Independent Assessment of Conduct of Operations at the Hanford Site Waste Treatment and Immobilization Plant

May 2024

Office of Enterprise Assessments
U.S. Department of Energy

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Acronyms

BNI	Bechtel National, Inc.
BOF	Balance of Facilities
CFR	Code of Federal Regulations
CRAD	Criteria and Review Approach Document
DFLAW	Direct-Feed Low Activity Waste
DOE	U.S. Department of Energy
EA	Office of Enterprise Assessments
EMF	Effluent Management Facility
eSOMS	Electronic Shift Operations Management System
FR	Facility Representative
LAB	Analytical Laboratory
LAW	Low-Activity Waste
LOTO	Lockout/Tagout
NFPA	National Fire Protection Association
OFI	Opportunity for Improvement
OOD	Operations Oversight Division
ORP	Office of River Protection
PA	Public Address
PPE	Personal Protective Equipment
SBS	Submerged Bed Scrubber
RL	Richland Operations Office
SOM	Shift Operations Manager
SSCs	Structures, Systems, and Components
WTCC	Waste Treatment Completion Company, LLC
WTP	Waste Treatment and Immobilization Plant

INDEPENDENT ASSESSMENT OF CONDUCT OF OPERATIONS AT THE HANFORD SITE WASTE TREATMENT AND IMMOBILIZATION PLANT

Executive Summary

The U.S. Department of Energy (DOE) Office of Enterprise Assessments (EA) conducted an independent assessment of the conduct of operations program 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) from February to March 2024. The assessment also evaluated the effectiveness of the Office of River Protection and Richland Operations Office (together "DOE Hanford") oversight of the BNI/WTCC conduct of operations program implementation.

EA identified the following strengths:

- The BNI/WTCC conduct of operations program is well documented and clearly establishes expectations and requirements for meeting 17 of 18 program requirements.
- Operator knowledge of plant systems and operation, and of conduct of operations principles, was exceptional.

EA also identified several areas of concern, including two findings, as summarized below:

- Plant communications systems, including alarms and emergency announcements directing protective actions, are not audible in all areas and do not effectively communicate emergency and normal conditions to all personnel at WTP, including in some areas inside process buildings. (Finding)
- BNI/WTCC has not established and implemented required operating practices for the control of interrelated processes. (Finding)
- Multiple observed field activities were not performed in accordance with procedure, were performed outside of the assumptions of job hazard analyses, or revealed procedure inadequacies.
- Temporary equipment labeling and various types of tags are not adequate to ensure that equipment is properly controlled and information on abnormal conditions is clearly communicated to plant personnel.
- Periodic reviews of timely orders and required reading are not being performed, and several periodic surveillances of lockout/tagouts were not performed.

In summary, BNI/WTCC has established a conduct of operations program, most aspects of which, if fully complied with, will be adequate to minimize the likelihood and consequences of human fallibility or technical and organizational system failures. While operator knowledge of conduct of operations principles was exceptional, EA identified a number of instances where program elements were inadequately implemented, or where field performance was not consistent with program requirements. Until the concerns identified in this report are addressed or effective mitigations are put in place to improve conduct of operations proficiency and compliance with programs and procedures, risk will be elevated as the facilities transition to high-hazard operations.

INDEPENDENT ASSESSMENT OF CONDUCT OF OPERATIONS 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 conduct of operations program 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 from February to March 2024.

At the time of this assessment, the WTP Low-Activity Waste (LAW) facility, the Analytical Laboratory (LAB), the Effluent Management Facility (EMF), 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 Conduct of Operations at the Hanford Site Waste Treatment and Immobilization Plant, February 2024*, this assessment evaluated the effectiveness of BNI/WTCC in managing and maintaining a conduct of operations program. The assessment also evaluated the effectiveness of the Office of River Protection (ORP) and Richland Operations Office (RL) (together "DOE Hanford")[1] oversight of BNI/WTCC's conduct of operations 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 related to the BNI/WTCC conduct of operations program. Criteria to guide this assessment were based on objectives and criteria from criteria and review approach document (CRAD) EA CRAD 31-39, Revision 0, *Review of Conduct of Operations*. EA also used elements of EA CRAD 30-07, Revision 0, *Federal Line Management Oversight Processes*, to collect and analyze data on DOE Hanford oversight activities related to the conduct of operations at WTP.

