Assessment of Issues Management at the Hanford Site Waste Treatment and Immobilization Plant

November 2019

Office of Enterprise Assessments
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Acronyms

ACE	Apparent Cause Evaluation
ASME	American Society of Mechanical Engineers
BNI	Bechtel National, Incorporated
CAMP	Corrective Action Management Program
CAP	Corrective Action Plan
CAQ	Condition Adverse to Quality
CR	Condition Report
CRRC	Condition Report Review Committee
DOE	U.S. Department of Energy
EA	DOE Office of Enterprise Assessments
EOC	Extent of Condition
IMRG	Issues Management Review Group
LO/TO	Lockout/Tagout
NEC	National Electric Code
NQA	Nuclear Quality Assurance
OFI	Opportunity for Improvement
ORP	DOE Office of River Protection
QA	Quality Assurance
WTCC	Waste Treatment Completion Company
WTP	Waste Treatment and Immobilization Plant

Assessment of Issues Management
at the Hanford Site Waste Treatment and Immobilization Plant
August – September 2019

Summary

Scope

This assessment evaluated issues management processes and their implementation in selected areas key to nuclear safety at the Hanford Site Waste Treatment and Immobilization Plant (WTP). The assessment is based on a sample of 426 condition reports (CRs) selected from the universe of 3,868 CRs that were either open as of July 1, 2017, or initiated between July 1, 2017 and July 1, 2019. The selection of the sample focused on CRs assigned to organizations that affect nuclear safety and all CRs designated as significant conditions adverse to quality.

Significant Results for Key Areas of Interest

Overall, the WTP issues management process is well defined and implemented, with effective procedures, senior management involvement, willingness to identify issues, and organizational commitment to correcting problems. However, a few significant exceptions were noted in the large population of CRs examined; some CRs are categorized to a lower level than appropriate, leading to ineffective resolutions and recurrence control. Other issues remain unresolved despite being repetitively documented on multiple CRs over a period of several years.

Procedures, Metrics, and Software Tool Functionality

The WTP issues management process is compliant with the approved project quality assurance programs and American Society of Mechanical Engineers (ASME) Nuclear Quality Assurance (NQA)-1 commitments. The governing procedures are adequately rigorous and comprehensive. Metrics are used effectively to track performance, and the Bechtel National, Incorporated (BNI) software tool provides excellent support for issues management, resolution, and closure.

Identification and Categorization

The generation rate for new CRs reflects a project culture in which individuals are willing to identify problems. Although most CRs are screened into the appropriate category for resolution, some were screened to lower levels than required by procedure, allowing significant issues to recur (e.g., worker safety issues).

Issue Resolution

The causal analyses reviewed were of good quality and procedurally compliant. The apparent cause evaluation process, however, remains overly complex and time-consuming, sometimes resulting in delayed corrective actions. Corrective action plans for most of the issues that were reviewed were adequate to resolve the identified problems. However, several recurring issues were noted where multiple CRs had not been effective in resolving the problem and preventing recurrence (e.g., National Electric Code violations, lockout/tagout violations, equipment lubrication). Finally, effectiveness reviews are used appropriately to improve program performance.

Timeliness and Closure

The assessment team identified several ways in which timeliness became problematic for some limited populations of CRs. However, during a 24-month time period when 2,846 new CRs were generated, the backlog of open CRs was reduced from over 800 to less than 350, reflecting a successful project initiative

to complete and close CRs. BNI is now working to address the accumulation of closed CRs awaiting review by the corrective action program staff prior to final transmittal to records management.

Best Practices and Findings

The assessment team identified two best practices as part of this assessment:

- BNI trending of CRs is enhanced through the use of dedicated resources and well-defined event codes consisting of "function and process" codes combined with "nature of issue" codes for more effective binning of issues.
- Review of CR closures by the BNI corrective action program staff results in additional actions or enhanced documentation that produces higher-quality corrective actions and closures.

The assessment team identified one finding as part of this assessment, namely that BNI does not consistently categorize or screen significant conditions adverse to quality as required by procedure to ensure that issues are managed with appropriate rigor to preclude recurrence.

Follow-up Actions

No follow-up activities were identified.

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1.0 INTRODUCTION

The U.S. Department of Energy (DOE) Office of Nuclear Safety and Environmental Assessments, within the independent Office of Enterprise Assessments (EA), conducted an assessment of issues management at the Hanford Site Waste Treatment and Immobilization Plant (WTP). The purpose of this assessment was to independently evaluate issues management processes and their implementation by Bechtel National, Incorporated (BNI) and Waste Treatment Completion Company (WTCC), the design and construction contractors, respectively. An EA team conducted the onsite portions of this assessment August 5-8 and September 16-19, 2019.

Issues management has recently been identified as a targeted review area for EA. This assessment is the second in a series of reviews that will examine corrective action processes at several sites over a multi-year period and that are expected to culminate in an EA lessons-learned report.

