



Department of Energy

Washington, DC 20585

June 1, 2015

Ms. Margaret McCullough
Project Director
Hanford Waste Treatment and Immobilization Plant Project
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99352

NCO-2015-02

Dear Ms. McCullough:

The Office of Enterprise Assessments' Office of Enforcement completed its investigation into the facts and circumstances associated with the misalignment of design documents with Waste Treatment and Immobilization Plant (WTP) facility authorization bases; welding deficiencies of fabricated vessels accepted by WTP; and implementation of the quality assurance and corrective action management programs. Bechtel National Inc. (BNI) documented these issues in DOE's Noncompliance Tracking System under the following reports:

- NTS-ORP--BNRP-RRPWTP-2011-0008,
- NTS-ORP--BNRP-RRPWTP-2012-0003,
- NTS-ORP--BNRP-RRPWTP-2014-0001, and
- NTS-ORP--BNRP-RRPWTP-2014-0002.

In accordance with 10 C.F.R. § 820.23, *Consent Order*, the Office of Enforcement has elected to resolve any potential noncompliances with requirements enforceable under 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*, through execution of a Consent Order.

DOE reserves the right to re-open this investigation if DOE later becomes aware that BNI provided any false or materially inaccurate information. Further, the Office of Enforcement may pursue additional enforcement activity if there is a recurrence of nuclear safety deficiencies similar to those identified in this Consent Order, or a failure to complete all action items prescribed in the Consent Order (or other related actions that BNI subsequently determines to be necessary) to prevent recurrence of the identified issues. The Office of Enforcement, the Office of Environmental Management, and the Office of River Protection will continue to closely monitor BNI's implementation of DOE nuclear safety requirements until the issues associated with this Consent Order are fully resolved.



Enclosed please find two signed copies of the Consent Order. Please sign both, keep one for your records, and return the other copy to the Office of Enforcement within 1 week from the date of receipt. Please follow all instructions specified in the enclosure. By signing this Consent Order, you agree to comply with all of the terms, including payment of the monetary remedy, specified in section IV of the Consent Order and in the manner prescribed therein.

Should you have any questions, please contact me at (301) 903-7707, or your staff may contact Mr. Jon Thompson, Director, Office of Nuclear Safety Enforcement, at (301) 903-1134.

Sincerely,

A handwritten signature in cursive script that reads "Steven C. Simonson".

Steven C. Simonson
Director
Office of Enforcement
Office of Enterprise Assessments

Enclosure: Consent Order (NCO-2015-02)

cc: Kevin Smith, ORP
William Hamel, ORP
Jean Dunkirk, BNI
Dawn Kammenzind, BNI

In the matter of) Report No. NTS-ORP--BNRP-RRPWTP-2012-0003
) Report No. NTS-ORP--BNRP-RPPWTP-2014-0001
) Report No. NTS-ORP--BNRP-RPPWTP-2014-0002
) Report No. NTS-ORP--BNRP-RPPWTP-2011-0008
Bechtel National Inc.)
)
)
)
)
) Consent Order NCO-2015-02

CONSENT ORDER INCORPORATING AGREEMENT BETWEEN U.S. DEPARTMENT OF ENERGY AND BECHTEL NATIONAL INC.

I

Bechtel National Inc. (BNI) is the prime contractor responsible for designing, constructing, and commissioning the Waste Treatment and Immobilization Plant (WTP), which is a radioactive waste treatment plant located at the Hanford site. BNI has performed this work under Contract No. DE-AC27-01RV14136 to the U.S. Department of Energy's (DOE) Office of River Protection (ORP) since December 2000. WTP will fulfill a critical DOE environmental mission by processing and stabilizing 56 million gallons of radioactive and chemical waste currently stored at the Hanford Site. The waste is stored in 177 aging underground tanks at the Hanford Site. More than one-third of the tanks have leaked, contaminating the subsurface and posing a potential contamination risk to the nearby Columbia River. The plant will use vitrification technology, which involves blending the waste with glass-forming materials, heating them, and pouring the mixture into stainless steel canisters to cool and solidify. In this glass form, the waste is stable and suitable for long-term storage.