EA examined key documents, such as system descriptions, work packages, procedures, manuals, analyses, policies, and training and qualification records. EA also interviewed key personnel responsible for developing and executing the associated programs; observed operations and maintenance activities; and walked down significant portions of DFLAW facilities, focusing on conduct of operations performance. 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.

[1] Some sitewide oversight functions are consolidated to a single group within ORP or RL. While operational oversight for ORP projects is provided by ORP's Operations Oversight Division, both RL and ORP provide programmatic oversight for projects managed by both offices.

3.0 RESULTS

3.1 Organization and Administration

This portion of the assessment evaluated BNI/WTCC's operations organization and administration policies, programs, and procedures; training; and self-assessment and monitoring.

BNI/WTCC has established an adequate framework of policies, programs, and procedures that appropriately implement a conduct of operations program in accordance with DOE Order 422.1, *Conduct of Operations*. The program document 24590-WTP-PD-RACO-CO-0001, *Conduct of Operations Program Description*, appropriately defines expectations for conduct of operations performance. Procedure 24590-WTP-RPT-RACO-CO-0001, *Conduct of Operations Implementation Matrix*, provides a comprehensive matrix specifying the detailed implementing procedures for the 18 elements required by DOE Order 422.1. Procedure 24590-WTP-GPP-RACO-CO-0001, *Organization and Administration*, defines roles, responsibilities, and accountability for most operations personnel. Interviews and observations demonstrated that senior managers, shift operations managers (SOMs), shift supervisors, control area operators, and field operators understand their roles and responsibilities[2]. Additionally, 24590-WTP-LIST-RACO-CO-0007, *Facility Key Positions and Watch Stations Operating Basis*, appropriately identifies essential personnel staffing. However, because 24590-WTP-GPP-RACO-CO-0001 does not identify the roles and responsibilities for the Day Shift SOM or the on-shift Deputy SOM, the division of responsibilities and authorities is not clear. (See **OFI-BNI/WTCC-1**.) One interviewed Deputy SOM stated that the SOM and Deputy SOM agree early in the shift which activities each would oversee.

Procedure 24590-WTP-RPT-TR-10-004, *Hanford Tank Waste Treatment and Immobilization Plant Training Implementation Matrix for Commissioning*, establishes an effective training program for on-shift operations personnel. Training program documents (i.e., program descriptions, task lists, and task-to-training matrices), selected training and qualification records, observations, and interviews confirmed effective implementation of 24590-WTP-RPT-TR-10-004. Having recognized a performance gap in some areas of operations, BNI/WTCC appropriately developed and implemented two interactive training lessons. Lesson 24590-WTP-COO-0026-IFT-001, *Conduct of Operations Refresher*, appropriately addresses all areas of operations performance, and Lesson 24590-WTP-HP-0001, *Human Performance Improvement*, focuses on human performance tools to reduce the likelihood of errors.

BNI/WTCC conducts generally adequate self-assessments and monitoring of operations performance. The November 2023 quality assurance audit of conduct of operations and four quality assurance surveillances documented an appropriate level of independent oversight. Procedure 24590-WTP-GPG-RAOP-OP-0042, *Management Observation Program* [MOP], provides an effective process for conducting management observations. The last three months of MOP observations and three monthly surveillances of the MOP provided effective feedback to the operations council, which monitors overall operations performance. Excellent cross-organizational engagement was observed at the monthly conduct of operations council meeting, demonstrating performance monitoring and a strong commitment to continuous improvement. However, the following weaknesses were identified:

- Contrary to 24590-WTP-GPP-RACO-CO-0001, sections 6.1.3.d and 6.1.3.e, BNI/WTCC has not "[a]nnually or more frequently, set auditable, measurable, realistic, and challenging safety, environmental, and operations goals" or "developed action plans to achieve" those goals. (See

[2] Non-management operators by contract hold the title of Commissioning Technicians while the facility is in a pre-operational commissioning status. This report refers to Commissioning Technicians and other operations staff as "operators."