The DOE Office of River Protection (ORP) provides Departmental oversight of the WTP project. In February 2016, the DOE Inspector General issued report OAI-M-16-06, *Corrective Action Program at the Waste Treatment and Immobilization Plant*, identifying significant weaknesses in issues management at WTP. A June 2018 BNI corporate assessment, *Independent Targeted Management Review*, identified similar issues and included several recommendations specific to issues management.

As described in the *Plan for the Office of Enterprise Assessments Assessment of Issues Management at the Hanford Site Waste Treatment and Immobilization Plant, August – September 2019*, this assessment evaluated issues management processes and their implementation by selected divisions that are key to nuclear safety at WTP (i.e., divisions cognizant of nuclear facility engineering and design, procurement, construction, maintenance, startup, and commissioning). The issues management process for both BNI and WTCC is controlled by a single set of procedures that collectively form the Corrective Action Management Program (CAMP). Individual issues, when entered into the computerized CAMP tool, generate condition reports (CRs) that are then assigned to responsible managers for resolution. The scope of this review included CRs open as of July 1, 2017, and any new CRs identified between July 1, 2017, and July 1, 2019. Individual CRs were examined to determine the effectiveness of the WTP issues management program in correcting problems and precluding recurrence.

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which is implemented through a comprehensive set of internal protocols, operating practices, assessment guides, and process guides. This report uses the terms "best practices, deficiencies, findings, and opportunities for improvement (OFIs)" as defined in DOE Order 227.1A.

This assessment considered the requirements related to issues management in Attachment 1 to DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, which requires the contractor assurance system to include a structured issues management system that captures program and performance deficiencies for timely reporting and correction using a graded approach. The assessment team also used the assessment criteria for Objective 3 of EA Criteria and Review Approach Document 30-01, Revision 1, *Contractor Assurance System*.

The assessment team examined key documents, such as procedures, quality assurance (QA) program descriptions, internal and external assessments, CRs, extent-of-condition (EOC) reviews, causal analyses, corrective action plans (CAPs), effectiveness evaluations, and evidence of corrective action completion. The CRs initially identified for review were those that were open as of July 1, 2017, and all CRs initiated between that date and July 1, 2019. A sample of 426 of these CRs selected for detailed review included CRs assigned to organizations that affect nuclear safety and all CRs designated as significant conditions adverse to quality.

The assessment team also interviewed key personnel responsible for contractor issues management process implementation, with a focus on issues associated with nuclear safety, and observed Issues Management Review Group (IMRG) meetings and Condition Report Review Committee (CRRC) meetings. The members of the assessment team, the Quality Review Board, and management responsible for this assessment are listed in Appendix A. Weaknesses noted by the assessment team in the handling/processing of individual CRs are summarized in Appendix B.

EA has not conducted a recent assessment of WTP issues management, so there were no items for follow-up during this assessment.

3.0 RESULTS

3.1 Issues Management Procedures and Software Tool Functionality

The objective of this portion of the assessment was to verify that the procedures that collectively control the issues management process and the supporting software tool adequately implement QA program requirements and comply with applicable commitments to American Society of Mechanical Engineers (ASME) consensus standard Nuclear Quality Assurance (NQA)-1, *Quality Assurance Requirements for Nuclear Facility Applications*.

Issues Management Process

The WTP *Quality Assurance Program Description*, 24590-WTP-PD-RAQA-QA-0001, commits most project functions (including engineering and construction) to meeting the requirements of ASME NQA-1-2000, Parts I and II. Startup and commissioning activities, however, are covered by a separate QA program, 24590-WTP-QIP-RAQA-QA-0001, *Commissioning and Operations Quality Assurance Implementation Plan*, which commits those activities to meeting the requirements of ASME NQA-1-2008, 2009 Addenda, Parts I and II. Requirements pertinent to corrective action processes are consistent between these two versions and formed the basis for review of the WTP implementing procedures. Six core procedures govern the issues management process for both BNI and WTCC. Those procedures, in aggregate, define a comprehensive and rigorous process that is compliant with NQA-1 and the WTP QA manuals.

In mid-2019, BNI and ORP worked jointly to amend the issues management process, creating the IMRG and issuing 24590-WTP-LIST-RACA-CR-0001, *Integrated Issues Management Systems*. This document lists the available approved alternate resolution programs, such as Document Action Requests for specific document type revisions and Nonconformance Reports for field quality issues. The IMRG is authorized to review newly initiated CRs and divert CRs into one of these alternate paths when appropriate. The alternate resolution paths are added to the approved list maintained in that document after a one-time review to ensure that they provide adequate control and tracking. The assessment team noted that no controls are in place to limit subsequent changes to the alternate path programs that might invalidate their suitability for this purpose. (See **OFI-BNI-1**.)

Categorization of CRs for significance as required by ASME NQA-1 is governed by 24590-WTP-GPP-RACA-CR-0111, *Condition Report and Recommendation Screening*. The CRRC uses guidance in Attachment 3 and examples in Table 1 of that procedure to perform screening. During the CR review, the assessment team found that Table 1 did not provide adequate guidance to support consistent screening/categorization in several areas, including safety evaluations, worker safety, and startup/commissioning activities. (See **OFI-BNI-2**.)

