Department of Energy
Washington, DC 20585

December 3, 2008

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. William Elkins
Project Director
Bechtel National, Inc.
2435 Stevens Center Place
Richland, Washington 99354

NEA-2008-04

Dear Mr. Elkins:

This letter refers to the Department of Energy (DOE) investigation into the facts and circumstances associated with procurement and design deficiencies of specific components at the Waste Treatment and Immobilization Plant (WTP). The Investigation Report, dated August 18, 2008, was provided and an enforcement conference was held on September 16, 2008, in Richland, Washington. A summary of the conference is enclosed.

Based on an evaluation of the evidence in this matter, including information presented by you and members of your staff during the conference, DOE concludes that violations of 10 C.F.R. Part 830, *Nuclear Safety Management*, occurred. The enclosed Preliminary Notice of Violation (PNOV) NEA-2008-04 describes the violations and includes a total proposed civil penalty of $385,000.

The majority of the proposed violations have been categorized as Severity Level II, based on their associated significance. The specific violation against DOE's quality improvement requirements, however, was categorized as Severity Level I, based on the numerous opportunities to correct the deficiencies in the procurement and fabrication of black cell piping. Problems related to black cell piping fabrication were communicated to BNI by the fabricator, by DOE, and by BNI's own assessment and Supplier Quality programs; however, in each case BNI's response was limited and failed to correct the issues effectively and in a timely manner.

DOE's statutory authority permits it to cite violations on a per day basis. DOE notes that significant quality improvement deficiencies have represented a common weakness in two prior BNI enforcement actions (EA 2007-05 and EA 2006-03). With respect to the current action, underlying quality improvement deficiencies ultimately contributed to the

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inappropriate procurement of 1,748 black cell pipe spools and 253 "hard to reach" pipe spools which did not meet specification requirements. These pipe spools will require (or have already undergone) additional inspection, evaluation and testing to determine their suitability for use at the WTP. To highlight this issue to senior BNI management, the Office of Enforcement elected to cite the quality improvement violation for two separate days, resulting in a civil penalty of $220,000 for this violation.

In calculating the civil penalty, no mitigation was granted for self-identification and reporting of the noncompliances associated with black cell piping because the significant majority of the nuclear safety issues were initially discovered by a black cell pipe supplier or the DOE Office of River Protection. With respect to BNI's investigation and corrective actions, DOE found that BNI performed a comprehensive causal analysis and that prompt and comprehensive corrective actions were taken once the significance of the issues was fully recognized. BNI's extent-of-condition review included a Common Cause Review, vulnerability management assessments, and a Broad Based Review. Based on your actions taken in response to these issues, 50 percent mitigation was applied to all violations except for the quality improvement violation, for which DOE is not compelled to provide mitigation.

DOE enforcement discretion was applied in combining the violations associated with BNI's failure to flow down requirements and those associated with the procurement and fabrication of black cell piping, rather than separately citing the specific violations associated with each issue. This decision was based on the view that the issues associated with the flowdown of requirements were similar to those found in the procurement and fabrication of black cell piping and that the flowdown issues were evidenced to have been proactively identified by BNI.

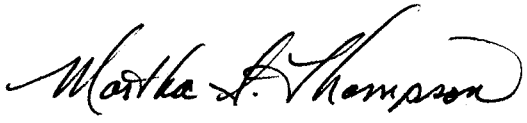
During the enforcement conference, we were encouraged by your increased focus on safety awareness. Examples include: establishing a Performance Improvement Review Board comprised of senior managers, creating cross-functional trending workgroups, and improving the management assessment process. Based on early results, the Broad Based Review may be an effective approach to assess and correct longstanding legacy issues. However, without an opportunity to review the final results, DOE can only be cautiously optimistic that BNI has adequately evaluated the WTP project for the presence of any additional, significant, longstanding legacy issues.

DOE recognizes the engineering and procurement process improvements that have taken place at the WTP over the last two years and the considerable effort that BNI has made to ensure the presence of adequate and well qualified personnel to implement these improvements. It is DOE's expectation that the same management commitment will be evident as the focus of the WTP project shifts to construction and commissioning activities. While DOE believes that the current BNI management team is committed to this task, changes in BNI management may occur over time. DOE also notes despite progress in the BNI corrective action management process and in personnel roles, responsibilities, authorities and accountability, some organizations within BNI appear to still be struggling with these fundamental management functions. DOE's expectation is

that throughout the coming transition, BNI senior management will maintain a "quality-conscious" system of management controls and will continuously communicate the highest nuclear safety expectations to every level of the project workforce, including subcontractors and suppliers.

In accordance with 10 C.F.R. § 820.24, *Preliminary Notice of Violation*, you are required to respond within 30 days of the date of this letter and to follow the instructions specified in the enclosed PNOV while preparing your response. After reviewing your response to the PNOV, including any proposed, additional corrective actions entered into the Noncompliance Tracking System, DOE will determine whether further enforcement action is necessary to ensure compliance with DOE nuclear safety requirements. DOE will continue to monitor the completion of corrective actions until these matters are fully resolved.

Sincerely,



Martha S. Thompson
Acting Director
Office of Enforcement
Office of Health, Safety and Security

Enclosure

cc: Richard Jurbala, BNI
Richard Azzaro, DNFSB

Preliminary Notice of Violation

Bechtel National, Inc.
Hanford Site

NEA-2008-04

As a result of a Department of Energy (DOE) investigation into the facts and circumstances associated with procurement and design deficiencies at the Waste Treatment and Immobilization Plant (WTP), multiple violations of DOE nuclear safety requirements were identified. Violations committed by Bechtel National, Incorporated (BNI) include inadequacies in the fabrication and procurement of black cell piping and the flowdown of design requirements into project specifications at the WTP.

The violations have been determined to include: one Severity Level I violation, six Severity Level II violations, and two Severity Level III violations. A total civil penalty of $385,000 is proposed.