Deficiency D-BNI/WTCC-1.) Not establishing operational goals and associated action plans could result in managers, supervisors, and workers not being aligned with a common focus to ensure continuous improvement within the organization.

- During an observed monthly governance meeting review of organizational key performance indicators, most indicators focused on meeting project milestone thresholds, without consideration of impacts on organizational risk or quality of performance. For example, indicators for scheduled drill completion and closure of condition reports focused only on the number completed, rather than on identified issues that affect risk or are adverse to quality. (See **OFI-BNI/WTCC-2**.)

Organization and Administration Conclusions

BNI/WTCC has established and implemented a generally adequate framework of policies, programs, and procedures; training for on-shift operations personnel; and self-assessment and monitoring of operations performance. However, BNI/WTCC has not established operational goals and associated action plans.

3.2 Shift Routines and Operating Practices

This portion of the assessment evaluated BNI/WTCC's procedure requirements and operator performance in the area of shift routines and operating practices.

BNI/WTCC has established and implemented effective procedures addressing shift routines and operating practices as required by DOE Order 422.1, attachment 2, requirement 2.b. Procedure 24590-WTP-GPP-RACO-CO-0002, *Shift Routines and Operating Practices*, appropriately establishes the standards and expectations necessary for proper and safe operator performance. During observed operator watchstanding activities and interviews, control area operators demonstrated strict compliance with procedures. For example, when the Melter 1 operator was directing field performance of procedure 24590-WTP-COWP-WC-23-06061, *Heat-up of the Thermal Catalytic Oxidizer (TCO) Skid*, the operator executed the procedure as written, effectively using the circle/slash method of placekeeping. During this evolution, the operator's radio communications were properly conducted in strict compliance with established protocols, including effective use of three-point communications. The control area operator was also observed appropriately responding to a steam plant boiler low-level alarm, properly accessing the alarm response procedure, and performing required actions. Additionally, BNI/WTCC's use of the electronic shift operations management system (eSOMS) for such activities as logkeeping, shift turnover, verifying qualifications, and obtaining documents is generally adequate. However, the following weaknesses were identified:

- An uncontrolled document was used to provide a detailed weekly summary of activities during an observed SOM turnover. The document was not part of the controlled turnover form and was not retained as a record. The on-coming SOM reviewed this document in detail instead of reviewing the official eSOMS log. The interviewed SOM stated that the document was not official and was not retained. (See **OFI-BNI/WTCC-3**.)
- Following turnover activities, operators were observed sharing information verbally and completing status reviews while at the controls, potentially impacting their ability to retain critical information related to operating conditions covered during the shift briefing. Also, information contained in standing and shift orders and recent procedure revisions was provided as paper copies, with no accountability mechanism to ensure the required reviews. (See **OFI-BNI/WTCC-4**.)

Shift Routines and Operating Practices Conclusions

BNI/WTCC has established and implemented effective procedures for shift routines and operating practices. In general, operators appropriately executed procedures, communicated effectively, and responded appropriately to abnormal conditions. However, some observed activities lacked the appropriate level of operational discipline.

3.3 Control Area Activities

This portion of the assessment evaluated BNI/WTCC's control area procedures and operational performance.

BNI/WTCC has established and implemented adequate control area operations procedures as required by DOE Order 422.1, attachment 2, requirement 2.c. Procedure 24590-WTP-GPP-RACO-CO-0003, *Control Area Activities*, appropriately and thoroughly addresses control area access, specifying which positions have unencumbered access, and properly establishes standards and expectations for professionalism and discipline while in the control area. This procedure further establishes appropriate protocols for entry into the at-the-controls area, limiting access as well as ensuring that performed activities remain focused on facility operations.

The observed control area operational performance was in strict compliance with 24590-WTP-GPP-RACO-CO-0003. Individuals entering the control area appropriately requested permission and stated their purpose. Entry into the at-the-controls area was properly controlled by the Control Room Supervisor. Additionally, the observed control area operators maintained high standards of professionalism while performing their duties, including shift turnover and equipment operations. Control area operators also demonstrated proper surveillance of control panels, trending of key facility performance parameters, and the ability to respond in a timely manner to determine and correct abnormalities and out-of-specification conditions. However, during control area observations, the Melter 1 operator could not locate the appropriate procedure to respond to 25 of 48 Melter 1 bubbler temperature indicators in alarm mode, nor was he clear on how many of these indicators could be out of service. The control area operator explained that these bubblers were recently installed and was able to demonstrate verification of flow through the bubblers. During a follow-up observation, another operator was able to locate the appropriate alarm response procedure, indicating that not all operators are familiar with the local alarm response procedure protocol.