BNI has developed and continues to improve and mature comprehensive metrics to track issues management program performance. The detailed metrics include self-identification rate, rate of CRs submitted anonymously, CR quality, average age and backlog of open CRs, timeliness, causal analysis/CAP quality, and average time to approve CAPs for Level A and B CRs. However, the monthly WTP Project Review to BNI and ORP management provides only a one-page, simplified summary. The complete metrics are available solely on the WTP CAMP website. (See **OFI-BNI-3**.)

In June 2019, all of the issues management metrics were "green" (i.e., meeting BNI's goals) except the CR self-identification rate, CR timely completion, and CAP approval age for Level A and B CRs. The metric for CR timely completion was improving after additional BNI management oversight to promote faster resolution of issues. BNI is also adequately responding to trends in the CR self-identification rate and CAP approval age by performing trend analysis and implementing actions to accelerate the approval process.

24590-WTP-GPP-RACA-TM-0001, *Performance Measures and Trending*, adequately establishes the roles, responsibilities, and procedures for monitoring issues management performance and trending CRs. Trending of CRs is enhanced through the use of well-defined event codes set out in 24590-WTP-LIST-RACA-TM-0001, *Condition Report Event Codes*. Event codes consist of "function and process" codes (e.g., "Construction/Field Operations Design Implementation") that are combined with "nature of issue" codes (e.g., "Procedure Implementation Issue") to allow enhanced trending of CRs. The Contractor Assurance Group has resources dedicated to proactively identifying trends in CRs on a monthly basis by using event and cause codes and keyword searches. (**Best Practice**)

Issues Management Software Tool

The BNI software tool, DevonWay, is a user-friendly system capable of initiating, tracking, trending, and documenting CR management, resolution, and closure. It provides for assignment of ownership of both CRs and individual corrective actions, and acts as a repository for records until final transmittal to records management. The assessment team used DevonWay extensively through the assessment process and found it to be a very capable tool for this purpose.

Issues Management Procedures and Software Tool Functionality Conclusions

The WTP issues management process is compliant with the approved project QA programs and ASME NQA-1 commitments. The procedures governing this process are adequately rigorous and comprehensive. Metrics are used effectively to track performance, and trending is performed to identify and proactively address potential performance issues.

3.2 Identification and Categorization

The objective of this portion of the assessment was to examine whether problems and performance issues are appropriately identified in CAMP when they occur, and whether the WTP issues management process effectively categorizes those issues in accordance with the WTP QA program and assigns them to a qualified resolution process.

Issue Identification

As described in Section 2 of this report, the approach for this assessment resulted in an initial population of 3,868 CRs. Of these, 2,846 were initiated in the two-year period preceding this assessment. Those CRs were initiated across the breadth of the organization. Based on the nuclear industry experience of the assessment team, this reflects a healthy willingness on the part of project personnel to identify and document potential problems for resolution.

Issue Categorization

As noted previously, the CRRC performs issue screening and categorization in accordance with 24590-WTP-GPP-RACA-CR-0111, with input from those assigned as responsible managers for each issue. Issues that require a root cause or apparent cause evaluation (ACE) are Level A or Level B, respectively. Level C is for issues that will require some action to be addressed, and Level D is for issues that have already been addressed by the time CRRC does its screening. Most Level C issues are identified at an adequately low significance threshold and appropriately categorized. The Level D issues reviewed by the assessment team were also appropriately categorized, and the actions taken to resolve the issues were adequately documented.

In the past, BNI effectively used its most rigorous issues management tools (e.g., root cause analyses, EOC and extent-of-cause evaluations, executive oversight, and independent QA reviews) to resolve significant adverse and complex problems (i.e., Level A conditions). However, the relative number of CRs screened as Level A declined each year from only 0.7% in 2012 to 0% in calendar years 2016, 2017, and 2018. CR 19-00903, created on September 12, 2019, is the only CR screened as Level A to date in 2019, and it was downgraded to Level B on October 1, 2019.

The June 2018 BNI management assessment noted, with respect to the corrective action process, that event categorization is often driven by Occurrence Reporting and Processing System reporting criteria and lacks consideration of other "business or management reasons for preventing recurrence," resulting in lower categorization levels than appropriate.

In extensive reviews of more recent CRs, the assessment team identified that BNI does not consistently categorize or screen "Significant conditions which, if uncorrected, could have a serious adverse effect on safety, quality, operability, the environment, or Project mission" (i.e., Level A conditions) per 24590-WTP-GPP-RACA-CR-0111 to ensure that issues are managed with appropriate rigor to preclude recurrence. Table 1 of that procedure also defines "A significant adverse trend related to an activity or item subject to the QA program" as a Level A condition. (See **Finding F-BNI-1**.) For example:

- Since June 2019, three CRs have been associated with falling objects striking workers (two events) and a falling object nearly injuring a worker (see Appendix B for 19-00655, 19-00700, 19-00903). BNI did not screen these CRs as Level A, even though 24590-WTP-GPP-RACA-CR-0111 states that "Level A are those which warrant the investment of resources because consequence of recurrence is not acceptable." WTP-GPP-RACA-CR-0112, *Condition Report and Recommendation Evaluation and Action Plan Development*, does not require root cause to be determined or addressed (to preclude recurrence) for Level B CRs. (**Deficiency D-BNI-1**)

- The assessment team identified significant recurring problems in hazardous energy control and implementation of lockout/tagout (LO/TO) procedures that were incorrectly screened as Level B (see Appendix B for 16-01616, 17-01330, 17-01459). (See **OFI-BNI-4**.)