In accordance with 10 C.F.R. Part 820, Appendix A, *General Statement of Enforcement Policy*, the violations are listed below. Citations specifically referencing the quality assurance criteria of 10 C.F.R. § 830.122 constitute a violation of § 830.121(a), which requires compliance with those quality assurance criteria.

VIOLATIONS

Deficiencies in the Fabrication and Procurement of Black Cell Piping and the Flowdown of Design Requirements into WTP Specifications

A. Performance of Work (Authorization Basis)

Title 10 C.F.R. § 830.201 requires DOE contractors to "perform work in accordance with the safety basis for a hazard category 1, 2, or 3 DOE nuclear facility and, in particular, with the hazard controls that ensure adequate protection of workers, the public, and the environment."

Contrary to the above, BNI black cell piping procurement activities failed to ensure that relevant safety basis requirements were appropriately implemented. Specifically, section 6 of 24590 WTP-SRD-ESH-01-001-02, Safety Requirements Document Volume II, appendix H, states that "The WTP design incorporates the 'black cell' concept as a key part of the facility design for Pretreatment (PTF) and High Level Waste (HLW) facilities. This entails locating certain equipment in shielded cells for which no maintenance entry is planned for the 40 year design life of the plant." The WTP Safety Requirements

Document (SRD) also contains features to ensure that vessels and piping in the black cell areas are adequately designed and fabricated to last the design life of the plant. These features include the requirement to: (1) use positive material identification (PMI) to ensure that the correct material has been used in shop-fabricated vessels and piping and in selected pipe welds where corrosion is a concern; (2) perform full volumetric inspection of the welds in the primary confinement boundary of vessels and of the girth welds in process piping to ensure that weld defects are discovered and repaired; and (3) conduct material traceability when required by code, standard, or specification.

However, between January 2003 and October 2007, BNI procured 1748 black cell piping spools from commercial (CM) suppliers that did not receive the SRD-required PMI or volumetric inspection and lacked the specification-required material traceability records.

Collectively, these deficiencies constitute a Severity Level II violation.
Proposed Civil Penalty - $27,500

B. Program

Title 10 C.F.R. § 830.122(a)(2) requires DOE contractors to establish "management processes, including planning, scheduling, and providing resources for the work."

Section 1.1.3.2.1.10 of BNI procedure 24590-WTP-QAM-QA-06-001, *Quality Assurance Manual*, Policy Q-01.1, additionally states that "managers/supervisors are responsible for assigning qualified personnel to perform work activities." Section 1.1.3.2.1.11 requires managers/supervisors to provide necessary resources to the project organizations.

Contrary to the above requirements, BNI failed to provide adequate resources to support the procurement of black cell piping. Specific examples include the following:

1. In 2002, BNI initiated a software change that associated flow arrows with the automatic population of various fabrication isometric drawing title block attributes. BNI, however, failed to ensure that necessary human resources were assigned to develop, review, and approve the increased number of fabrication isometric drawings that needed to be generated. This deficiency contributed to BNI's failure to identify black cell piping on fabrication isometric drawings.

2. In early 2005, the number of BNI Supplier Quality (SQ) organization Supplier Quality Representatives (SQRs) was reduced by about one third, while concurrently there was significant turnover at piping supplier facilities, particularly CM piping suppliers. BNI's failure to provide necessary human resources to support the SQ organization reduced the likelihood of timely identification of black cell piping issues.

Collectively, these deficiencies constitute a Severity Level III violation.
No Civil Penalty

C. Quality Improvement

Title 10 C.F.R. § 830.122(c) requires DOE contractors to: (1) "establish and implement processes to detect and prevent quality problems;" (2) "identify, control, and correct items, services, and processes that do not meet established requirements;" and (3) "identify the causes of problems and work to prevent recurrence as a part of correcting the problem."

Contrary to these requirements, BNI failed to effectively identify, control, and prevent recurrence of quality problems related to the procurement and receipt of black cell piping and the flowdown of nondestructive examination (NDE) requirements for "hard to reach" piping[1]. Specific examples include the following:

Procurement and Fabrication of Black Cell Piping

1. BNI failed to adequately evaluate and respond to a black cell piping supplier's communications identifying an issue. During the summer of 2003, shortly after the May 14, 2003, issuance of BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, revision 2 (the revision used for the first procurement of black cell piping), a black cell piping supplier questioned the relationship between the black cell room numbers listed in appendix A of the specification and the isometric drawings, which did not indicate room numbers. BNI's September 2003 response to this inquiry sufficiently enabled the supplier to understand the correspondence between black cell room numbers (listed in the specification appendix) and construction work area (CWA) designations appearing on the isometric pipe design drawings issued by BNI Plant Design to suppliers for fabrication.

   Nonetheless, project records, discussions with other suppliers, and interviews conducted by the BNI root cause analysis (RCA) team provided no evidence that BNI conveyed the above information to other black cell pipe suppliers. BNI's failure to recognize the broader implications of this issue resulted in the receipt of improperly designed black cell piping from other suppliers.

2. A BNI internal recommendation to assess a sampling of specifications was not accepted or implemented. On July 29, 2003, BNI issued RCA 24590-WTP-RPT-AS-03-001, *Missed Specification Requirement During Acquisition Process*, revision 0 to address concerns arising from a missed technical specification requirement for suppliers of carbon steel that was used for WTP construction. Recommendation 7 of this RCA states that "Specification language was a significant issue throughout this analysis. The team recommends that a sampling of issued specifications be reviewed and reassessed, using the project Specification Checklist, in light of the salient points of this root cause analysis." Engineering management did not accept the action, believing that it was unnecessary. Conducting this review could have aided BNI in the early identification and

[1] For the purpose of this Preliminary Notice of Violation, "hard to reach" piping includes piping that is not physically located in black cells but is associated with black cells, and designated piping located in other areas outside black cells.

correction of specification language problems associated with black cell piping fabrication.