Control Area Activities Conclusions

BNI/WTCC has established and implemented adequate control area operations procedures. Control area operations, including entry controls, were executed properly and in a disciplined and professional manner by operations personnel. However, some control area activities were not conducted in an appropriate manner.

3.4 Communications

This portion of the assessment evaluated BNI/WTCC's communications procedures, operational performance, and systems.

BNI/WTCC has established and implemented effective operations communications procedures as required by DOE Order 422.1, attachment 2, requirement 2.d. Procedure 24590-WTP-GPP-RACO-CO-0004, *Communications*, provides appropriate guidance for accurate, unambiguous communications during

emergency and normal operations, including appropriate protocols for face-to-face, phone, radio, and public address (PA) communications.

Control area operators used appropriate radio and phone communications during several observed activities. Operators made proper use of the phonetic alphabet and repeat-back communication protocols. The PA system was appropriately used solely for normal and emergency operational situations. Observations of alarms and PA system announcements involving actual emergency conditions, including a fire, a worker injury, and high wind conditions, were performed in accordance with procedure direction. However, contrary to 24590-WTP-GPP-RACO-CO-0004, the systems were inadequate to communicate emergency and normal conditions and required actions to personnel. (See **Finding F-BNI/WTCC-1**.) Inadequate communications could result in personnel not taking required actions, increasing risks to worker safety. Specifically:

- The Hanford Site take-cover siren test and the associated PA system announcement could not be heard in Building T-1. The site provided a copy of an implementation strategy (discussed below) to address this issue.
- During a fire response in LAB, the fire alarm was not audible in Building T-1. No PA announcement or other communication was provided, despite Building T-1 being adjacent to LAB. The communications system engineer stated that because Building T-1 is not part of the permanent plant design, plant alarms and PA speakers were not required. Additionally, PA announcements during a drill were not audible in the LAW +28-foot elevation, where emergency actions may have been required for worker protection. The communications procedure appropriately provides guidance for testing the PA system, and where weaknesses in the system are noted, actions to address them are required. Although compensatory actions have been taken in many cases, a backlog of corrective actions remains, and the current system configuration cannot communicate emergency and normal information to all personnel in process buildings. The site provided a list of 22 open work orders for PA speakers, some addressing multiple speakers.
- The systems in place to address shortcomings, which include handheld radios and an Alertus system that provides an audible alarm and message, are not included in the communications procedure. Not all plant emergency communications were provided via the Alertus system. Additionally, these systems are tested based on a repetitive work order for scheduling, with no objective acceptance criteria to determine overall system operational status. Document 24590-WTP-PL-ENG-23-0003, *Communication and Network Implementation Strategy for Non-Processing Facilities*, addresses the communication system challenges and states, "The combination of supplementary systems results in a robust communication approach that meets the intent of the requirements in the ORD [Operations Requirements Document] and other Project requirements documents." The implementation strategy takes credit for multiple systems without providing a basis for identifying their acceptability. As described above, in multiple instances the credited and supplementary systems were inadequate to provide emergency and normal communications to all potentially affected personnel.

Communications Conclusions

BNI/WTCC has established and implemented operations communications procedures that were properly implemented during all observed activities. However, communications systems required for personnel protection do not effectively notify all onsite personnel of emergency and normal conditions, and compensatory measures have not adequately provided the necessary actions to ensure personnel notification.

3.5 On-shift Training

This portion of the assessment evaluated BNI/WTCC's procedures and operator understanding of their responsibility when conducting on-shift training.