- The discussion of recurring issues in Section 3.3 of this report identifies a series of CRs documenting repeated National Electric Code (NEC) violations on installed electrical commodities. This issue was incorrectly screened as Level B, and NEC non-compliances persist several years after the initial identification, with evaluations that document ineffective corrective actions and recurrence control.

Identification and Categorization Conclusions

The generation rate for new CRs reflects a project culture in which individuals are willing to identify problems. Most CRs are then screened into the appropriate category and assigned to a responsible manager/person for CAP development. However, the assessment team identified a finding based on significant exceptions where CRs were screened to lower levels than required by 24590-WTP-GPP-RACA-CR-0111.

3.3 Issue Resolution

The objective of this portion of the assessment was to verify that the issues management system includes structured processes for identifying root causes (applied to all items using a graded approach based on risk). The issues management process is also responsible for the resolution of any issues identified.

An effective issues management process includes (DOE G 414.1-2B Section 4.3.2.3):

- Causal analysis when and as appropriate
- Corrective actions sufficient to resolve the issue
- An EOC review when appropriate to ensure that the entire extent of the issue is addressed
- Recurrence controls when appropriate
- Clearly identified responsible individuals and organizations for all of the above
- Effectiveness reviews when appropriate.

Causal Analysis and Correction Action Plan Development

The assessment team found that, with a few significant exceptions, the corrective action process for the 426 CRs that were evaluated is implemented with fidelity to the procedural requirements and with an end goal of correcting the identified problems. Planned corrective actions are generally adequate, and completion is appropriately documented. Responsible managers/persons often take the initiative to perform an EOC review and/or identify actions to prevent recurrence for Level C issues in order to continuously improve their work, even though these steps are not required by procedure.

Causal analysis is performed as required by procedure. Root cause analysis is required for Level A CRs and ACEs for Level B CRs. Cause codes are assigned for Level C CRs to support trending. The causal analyses reviewed were of good quality and consistent with the intent of ASME NQA-1.

However, the assessment team concluded that the ACE process remains unnecessarily time consuming, despite having undergone recent requirement changes in the interest of simplification. Further efforts to simplify and shorten this process are warranted.

Recurring Issues

The assessment team identified the following areas where significant breakdowns in quality control and procedural compliance occurred, and where multiple CRs were written to document the problems. The corrective actions were implemented inadequately, or were not effective in resolving these issues, resulting in continued violations. Many of these CRs were also screened inappropriately, as noted

previously. These issues are significant because they represent risk to the project in terms of construction quality and worker safety, with the potential to impact both cost and schedule.

- Since 2015, numerous NEC violations have been identified on installed plant electrical commodities. Corrective actions were defined and implemented but were not adequate to correct the identified problems:
  - On August 25, 2015, ORP site inspectors performed a walkdown and review of the fire service water system for Buildings 84A and 84B, which had been turned over to and accepted by Operations on March 3, 2008. The site inspectors noted energized electrical equipment that did not comply with NEC requirements. WTP issued CR 15-01950 (a Level B CR) documenting ORP's finding. During the ACE, it was found that between March 31, 2014, and March 31, 2016, WTCC or ORP identified approximately 100 electrical code and/or design non-compliances, most of them NEC-related. The corrective actions for 15-01950 included updating training on electrical code requirements for involved personnel and specialized training for the electrical field engineers. An Electrical Safety Committee was established, and organizational responsibilities were clarified.
  - Continued NEC compliance issues and inspector staffing issues subsequently resulted in CR 17-00698, but no additional corrective actions were identified because it was determined that the corrective actions for CR 15-01950 would resolve the continuing problem.
  - A BNI effectiveness review subsequently found that the corrective actions for both CRs were only partially effective.
  - CR 19-00179 was then written in March 2019 to address multiple NEC code non-compliances with installations. Power was shut off to the Low-Activity Waste Facility for two months to allow NEC inspections.
  - CRs 19-00125 and 19-00263 were also initiated in the first half of 2019 "to identify additional corrective actions needed to obtain the desired results of building electrical systems/commodities that are NEC code compliant." Both CRs are still in "Implementation" status. These two CRs resulted from an effectiveness review that noted repeated new NEC code violations, lack of adequate resolution for the original CRs, and the need to identify more effective corrective actions. CRs 19-00125 and 19-00263 are both Level C. 19-00263 now requires an effectiveness review (added 10/3/2019), but 19-00125 does not.