II

PDSA/Design-Misalignment

Over the past fifteen years, BNI has been developing the design and authorization basis documentation for the WTP facilities. Preliminary Documented Safety Analyses (PDSAs) were approved over ten years ago for each of the major WTP facilities, based on information that was known at that time, in order to allow expedited commencement of construction. As the design and construction have progressed, technical issues have arisen that have challenged the accuracy and completeness of the information in the PDSAs, leading to inconsistencies between the

evolving design, the existing safety basis documentation (as defined by BNI), and in some cases, installed systems and components.

On November 17, 2011, pursuant to 10 C.F.R. Section 820.21(a), the Office of Enforcement initiated an investigation into potential issues in WTP vessel design, design process implementation, and alignment between design documents and the WTP authorization basis. The onsite investigation took place March 6-8 and May 15-17, 2012. The Office of Enforcement's investigation report identified deficiencies in (a) the content and usage of existing procedures, having nuclear safety implications, for plant design and safety-basis development, and (b) the area of quality improvement.

The approved PDSA is intended to provide a reasonable basis for the preliminary conclusion that WTP can be operated safely. It is DOE's view that the PDSA needs to be maintained current to ensure that DOE can continue to rely on the information in the PDSA even as the design evolves. Furthermore, it is the position of the Office of Enforcement that during the timeframe encompassed by the Enforcement investigation identified above, BNI had committed to PDSA maintenance through requirements delineated in its Safety Requirements Document.

The Office of Enforcement determined that BNI failed to maintain its PDSAs and has allowed known inconsistencies between the PDSA and the design to exist, in some cases, for many years. It is the Office of Enforcement's view that these inconsistencies constitute potential noncompliances with DOE's nuclear safety requirements in the work process area. Additionally, the Office of Enforcement has determined that potential noncompliances have occurred in the following areas:

- Screening of Changes to the Safety Basis or Design: In several instances, changes that were made to either system drawings or the PDSA resulted in inconsistencies that were not identified by the BNI review and approval process.
- Conduct of Hazards Analyses and Control: In several instances, PDSA hazards analyses were either incomplete or not conducted. This has led to deficiencies in developing functional requirements and performance criteria for safety-related systems, structures, and components.
- Design Control: In several instances, system drawings were changed using a noncompliant methodology and the Design Criteria database was not correctly updated and used as a comprehensive repository of design criteria.
- Quality Improvement: In several instances, BNI failed to identify, control, and correct, over an extended timeframe, various nuclear safety issues related to fire protection and installation and operation of the Cathodic Protection System.

Vessel Welding

Over the past ten years, BNI has procured numerous large scale vessels for installation in the four major facilities at WTP. These vessels have been procured through more than a dozen different suppliers throughout the United States and abroad. The suppliers are audited by BNI and then added to an approved list of suppliers for specific items or components. The suppliers sign a contract with BNI to fabricate these vessels to certain standards and specifications. BNI's

quality assurance (QA) program provides oversight of supplier activities and has responsibility to ensure that procured items meet applicable specifications.

Bendalls, an approved vessel fabricator, was awarded a Purchase Order (PO) in 2003 for the design and fabrication of two vessels, including a specific vessel listed as RLD-VSL-00008. The PO was suspended several times and restarted in January 2011, with limited fabrication commencing in March 2011. From January to August 2011, multiple PO revisions, material requisition (MR) revisions, and directed changes occurred, which changed the scope of work, the requirements, and the work processes and procedures. According to the BNI Root Cause Analysis (RCA), the supplier quality representative (SQR) and project supplier quality supervisor were overloaded, rushed due to logistics scheduling pressure, and did not communicate effectively, which resulted in releasing the vessel for shipment even though it was later determined that the vessel did not comply with PO/MR requirements. The vessel was shipped in late 2011 and diverted to a laydown yard in Richland in the early part of 2012, where BNI was able to inspect the vessel prior to formal receipt. It was later noted that there were significant issues associated with the material acceptance plan and the quality verification document review.

