Independent Assessment of the Training and Qualification Program at the Hanford Site Waste Treatment and Immobilization Plant

March 2025

U.S. DEPARTMENT of ENERGY | Office of Enterprise Assessments

Table of Contents

Acronyms

BNI	Bechtel National, Inc.
BOF	Balance of Facilities
CAMP	Corrective Action Management Program
CFR	Code of Federal Regulations
CR	Condition Report
CRAD	Criteria and Review Approach Document
CSMP	Chemical Safety Management Program
DFLAW	Direct-feed Low-activity Waste
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EA	Office of Enterprise Assessments
HFO	Hanford Field Office
JTA	Job Task Analysis
LAB	Analytical Laboratory
LAW	Low-activity Waste
OFI	Opportunity for Improvement
OJE	On-the-Job Evaluation
OJT	On-the-Job Training
PCM	Personnel Contamination Monitor
Radcon	Radiological Control
RCT	Radiological Control Technician
RW	Radiological Worker
RWP	Radiological Work Permit
SAC	Specific Administrative Control
SMP	Safety Management Program
SOM	Shift Operations Manager
SRD	Special Relief Device
T&Q	Training and Qualification
TIM	Training Implementation Matrix
TSR	Technical Safety Requirement
WTCC	Waste Treatment Completion Company, LLC
WTP	Waste Treatment and Immobilization Plant

INDEPENDENT ASSESSMENT OF THE TRAINING AND QUALIFICATION PROGRAM AT THE HANFORD SITE WASTE TREATMENT AND IMMOBILIZATION PLANT

Executive Summary

The U.S. Department of Energy Office of Enterprise Assessments (EA) conducted an independent assessment of the training and qualification (T&Q) program for nuclear facilities implemented by Bechtel National, Inc. (BNI) and its subcontractor, Waste Treatment Completion Company, LLC (WTCC), at the Hanford Site Waste Treatment and Immobilization Plant (WTP) in October and November 2024. The assessment also evaluated the effectiveness of Hanford Field Office (HFO) oversight of the BNI/WTCC T&Q program.

EA identified the following strengths, including one best practice:

- BNI/WTCC simulator training was conducted with exemplary discipline and formality, and included rigorous implementation of conduct of operations principles. (Best Practice)
- Most observed BNI/WTCC training was well-designed, with content that was maintained current and tailored to the intended audience, and delivered by appropriate methods to ensure that objectives were met.
- HFO has developed and is implementing a comprehensive oversight strategy to evaluate BNI/WTCC implementation of a T&Q program that ensures personnel included in the program have the requisite knowledge, skills, and abilities to properly perform work in accordance with the safety basis.

EA also identified several weaknesses, including two findings, as summarized below:

- BNI/WTCC is not applying nuclear facility T&Q requirements to all personnel who, through action or inaction, can affect the safety basis. (Finding)
- HFO approved BNI/WTCC implementation documentation that is not compliant with all T&Q requirements for nuclear facilities. (Finding)
- BNI/WTCC is incorrectly teaching trainees that the chemical safety management program is not part of the Low-activity Waste Facility safety basis.
- BNI/WTCC is not always delivering radiological control training consistent with the conditions that trainees will encounter in WTP facilities; further, radiological worker techniques being taught do not always align with industry standard practices.
- BNI/WTCC is not using the issues management system to proactively identify potential programmatic issues specific to the T&Q program.

In summary, BNI/WTCC has established a T&Q program that, for covered positions, will ensure a well-trained nuclear facility organization with the requisite knowledge, skills, and abilities to properly perform work in accordance with the safety basis. Hands-on operations training for control room operators was conducted with exemplary discipline and formality using a well-designed plant simulator. However, not all contractor personnel who, by action or inaction, can affect the safety basis are included in the BNI/WTCC T&Q program. HFO inappropriately approved the T&Q program even though it did not comply with all requirements. Additionally, EA identified issues with tracking and trending of identified training-related performance deficiencies, and with the adequacy of training in radiological controls. Until the concerns identified in this report are addressed and effective mitigations are put in place to ensure that all safety basis-affecting personnel are receiving adequate training, the knowledge, skills, and abilities of some personnel to perform work in accordance with the safety basis will not be assured.

INDEPENDENT ASSESSMENT OF THE TRAINING AND QUALIFICATION PROGRAM AT THE HANFORD SITE WASTE TREATMENT AND IMMOBILIZATION PLANT

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 the training and qualification (T&Q) program for nuclear facilities implemented by Bechtel National, Inc. (BNI) and its subcontractor, Waste Treatment Completion Company, LLC (WTCC) (collectively "BNI/WTCC"), at the Hanford Site Waste Treatment and Immobilization Plant (WTP). The assessment was conducted in October and November 2024.

At the time of this assessment, the WTP Low-activity Waste (LAW) Facility, the Analytical Laboratory (LAB), the Effluent Management Facility, and the Balance of Facilities (BOF) had completed startup testing and were undergoing commissioning in preparation for direct-feed low-activity waste (DFLAW) operations expected to begin in 2025.

Consistent with the *Plan for the Independent Assessment of Training and Qualifications at the Hanford Site Waste Treatment and Immobilization Plant, November 2024*, this assessment evaluated the effectiveness of the BNI/WTCC T&Q program.[1] The assessment also evaluated the effectiveness of Hanford Field Office (HFO) oversight of BNI/WTCC's T&Q program implementation.

2.0 METHODOLOGY

The DOE independent oversight program is described in and governed by DOE Order 227.1A, *Independent Oversight Program*, which EA implements 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 the order.