3. BNI failed to effectively implement corrective actions in response to a DOE assessment recommendation. In February 2004, the DOE Office of River Protection (ORP) assessed the adequacy of black cell design at the WTP and subsequently issued the *Black Cell Design Adequacy Oversight Report*. Recommendation 5 of that report was to identify black cell boundaries on primary drawings, physical fabrication and construction, and collateral databases. In response, BNI issued Recommendation and Issues Tracking System (RITS) report 24590-WTP-RITS-QAIS-04-171. BNI closed the action on April 30, 2004. The RITS closure comment for this action stated that, "Piping requires isometrics used by the fabricator and construction. For piping, black cells will be identified on isometrics that are issued in the future by denoting the black cell volume in the model that will automatically generate a black cell designation. A black cell piping list has been pulled directly from a database associated with the model. Black cell line numbers will be given to the fabricators to ensure that piping that has already been ordered will meet the black cell requirements."

   Contrary to the above closure comments, BNI did not begin identifying black cells on isometrics until 2008. Furthermore, in December 2007, the BNI RCA team found no evidence that a list of black cell line numbers was provided to the black cell pipe suppliers. The ORP relied on the accuracy of the closure statement cited above to close its recommendation. BNI's failure to identify black cells on the fabrication isometrics and to provide lists of black cell line numbers to suppliers contributed to suppliers' failure to apply all piping fabrication specification requirements.

4. BNI corrective actions to improve the identification of black cell piping to suppliers were limited in scope and effectiveness. In March and June 2005, BNI issued two specification change notices (SCNs), 24590-WTP-3PN-PS02-00045 and -00052, directed at modifying BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, revision 5, dated December 27, 2004. The specification changes were issued to better enable pipe spool suppliers to identify black cell piping from fabrication isometrics. Both change notices modified the specification to correlate black cell room numbers to planning area locations.

   However, neither the black cell room numbers nor the planning area designators appeared on the fabrication isometrics issued to the suppliers for fabrication of the black cell pipe spools. Thus, the suppliers were given fabrication isometrics that designated the pipe spools as belonging to CWAs, but provided no clear way to determine whether a specific pipe spool being fabricated was to be located in a black cell or not. The specification changes were insufficient for their stated purpose and failed to correct the problem.

   BNI's efforts to resolve the problem by identifying black cell piping on fabrication isometric drawings addressed only new fabricated piping and failed to consider previously fabricated piping. The BNI RCA concluded that BNI did not identify the need to evaluate pipe spools that were already delivered or in the supply chain to ensure that

black cell piping was properly identified and that specification requirements were correctly applied. BNI's ineffective remedial action in response to a known problem and failure to properly conduct an extent-of-condition represents a missed opportunity to correct the black cell piping issues.

5. BNI's subsequent recognition that earlier commitments had not been implemented did not lead to an effective resolution. In July 2005, BNI issued management assessment 24590-WTP-MAR-ENG-05-0007, *Implementation and Flowdown of Black Cell Basis of Design Requirements Management Assessment Report*, revision 0, to evaluate the implementation and flowdown of requirements stated in the Basis of Design (BOD), 24590-WTP-DB-ENG-01-001, section 16. These requirements were intended to ensure that the equipment and piping in black cells were adequately designed and fabricated to achieve a design life of 40 years without in-service inspection, repair, or replacement. The management assessment also evaluated the implementation of BNI commitments in closure documents issued by the ORP in their black cell review verification documents.

   The BNI assessment identified that the commitments in response to 24590-WTP-RITS-QAIS-04-171, *Black Cell Design Adequacy Report – Recommendation 5*, had not been implemented. BNI issued RITS report 24590-WTP-RITS-QAIS-05-623, *Black Cell Piping Design and Fabrication Adequacy*, to document this concern. The RITS action description was "This RITS is written to clarify the commitments previously made in the closed RITS 24590-WTP-RITS-QAIS-04-171 Item (b). The referenced RITS stated, 'The black cell will be identified on isometrics that are issued by denoting the black cell volume in the model that will automatically generate a black cell designation.' Contrary to the statement such isometrics are not automatically generated."

   In August 2005, BNI closed the RITS action with the following statement: "Identifying piping located in black cells is achieved by utilizing the planning area designation already shown on the isometric drawing, and by providing a crosswalk between the planning area and the related facility room number provided to the shop pipe fabricator." At the time of closure, however, planning areas were not reflected on the fabrication isometrics. Instead, the fabrication isometrics only showed CWAs. BNI's failure to correct a known problem in the black cell fabrication isometrics represents a missed opportunity to properly identify black cell piping to suppliers and contributed to the failure of suppliers to apply all pipe spool fabrication specification requirements.

6. BNI supplier quality activities failed to adequately evaluate identified deficiencies. In January 2006, a BNI SQR at a piping fabricator noted that a black cell piping spool had not received 100 percent radiographic testing as required by 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, revision 6, dated August 22, 2005. This condition was documented on Source Verification Report 24590-CM-YQB-PS02-70114, and the pipe spool was removed from the shipment pending completion of the required radiographic testing.

   However, BNI took no further action to: (1) identify the root cause of the problem, (2) determine whether this condition may have been present in previously fabricated

black cell pipe spools, (3) determine whether this condition may have been present at other black cell piping suppliers, and (4) address more programmatic concerns through appropriate corrective actions. BNI's failure to perform an adequate extent-of-condition review upon identification of the issue represents a missed opportunity to correct the problems associated with the fabrication of black cell piping.