As required by DOE Order 422.1, attachment 2, requirement 2.e, BNI/WTCC has established and implemented adequate operations procedures that control on-shift training. Procedure 24590-WTP-GPP-RACO-CO-0005, *On-Shift Training*, provides adequate controls for the on-shift training of facility operators to prevent inadvertent or incorrect trainee manipulation of equipment. The procedure appropriately includes authorization and documentation of training activities, implementation of facility conditions and controls for conducting training, and guidance for suspension of training during unanticipated or abnormal events.

During interviews, control area operators appropriately demonstrated their knowledge of the requirements associated with on-shift training and the control of trainees. Each interviewed operator properly discussed the requirements and expectations associated with the control of trainees and demonstrated the knowledge of trainees, plant conditions during training, qualifications of the operator trainer, and actions required to suspend training. BNI/WTCC was conducting simulator training for new operators during the week of the assessment and had no on-shift training scheduled.

On-shift Training Conclusions

BNI/WTCC's on-shift training procedures and practices adequately control on-shift training of facility operators and prevent inadvertent or incorrect trainee manipulation of equipment.

3.6 Investigation of Abnormal Events, Conditions, and Trends

This portion of the assessment evaluated BNI/WTCC's process for investigating abnormal events, conditions, and trends.

BNI/WTCC has developed an adequate procedure (24590-WTP-G-RAOP-OR-0001, *Event Notification, Investigation and Management*) for managing event scenes and performing event investigations. The procedure includes provisions and criteria for identifying specific events that require investigation; specifies training and qualification requirements for event investigators; requires causal analysis, extent-of-condition review, and corrective actions to preclude recurrence; and includes guidance for the conduct of fact-finding meetings and critiques. The reviewed event investigations, causal analyses, trend data, and operability evaluations demonstrate that BNI/WTCC is adequately implementing the requirements of 24590-WTP-G-RAOP-OR-0001 and DOE Order 422.1, attachment 2, requirement 2.f.

Fact-finding meetings and critiques are required by 24590-RAOPF00095, *Event Evaluation/Notification*, to determine whether an event investigation is needed. An observed fact-finding meeting associated with the LAW secondary offgas/vessel vent process system (LVP) low flow programmable protection system (PPJ) interlock trip was conducted effectively according to the requirements of 24590-RAOPF00095. The meeting was well attended by personnel involved in the event, including shift operators, first line supervisors, an SOM, and a shift technical engineer. The meeting was conducted by a trained and qualified event investigator who effectively set the expectations and purpose of the meeting. The meeting was open, focused on fact finding, and did not attempt to assign blame to individuals. The meeting focused primarily on procedural actions in response to a PPJ trip following placement of an untuned control valve in automatic. Conduct of operations-related topics, such as verbatim compliance with procedures, use of timeouts, and use of immediate procedure changes, were effectively discussed as applicable contributors to the event. However, one conduct of operations topic related to

equipment/system status was only briefly mentioned during the question/answer session at the end of the meeting. Specifically, the controller had a known issue for the eight months leading up to the event, and the condition had not been corrected or a caution tag used to warn operators of a precaution related to the operation of the valve. Timely repair of safety-related equipment is imperative to ensure that plant safety systems can effectively perform their intended safety function when needed. In addition, effective use of caution tags ensures that operators are aware of conditions that could impact equipment protection or operational control, as further discussed in section 3.9.

Investigation of Abnormal Events, Conditions, and Trends Conclusions

BNI/WTCC has established and implemented adequate operations practices for investigating and reporting abnormal events, conditions, and trends.

3.7 Notifications

This portion of the assessment evaluated BNI/WTCC's operations procedures and practices to ensure appropriate notifications and timely response to events.

Procedure 24590-WTP-G-RAOP-OR-0001 documents adequate guidance for providing required and informational notifications to BNI/WTCC management and support groups and DOE Hanford, as required by DOE Order 422.1, attachment 2, requirement 2.g. Attachment 2 of this procedure, *WTCC Reportability, Investigation, and Notification*, provides a detailed matrix for specific notifications based on event type and hazard significance. This procedure requires users to input event information, such as title, date and time of the event, event location, facts, preliminary causes, lessons learned, and immediate actions taken, into form 24590-RAOPF00095. Completion of the form generates a blast email to all potentially impacted organizations, referred to as a "heads up" notification. The reviewed event notification forms demonstrate that BNI/WTCC is generally implementing the requirements of 24590-WTP-G-RAOP-OR-0001. However, one event notification, 24590-WTP-GCA-24-00193, *LVP Low Flow PPJ Interlock*, was not completed until February 28, 2024, a week after the event occurred on February 21, 2024. Another event notification, 23-069-00, *Positive Sample Results for Hexavalent Chromium on Frit Addition Hopper*, was not completed until 10 days after the event occurred on August 11, 2023. (See **OFI-BNI/WTCC-5**.) Form 24590-RAOPF00095, step 6.2.1, states that notifications should be completed within 30 minutes but may be created at a reasonable time thereafter as the situation dictates.