As identified in the assessment plan, this assessment considered requirements for T&Q at DOE nuclear facilities, primarily evaluating the qualification process, continuing training program, training records, and training needs assessment process. Criteria to guide this assessment were based on the criteria from the appendix of DOE-STD-1070-94, *Criteria for Evaluation of Nuclear Facility Training Programs* (which is invoked by DOE Order 426.2[2], *Personnel Selection, Training, Qualification, and Certification Requirements for DOE Nuclear Facilities*) and selected objectives from EA CRAD 30-12, Revision 0, *Safety Training Assessment*. EA also used elements of EA CRAD EA-30-07, Revision 0, *Federal Line Management Oversight Processes*, to collect and analyze data on HFO oversight activities related to BNI/WTCC's T&Q program.

EA examined key documents, such as program descriptions, work packages, procedures, manuals, analyses, policies, lesson plans, computer-based training modules, and T&Q records. EA also

[1] The BNI/WTCC training program includes project-wide training managed by BNI, with DFLAW-specific training managed under a separate but integrated WTCC program. The scope of this assessment included training that applies to WTCC personnel under either program.

[2] The current version of the DOE T&Q order is DOE Order 426.2A, Change 1, dated May 30, 2024. The BNI contract lists a previous version, DOE Order 426.2, dated April 21, 2010, as the applicable directive. Federal requirements are specified in DOE Order 426.2A.

interviewed key personnel responsible for developing and executing the associated programs; observed T&Q activities in the field and at the WTP control room simulator; and walked down DFLAW training and process facilities, focusing on T&Q program implementation. The members of the assessment team, the Quality Review Board, and the management responsible for this assessment are listed in appendix A.

There were no previous findings for follow-up addressed during this assessment.

3.0 RESULTS

3.1 Personnel Selection, Training, Qualification, and Certification Requirements

3.1.1 Management and Administration of Training and Qualification Programs

This portion of the assessment evaluated BNI/WTCC's T&Q program documentation, including procedures to manage T&Q records.

BNI/WTCC's procedures and processes generally adequately implement DOE Order 426.2, attachment 1, chapter I and II, requirements. Program description document 24590-WTP-PD-RATR-TR-0001, *Project Training Program Description*, and 24590-WTP-GPP-RATR-TR-1000, *Training Program Administration*, adequately document responsibilities, qualifications, and authority of training organization personnel, and define managerial roles, responsibilities, authority, and accountability in accordance with DOE Order 426.2, attachment 1, chapter I, section 2. 24590-WTP-PD-RAEN-EN-0002, *Plant Engineering Training Program Description*, and 24590-WTP-GPP-RAEN-EN-0020, *Plant Engineering Technical Staff Training*, and supporting program documents adequately establish training expectations for the Engineering positions that are subject to DOE Order 426.2 requirements. 24590-WTP-GPP-RATR-TR-1000 and 24590-WTP-LIST-RAEN-EN-0001, *Training Assignment Matrix*, adequately specify the training expectations for the Engineering positions subject to the requirements of DOE Order 426.2, attachment 1, chapter II. 24590-WTP-GPP-RATQ-TQ-0001, *Nuclear Facility Training Administration*, along with 24590-WTP-GPP-RATQ-TQ-0002, *Nuclear Facility Training Manual*, provides adequate requirements for the maintenance of training, qualification, and certification records.

While BNI/WTCC's procedures and processes are generally adequate, a weakness was identified. Contrary to DOE Order 426.2, attachment 1, chapter I, which provides requirements that are to be applied to "all personnel who can impact the safety basis through their involvement in the operation, maintenance, and technical support of all Department of Energy Hazard Category 1, 2, and 3 nuclear facilities," BNI/WTCC's implementation of T&Q requirements is mostly limited to specific administrative control (SAC)-affecting and special relief device (SRD)-affecting positions and does not include all positions affecting safety management programs (SMPs). (See **Finding F-BNI/WTCC-1**.) Not identifying and implementing adequate training requirements to include SMP elements (responsible positions) could result in personnel without appropriate qualification being assigned responsibilities supporting the safety basis. Specifically, some of the SMP elements described in the T&Q SMP have not been adequately incorporated into the BNI/WTCC training program in support of nuclear facility operations, including training related to chemical safety management, emergency management, fire protection, hazardous materials management, and radiological protection.

Management and Administration of Training and Qualification Programs Conclusions

BNI/WTCC's procedures and processes generally adequately implement DOE Order 426.2 requirements. Procedures adequately address requirements for the maintenance of training, qualification, and

certification records. However, BNI/WTCC's incomplete implementation of DOE Order 426.2 was identified as a weakness.

3.1.2 Development and Qualification of Training Staff

This portion of the assessment evaluated BNI/WTCC's development and qualification of training staff.

Training instructor positions are appropriately specified as positions that require qualification, in accordance with 24590-WTP-LIST-RATQ-TQ-0001, *Qualified Positions in Accordance with DOE O 426.2*. Reviewed qualification cards for three instructors showed that all three were fully qualified and demonstrated appropriate content.

Further, instructors receive continuing training in accordance with 24590-WTP-PL-RATQ-TQ-0003, *WTCC Instructional Staff Continuing Training Program Plan*. Reviewed records demonstrated that the three instructors were up to date with their continuing training requirements. Continuing training included appropriate subject matter to ensure that instructors stayed current with technical training content and delivery techniques.

Nine training instructors who were observed at the simulator facility demonstrated excellent formality during the delivery of training and in role playing during simulated exercises. All nine instructors had nuclear navy or commercial nuclear backgrounds and demonstrated professional conduct during simulator training. The instructors delivered thorough pre-simulator instruction to trainees and provided appropriate and detailed feedback to the trainees after the simulator activity.