7. BNI corrective actions in response to deficiencies in two black cell piping spools failed to address the extent of the problem. In January 2006, a corrective action report (CAR), 24590-WTP-CAR-QA-06-017, documented the receipt of two black cell spools from a CM supplier without the required material test reports (MTRs) to establish material traceability. Action 17-1 of the CAR states that "The material received to date (pipe spools) is on hold at the marshalling yard and a CDR [construction deficiency report] has been written 24590-CDR-CON-06-0008 documenting the deficiency."

   The CDR, however, only addressed the two pipe spools that were the subject of the CAR and failed to address any other "material received to date." BNI's corrective actions only addressed currently fabricated piping or piping that would be fabricated in the future instead of previously fabricated piping. BNI's failure to perform an extent-of-condition review in connection with the discovery of two black cell pipe spools lacking the required MTRs represents a missed opportunity to correct a known problem in the fabrication of black cell piping.

Flowdown of NDE Requirement for "Hard to Reach" Piping

1. BNI failed to effectively implement corrective actions in response to a DOE assessment recommendation. Open Item number 4 of the ORP-issued *Black Cell Design Adequacy Oversight Report* required that BNI evaluate: (1) the permissible configurations for black cell piping related to socket welds, branch connections, and welded reinforcement pads and other welded attachments to piping; and (2) the required NDE for permissible configurations in the black cells and update appendix A to the shop fabrication and field piping specifications regarding inspection requirements for black cell piping. The scope of these requirements was subsequently increased to include evaluation of piping in "hard to reach" areas that may be outside of black cells. In March 2005, BNI prepared an NDE table for inclusion in section 17 of the BOD that addressed these ORP report evaluation requirements.

   In May 2005, SCNs were issued to modify BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, and BNI specification 24590-WTP-3PS-PS02-T0003, *Engineering Specification for Field Fabrication and Installation of Piping*. These SCNs included the entire NDE table previously mentioned. During the SCN review and approval process, however, BNI simplified the NDE table by eliminating the NDE requirements for "hard to reach" area piping. These modified SCNs were approved in June 2005.

   In September 2005, BNI issued Basis of Design Change Notice (BODCN) 24590-WTP-BODCN-ENG-05-0007, *Nondestructive Examination Requirement*, to add the NDE

requirements table that included "hard to reach" areas. In response to an October 2005, ORP inquiry into whether the BODCN would require specification changes, BNI replied that these changes had already been made through the SCNs. DOE approved the BODCN later that month. Consequently, the BOD revision in January 2006 included the full NDE table, creating inconsistencies between the BOD and specifications 24590-WTP-3PS-PS02-T0001 and 24590-WTP-3PS-PS02-T0003 with respect to "hard to reach" area piping. This inconsistency remained until late 2006, when the ORP identified the issue while reviewing an Authorization Basis (AB) Amendment Request.

2. BNI's corrective actions taken in response to identified deficiencies in the flowdown of AB requirements to specifications have not been effective in preventing recurrence. In late 2002 and early 2003, BNI discovered a number of design deficiencies at the WTP, including a widespread problem in that design drawings and specifications were inconsistent with AB requirements. Specific deficiencies included: (1) use of unapproved engineering codes or standards revisions, (2) failure to incorporate AB-level design requirements in the actual design, (3) failure to adequately review design documents for AB consistency, (4) failure to adequately describe or evaluate changes in design that resulted in AB changes, and (5) failure to appropriately transmit and retain AB maintenance records. Identified noncompliances were reported into BNI's Noncompliance Tracking System (NTS) (NTS-RP-BNRP-RRPWTP-2005-0001, *Inconsistencies Involving Design Documents and the Authorization Basis*. BNI's corrective actions were tracked in BNI CAR 24590-WTP-CAR-QA-05-006. In March 2006, the Office of Enforcement issued a Preliminary Notice of Violation (PNOV) to BNI addressing noncompliances associated with this issue.

   To establish design requirements, codes, and standards for the WTP, BNI issued revision 1 of the BOD in September 2003 (24590-WTP-DB-ENG-01-001, *Basis of Design*). The BOD, which is not an AB document, was then revised in January 2006 to include enhanced welding requirements for black cell piping and "hard to reach" area piping. These requirements, however, did not flow down to the pipe fabrication specification. BNI should have taken broader corrective actions for previously-identified inconsistencies between AB documentation and specifications that also accounted for potential inconsistencies between non-AB documentation (e.g., the BOD) and specifications. These measures would have led to the timely identification and correction of inconsistencies between the BOD and pipe spool fabrication specification.

Collectively, these deficiencies constitute a Severity Level I violation.
Proposed Civil Penalty - $220,000

D. Work Processes – Procedural Inadequacies

Title 10 C.F.R. § 830.122(e)(1) requires DOE contractors to "perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means."

Contrary to this requirement, multiple instances were noted in which BNI procedures were either not in place or inadequate to effectively control the fabrication and procurement of black cell piping and the flowdown of design requirements into WTP specifications. Specific examples include the following:

1. The BNI procedures that were used to develop and control isometric drawings did not address or control the use of the flow arrow process. BNI procedure 24590-WTP-3DP-G04B-00046, *Engineering Drawings*, establishes requirements for the preparation, coordination, review, approval, and control of drawings for the WTP. BNI procedure 24590-WTP-3DP-G04T-00906, *Isometric Drawings and Associated Calculations*, defines the requirements for isometric drawings to ensure a solid design basis. BNI desk instruction PDI-00005, *Isometric Drawings*, provides for consistency in the format, content, and process for generating isometric drawings. Collectively, these three documents were intended to control the generation of piping fabrication isometrics, including black cell piping fabrication isometrics.

   The BNI RCA team concluded that "The location and application of the flow arrow and the secondary characteristic as a model volume (the primary characteristic is to indicate the direction of flow) is entirely based on the experience level of the designer and checker with no evidence of a mechanism for organizational learning. The use of the flow arrow for indicating construction work area (black cell, indirectly) is 'tribal knowledge.'"