- The assessment team identified significant recurring problems in hazardous energy control and implementation of LO/TO procedures that were not addressed effectively to prevent recurrence and, as mentioned in the previous section, were incorrectly screened as Level B.
  - CR 16-01616 reported recurring hazardous energy control program violations associated with hazardous electrical energy (over 50 volts) not being identified in maintenance work packages for 924 electrical commodities and confusion about the scope or protection provided by Project Wide Master Clearance tags.
  - CR 17-01330 reported an adverse trend in CRs on LO/TOs, noting that 54 CRs were created in 24 months, with an increase in number (not due to an increase in workload) and significance from January to July 2017. CR 17-01330 noted that "If left uncorrected, this adverse trend may impact the safety of personnel." Despite the trend analysis determining that LO/TO process was "high-risk," neither CR 17-01330 nor any of the 54 CRs referenced by CR 17-01330 were categorized as Level A to preclude personnel injury.
  - CR 17-01459, created September 23, 2017, reported the inadvertent discovery of electricity inside a transformer cabinet after work in the cabinet began. The CR stated that the potential consequence was "injury or death," but it was categorized as Level B. 24590-WTP-GPP-RACA-CR-0111 requires conditions with unacceptable recurrence to be categorized as Level A.

- CR 18-00776 documents recurring problems with use of incorrect lubricants in permanent plant equipment. The ACE appropriately concluded that the causes were the lack of an effective lubricant control program and lack of a lubrication subject matter expert for the project. After the preventive actions were recorded as complete, but before the effectiveness review occurred, numerous additional CRs documented recurrence of issues involving incorrect lubricants and other related problems. The actions under CR 18-00776 were reviewed and reopened, and additional compensatory measures were put in place to limit recurrence until the preventive actions were complete. The compensatory actions included review of the other 26 CRs related to lubricant issues.

Inappropriate Use of Alternative Tracking Systems

As noted in Section 3.1 of this report, BNI revised its process for evaluating new CRs, which now consists of review by the IMRG. IMRG review is, in part, intended to ensure that conditions adverse to quality (CAQs), as defined in NQA-1 and issues management procedure 24590-WTP-GPP-RACA-CR-0111 Attachment 3, are assigned to the CAMP for disposition, and that non-CAQ issues are assigned to other administrative processes for resolution. Assignment of CAQs to these administrative processes is not permitted.

However, this assessment identified five CRs (see Appendix B for 19-00277, 19-00637, 19-00638, 18-01243, 18-1017) that meet the criteria defined for CAQs (e.g., errors in issued calculations and drawings) and were categorized by the CRRC as CAQs during the internal screening process, but were subsequently transferred to the Engineering Action Tracking System, an administrative tracking process. (**Deficiency D-BNI-2**) The February 2016 inspector general report identified handling of issues outside the corrective action program as examples of "circumventing or not fully adhering to corrective action program requirements" in a manner that increases risk.

Effectiveness Reviews

Effectiveness reviews are required for Level A CRs and optional for Level B CRs. In reviewing all Level A and B CRs within the sample scope of this assessment, the assessment team found that effectiveness reviews are used appropriately to drive performance improvement and enhance the overall quality of the corrective action process. In several cases, effectiveness reviews found that CR CAP results for both Level A and B CRs were found to be only partially effective, leading to additional measures and improved outcomes.

Issue Resolution Conclusions

Overall, the causal analyses reviewed during this assessment were of good quality and performed as required by procedure. The ACE process, however, remains overly complex and time-consuming, sometimes to the detriment of the corrective action process. CAPs for most of the reviewed issues were adequate to resolve the identified problems. However, several recurring issues were noted where multiple CRs were not effective in resolving the problem and preventing recurrence (e.g., NEC violations, LO/TO violations, equipment lubrication). Inappropriate categorization at a level lower than called for by procedure was a likely contributor to these problems. Other CRs were found to have been inappropriately transferred to administrative programs in violation of CAMP procedures. Finally, effectiveness reviews are being used appropriately to improve program performance.

3.4 Timeliness and Closure

The objective of this portion of the assessment was to ensure that planned corrective actions are completed in a timely manner and adequately documented. Timeliness of causal analyses and corrective actions was identified as problematic in the February 2016 inspector general report.

BNI/WTCC initiated 2,846 CRs during the two-year period ending on July 1, 2019. During the same period, BNI/WTCC reduced the backlog of open CRs from over 800 to less than 350 through a concerted effort by the Project to resolve and close issues. The current tally reflects a manageable backlog. However, the assessment team identified several areas where CR timeliness did not meet NQA-1 requirements that "Conditions adverse to quality shall be … corrected as soon as practicable." (**Deficiency D-BNI-3**)

- Interviews revealed that delays in processing newly initiated CRs can result when the CRRC cannot agree on assignment of a responsible manager, significance, or organizational ownership. The BNI screening procedure allows the screening process to be deferred by the CRRC for up to three meetings (the CRRC meets twice a week). At that point, the CR is escalated to the contractor assurance system manager for assignment.
- Delays often result from the ACE process, which has historically taken two to three months to complete. Since the CAP for a CR is typically delayed until the ACE is complete, corrective actions may not be timely. An example is CR 19-00655 (noted on page 4), which documented a worker injury event. The ACE for 19-00655 took three months to complete, during which time another worker was injured by a falling object (19-00903) and another near miss occurred (19-00700). The causal analysis for 19-00700 remains incomplete two months after the event (at the time of this report). NQA-1 states that "In the case of a significant condition adverse to quality, the cause of the condition shall be determined and corrective action taken to preclude recurrence."
- Across departments, a small percentage of CRs go without an action plan for months, creating a timeliness issue. Others experience delayed implementation. (see Appendix B for 18-01335, 19-00340).