During the assessment, EA requested the event notification related to the near miss involving an argon spill during placement of the hose in the tanker truck. BNI/WTCC stated that no "heads up" was generated for that event. A near miss is defined in 24590-WTP-G-RAOP-OR-0001 as, "Any event or condition which has the potential to cause death, injury/illness, property damage, and/or environmental impact. A near miss to an injury, where something physically happened that was unexpected or unintended AND where no barrier prevented an event from having a reportable consequence." In this case, the only barrier preventing a potential injury was the required personal protective equipment (PPE) – safety glasses, goggles, apron, sleeves, and gloves – which, in violation of procedure, personnel removed before placement of the hose in the tanker truck. Contrary to 24590-WTP-GPP-RAOP-OR-0001, attachment 2, *Conduct of Operations Events* section, BNI/WTCC did not complete an event notification ("heads up") for a procedural violation or personnel error with actual or potential personnel injury, facility damage, or facility safety degradation. (See **Deficiency D-BNI/WTCC-2**.) Not making such notifications could hinder personnel from effectively responding to and reporting events involving nuclear, environmental, and personnel safety. In this case, the procedural violation/personnel error was removing the required PPE before all work steps were complete, and the potential personnel injury was skin exposure to cryogenic fluids.

Notifications Conclusions

BNI/WTCC has developed an adequate procedure for managing event scenes, performing event investigations, and providing required and informational notifications. The reviewed event notification forms demonstrate that BNI/WTCC is generally implementing the requirements of the procedure. However, BNI/WTCC did not complete an event notification ("heads up") for a procedural violation or personnel error with actual or potential personnel injury, facility damage, or facility safety degradation.

3.8 Control of Equipment and System Status

This portion of the assessment evaluated BNI/WTCC's practices for the control of equipment and system status.

Procedure 24590-WTP-GPP-RACO-CO-0008, *Control of Equipment and System Status*, adequately addresses DOE Order 422.1, attachment 2, requirement 2.h, to establish and implement operations practices for equipment lineups and subsequent changes to ensure that facilities operate with known, proper configurations as designed. This procedure appropriately invokes the work control requirements of 24590-WTP-GPP-RAMN-WC-0001, *Work Control Process*, to plan and authorize any repair or maintenance work, including work on safety significant structures, systems, and components (SSCs). The procedure also invokes 4590-WTP-GPP-RAEN-EN-0013, *Temporary Modification*, to establish administrative systems and requirements to ensure that design changes to SSCs are documented, installed, monitored, and removed under a temporary modification process. Operations and maintenance personnel appropriately coordinate with engineering personnel to maintain configuration control of system alignment. Interviews with control room personnel and observations of control room activities confirmed continuous awareness of facility equipment status, including the use of eSOMS to verify and confirm system status and deviations. Interviews also confirmed that control area operator and operations management personnel clearly understood their responsibilities for maintaining proper configuration and authorizing status changes for major equipment.

Generally adequate control of equipment and system status was observed during walkdowns. During a system alignment walkdown of EMF's fire water system, field alignment was observed to match the documented configuration and supporting drawings. Additionally, BNI/WTCC had 31 temporary modifications. The installation records were reviewed for all the modifications, and four were selected for visual verification within LAW, LAB, and BOF. Field walkdowns demonstrated that the tags were legible, and components were in the appropriate configuration. However, the following weaknesses were identified:

- Contrary to National Fire Protection Association (NFPA) 80, *Standards for Fire Doors and Other Opening Protectives*, requirements, and 24590-WTP-GPP-RAFP-FP-0002, *Fire Protection System Impairment Tracking Process*, BNI/WTCC did not generate a fire impairment for a fire door that was known to be deficient. (See **Deficiency D-BNI/WTCC-3**.) Not identifying fire impairments delays repair of deficient conditions and increases risk from fire events.
- Temporary modification 24590-BOF-TMOD-GFR-0500, *Offload GFC Batch to the LAW Blend Hopper*, had no record of installation verification. An SOM searched eSOMS, but no record of the verification was found.