Observed training activities relating to job task analysis (JTA), activity-level work planning and control, and the documented safety analysis (DSA) for engineers contained appropriate content. The two instructors who led these training activities were fully qualified and conducted the training in a disciplined manner. The DSA training was conducted by a qualified nuclear safety specialist.

Development and Qualification of Training Staff Conclusions

BNI/WTCC is adequately developing and qualifying training instructors. The reviewed instructors were fully qualified and were appropriately completing continuing training. Further, the reviewed instructors had appropriate nuclear backgrounds prior to being assigned instructor duties.

3.1.3 Trainee Entry-level Requirements

This portion of the assessment evaluated BNI/WTCC's application of entry-level training requirements.

BNI/WTCC has adequately established entry-level training requirements in 24590-WTP-GPP-RATQ-TQ-0001. This procedure appropriately specifies entry-level education and experience requirements for all nuclear facility positions covered by DOE Order 426.2. 24590-WTP-GPP-RATQ-TQ-0004, *Nuclear Facility Training Exceptions*, appropriately allows for exceptions to be made in accordance with DOE Order 426.2, attachment 1, sections 3.b and 3.c, and documented on form 24590-HR-F00031, *Verification of Education and Experience Justification* (form 31). Of the 84 incumbents of DOE Order 426.2 positions having education and experience requirements, 52 (62%) were qualified using form 31 -documented equivalencies rather than the stated education and experience requirements.

Ten of 12 reviewed form 31s had equivalencies adequately justified based on alternatives permitted by DOE Order 426.2, attachment 1, sections 3.b and 3.c. The two candidates who did not meet these alternatives were appropriately submitted to HFO for case-by-case approval in accordance with DOE

Order 426.2, attachment 1, section 3.a. HFO approved one of the two candidates and conditionally approved the other "contingent on the candidate's completion of facility fundamentals as taught in 24590-WTP-FUND-200X-LP-001 courses and systems training defined by Curriculum ID SOM_SYS, shift operations manager systems." The conditionally approved candidate completed the SOM_SYS qualification as required but completed 24590-WTP-FUND-0002-LP-001, *Fundamentals for Commissioning Technicians*, in place of the "facility fundamentals as taught in 24590-WTP-FUND-200X-LP-001 courses" required by the conditional HFO approval. No justification of the equivalency of these two curricula was requested or approved by DOE. Contrary to DOE Order 426.2, attachment 1, chapter I, section 3.a, BNI/WTCC assigned an individual in a safety-basis-affecting position who did not meet the education and experience requirements for that position or allowed alternatives, and did not satisfy the requirements of HFO's conditional approval of a documented justification for an exception. (See **Deficiency D-BNI/WTCC-1**.) Not meeting education and experience requirements or approved alternatives could lead to personnel without adequate knowledge, skills, and abilities performing duties associated with a safety-basis-affecting position.

Trainee Entry-level Requirements Conclusions

BNI/WTCC has adequately established entry-level training and experience requirements. However, one individual did not meet the requirements of HFO's conditional approval of an exception to required education and experience.

3.1.4 Determination of Training Program Content

This portion of the assessment evaluated BNI/WTCC's development of training content using the systematic approach to training.

BNI/WTCC conducts an adequate systematic analysis of job tasks for all required positions, which are appropriately documented in the position JTA in accordance with 24590-WTP-GPP-RATQ-TQ-0002 and 24590-WTP-GPP-RATQ-TQ-0001. Reviewed JTAs for melter operator, process operator, and control room supervisor appropriately identified the training tasks and type (e.g., classroom, on-the-job training (OJT)) required for each JTA task in accordance with 24590-WTP-GPP-RATQ-TQ-0001. JTAs are appropriately kept up to date through a periodic review process conducted by facility management, operations management, and training department personnel. Reviewed JTAs for a nuclear facility manager, electrician, and maintenance supervisor were current and captured accurate task requirements.

JTAs are accurately flowed into position qualification cards in accordance with 24590-WTP-GPP-RATQ-TQ-0001. Qualification cards for the melter operator, process operator, and control room supervisor appropriately contained all necessary elements from the JTA for each of the positions. Pertinent requirements from the DSA and technical safety requirements (TSRs) were adequately included in each qualification card. Needed criticality safety controls and operating procedures necessary to operate the facility equipment were also appropriately included in the qualification card. Qualification cards for all process operator positions are developed by and well controlled by the simulator training department. Over 20 interviewed personnel demonstrated good knowledge and understanding of the TSRs that were pertinent to their position and were aware of critical controls in their facilities.

A January 2020 revision to the LAW safety basis resulted in several controls being ported from the TSRs into a chemical safety management program (CSMP), which is credited as an SMP in chapter 18 of the revised DSA. Many positions associated with the CSMP and other credited SMPs are not included in the BNI/WTCC training implementation matrix (TIM), such that DOE Order 426.2 T&Q requirements are not applied to all personnel who can impact the safety basis. (See the discussion in section 3.1.1 and Finding F-BNI/WTCC-1.) Furthermore, several interviewed BNI/WTCC personnel incorrectly explained

that the CSMP was not part of the safety basis. Review and observation of the *DSA/TSR/CSMP/HAR for Shift Operations Managers and System Engineers* training class (24590-LAW-G-0007-LP-001) confirmed that BNI/WTCC instructors were incorrectly teaching that the CSMP is not part of the safety basis, contrary to 10 CFR 830.122(b)(1) and DOE Order 414.1D, *Quality Assurance*, attachment 2, criterion 2.a. (See **Deficiency D-BNI/WTCC-2**.) Inadequate personnel training on the facility safety basis could result in a programmatic breakdown of an SMP and has likely contributed to inadequate implementation of DOE Order 426.2 requirements.