When a CR is closed by the responsible manager, it is placed in CAP Manager Approval status by the DevonWay tool. As of July 16, 2019, 818 CRs were in CAP Manager Approval status. At this stage, the CAMP staff reviews all Level A and B closures and a sample of Level C closures. Common insights or trends from these reviews are provided to the responsible managers to improve their performance. This review process has been successful in enhancing the quality of CR corrective actions, documentation, and closures. (**Best Practice**) For example, the CAMP staff identified inadequacies in 8-10% of the CR closure packages they reviewed, approximately 63% of which were related to how issues were managed. However, the assessment team found that approximately 10% of the CRs in this status had been in this status for over a year, reflecting inadequate attention to timeliness once CRs reach this latter stage of the process. As a result, the CRs in CAP Manager Approval status represent a limited-scope risk to the project because the CRs could be rejected at this stage, resulting in additional work. The contractor assurance program manager noted that additional attention is warranted to minimize this risk by fully addressing these CRs.

When the CAMP staff identifies an inadequacy in CR closure, the affected CR may stay in CAP Manager Approval status until the inadequacy is resolved, or the CR may be returned to Implementation status. Some additional timeliness issues were noted in this area:

- 85 Level C CRs are still being reviewed one to two years after closure by the responsible manager or person.
- 4 Level A CRs and 55 Level B CRs are still being reviewed by CAMP staff an average of 8.5 months after closure by the responsible manager or person.

Timeliness and Closure Conclusions

The assessment team identified several ways in which timeliness is problematic for some limited populations of CRs. However, during a 24-month time period when 2,846 new CRs were generated, the backlog of open CRs was reduced from over 800 to less than 350, reflecting a successful project initiative to complete and close CRs. A best practice was noted in the CAMP staff review of CR closures. BNI is now working to address the accumulation of closed CRs awaiting review by the corrective action program staff prior to final transmittal to records management.

4.0 BEST PRACTICES

Best practices are safety-related practices, techniques, processes, or program attributes observed during an assessment that may merit consideration for implementation by other DOE and contractor organizations. The following best practices were identified as part of this assessment.

- BNI trending of CRs for WTP is enhanced through the use of well-defined event codes consisting of "function and process" codes that are combined with "nature of issue" codes for more effective binning of issues. The Contractor Assurance Group has dedicated resources that proactively identify trends in CRs on a monthly basis using event and cause codes and keyword searches.
- Review of CR closures by the BNI CAMP staff constitutes a best practice for BNI. In numerous cases, this review led to additional actions or enhanced documentation that produced higher-quality corrective actions and closures.

5.0 FINDINGS

Findings are deficiencies that warrant a high level of attention from management. If left uncorrected, findings could adversely affect the DOE mission, the environment, the safety or health of workers and the public, or national security. DOE line management and/or contractor organizations must develop and implement corrective action plans for findings. Cognizant DOE managers must use site- and program-specific issues management processes and systems developed in accordance with DOE Order 226.1, *Implementation of Department of Energy Oversight Policy*, to manage the corrective actions and track them to completion.

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Finding F-BNI-1: Contrary to the requirements of 24590-WTP-GPP-RACA-CR-0111, BNI does not consistently categorize or screen "Significant conditions which, if uncorrected, could have a serious adverse effect on safety, quality, operability, the environment, or Project mission" (i.e., Level A conditions) to ensure that issues are managed with appropriate rigor to preclude recurrence.

6.0 DEFICIENCIES

Deficiencies are inadequacies in the implementation of an applicable requirement or standard. One deficiency that does not meet the criteria for a finding is listed below, with the expectation from DOE Order 227.1A for site managers to apply their local issues management processes for resolution.

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Deficiency D-BNI-1: Contrary to the requirements of 24590-WTP-GPP-RACA-CR-0111, BNI did not screen CRs 19-00655, 19-00700, 19-00903 associated with falling objects striking or nearly injuring workers as Level A, even though 24590-WTP-GPP-RACA-CR-0111 states that "Level A are those which warrant the investment of resources because consequence of recurrence is not acceptable."

Deficiency D-BNI-2: Contrary to the requirements of 24590-WTP-GPP-RACA-CR-0111, CRs 19-00277, 19-00637, 19-00638, 18-01243, and 18-1017, documenting CAQs as defined in that procedure, were closed and transferred to an administrative tracking tool, the Engineering Action Tracking System.

