2012, Independent Oversight identified three discrepancies in the HLW and PTF, and also identified establishment of a formal maintenance program to maintain and preserve the PTF and HLW structures as an opportunity for improvement.

During the current review, Independent Oversight noted that two of the three discrepancies had been corrected. These discrepancies involved improper storage of new structural steel fasteners in the PTF and improper housekeeping that could result in corrosion of the embedded hardware which is the substructure for the lower rails and supports for the heavy shield doors that provide access to the crane maintenance area in the HLW filter caves. Kegs of fasteners had been stored on a concrete floor in a covered shelter in the PTF; the bottoms of some of the kegs were immersed in standing water, and the lids on some of the kegs were loose. In response to Independent Oversight's observations in May 2012, the kegs of fasteners were immediately placed on pallets, and they have since been relocated to a more protected storage area. With respect to the shield doors for the HLW filter cave crane maintenance area, the embedded hardware is installed in depressions in the floor that, in May 2012, were full of water. The lower rails and supports for the shield doors will be attached to the embedded hardware. The concern was potential corrosion of the embedded hardware which was submerged in water which could affect the structural integrity of supports and rails for the heavy doors. Since then, the water has been drained from the depressions, and they were dry at the time of the current review.

No action has been taken to address the concern identified in May 2012 regarding unpainted PTF structural steel at beam-column connections and at column splices; painting is needed to protect the steel and tensioned bolt assemblies from rusting/corroding. Independent Oversight identified one new discrepancy during the current review: failure to cap the ends of permanent piping that penetrates concrete walls, in order to prevent internal contamination of the piping. Approximately a dozen stainless steel pipes in the HLW were missing the protective covers. Some of these may have been joggles, which could become blocked with construction debris that could be extremely difficult to remove.

## 6.0 CONCLUSIONS

Independent Oversight determined that construction quality at WTP is adequate in the areas that were reviewed. BNI Engineering had developed appropriate corrective actions to disposition the NCRs and CDRs that Independent Oversight reviewed. Concrete quality is good, and the program for pressure testing of installed piping is adequate. A review of corrective actions accepted by BNI to previously identified opportunities for improvement in the area of PTF structural steel painting and needed changes to the BNI structural steel installation procedure have not been initiated. One new opportunity for improvement that was identified in the HLW is the need to ensure temporary caps are installed in the ends of permanent piping to prevent internal contamination.

## 7.0 OPPORTUNITIES FOR IMPROVEMENT

Independent Oversight identified the following opportunity for improvement. These recommendations are not intended to be mandatory. Rather they are offered to the project to be reviewed and evaluated by the responsible line management organization and be accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities:

- Consider establishing a program to maintain temporary caps on the ends of installed piping to prevent internal contamination of the piping.

## 8.0 ITEMS FOR FOLLOW-UP

Independent Oversight will continue follow up on inspection of piping, pipe supports, and installation of mechanical equipment. Independent Oversight will also review additional pressure testing activities and follow up on previously identified opportunities for improvement.

# APPENDIX A
# SUPPLEMENTAL INFORMATION

**Review Dates**

August 6-10, 2012

**Office of Health, Safety and Security Management**

Glenn S. Podonsky, Chief Health, Safety and Security Officer
William A. Eckroade, Principal Deputy Chief for Mission Support Operations
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William Eckroade
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George Armstrong
Robert Nelson