Determination of Training Program Content Conclusions

Qualification card content is accurately derived from the position JTA using a systematic approach. JTAs are periodically reviewed by management and training personnel to ensure that they are up to date. Interviewed and observed personnel demonstrated adequate knowledge and understanding of facility operations and pertinent TSR controls. However, not all positions that can impact the safety basis are identified in the TIM as required by DOE Order 426.2, and safety basis training regarding the CSMP is inadequate.

3.1.5 Design and Development of Training Programs

This portion of the assessment evaluated BNI/WTCC's training program materials to ensure that the knowledge and skills necessary for the positions are appropriately provided in the training to WTP personnel.

Learning objectives were appropriately identified for the 17 observed training activities. Instruction on operating the LAW facility were clearly communicated to trainees prior to operating the simulator. Several plant upset conditions were covered in the simulator with critical tasks identified in the team task training materials. The learning objectives were clearly communicated at the beginning of the course with a direct link to trainee JTAs. Trainees clearly understood the objectives prior to the simulator operation. The training team conducted a pre-training briefing to ensure that the training team fully understood when simulated events would occur. Two OJT activities were observed in the LAW facility for a utility operator and a BOF/LAB operator, and the trainers clearly covered operations of the facilities and specified parameters requiring monitoring by the operators. The OJT activities were appropriately conducted by qualified operators and OJT evaluators.

Fifteen reviewed simulator lesson plans were accurate, supported the learning objective, and promoted effective delivery of the training. The lesson plans clearly identified all tasks that needed to be demonstrated and further identified which tasks were critical training objectives.

All qualified personnel have continuing training appropriately assigned in accordance with training program administration procedures. Continuing training is determined through a rigorous systematic approach to training process involving the training department, the training coordinator, and facility and operations management. All observed and interviewed personnel (more than 25) were adequately familiar with their continuing training responsibilities and were knowledgeable of how to look up their training requirements to ensure that they met the continuing training schedule.

BNI/WTCC has appropriately made improvements to training materials as needed. For example, feedback from an independent assessment performed in support of readiness identified inadequacies in the ammonia safety training conducted as part of general employee training. BNI/WTCC revised the training material to better meet the needs of general plant employees and delivered additional, in-depth training to responders and individuals most likely to be affected.

Design and Development of Training Programs Conclusions

Training materials adequately identify and support the knowledge and skills needed by trainees to perform necessary tasks. Lesson plans for simulator training activities were accurate and supported the learning objective. Two OJT activities were appropriately conducted by qualified operators and OJT evaluators. Continuing training is appropriately assigned to all required positions, and a systematic approach is used to update continuing training content.

3.1.6 Conduct of Training

This portion of the assessment evaluated BNI/WTCC's conduct of training to ensure that it was consistently and effectively presented.

During the observation of 17 training activities, training was appropriately conducted using approved and current training materials. Observed training conducted at the LAW simulator provided excellent hands-on experience. The LAW simulator provides good fidelity with the actual LAW facility control room, although the actual LAW facility control room is busier and noisier than the simulator. (See **OFI-BNI/WTCC-1**.) During interviews, simulator training personnel noted that some enhancements were being evaluated for inclusion in the next training cycle. OJT was conducted by qualified operators who diligently went through the trainee's qualification card to cover key elements to stress with trainees. The OJT trainers also quizzed the trainees regarding knowledge of plant operations.

During 15 observed simulator training activities, the instructor staff demonstrated exemplary conduct of training operations. The instructors conducted thorough pre-simulator training so that the trainees understood what scenarios they would encounter. The lead instructor conducted a pre-job briefing with the instructor team so that the entire team was familiar with when activities would occur during the evolution. The instructional staff demonstrated excellent formality and communication during all simulator training activities. BNI/WTCC's implementation of the DFLAW simulator training program was considered a **Best Practice** because of the discipline and formality of simulator instructors, along with the rigorous implementation of conduct of operations principles during simulator training.

Conduct of Training Conclusions

Observed training was conducted using current, approved training materials. The LAW simulator provides good fidelity to the actual LAW facility control room. Instructors conducted a pre-job briefing prior to running the simulation to ensure that the entire team understood the sequence of events. Instructors demonstrated good formality and communication during simulator training. The discipline and formality of simulator instructors, along with the rigorous implementation of conduct of operations principles during simulator training, was considered a best practice.

3.1.7 Trainee Examinations and Evaluations

This portion of the assessment evaluated BNI/WTCC's evaluation of trainees to ensure that learning is taking place and that trainees are acquiring the knowledge and skills required to work efficiently and safely at their jobs.

BNI/WTCC conducts appropriate evaluation of trainees in accordance with 24590-WTP-GPP-RATQ-TQ-0002 to ensure that learning is taking place and that trainees are acquiring the knowledge and skills required to work efficiently and safely at their jobs. Reviewed trainee evaluations for training classes 24590-LAW-G-0007-LP-001, *DSA/TSR/CSMP/HAR for Shift Operations Managers and System Engineers*; 24590-LAW-G-0003-LP-001, *DSA/TSR/CSMP/HAR for Commissioning Technicians*; 24590-

LAW-G-0006-LP-001, *DFLAW DSA/TSR/CSMP for Maintenance*; and 24590-LAW-G-0002-LP-001, *DFLAW DSA/TSR/CSMP/HAR Overview*, demonstrated appropriate examination administration at the conclusion of structured segments of the training program and included an adequate sampling of the knowledge and skills necessary to meet the defined learning objectives. Questions related to the DSA/TSR and safety system descriptions were evident.