Vessel welding deficiencies were first identified by BNI in April 2012. BNI identified the potential programmatic significance of this issue, which led to BNI generating a Project Issue Evaluation Report and conducting an RCA. This particular vessel was released to ship from the fabricator/supplier with various welding nonconformances, including significant vessel head to shell misalignment, which eventually resulted in a determination to repurpose the vessel for use in integrated testing and removal of the vessel from the list of permanent plant equipment. BNI's extent of condition review also identified several other areas of concern, including: source verification through SQRs, procurement documentation, and inadequacies in BNI's procedures and training requirements.

Subsequently, a sampling plan was developed to determine the extent of condition with respect to weld deficiencies in black cell vessels received by the project and installed in the plant. Black cell vessels will be located in areas of the plant where the radiological conditions are such that they will be inaccessible to personnel throughout the operational life of the plant. The plan called for a review of the exterior welds of 21 of the 71 Black Cell/Hard to Reach (BC/HTR) vessels. The inspections identified welding deficiencies and indicated conditions that did not meet the established PO requirements and/or specifications. After finding these additional welding issues, BNI committed to perform physical inspection of welds for all BC/HTR vessels based on sampling results, and a sampling review of vessels located outside these areas. It is DOE's perspective that, collectively, the welding deficiencies called into question the basis for assurance that the vessels could perform their specified design and safety function.

BNI's RCA (24590-WTP-RCA-PROC-12-0001, *Vessel RLD-VSL-00008 Weld Defects*) identified two root causes and five contributing causes related to the vessel welding deficiencies. Specific deficiencies included: weld changes were not adequately communicated; lack of adherence to WTP processes and procedures; unclear management expectations; inadequate vendor support of the welding changes; check of work was less than adequate; inadequate SQR performance; insufficient manpower; and ambiguous instructions and requirements.

Contemporaneously with BNI's identification of actual weld defects, weld documentation issues were identified by the Office of the Inspector General's (OIG) Audit Report DOE/IG-0863, *The Department of Energy's \$12.2 Billion Water Treatment and Immobilization Plant – Quality Assurance Issues – Black Cell Vessels*, issued in April 2012. The OIG report found that BNI had procured and installed vessels in WTP that did not always meet quality assurance and/or contract requirements. The report identified multiple instances where quality assurance records were either missing or not traceable to the specific area or part of the vessel. Examples of deficient areas included: nondestructive examination (NDE) of vessels; traceability of vessel fabrication; positive material identification; deviation from contractor requirements; source verification; and receipt verification. BNI committed to perform a 100 percent quality verification documentation package review of all BC/HTR vessels, and safety class and safety significant vessels located outside these areas (CCN 247894, reaffirmed by CCN 265656, dated August 1, 2012 and August 28, 2014, respectively).

During the same timeframe as the OIG report, ORP conducted an additional audit of BNI's procurement process with a specific focus on BC/HTR piping. ORP audit U-12-ESQ-RPPWTP-002, *Bechtel National, Inc. Procurement Process Vertical Slice Audit (Black cell and hard to reach piping both Q and CM)* was issued on December 12, 2012, and concluded that "BNI's programs implementing procurement process requirements were less than adequate, were not acceptably implemented, and not fully effective." The ORP audit identified three Priority Level 2 and three Priority Level 3 findings that highlighted issues with conflicting engineering specification requirements; acceptance of material without proper documentation; welds accepted without proper NDE results; noncompliant visual inspection records; and weld labeling discrepancies. In addition, one Priority Level 2 finding concluded that "BNI's implementation for 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."