Control of Equipment and System Status Conclusions

BNI/WTCC has established and implemented adequate practices for initial equipment lineups and subsequent changes to ensure that facilities operate with known and proper configurations. Control area operators manage equipment deficiencies, maintenance activities, post-maintenance testing, and return to

service adequately. However, BNI/WTCC did not generate a fire impairment for a fire door that was known to be deficient.

3.9 Lockouts and Tagouts

This portion of the assessment evaluated BNI/WTCC's operator practices for the installation and removal of lockout/tagouts (LOTOs) to protect personnel, and the use of caution and miscellaneous tags to support facility operations.

BNI/WTCC has established and generally implemented effective practices for installing and removing LOTOs to protect personnel from hazardous energy sources. Procedure 24590-WTP-GPP-RAOP-OP-0032, *System and Equipment Lockout/Tagout*, adequately addresses the procedures, roles, and responsibilities associated with the development, documentation, review, installation, independent verification, and removal of a LOTO consistent with DOE Order 422.1, attachment 2, requirement 2.i; 29 CFR 1910, *Occupational Safety and Health Standards*; 29 CFR 1926, *Safety and Health Regulations for Construction*; and NFPA 70E, *Standard for Electrical Safety in the Workplace*. The reviewed training records for two authorized tagging authority operators demonstrated that assigned personnel are qualified and authorized to perform LOTOs.

Two observed LOTO installations demonstrated proper control of tags, locks, lockboxes, chains, and other components in accordance with 24590-WTP-GPP-RAOP-OP-0032. The reviewed LOTO permits (WTP-24-283, *Annual PCW Cooling Tower Fan Motor Lubrication PCW-MTR-00031*, and WTP-23-1502, *5-Year Clean and Inspect Lab LVE-PNL-60035 and LVE-XFMR-60035*) confirmed proper authorization for LOTO installation and identification of any special conditions or operations impacts. The observed deviation for LOTO permit WTP-23-1787, *Five Year Clean and Inspect of LVE-PNL-86001*, demonstrated proper positioning of LOTO components and control of equipment/system status by operations. However, contrary to 24590-WTP-GPP-RAOP-OP-0032, section 6.1.6, BNI/WTCC did not complete several required quarterly LOTO surveillances in 2022 and 2023 and the annual LOTO audit in 2023. (See **Deficiency D-BNI/WTCC-4**.) Not performing LOTO surveillances and audits could result in missed opportunities for early identification of LOTO-related issues impacting worker safety. The deficient conditions were entered into the issues management system as condition reports CR 23-00792, *24590-WTP-SAR-MGT-23-0005 - LOTO Assessment - Periodic Inspections*, and CR 24-00119, *24590-WTP-SAR-OP-24-0001 – 2023 Annual Lockout/Tagout Assessment – LOI #3 – Quarterly Surveillances Not Performed as Required*. The reviewed corrective actions included an action to establish a quarterly recurring task assigned to the LOTO subject matter expert but did not include an action to establish a similar recurring task for the annual audit. Additionally, the condition reports were classified as Level C, even though there were multiple examples over multiple years of the required LOTO surveillances/audits not being performed; Level C is typically limited to isolated occurrences.