Exams conducted by pen and ink are graded at the time of examination, with answer sets controlled by the instructor. Acceptance criteria used to grade examinations and performance evaluations are appropriately defined in accordance with 24590-WTP-GPP-RATQ-TQ-0002. The content of written and oral examinations is appropriately changed to maintain currency and prevent compromise. 24590-WTP-GPP-RATQ-TQ-0001 appropriately provides for remedial training and reevaluation when examination or performance standards are not met; remedial training is based upon weaknesses identified in the examination. Additionally, this procedure appropriately requires qualification examinations to establish qualification/certification for candidates already possessing the knowledge and skills necessary for certain aspects of their job, and properly ensures that qualification is granted only after ensuring that all requirements (including training and examinations) and other specified requirements (e.g., medical examinations for operators and certified supervisors) have been satisfactorily completed.

During observed final evaluated watches for control room watch-standers' biennial requalification performed in the control room simulator, written feedback was provided to each individual watch-stander being evaluated, and passing scores were appropriately documented and acknowledged by the lead simulator instructor and a qualified shift operations manager (SOM) using form 24590-RATQ-F00107, *Simulator Watch Stander Final Evaluation*. Additional verbal feedback was also provided. However, the SOM participating in the watch-stander evaluations was not the on-shift SOM who would be supervising the watch-standers during in-plant operations. (See **OFI-BNI/WTCC-2**.)

Trainee Examinations and Evaluations Conclusions

BNI/WTCC's procedures and processes are generally adequate to implement DOE Order 426.2 to ensure that learning is taking place and that trainees are acquiring the knowledge and skills required to work efficiently and safely at their jobs. These processes include appropriate evaluation and examination administration at the conclusion of structured segments of training programs.

3.1.8 Training Program Evaluation

This portion of the assessment evaluated BNI/WTCC's systematic evaluation of training effectiveness and its relation to on-the-job performance to ensure that the training program conveys all required skills and knowledge.

Assessment Program

BNI/WTCC has established and implemented a generally adequate assessment program that identifies performance deficiencies and areas in need of improvement. Procedure 24590-WTP-GPP-RACA-AM-0002, *Conduct of Assessments*, provides requirements for planning, scheduling, performing, documenting, and issuing risk-informed management assessments. The assessment planning process is documented in an integrated assessment schedule. Procedure 24590-WTP-PD-RATQ-TQ-0002, *WTCC Instructional Training Program Description*, provides project management with the process for planning, scheduling, performing, documenting, and issuing risk-informed management assessments.

Assessment Schedule

As required by DOE Order 426.2, BNI/WTCC is assessing the entire scope of DOE-STD-1070-94 during a three-year interval. The schedule is implemented through 24590-WTP-PL-RATQ-TQ-0002, *WTCC Training Program Surveillance and Assessment Plan*. Additional assessments and surveillances are scheduled and are being conducted weekly, monthly, quarterly, semiannually, annually, or every 18 months to supplement the order-required assessment program. Assessments included classroom evaluations, OJT, on-the-job evaluations (OJEs), simulator evaluations, line management evaluations, student feedback, and program reviews.

Assessments

BNI/WTCC performs generally adequate assessments of its training program. Five reviewed assessments and 16 reviewed surveillances of the training program demonstrated self-critical evaluations. Identified deficiencies and OFIs were appropriately entered into BNI/WTCC's issues management system, Corrective Action Management Program (CAMP). Surveillances were often performed using pre-established observation checklists. Four reviewed observation checklists demonstrated assessment of key attributes of the training program. However, the observation checklists as defined by 24590-WTP-PL-RATQ-TQ-0002 do not have a requirement to enter identified noncompliances into CAMP as a condition report (CR). (See **OFI-BNI/WTCC-3**.)

BNI/WTCC effectively obtains feedback from students upon training class completion. Eight reviewed *WTCC Training Student Feedback Forms* as defined in 24590-WTP-PL-RATQ-TQ-0002 demonstrated an effective process for capturing student feedback for continuous improvement of training classes.

Issues Management

Overall, BNI/WTCC has implemented an effective issues management program to correct issues identified in the training program in a timely manner. 24590-WTP-GPP-RACA-CR-0111, *Condition Report and Recommendation Initiation and Screening*, adequately describes the process for prompt identification of conditions and details how to document, track, and report CRs to the appropriate levels of responsible management. Forty-five reviewed training-related CRs issued in the past year thoroughly addressed the identified noncompliances, and 54 reviewed training-related recommendations served to enhance the overall training program. However, contrary to DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*, attachment 1, section 2.b.(3), and 24590-WTP-GPP-RACA-CR-0111, 5 of the 54 reviewed training-related recommendations involved adverse conditions that should have been documented as CRs. (See **Deficiency D-BNI/WTCC-3**.) Not properly categorizing adverse conditions can result in a lack of corrective actions and ultimately increased risk of training program weaknesses and employee proficiency concerns. Examples of issues that were incorrectly documented as recommendations instead of CRs included five unperformed scheduled surveillances, "issues noted [but] not documented with CRs when warranted," and a lack of training department involvement in the signatory process for final operator qualifications. After EA communicated this deficiency, BNI/WTCC promptly recategorized the five recommendations involving adverse conditions as CRs.