On August 12, 2013, pursuant to 10 C.F.R. § 820.21(a), and based on the NTS report and discussions with (ORP and the Office of Environmental Management (EM)), the Office of Enforcement initiated an investigation into the vessel welding deficiencies first communicated to DOE on June 6, 2012. The onsite investigation took place December 10-12, 2013, in Richland, WA. The Office of Enforcement's investigation identified several potential noncompliances by BNI with DOE Nuclear Safety Requirements. Specific noncompliances were evident in the areas of management programs, training and qualification, quality improvement, documents and records, work processes, and procurement. During the review of the NTS reports, and other relevant documentation associated with the corrective action management (CAM) program and QA program, additional noncompliances were identified in the areas of management assessment, conducting work in accordance with the criteria in § 830.122, and conducting work in accordance with BNI's QA program. Given the similar QA and CAM program issues identified by ORP through routine oversight of BNI, the welding deficiencies appeared to be symptomatic of broader QA and CAM program issues.

QA and CAM Programs

ORP issued Audit Report U-13-QAT-RPPWTP-001, *Bechtel National, Inc. Quality Assurance Program Requirements 3, 4, 7, 8, 15, and 16*, on October 28, 2013. The audit evaluated the adequacy, implementation, and effectiveness of BNI procedures as related to the QA Program. The ORP audit focused on the success of BNI's QA Program in self-identifying issues; the effectiveness of BNI's corrective actions related to issues identified by oversight activities performed by regulatory stakeholder agencies; and the capacity of BNI's QA Program to prevent the recurrence of previously identified and documented conditions adverse to quality. The audit identified two Level 1 findings with the QA Program and CAM Program: specifically, BNI's overall QA Program has not been implemented in accordance with requirements and is not fully effective, and BNI's overall CAM Program has not been implemented in accordance with requirements and is not fully effective. The ORP team identified weaknesses in design control, software quality assurance, procurement document control, control of purchased items and services, identification and control of items, and corrective action. At ORP's request, BNI identified the compensatory measures that would address any ongoing work during a two-year performance improvement period. In order to integrate these compensatory measures, BNI subsequently developed the Managed Improvement Plan (MIP) (24590-WTP-PL-MGT-14-0006, Revision 1), dated August 28, 2014, to establish processes, procedures, and metrics that will result in an overall quality program that fully meets all ORP contractual requirements to deliver WTP facilities that can safely operate in compliance with ORP-approved nuclear safety requirements.

BNI's common cause analysis, 24590-WTP-CMCA-MGT-13-0003, *Common Cause Analysis of Inadequate Implementation of the WTP Corrective Action Program*, identified one root cause and five contributing causes directly related to the implementation of the CAM program. The report determined that implementation of the CAM Program "is not substantially improved" and that the timely resolution of issues requires improvement. Specific deficiencies were noted in the following areas: senior management leadership support; accountability, engagement, and ownership; resource allocation and tracking; training; monitoring and oversight; and sustainment of previous CAM program initiatives. BNI submitted the corrective action plan (CCN 265648) on July 18, 2014, and committed to complete the corrective actions by October 31, 2015.

A second BNI common cause analysis, 24590-WTP-CMCA-MGT-14-0001, *Common Cause Analysis of Quality Assurance Program Implementation and Effectiveness Issues*, identified one root cause and five contributing causes directly related to ineffectiveness of the quality assurance program. The common cause analysis determined the common, root, and contributing causes associated with why the overall QA program has not been implemented in accordance with requirements and is not fully effective. Examples of causes that adversely impact the overall QA program included: unclear roles and responsibilities; less than adequate workforce knowledge skills and abilities; inadequate oversight; inadequate resources; ineffective prevention of issue recurrence; and inconsistent procedure compliance. More specifically, the reported identified that: processes do not support robust nuclear QA requirements; management's attention attenuates prior to achieving effective and sustainable closure of QA issues; there is an absence of systemic QA improvements that cross organizational boundaries; and there is a persistent existence and non-correction of quality issues. BNI submitted the corrective action plan (CCN

265649) on July 27, 2014, and originally committed to complete the corrective actions by June 30, 2015.