Deficiency D-BNI-3: Contrary to NQA-1, inherent delays with BNI's processing and closure of CRs have prevented "Conditions adverse to quality shall [from being] … corrected as soon as practicable."

7.0 OPPORTUNITIES FOR IMPROVEMENT

The assessment team identified three OFIs to assist cognizant managers in improving programs and operations. While OFIs may identify potential solutions to findings and deficiencies identified in assessment reports, they may also address other conditions observed during the assessment process. These OFIs are offered only as recommendations for line management consideration; they do not require formal resolution by management through a corrective action process and are not intended to be prescriptive or mandatory. Rather, they are suggestions that may assist site management in implementing best practices or provide potential solutions to issues identified during the assessment.

Bechtel National, Inc.

OFI-BNI-1 Consider revising 24590-WTP-GPP-RACA-CR-0109, *Issues Management*, to include formal controls on future revisions to approved issues management systems in order to ensure continued compliance with the requirements of this procedure.

OFI-BNI-2 Consider revising 24590-WTP-GPP-RACA-CR-0111, Attachment 3, Table 1 to include examples of proper categorization in other areas, such as safety evaluations, worker safety, and startup/commissioning activities.

OFI-BNI-3 Given the continuing project initiative to reduce the backlog of open CRs, consider actively disseminating the detailed CAMP metrics to project management monthly for increased visibility.

OFI-BNI-4 Consider having BNI quality assurance personnel assess the hazardous energy control program and implementation of LO/TO procedures to ensure the significant recurring problems identified in CRs 16-01616, 17-01330, 17-01459 have been precluded from recurrence.

Appendix A
Supplemental Information

Dates of Assessment

Onsite Assessment: August – September 2019

Office of Enterprise Assessments (EA) Management

Nathan H. Martin, Director, Office of Enterprise Assessments
April G. Stephenson, Deputy Director, Office of Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
Kevin G. Kilp, Deputy Director, Office of Environment, Safety and Health Assessments
C.E. (Gene) Carpenter, Jr., Director, Office of Nuclear Safety and Environmental Assessments
Charles C. Kreager, Acting Director, Office of Worker Safety and Health Assessments
Gerald M. McAteer, Director, Office of Emergency Management Assessments

Quality Review Board

April G. Stephenson
Steven C. Simonson
Thomas R. Staker
Michael A. Kilpatrick

EA Site Lead for the Hanford Office of River Protection

Samina A. Shaikh

EA Assessors

Charles R. Allen – Lead
Joseph E. Probst
Sarah C. Rich
Samina A. Shaikh

Appendix B
Weaknesses Noted in Individual Condition Reports

Worker Safety Issues	
Condition Report	Comment
16-01616	This CR reported recurring hazardous energy control program violations associated with hazardous electrical energy (over 50 volts) not being identified in maintenance work packages of 924 assets and confusion about the scope or protection provided by Project Wide Master Clearance tags. This CR was categorized as Level B contrary to WTP-GPP-RACA-CR-0111, which requires CRs for conditions with unacceptable recurrence to be categorized as Level A.
17-01330	This CR reported an adverse trend in CRs on LO/TOs, noting that 54 CRs were created in 24 months, with an increase in number (not due to an increase in workload) and significance from January to July 2017. CR 17-01330 noted that "If left uncorrected, this adverse trend may impact the safety of personnel." Despite the trend analysis determining that LO/TO process was "high-risk," neither CR 17-01330 nor any of the 54 CRs referenced by CR 17-01330 were categorized as Level A to preclude personnel injury or death.
17-01459	This CR reported the inadvertent discovery of electricity inside a transformer cabinet after work in the cabinet began. The CR stated that the potential consequence was "injury or death," but it was categorized as Level B. WTP-GPP-RACA-CR-0111 requires conditions with unacceptable recurrence to be categorized as Level A.
19-00655	On June 15, 2019, a worker was struck by a vertical 13-foot scaffold pole falling over. • Contrary to WTP-GPP-RACA-CR-0111, which requires conditions with unacceptable recurrence to be Level A, this CR was Level B. WTP-GPP-RACA-CR-0112 does not require the root cause or extent of cause for Level B CRs to be determined or addressed to preclude recurrence. Neither a root cause analysis nor an evaluation of the extent of cause was performed. • The apparent cause evaluation was completed on September 11, 2019, and the action plan was developed on September 13, 2019 (three months after the event and a month after the targeted completion date of August 13, 2019, for the causal analysis). The only action completed to date was to brief scaffold carpenters. Actions to address broader apparent causes (e.g., workers not following procedures) were "awaiting response" from the responsible manager.
19-00700	On July 20, 2019, pieces of a heavy-duty jack stand fell 14 feet, resulting in a near miss to an individual. • Contrary to WTP-GPP-RACA-CR-0111, which requires conditions with unacceptable recurrence be Level A, this CR was Level B. WTP-GPP-RACA-CR-0112 does not require the root cause or extent of cause for Level B CRs to be determined or addressed to preclude recurrence. Neither a root cause analysis nor an evaluation of the extent of cause was performed. • As of September 20, 2019, the causal analysis for CR 19-00700 was not complete, two months after was the CR was created and exceeding its targeted completion date of August 9, 2019. The only action being tracked in DevonWay for this CR is to determine whether the event should be reported via the DOE Non-compliance Tracking System.