Trending

Trending of contractor performance is being executed at a high level by using contractor assurance system data in accordance with 24590-WTP-GPP-RACA-TM-0001, *Performance Measures and Trending*. However, contrary to DOE Order 226.1B, attachment 1, section 2.b.(3) and 24590-WTP-GPP-RACA-TM-0001, trending of training-specific issues is not being performed. (See **Deficiency D-BNI/WTCC-4**.) Not tracking training-related issues for adverse trends can lead to unidentified

programmatic or implementation issues and is not indicative of a learning culture. With 45 training-related CRs being identified over the past year, repeat occurrences and causes are not being evaluated for trends.

Five of the 45 reviewed CRs had an "NA" determination for their significance level, primarily due to the CRs being incorporated into other CRs. 24590-WTP-GPP-RACA-CR-0111, *Condition Report and Recommendation Initiation and Screening*, defines the "NA" significance level as "[u]sed for administrative closure when a CR is a duplicate CR or considered not to be a condition/issue." The five training-related CRs with significance level "NA," did not meet these procedure criteria. By not assigning a significance level, the classification may mask the CR significance for trending. (See **OFI-BNI/WTCC-4**.)

Metrics

BNI/WTCC has developed and implemented an effective training metrics program with established goals for continuous improvement. 24590-WTP-PL-RATQ-TQ-0002 adequately specifies the performance metrics that are tracked by the training organization. Reviewed metrics (e.g., qualified training staffing level, WTCC training impact log/backlog, training no-shows, item breakdown, and overdue training/training delinquency) demonstrate adequate implementation of the program. BNI/WTCC is developing additional metrics that are tracked by formal recommendations; examples include training CR age, student satisfaction, classes delivered monthly, and a metric to review exam failure rate on a quarterly basis.

Training Program Evaluation Conclusions

BNI/WTCC has established a systematic program for the evaluation of training effectiveness and its relation to on-the-job performance to ensure that the training program conveys all required skills and knowledge. Assessments are detailed with corrective actions and completed on a timely basis. However, weaknesses were identified with CR determinations, significance levels, and trending.

3.2 Radiation Safety Training

This portion of the assessment evaluated BNI/WTCC's radiation safety training program for radiological workers (RWs) and radiological control technicians (RCTs).

Radiological Worker Training and Qualification

BNI/WTCC has generally adequate program procedures and processes for radiation safety training for RWs. BNI/WTCC's program, procedures, and processes adequately define a radiation safety training program in accordance with 10 CFR 835, *Occupational Radiation Protection*, subpart J, *Radiation Safety Training*. 24590-WTP-PL-RARP-0002, *Radiation Requirement Area Training Plan*, appropriately establishes radiation protection standards, limits, and program requirements for protecting personnel from ionizing radiation. Further, this training plan adequately defines radiological safety training topics; required education, training, and skills of individuals responsible for developing and implementing radiation safety training; and basic radiation safety training using DOE core course materials augmented with WTP site-specific materials. 24590-WTP-RPP-ESH-01-001, *Radiation Protection Program for Design, Construction, Commissioning and Operation*, in conjunction with the training plan, establishes adequate requirements for implementing 10 CFR 835, subpart J, and 10 CFR 835.103, *Education, training, and skills*, radiation safety training requirements. Each instructor responsible for training (classroom and practical factors) associated with RW qualifications has many years of experience working under radiological controls, and was knowledgeable about the subject area.

While BNI/WTCC's radiation safety training procedures and processes are generally adequate, the following implementation weaknesses were identified:

- Posted instructions for the donning and doffing of radiological personal protective equipment (PPE) being used as training aids and job aids did not indicate document or revision number to allow personnel to verify they were performing work per the latest version of requirements. Similarly, posted radiological work permit (RWP)-specific PPE requirements did not indicate the RWP to which they applied. This does not allow workers and trainees to ensure they are using the latest revisions of procedures as required by DOE Order 422.1, *Conduct of Operations*, attachment 2, requirement 2.p, regarding procedure implementation and change control. (See **Deficiency D-BNI/WTCC-5**.) The practice of training personnel to use posted checklists or job aids without verifying they are current or associated with the applicable RWP could lead to the performance of work activities using outdated or inapplicable instructions.
- During a walkdown of LAB radiological areas (existing postings) and an observed RW II training examination demonstration, postings and directions provided to workers stated a requirement to conduct whole-body surveys using hand-held instruments with a stated survey time of two to three minutes, which may not be adequate in all cases. In general, proper survey techniques include pausing at areas of concern (e.g., mouth, nose, knees), and the active detector area of the instruments being used may require a longer survey time to achieve the desired detection sensitivity. Performing self-surveys using a scan rate that is too fast and without an appropriate pause time at areas of concern does not ensure the detection of potential contamination. (See **OFI-BNI/WTCC-5**.)
- A training RWP used by workers during an observed demonstration of an RW II training examination to perform simulated activities during an evaluated entry into a radiologically controlled area did not accurately reflect demonstration conditions. For example, RWP void limits were set at levels lower than simulated contamination levels in the work area, which would not allow the demonstration to be conducted under that RWP. (See **OFI-BNI/WTCC-6**.)
- BNI/WTCC's RW II training does not include the use of automated counting systems, such as personnel contamination monitors (PCMs), when personnel exit a contamination area or radiological buffer area. However, BNI/WTCC plans to initiate the use of PCMs in DFLAW facilities as it begins processing waste. (See **OFI-BNI/WTCC-7**.)