   BNI Plant Design utilized flow arrows from the isometric drawing extraction software to generate piping isometrics associated with specific CWAs, which can identify whether the piping on the isometric drawing is located within a black cell. However, BNI procedures did not discuss the use of flow arrows in the extraction of piping isometrics.

2. The BNI *Engineering Drawings* procedure (24590-WTP-3DP-G04B-00046) also establishes a process whereby BNI can temporarily deviate from design or administrative controls found in AB documentation, pending formal approval of an AB amendment request or a condition of acceptance. However, BNI failed to establish a similar process for temporary deviations from non-AB requirements (e.g., BOD requirements).

3. Between August 2003 and September 2006, several changes were made to the specification *Engineering Specification for Shop Fabrication of Piping*, and included changes to appendix A, *Non-Destructive Examination (NDE) of Fabricated Pipe Welds*, and changes in the application of certificates of compliance. However, BNI failed to adopt adequate procedures to ensure effective communication of such changes to suppliers of black cell piping. As a result, these changes in specifications were not communicated in a timely fashion to the black cell piping suppliers.

4. BNI procedures did not adequately identify specific expectations for extent-of-condition reviews. The BNI *Corrective Action* procedure (24590-WTP-GPP-QA-201) states that the Responsible Manager is charged with conducting investigative action, determining the cause and extent-of-condition, and documenting the results in the CAR. In

January 2006, BNI identified two black cell pipe spools which were received from a CM supplier without the required MTRs to establish material traceability. This issue was documented in BNI CAR 24590-WTP-CAR-QA-06-017, *CM Pipe Spools Received on MRR Without the MTR*. The extent-of-condition statement in the CAR states that "Plant Design Automation reviewed the model and identified the affected CM spools located within the black cells for HLW and PTF."

The Office of Enforcement does not view the above CAR statement as indicative of an effective extent-of-condition review, since it merely documents the location of the pipe spools at that time. Beyond these two identified pipe spools; BNI took no further remedial actions. BNI's lack of understanding of extent-of-condition review expectations was noted repeatedly throughout the Office of Enforcement investigation. Although extent-of-condition reviews are mentioned and required by BNI procedures, there is no discussion of BNI's specific expectations for extent-of-condition reviews.

5. The BNI procedure for addressing externally identified issues did not adequately provide for the significance evaluation of those issues. BNI procedure 24590-WTP-GPG-MGT-002, *Recommendation and Issues Tracking System*, is used, in part, to track issues, commitments, and actions identified by the ORP. In February 2004, the ORP issued an assessment of BNI, documented in the *Black Cell Design Adequacy Oversight Report,* to evaluate the adequacy of black cell design for the WTP. Recommendation 5 of the assessment was to identify black cell boundaries on primary drawings, physical fabrication and construction, and collateral databases. In response to this recommendation, BNI issued RITS 24590-WTP-RITS-QAIS-04-171.

   However, the RITS procedure inadequately addressed the significance of externally identified issues. BNI addressed external issues based on their categorization (e.g., improvement opportunity or recommendation) rather than on the significance of the issue. The RITS procedure did not provide a mechanism for appropriately categorizing externally-identified, significant, quality-related issues (e.g., the need to identify black cell boundaries on primary drawings) as anything other than an improvement opportunity or recommendation.

6. The BNI *Quality Deficiency Reports* procedure (24590-WTP-GPP-PSQ-047), states that quality deficiency reports (QDR) serve to identify significant deficiencies, irrespective of type, which if uncorrected may result in noncompliant or indeterminate quality of procured materials, equipment, and/or related documentation.

   Revision 4 of this procedure failed to establish adequate criteria for generating a QDR in response to significant procurement-related deficiencies. In January 2006, for example, no QDR was generated when the SQR discovered that a black cell pipe spool did not receive 100 percent radiographic testing as required by the specification. If a QDR had been properly generated, the procedure would have required an extent-of-condition review to determine whether the problem existed throughout the entire manufacturing process, rather than merely correcting the problem associated with the single identified pipe spool.

7. Formal procedures were not in place for handling supplier clarifications or other information requests. Prior to September 2003 (approximately), Shaw-NAPTech, a quality level supplier of black cell piping, questioned the usefulness of the room number listing and its application to the fabrication of black cell piping (no clear date of this communication was established). In September 2003, BNI emailed Shaw-NAPTech and stated "the attached file contains a cross-reference of room numbers to CWAs. The CWAs appear on the face of the isometric. There are three tabs on the attached spreadsheet; one tab each for LAW [low-activity waste], HLW, and Pre-treat."

   Neither the BNI RCA team nor the Office of Enforcement could locate the specific black cell designations or the CWAs in the referenced file. There was no evidence that other suppliers of black cell piping received the BNI e-mail communication or any other correspondence relating to the Shaw-NAPTech concern or the associated BNI response. BNI failed to adopt formal procedures at the time of the Shaw-NAPTech communication for handling supplier clarifications or other information requests.

Collectively, these deficiencies constitute a Severity Level II violation.
Proposed Civil Penalty - $27,500

E. Work Processes – Procedural Violations

Title 10 C.F.R. § 830.122(e)(1) states that DOE contractors are to "perform work consistent with technical standards, administrative controls, and other hazard controls adopted to meet regulatory or contract requirements, using approved instructions, procedures, or other appropriate means."

Contrary to this requirement, BNI failed to adhere to approved procedures relating to the fabrication and procurement of black cell piping and the flowdown of design requirements into WTP specifications. Specific violations include the following:

1. The BNI *Recommendation and Issues Tracking System* procedure (24590-WTP-GPG-MGT-002) states that "The RITS shall not be used to identify conditions adverse to quality." Contrary to this prohibition, however, in 2005 BNI issued a RITS report to document a condition adverse to quality.