19-00903	On September 12, 2019, "a job-built siding panel installation tool being used by an Ironworker fell from elevation and struck an employee on the ground 20 feet below. This event had the actual consequence of an employee being contacted by a falling object, with the potential for injury greater than first aid." • During the assessment outbrief, BNI executives stated that this CR was screened as Level A due to the reporting requirements of DOE Order 232.2A, *Occurrence Reporting and Processing of Operations Information*, as invoked by the current Environmental Management Contractor Requirements Document, rather than in consideration of the consequence of recurrence. While the assessment team was on site, BNI was going to categorize this event at a "High" reporting level. WTP-GPP-RACA-CR-0111 requires "High" level reportable events to be Level A, but BNI subsequently reported this event "for information" (the lowest reporting level). • On October 1, 2019, BNI downgraded this CR to Level B, even though this was the third event involving workers being struck or nearly injured by falling objects since June 2019 (see also CR 19-00655 and 19-00700). • WTP-GPP-RACA-CR-0112, *Condition Report and Recommendation Evaluation and Action Plan Development*, requires extent-of-cause evaluations for Level A conditions to determine "The range over which the same root or underlying cause(s) of a condition may be affecting performance elsewhere (activities, processes, equipment, or human performance)" to preclude recurrence in other areas (e.g., to preclude the root cause(s) of objects falling and injuring personnel in work groups other than those associated with CRs 19-00655, 19-00700, and 19-00903). Extent-of-cause evaluations are not required for Level B conditions.
Engineering Issues	
19-00277, 19-00637, 19-00638, 18-01243, 18-1017	These CRs were procedurally screened as CAQs and then inappropriately transferred to the administrative Engineering Action Tracking System. The issues involved appear to meet the definition of a CAQ in 24590-WTP-GPP-RACA-CR-0111.
15-01653	This CR pertains to a High-Level Waste facility System Design Description (SDD) and was closed with no corrective action taken based on supposed future update per the SDD Procedure. However, future SDD review is unlikely to identify a discrepancy with closed procurement documents that are less conservative than the SDD. If this CR had been designated as a long-term CR, it might have been more appropriately kept open.
Maintenance Issues	
19-00572	This CR was identified in June 2019, and the action plan was developed in July 2019. However, the action plan simply says to document the steps taken to resolve the condition and does not include information about what steps to take.
19-00643	This issue identifies storage of items in a location that got hotter than allowed by the storage requirements. The corrective actions addressed the long-term solution but did not document how the affected items were dispositioned.
18-00776	The apparent cause evaluation appropriately concluded that the causes were the lack of an effective lubricant control program and lack of a lubrication subject matter expert for the project. After the preventive actions were recorded as complete, but before the effectiveness review occurred, numerous additional CRs documented recurrence of issues with incorrect lubricants, along with other related issues. The actions were reviewed and reopened, and additional compensatory measures were put in place after review of the other 26 CRs related to lubricant issues to limit recurrence until the preventive actions were complete.

Procurement Issues	
16-01554	The corrective actions to address this issue were not deemed effective until the third effectiveness review, partly because the corrective actions were ineffective and partly because the first two effectiveness reviews did not measure effectiveness well.
18-01357	Timeliness issue: This CR documents issues found during a storage surveillance in December 2018. The actions to correct the associated issues in equipment storage, such as missing covers for pipe openings, were not completed until August 2019.
18-01287	This CR was identified in November 2018. The associated procedure was corrected in June 2019 to prevent future occurrences, but the EOC review had not been completed at the time of this assessment.
Quality Issues	
18-01335	This CR documents that a simple procedure change had not occurred, despite a previous action to revise the procedure under CR 2017-01581. The procedure change was made two months later.
19-00292	The action in this CR was to conduct an audit, but it was closed out while the audit was still ongoing.
18-00865	Timeliness issue: This CR was written in July 2018 for actions to address an issue from 2013. A corrective action was written in January 2019 to document previously-completed process improvements, but it had not been completed at the time of this assessment.
19-00340	Timeliness issue: This CR was written in April 2019, but the CAP was not documented until August, and the actions are not due until November.
17-00598	The effectiveness review was overall very thorough and appropriately determined that the corrective actions were effective. However, interviews for the effectiveness review did not cover the full range of work roles that were surveyed to identify the extent of the condition.
Construction/Startup Issues	
15-01950, 17-00698, 18-00325, 19-00179	These CRs document repeated NEC code violations spanning a period of four years, without adequate issue resolution.
19-00125, 19-00263	These CRs were initiated to address the NEC code violations mentioned above. However, both CRs are level C, and effectiveness reviews are not conducted for Level C issues. Therefore, there is no assurance of effective corrective actions from these CRs. Based on the ineffectiveness of corrective actions for previous CRs on this subject, these CRs should have been categorized at a higher level.