Radiological Control Technician Training and Qualification

BNI/WTCC has generally adequate program procedures and processes for radiation safety training for RCTs, and the radiological control (radcon) training program is adequately designed to develop and maintain the knowledge and skills needed by radcon personnel to perform activities safely and effectively. 24590-WTP-PD-RARP-RP-0003, *Radiological Control Training Program Description*, adequately describes radcon training program minimum entry-level requirements, as well as training requirements for radcon personnel. Interviews with both instructors and training administration management indicated that incoming RW and RCT students require remedial effort in "nuclear vocabulary," scientific notation, and statistical analysis associated with the use of radiological analytical techniques, which BNI/WTCC is appropriately including in the training program. 24590-WTP-PD-RARP-RP-0003 describes the processes for conducting radcon training and administering radcon personnel qualifications, and, in conjunction with 24590-WTP-LIST-RARP-RP-0017, *Radiological Control Training Assignments*, adequately supports the implementation of 10 CFR 835 and DOE-STD-1107-97, *Knowledge, Skills, and Abilities for Key Radiation Protection Positions at DOE Facilities*.

24590-WTP-GPP-RARP-RP-1019, *Radiation Safety Training*, adequately identifies key radiation protection positions for radcon management responsible for implementing the radiation protection SMP

as described in the LAW DSA. Each instructor responsible for training (classroom and OJT/OJE) associated with RCT qualifications has many years of experience working under radiological controls, and was knowledgeable about the subject area.

BNI/WTCC's procedures and processes are generally adequate to implement appropriate training for RCTs. Practical factors and OJT/OJE activities associated with RCT training were not evaluated during this assessment. However, the observed demonstration areas being used for RCT practical factors demonstrations were limited to mockups of areas to be surveyed (e.g., a taped-off area on the top of a cart or a countertop for counting sample preparation) and not truly representative of actual working surfaces (size and markings/posting of simulated radiological conditions, etc.). Further, facility conditions and equipment (e.g., noise, lighting, area congestion, or access to and use in the field of air sampling and/or other radiological instrumentation) were not adequately incorporated into the simulated demonstration areas. (See **OFI-BNI/WTCC-8**.)

Radiation Safety Training Conclusions

BNI/WTCC has generally adequate program procedures and processes for radiation safety training for RWs and RCTs. Instructors responsible for training associated with RW and RCT qualifications have extensive prior experience with radiological controls. However, weaknesses were identified in the areas of training simulation.

3.3 Federal Line Management Oversight

This portion of the assessment reviewed HFO oversight activities to evaluate BNI/WTCC's implementation of DOE Order 426.2 requirements and the overall effectiveness of the nuclear facility T&Q program.

HFO has established *DOE 1070-94 Schedule* as a scheduling and tracking mechanism for the three-year period beginning May 1, 2024, to satisfy the DOE Order 426.2A, section 4.c, requirement that heads of DOE field elements evaluate the overall effectiveness of T&Q programs at least once in a three-year interval. If implemented as intended, the established schedule will evaluate BNI/WTCC implementation of the entire scope of DOE-STD-1070-94 as required. Completion of each objective is scheduled and tracked using HFO's line management oversight process, in accordance with DOE Order 226.1B, with the element-by-element schedule maintained informally in a spreadsheet to verify accomplishment of each sub-objective. Oversight is being managed as core requirement 3 under the DOE Order 425.1D, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, readiness program as WTP prepares for DFLAW processing.

While current HFO oversight of the BNI/WTCC T&Q program is generally adequate, no systematic approach to implementing field office requirements and responsibilities from DOE Order 426.2A was implemented prior to May 2024. A review of a list of T&Q-related HFO surveillances and operational awareness activities performed over the three-year period prior to May 2024 showed that many areas within the T&Q program had been reviewed by HFO. However, contrary to DOE Order 426.2A, section 4.c, these activities were not scheduled and conducted in accordance with DOE Order 226.1B, and no verification was performed to ensure that the entire scope of DOE-STD-1070-94 had been addressed. (See **Deficiency D-HFO-1**.) Not tracking completion of an evaluation conducted in phases over a three-year period may result in required program elements being missed, and not performing a comprehensive evaluation of all performance elements as required may result in deficient elements not being identified.

DOE Order 426.2A further provides that heads of DOE field organizations are responsible for ensuring an adequate number of persons with responsibility for oversight of the contractor's nuclear facility T&Q

program. Currently, a contract employee of HFO performs the majority of oversight of the BNI/WTCC T&Q program. The contract employee has extensive relevant experience and has taken two appropriate DOE training classes on fundamentals of DOE oversight and assessment, but, as a contract employee, has not completed a formal DOE technical qualification program. (See **OFI-HFO-1**.)

Finally, as discussed in section 3.1.1 of this report, DOE Order 426.2 requires application of chapter I of the contractor requirements document to "all personnel who can impact the safety basis through their involvement in the operation, maintenance, and technical support of all Department of Energy Hazard Category 1, 2, and 3 nuclear facilities." Contrary to DOE Order 426.2A, section 4.b, HFO approved a BNI/WTCC TIM with a list of qualified positions that does not include all personnel who can impact the facility safety basis. (See **Finding F-HFO-1**.) Not requiring all safety-basis impacting personnel to be included in the credited and approved T&Q program may result in inadequately trained personnel performing work that adversely affects systems or programs required to provide reasonable assurance of adequate protection of safety and health.

In *WTP DFLAW Core Requirement Oversight Strategy: Core Requirement 3 – Training and Qualification*, HFO states that the DFLAW safety basis includes no safety significant or safety class controls, and that the likelihood of other safety basis activities "contributing to an uncontrolled release of radiological or toxic chemical materials is small because of the combined layers of defense-in-depth established by physical plant systems and administrative controls over work processes." The HFO-approved BNI/WTCC TIM uses similar language to conclude that personnel who can affect SMPs are outside the scope of DOE Order 426.2 requirements if those SMPs do not include key elements. This inappropriately excludes personnel affecting other SMPs credited in the safety basis that are part of the controls established to minimize the likelihood of an uncontrolled release.