   In July 2005, BNI issued 24590-WTP-MAR-ENG-05-0007, *Implementation and Flowdown of Black Cell Basis of Design Requirements Management Assessment Report*, revision 0. The purpose of this management assessment was, in part, to evaluate the implementation of BNI commitments in closure documents issued by the ORP in their black cell review verification documents. This BNI management assessment identified that the commitments in response to BNI RITS report 24590-WTP-RITS-QAIS-04-171, *Black Cell Design Adequacy Report – Recommendation 5*, had not been implemented. RITS report 24590-WTP-RITS-QAIS-05-623 was issued to document this concern rather than the Corrective Action Program that was in effect at that time. BNI violated existing procedure on the use of RITS by issuing a RITS report to track and close the observation

that actions identified in response to the ORP recommendation had not been implemented.

2. BNI procedure 24590-WTP-GPG-MGT-002, *Recommendation and Issues Tracking System*, states that the Responsible Actionee is to enter the closure date and closure comments when the RITS action item is complete. Further, the RITS Originator is to review and validate the closure information and verify that actions taken in response to the item description are appropriate to close the RITS.

   In March 2004, BNI issued RITS 24590-WTP-RITS-QAIS-04-171 in response to Recommendation 5 of the ORP *Black Cell Design Adequacy Report*. In July 2005, BNI issued 24590-WTP-MAR-ENG-05-0007, *Implementation and Flowdown of Black Cell Basis of Design Requirements Management Assessment Report*, finding that the commitments in response to 24590-WTP-RITS-QAIS-04-171 had not been implemented. The Responsible Actionee entered the closure date to indicate completion of the RITS, and the RITS Originator reviewed and validated actions relating to the RITS closure. However, BNI never implemented the identified actions.

3. BNI procedure 24590-WTP-3DP-G04B-00049, *Engineering Specifications*, revision 8, section 3.1, dated April 4, 2005, lists several types of requirements to be considered in preparing specifications. The procedure does not provide for defining the scope of application of the specification requirements (i.e., room number, planning area, CWA) within the specification.

   However, BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, was used to not only convey requirements for the fabrication of piping, including black cell piping, but also to attempt to define the black cells or black cell areas to which the requirements apply. This inappropriate definition of scope within the specification resulted in many of the deficiencies associated with the fabrication of black cell piping.

4. BNI procedure 24590-WTP-GPP-MGT-013, *Acceptance of Procured Material*, states that a material acceptance plan (MAP) is to include the "complete set of attributes/activities required for acceptance" and provide examples that include inspections and examinations, traceability, segregation control, classification, and quality verification documentation. In addition, the MAP is required to define the sequence of planned acceptance activities, critical features, and hold/witness points, as applicable.

   Contrary to procedural requirements, BNI failed to ensure that black cell specific attributes and activities were incorporated in the applicable MAP in a timely fashion. BNI initially addressed black cell piping in revision 2 of *Engineering Specification for Shop Fabrication of Piping*, dated May 2003. However, the corresponding MAP did not address black cell piping until revision 6, dated February 2006. This failure to revise MAPs to ensure consistency with revised specifications was inconsistent with the BNI procedure.

5. The BNI *Corrective Action* procedure (24590-WTP-GPP-QA-201) requires the quality assurance point of contact to perform final verification after all corrective actions have been completed. This procedure also requires the Responsible Manager to follow up to ensure the effectiveness of corrective actions.

   In January 2006, BNI issued 24590-WTP-CAR-QA-06-017 to document that two black cell spools were received from a CM supplier without MTRs, which are used to establish material traceability. Corrective Action number 1 of this CAR stated that the "material received to date (pipe) spools is on hold at the marshalling yard and a CDR has been written 24590-CDR-CON-06-0008 documenting the deficiency." In May 2006, the quality assurance point of contact verified completion of the action and signed the CAR. However, the CDR only addressed the two pipe spools in question and did not include all material received to date, as stated in the CAR corrective action. During the effectiveness review, the Responsible Manager failed to identify that the corrective action had not been implemented as stated in the CAR.

6. BNI procedure 24590-WTP-3DP-G04B-00001, *Design Criteria*, section 3.2.1, states that the BODCN Originator shall "Obtain a list of potentially impacted documents from the EDMS [Electronic Document Management System] that will require coordination between potentially affected disciplines and the BOD change." In January 2006, BNI BODCN 24590-WTP-BODCN-ENG-05-0007, *Nondestructive Examination Requirement*, was incorporated into the BOD. In February 2006, this BODCN, along with 11 other BODCNs, was forwarded for an engineering discipline impact review.

   However, BNI did not provide the required list of potentially impacted documents to help reviewers determine whether changes in the BOD as a result of 24590-WTP-BODCN-ENG-05-0007 could impact other documentation, such as BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, and BNI specification 24590-WTP-3PS-PS02-T0003, *Engineering Specification for Field Fabrication and Installation of Piping*.

7. Section 3.7.1 of the BNI *Recommendation and Issues Tracking System* procedure (24590-WTP-GPG-MGT-002) states that the Responsible Actionee is to enter the closure date and closure comments when the RITS action item is complete. Section 3.7.3 states that the RITS Originator is to review and validate the closure information and verify that actions taken in response to the item description are appropriate to close the RITS. In February 2004, the ORP issued the *Black Cell Design Adequacy Oversight Report*. Open Item number 4 of the report requested that BNI: (1) evaluate the permissible configurations for black cell piping related to socket welds, branch connections, welded reinforcement pads, and other welded attachments to piping; (2) evaluate the required NDE for the permissible configurations; and (3) update appendix A of the shop fabrication and field piping specifications regarding inspection requirements for black cell piping, as appropriate.

To address this open item, BNI prepared 24590-WTP-RITS-QAIS-05-378. The purpose of this RITS action was to revise appendix A of BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, and BNI specification 24590-WTP-3PS-PS02-T0003, *Engineering Specification for Field Fabrication and Installation of Piping*, to include a table of NDE welding requirements agreed to by the ORP. However, BNI closed this RITS action without incorporating the ORP-approved version of the table of NDE welding requirements into the specifications.