**Acting Independent Oversight Site Lead for Hanford Site**

William Miller

**Independent Oversight Team Member**

Joseph Lenahan

# APPENDIX B
# DOCUMENTS REVIEWED

- DOE-WTP Surveillance Reports for March through July, 2012
- Construction Procedure 24590-WTP-GPP-CON-3503, Rev. 5D, Aboveground Piping Installation, August 11, 2011
- Construction Procedure 24590-WTP-GPP-CON-3509, Rev. 2C, Pipe Support Installation, July 11, 2012
- Construction Procedure 24590-WTP-GPP-CON-3504, Rev. 8, Pressure Testing of Piping, Tubing and Components, May 1, 2012
- Construction Procedure 24590-WTP-GPP-CON-3206, Rev. 4A,Structural Steel Installation and Onsite Fabrication, February 28, 2012
- Construction Procedure 24590-GPP-MGT-043, Rev. 3A, Corrective Action Management, July 25, 2012
- Construction Procedure 24590-GPP-MGT-044, Rev. 1, Nonconformance Reporting and Control, January 17, 2012
- Specification No. 24590-WTP-3PS-DB01-T0001, Rev. 8, Engineering Specification for Furnishing and Delivering Ready-Mix Concrete, March 26, 2007
- Specification No. 24590-WTP-3PS-SS00-T0001, Rev. 7, Engineering Specification for Welding of Structural Carbon Steel, January 30, 2008
- Specification No. 24590-WTP-3PS-PS02-T0003, Rev. 9, Engineering Specification for Field Fabrication and Installation of Piping, March 25, 2011
- Specification No. 24590-WTP-3PS-PH01-T0002, Rev. 6, Engineering Specification for Installation of Pipe Supports, July 13, 2011
- Document No. 24590-WTP-MN-CON-01-001-10-10, Rev. 6, Welding Control Manual, VT-AWS D1.1, Visual Examination Standard, August 15, 2006
- Document No. 24590-WTP- MN-CON-01-001-10-09, Rev. 7, Nondestructive Examination Standard Visual Examination VT-ASME, August 24, 2011
- Document No. 24590-WTP- GPG-M-017, Rev. 9C, Design Parameters & Test Pressures for Equipment & Piping, April 9, 2012
- Document No. 24590-WTP- QAM-QA-06-001, Rev. 11, Quality Assurance Manual, July 30, 2012
- Nonconformance Report 24590-WTP-NCR-CON-10-00089, Intermech CGD, Indeterminate Quality of Material
- Construction Deficiency Reports numbers 24590-WTP-CDF-CON-12-0151 through -0186.
- Nonconformance Report numbers 24590-WTP-NCR-CON-12-0085 through -0112, and 24590-WTP-NCR-CON-12-0114 through -0138. Note: Number 24590-WTP-NCR-CON-12-0113 was not issued.
- Quality Assurance Surveillance 24590-WTP-SUV-QA-12-010, Review of Intermech, Inc (VIT) Negative Pressure Ductwork Test
- Quality Assurance Surveillance 24590-WTP-SUV-QA-12-017, Surveillance of Intermech, Inc (VIT) WTP Site Leak Rate Test Control Activities
- Quality Assurance Surveillance 24590-WTP-SUV-QA-12-034, Surveillance Supporting Closure of Intermech, Inc (VIT) Supplier Corrective Action Reports
- Quality Assurance Supplier Audit Report 24590-WTP-AR-QA-11-042, Revision 1, Supplier Audit Report, Intermech, Inc (VIT)
- Quality Assurance Internal Audit Report 24590-WTP-IAR-QA-11-0004 WTP Receiving Inspection Process
- Drawing Number 24590-LAB-M6-CHW-00001001, Rev. 0, P&ID-LAB Chilled Water System Distribution (Marked up for system pressure test, Document No. 24590-LAB-PPTR-CON-12-0024)

- Drawing Number 24590-LAB-M6-CHW-00002001, Rev. 0, P&ID-LAB Chilled Water System C2 Air Handler Distribution (Marked up for system pressure test, Document No. 24590-LAB-PPTR-CON-12-0024)
- Drawing Number 24590-LAB-M6-CHW-00001002, Rev. 0, P&ID-LAB Breathing Service Air System – Compressor Lube Oil and Cooling Water (Marked up for system pressure test, Document No. 24590-LAB-PPTR-CON-12-0024)
- Reference CCN 216333, Testing Results for Ryerson/Intermech HVAC Materials