BNI voluntarily reported potential noncompliances with DOE Nuclear Safety Requirements associated with these four issues into DOE's Noncompliance Tracking System (NTS) in reports NTS-ORP-BNRP-RPPWTP-2011-0008, *Evaluation of Design and Safety Basis Concerns*; NTS-ORP--BNRP-RPPWTP-2012-0003, *Weld Deficiencies Identified on the HLW Plant Wash & Drain Vessel 24590-HLW-MV-RLD-VSL-00008*; NTS-ORP--BNRP-RPPWTP-2014-0001, *Inadequate Implementation of the WTP Corrective Action Program*; and NTS-ORP--BNRP-RPPWTP-2014-0002, *QA Program Implementation Is Not Fully Effective*.

III

Pursuant to 10 C.F.R. § 820.23, at any time during enforcement proceedings, DOE may resolve any or all outstanding issues with a Consent Order if the settlement is consistent with the objectives of the Atomic Energy Act of 1954, as amended, and DOE nuclear safety requirements enforceable under 10 C.F.R. Part 820, *Procedural Rules for DOE Nuclear Activities*.

To resolve the potential noncompliances of 10 C.F.R. Part 830 requirements and in consideration of BNI's investigation, causal analyses, and associated corrective actions taken since the submission of the NTS reports referenced above, DOE has elected to enter into settlement. DOE and BNI have reached agreement to resolve this matter through execution of this Consent Order.

IV

Accordingly, the terms of this Consent Order are as follows:

In consideration of the mutual agreements set forth in this section, the sufficiency and adequacy of which are acknowledged by DOE and BNI (hereinafter the "Parties"), the following terms represent agreement by the authorized representatives of the Parties to resolve by settlement the potential noncompliances at WTP, in lieu of an enforcement action that DOE may issue pursuant to 10 C.F.R. § 820.24.

1. BNI shall fully implement the QA Program and CAM Program Effectiveness Priority Level 1 Finding Corrective Action Plans (CCNs 265648 and 265649) and the MIP (24590-WTP-PL-MGT-14-0006, Rev 1, dated August 28, 2014). Specifically, BNI shall complete the following actions and provide the specified deliverables in accordance with funding provided by ORP and applicable contractual requirements:
 - a. By September 30, 2015, BNI shall complete the corrective actions outlined in CCN 265649 and agreed to by ORP to correct the QA program deficiencies.

- b. By December 31, 2015, BNI shall fully implement the corrective actions to improve the alignment of the design and authorization basis through nuclear safety and engineering procedure revisions and organizational restructuring as defined in the MIP action 49.
 - c. Within nine (9) months of the effective date of the Consent Order, BNI shall brief ORP on the progress and results of its review of BC/HTR pressure vessels' welds and weld documentation. This briefing shall include a discussion of the issues identified and the actions taken or planned to address them. Annually thereafter, BNI shall provide updated briefings of the progress and results of this effort until completion of the review of all welds and weld documentation, as agreed by ORP.
 - d. In accordance with the schedule established by ORP, BNI shall fully implement their actions to review all quality verification documentation packages for BC/HTR pressure vessels, and safety class and safety significant pressure vessels located outside these areas that have been received to date at WTP to ensure that all required documentation has been received and that any nonconformances are identified and addressed in accordance with the NQA-1 standard invoked in the contract, as outlined in CCN 269515.
 - e. In accordance with the schedule established by ORP, BNI shall physically inspect BC/HTR pressure vessels and a representative sampling of pressure vessels located outside these areas that have been received to date at WTP to ensure that any non-conformances are identified and addressed in accordance with the NQA-1 standard invoked in the contract (24590-WTP-RPT-ENG-12-035 for BC/HTR vessels, 24590-WTP-RPT-ENG-13-015 for non-BC/HTR vessels).
 - f. By October 31, 2015, BNI shall complete the corrective actions to correct the CAM program deficiencies, as outlined in CCN 265648.
 - g. By April 30, 2016, BNI shall complete the actions identified in the MIP to the extent necessary to restore the QA and CAM programs to full effectiveness, as outlined in CCN 270719.
 - h. By November 30, 2016, BNI shall complete an independent (external to BNI) assessment of the effectiveness of all corrective actions identified in the corrective action programs for the two Priority Level 1 Findings. BNI shall brief ORP and the Office of Enforcement on the results of this independent assessment, the status of all open corrective actions (including a discussion of any extension(s) granted from the original corrective action target completion dates), and a discussion of any significant new quality-related performance issues identified since issuing this Consent Order.
 - i. By December 31, 2016, BNI shall submit the independent assessment report to ORP and the Office of Enforcement and describe actions to address any identified issues.
2. BNI shall pay the amount of \$800,000 reflecting an agreed upon monetary remedy in lieu of the issuance of an enforcement action with the proposed imposition of a civil penalty pursuant to 10 C.F.R. § 820.24.