Collectively, these deficiencies constitute a Severity Level II violation.
Proposed Civil Penalty - $27,500

F. Design

Title 10 C.F.R. § 830.122(f) requires DOE contractors to: "(2) "incorporate applicable requirements and design bases in design work and design changes;" (3) "identify and control design interfaces;" (4) "verify or validate the adequacy of design products using individuals or groups other than those who performed the work; and (5) "verify or validate work before approval and implementation of the design."

Contrary to these requirements, BNI failed to incorporate design requirements and validate the adequacy of design products. Specific violations include the following:

1. The BNI *Engineering Drawings* procedure (24590-WTP-3DP-G04B-00046) establishes requirements for the preparation, review, approval, and control of drawings, datasheets, and engineering lists. Fabrication isometrics are design drawings used to fabricate the piping spools. The fabrication isometric contains a title block that references the CWA in which the piping is to be placed. The CWA could be used to determine whether fabricated piping is to be located in a black cell. Fabrication isometrics are extracted from a three-dimensional model using extraction software and the use of flow arrows where the last flow arrow touched establishes the CWA shown on the fabrication isometric.

   However, BNI failed to adequately control the use of flow arrows while developing the black cell fabrication isometric and failed to verify or validate the adequacy of the resulting fabrication isometrics. Consequently, the title block of the fabrication isometric did not identify whether a specific spool was located, fully or partially, within a black cell. These failures also contributed to suppliers' fabricating many black cell pipe spools that did not incorporate the design requirements of 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*.

2. BNI procedures 24590-WTP-3DP-G04B-00001, *Design Criteria*, and 24590-WTP-3DP-G04B-00049, *Engineering Specifications*, establish procedures for modifying the BOD and engineering specifications, respectively. BNI's control and integration of design interfaces failed to provide adequate assurance that BOD requirements were incorporated into specifications. BNI initially prepared SCN 24590-WTP-3PN-PS02-00052 to change BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop*

Fabrication of Piping, to include an ORP approved table of NDE welding requirements in appendix A of the specification. During the SCN review process, BNI chose to simplify the table by eliminating the NDE welding requirements for "hard to reach" piping. In June 2005, the revised SCN was approved. Revision 6 of BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, was issued in August 2005 and incorporated BNI specification changes contained in SCN 24590-WTP-3PN-PS02-00052.

In January 2006, BNI incorporated BODCN 24590-WTP-BODCN-ENG-05-0007 into revision 1D of the BOD. This BODCN added Chapter 17, which contained the previously mentioned table that included NDE welding requirements for "hard to reach" piping. The impact review (required by BNI procedure) for changes to BOD revision 1D failed to identify that Chapter 17 NDE requirements – i.e., the complete table of NDE welding requirements – were not incorporated into BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*. BNI's failure to properly integrate and control these two design interfaces resulted in BOD requirements that did not flow down to design specifications.

3. Section 3.2 of the BNI *Engineering Specifications* procedure (24590-WTP-3DP-G04B-00049) requires that validation of specifications prior to issuance is to be independently performed by an individual with adequate qualifications to originate the specification. This procedure also states that this independent check is typically performed by an individual other than the immediate supervisor or the originator. If no qualified individual is available, the immediate supervisor may perform the validation.

   The BNI RCA determined that the individual responsible for the development and checking of SCN 24590-WTP-3PN-PS02-00052 lacked independence, possibly contributing to BNI's failure to adequately incorporate NDE welding requirements for "hard to reach" piping into BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*.

4. BNI design management processes failed to ensure that the requirements of 24590-WTP-DB-ENG-01-001, *Basis of Design*, properly flowed down to the requirements contained in piping fabrication specifications. Section 17 of the BOD revision 1D includes a table for defining the expected NDE and PMI requirements for black cells, including piping in "hard to reach" areas of the WTP. However, the NDE requirements for "hard to reach" areas did not flow down into the piping fabrication and installation specifications used to fabricate the piping.

Collectively, these deficiencies constitute a Severity Level II violation.
Proposed Civil Penalty - $27,500

G. Procurement

Title 10 C.F.R. § 830.122(g)(1) requires DOE contractors to "procure items and services that meet established requirements and perform as specified."

Contrary to this requirement, BNI failed to procure black cell and "hard to reach" piping in compliance with established specifications. Specific violations include the following:

1. The BNI *Engineering Specifications* procedure (24590-WTP-3DP-G04B-00049) states that project design criteria, system or structure functional requirements, and design basis documents are to be considered in the development of specifications.

   However, BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping,* failed to adequately discuss BOD design criteria and SRD design basis requirements in that the specification failed to identify requirements for MTR, weld examination, and PMI specific to black cell piping.

   As a result, 1748 black cell piping spools (1334 at the marshalling yard and 414 issued to the field) were fabricated and procured that did not meet the BOD/SRD requirements for MTRs, weld examination, or PMI over the time period January 2003 through October 2007.

2. BOD 24590-WTP-DB-ENG-01-001, *Basis of Design*, revision 1D, Chapter 17, provides a table of NDE welding requirements. This table includes the NDE welding requirements for "hard to reach" piping. As a result of the issues arising from the flowdown of the BOD welding requirements into BNI specification 24590-WTP-3PS-PS02-T0001, *Engineering Specification for Shop Fabrication of Piping*, 253 CM fabricated pipe spools in "hard to reach" areas were procured and received that did not satisfy design requirements stated in the BOD.

Collectively, these deficiencies constitute a Severity Level II violation.
Proposed Civil Penalty - $27,500

H. Inspection and Testing

Title 10 C.F.R. § 830.122(h)(1) requires DOE contractors to "inspect and test specified items, services, and processes using established acceptance and performance criteria."