Federal Line Management Oversight Conclusions

Current HFO oversight of the BNI/WTCC T&Q program adequately meets most DOE Order 426.2A requirements. A comprehensive plan is being implemented to ensure that future required oversight is methodically performed and tracked. However, this plan is new and all T&Q requirements were not verified to be complete during the previous assessment cycle. Further, HFO has not ensured that all BNI/WTCC personnel who can impact the safety basis are covered by BNI/WTCC's training and qualification program for nuclear facilities.

4.0 BEST PRACTICES

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

- BNI/WTCC simulator training was conducted with exemplary discipline and formality, and included rigorous implementation of conduct of operations principles.

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.

Bechtel National, Inc./Waste Treatment Completion Company, LLC

Finding F-BNI/WTCC-1: BNI/WTCC is not applying the requirements of DOE Order 426.2 to all required personnel; implementation is mostly limited to SAC-affecting and SRD-affecting positions and does not include all SMPs. (DOE Order 426.2, att. 1, ch. I)

Hanford Field Office

Finding F-HFO-1: HFO approved BNI/WTCC contractor implementation documentation that did not show compliance with DOE Order 426.2 and its contractor requirements document. (DOE Order 426.2A, sec. 4.b)

6.0 DEFICIENCIES

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

Bechtel National, Inc./Waste Treatment Completion Company, LLC

Deficiency D-BNI/WTCC-1: BNI/WTCC assigned an individual in a safety basis-affecting position who did not meet the education and experience requirements for that position or allowed alternatives, and did not satisfy the requirements of HFO's conditional approval of a documented justification for an exception. (DOE Order 426.2, att. 1, ch. I, sec. 3.a)

Deficiency D-BNI/WTCC-2: BNI/WTCC is incorrectly teaching personnel that the CSMP is not part of the safety basis. (10 CFR 830.122(b)(1) and DOE Order 414.1D, att. 2, criterion 2.a)

Deficiency D-BNI/WTCC-3: BNI/WTCC incorrectly documented the adverse conditions associated with 5 of the 54 reviewed training-related recommendations as recommendations instead of CRs. (DOE Order 226.1B, att. 1, sec. 2.b.(3), and 24590-WTP-GPP-RACA-CR-0111)

Deficiency D-BNI/WTCC-4: BNI/WTCC is not performing trending of training-specific issues. (DOE Order 226.1B, att. 1, sec. 2.b.(3), and 24590-WTP-GPP-RACA-TM-0001)

Deficiency D-BNI/WTCC-5: BNI/WTCC has not ensured that all posted radiological checklists and job aids include a method to ensure that workers have available and use the latest revisions of applicable work instructions. (DOE Order 422.1, att. 2, req. 2.p)

Hanford Field Office

Deficiency D-HFO-1: During the three-year period ending May 2024, HFO did not evaluate and document the overall effectiveness of the BNI/WTCC nuclear facility T&Q program. (DOE Order 426.2A, sec. 4.c, and DOE Order 226.1B)

7.0 OPPORTUNITIES FOR IMPROVEMENT

EA identified the OFIs shown below 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./Waste Treatment Completion Company, LLC

OFI-BNI/WTCC-1: Consider creating a more plant-like environment in the simulator control room, including background noise and distractions from field personnel, to enhance evaluation of watch-standers' ability to operate in real-world conditions.

OFI-BNI/WTCC-2: Consider ensuring that on-shift SOMs are present for control room watch-standers' final evaluated watches in the simulator, or enhancing documentation of feedback if the on-shift SOM is unavailable, to prevent the potential loss of feedback and opportunities for continuous watch-stander improvement while on shift.

OFI-BNI/WTCC-3: Consider requiring the entry of identified noncompliances on observation checklists into CAMP.

OFI-BNI/WTCC-4: Consider requiring that all training-related CRs are assigned a CR significance level other than "NA" for the purposes of trending.

OFI-BNI/WTCC-5: Consider updating job aids for personnel contamination surveys using hand-held instrumentation to indicate a frisk rate (inches per second) with guidelines for minimum required times for proper whole-body and hand-and-foot frisks.

OFI-BNI/WTCC-6: Consider training simulation that better reflects both current and anticipated field conditions, including simulation of RWP issuance with RWPs specifically written to match simulated activities.

OFI-BNI/WTCC-7: For self-survey training, consider adding a modified self-survey, such as hand-and-foot, followed by use of an automated counting system, such as a PCM, to validate the effectiveness of self-survey techniques currently performed at the radiological buffer area boundary.

OFI-BNI/WTCC-8: Consider in-facility training simulation, along with classroom or mock-up survey and sample analysis, to ensure RCTs' ability to perform designated tasks while under facility-specific conditions (e.g., noise, space limitations, equipment variability).

Hanford Field Office

OFI-HFO-1: Consider assigning a Federal employee, who is enrolled in the DOE technical qualification program, to provide oversight of contractor nuclear facility T&Q programs.

Appendix A
Supplemental Information

Dates of Assessment

October 22 to November 26, 2024

Office of Enterprise Assessments (EA) Management

John E. Dupuy, Director, Office of Enterprise Assessments
William F. West, Deputy Director, Office of Enterprise Assessments
Kevin G. Kilp, Director, Office of Environment, Safety and Health Assessments
David A. Young, Deputy Director, Office of Environment, Safety and Health Assessments
Thomas E. Sowinski, Director, Office of Nuclear Safety and Environmental Assessments
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Jack E. Winston, Director, Office of Emergency Management Assessments
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