3. BNI agrees to return a signed copy of this Consent Order, within one week from the date of receipt, to the address provided in item 5 below.
4. The Effective Date of this Consent Order shall be the date upon which BNI signs this Consent Order.
5. BNI shall remit the monetary remedy of \$800,000 by check, draft, or money order payable to the Treasurer of the United States (Account Number 891099) within 30 calendar days after the Effective Date of this Consent Order. Payment shall be sent by overnight carrier to:

Director, Office of Enforcement
Attention: Office of the Docketing Clerk, EA-10
U.S. Department of Energy
19901 Germantown Road
Germantown, MD 20874-1290


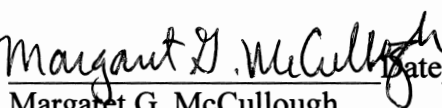
6. This Consent Order shall constitute a full and final settlement of the potential noncompliances identified in the referenced NTS reports, subject to the following: (a) BNI's payment of the monetary remedy in accordance with item 5 above; and (b) BNI's completion of all actions set forth in item 1 above to the satisfaction of the Department of Energy.
7. Neither the monetary remedy nor any costs, as defined in the Federal Acquisition Regulation, 48 C.F.R. § 31.205-47, incurred by, for, or on behalf of BNI relating to coordination and cooperation with DOE concerning the investigation of matters covered by this Consent Order, shall be considered allowable costs under the Contract. However, costs incurred by, for, or on behalf of BNI relating to the development and implementation of corrective actions, including costs associated with the effectiveness review required under item 1 above, may be considered allowable costs under the Contract.
8. This Consent Order does not preclude DOE from re-opening the investigation or issuing an enforcement action under 10 C.F.R. § 820.24 with respect to a potential noncompliance if: (a) after the Effective Date (as defined in item 4 above), DOE becomes aware of any false or materially inaccurate facts or information provided by BNI; (b) there is a recurrence of nuclear safety deficiencies similar to those identified above; or (c) BNI fails to complete all actions identified in item 1 above in a timely and effective manner to prevent recurrence of the identified issues.
9. Any modification to this Consent Order requires the written consent of both Parties.
10. BNI waives any and all rights to appeal or otherwise seek judicial or administrative review of the terms of this Consent Order. DOE retains the right to judicially enforce the provisions of this Consent Order by all available legal means.
11. This Consent Order is issued pursuant to DOE's authority under Section 234A of the Atomic Energy Act of 1954, as amended (42 U.S.C. § 2282a), and the implementing provisions of 10 C.F.R. Part 820 governing enforcement of DOE nuclear safety requirements.

12. Pursuant to 10 C.F.R. § 820.23(d), this Consent Order shall become a Final Order 30 calendar days after the signed copy, referenced in item 3 above, is filed by the Office of Enforcement's Office of the Docketing Clerk unless the Secretary of Energy files a rejection of the Consent Order or a modified Consent Order.

On behalf of my respective organization, I hereby agree to and accept the terms of the foregoing Consent Order.

FOR U.S. Department of Energy

FOR Bechtel National, Inc.

	Date	<u>6/1/15</u>		Date	<u>6/8/15</u>
Steven C. Simonson			Margaret G. McCullough		
Director			Project Director		
Office of Enforcement			Bechtel National Inc.		
Office of Enterprise Assessments					
U.S. Department of Energy					