Contrary to this requirement, BNI failed to adequately inspect supplier-fabricated black cell piping. The BNI *Source Verification Initial Visit* procedure (24590-WTP-GPP-PSQ-041) states that the SQR is to conduct a thorough review of the assignment transmittal to ensure that the applicable requirements are clearly defined and understood. *Engineering Specification for Shop Fabrication of Piping*, revision 2, (the revision used for the first procurement of black cell piping), section 2.1.2, states that "Material traceability is required for <u>all</u> piping in the black cells and all Quality Levels QL-1, QL-2 and QL-3." This

requirement applies equally to all piping in the black cells and includes black cell piping provided from CM suppliers.

BNI SQ personnel who inspected the piping provided by suppliers incorrectly believed that the black cell piping was not part of CM piping orders. This misjudgment diminished their inspection of enhanced black cell piping requirements and contributed to BNI's failure to adequately inspect and ensure that black cell CM piping met design specifications.

This deficiency constitutes a Severity Level III violation.
No Civil Penalty

I. Assessment

Title 10 C.F.R. § 830.122(i) requires DOE contractor managers to "assess their management processes and identify and correct problems that hinder the organization from achieving its objectives." Under section 830.122(j)(1), a DOE contractor shall "plan and conduct independent assessments to measure item and service quality, to measure the adequacy of work performance, and to promote improvement."

Contrary to these requirements, BNI assessment activities failed to identify and correct problems and effectively measure item quality in a timely manner. Specific examples include the following:

1. Effective internal quality assurance assessments to verify implementation of black cell requirements were not performed, despite numerous changes to the piping fabrication specification from 2002 through 2006 to address identified problems. These problems were initially identified by Shaw-NAPTech and the ORP. Furthermore, the BNI RCA team's review of the WTP quality assurance program internal assessment history for black cell piping-related issues revealed that "assessments conducted did not result in any evaluation of the areas of concern" and that the independent assessment program "was ineffective in its ability to identify project risks." These findings establish a clear failure of BNI to adequately plan and conduct independent assessments to measure project work product quality and to promote improvement.

2. Actions taken by BNI to resolve and close issues identified by management assessments were either ineffective or not implemented as described. Engineering management assessment 24590-WTP-MAR-ENG-05-0007, *Implementation and Flowdown of Black Cell Basis of Design Requirements Management Assessment Report*, identified that the actions taken to resolve and close the improvement actions from the *Black Cell Design Oversight Report* were not implemented, and an additional RITS item, 24590-WTP-RITS-QAIS-05-623, was written. However, this newer RITS item was subsequently closed inappropriately.

3. The BNI *Independent Assessment (Audit)* procedure (24590-WTP-GPP-QA-501) states that audits are to be supplemented with additional audits or surveillances of specific

subjects as necessary to provide an adequate independent assessment of compliance or effectiveness.

In October 2002, a BNI management assessment identified 21 approved design drawings that were inconsistent with AB requirements. Although some process improvements have been made, instances remain where the flowdown of AB requirements to subtiered documents has not occurred.

The BNI RCA reviewed CARs and condition reports (CRPTs) over the 2006 through 2007 timeframe and identified 8 CARs/CRPTs in which the flowdown of AB requirements was an issue. Over the same timeframe, the BNI RCA team identified 21 CARs/CRPTs in which the flowdown of non-AB requirements was an issue. Given the significant number of CARs/CRPTs involving the flowdown of non-AB requirements and the close relationship between these reports and previously-identified issues associated with the flowdown of AB requirements, BNI should have performed additional assessments focused on the flowdown of AB and non-AB requirements.

The BNI RCA team concluded that a "thorough assessment of requirement flow down to verify implementation to the specification level was not conducted." Furthermore, the BNI RCA concluded that "When considered as a defense to prevent the type of Project failures being investigated, the assessment program was ineffective in its ability to identify project risks associated with important to project mission attributes."

Collectively, these deficiencies constitute a Severity Level II violation.
Proposed Civil Penalty - $27,500

REPLY

Pursuant to the provisions of 10 C.F.R. § 820.24, BNI is hereby required, within 30 days after the date of filing this PNOV, to submit a written reply by overnight carrier to the following address:

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

Copies should also be sent to the Assistant Secretary for Environmental Management and the Manager of the DOE Office of River Protection. This reply should be clearly marked as a "Reply to a Preliminary Notice of Violation" and should include the following for each violation: (1) any facts, explanations, and arguments which support a denial that a violation has occurred as alleged; (2) facts that demonstrate any extenuating circumstances or other reasons why the proposed remedy should not be imposed or should be mitigated; and (3) full and complete answers to any questions set forth in the Notice. Copies of all relevant documents shall be submitted with the reply. The reply shall include a discussion of the relevant authorities which support the position asserted, including rulings, regulations, interpretations, and previous

decisions issued by DOE. Corrective actions that have been or will be taken to avoid further violations should be delineated with target and completion dates in DOE's Noncompliance Tracking System. If BNI agrees to comply with the proposed remedy and waives any right to contest the Notice or the remedy, this PNOV will constitute a Final Order upon the filing of the reply.

If BNI agrees to comply with the proposed remedy in its reply, the penalty of $385,000 must be paid within 60 days after the reply is filed by check, draft, or money order payable to the Treasurer of the United States (Account 891099) and mailed to the Director, Office of Enforcement, Attention: Office of the Docketing Clerk, at the above address. If BNI should fail to reply within the time specified, the Director will request that a default order be issued against BNI. If additional mitigation of the proposed civil penalty is requested, BNI should address the adjustment factors described in 10 C.F.R. Part 820, appendix A, section IX.3.

Martha S. Thompson
Acting Director
Office of Enforcement

Washington, D.C.
this 3rd day of December 2008