The BNI/WTCC caution and miscellaneous tag program is governed by 24590-WTP-GPP-RACO-CO-0019, *Caution and Miscellaneous Tags*, which implements the requirements of DOE Order 422.1, attachment 2, requirement 2.i.(2). A walkdown of active tags in LAW demonstrated that BNI/WTCC is generally implementing the requirements of 24590-WTP-GPP-RACO-CO-0019. A sampling of tags (approximately 20) was walked down to verify the presence and condition of the tag, serial number, description, proper use, status, and agreement with the tag log, and some discrepancies were observed. First, several tags contained truncated information, limiting personnel's understanding of tag information, including problem description and work document number (see figure 1). Contrary to 24590-WTP-GPP-RACO-CO-0019, section 6.3.4.d, BNI/WTCC does not ensure that all tag information is verified to be legible and complete. (See **Deficiency D-BNI/WTCC-5** and **OFI-BNI/WTCC-6**.) Illegible tags could result in the miscommunication of important information related to equipment operability and safety. Second, two tags (information tag I-19-060 and caution tag O-191-2) had serial numbers that could not be

found in the tag log. Third, tags I-19-060 and O-191-2 had identification numbers that were inconsistent with the numbering convention generated by eSOMS. Finally, LAW has a significant number of legacy tags, including caution tags, quality assurance hold tags, and out-of-service tags, that could impact startup readiness. (See **OFI-BNI/WTCC-7**.)

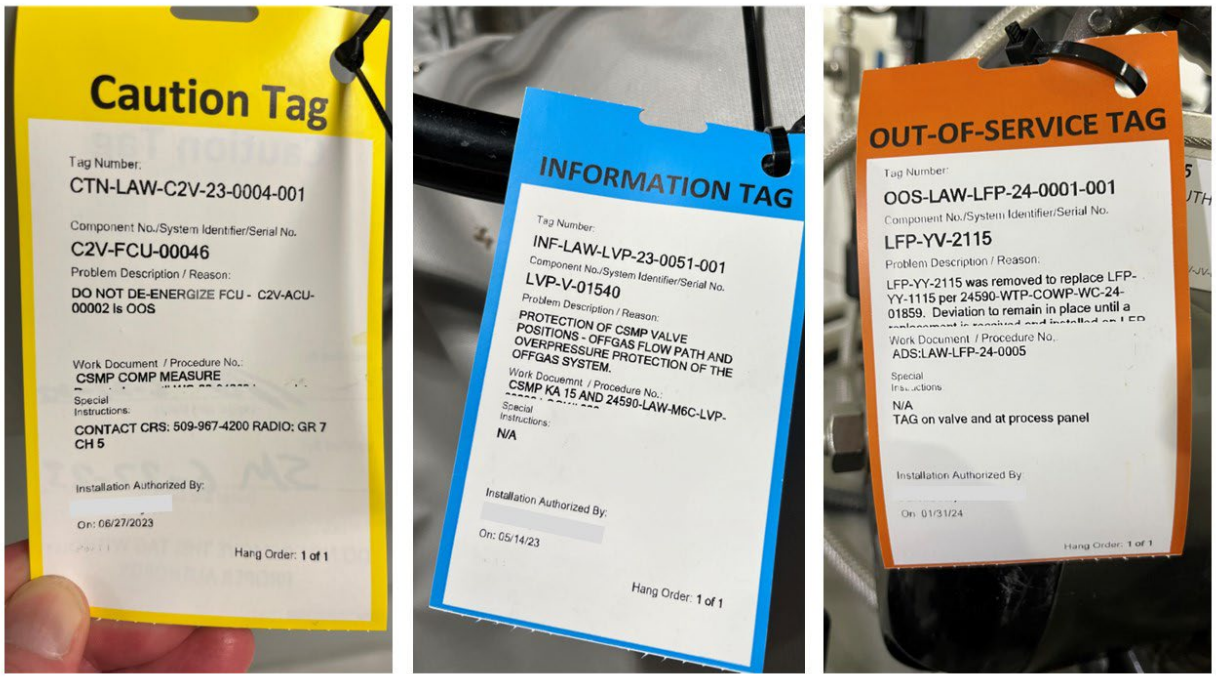

Figure 1 – Examples of tags with truncated text

As previously discussed in section 3.6 of this report, during an observed fact-finding meeting for a PPJ interlock trip (heads-up 24-014-00), BNI/WTCC determined that a caution tag had not been placed on a faulty valve controller, potentially contributing to the cause of the event. Specifically, the controller was not tuned properly for use in the automatic mode, and the condition had existed for eight months prior to the event. Contrary to 24590-WTP-GPP-RACO-CO-0019, section 6.2.1, BNI/WTCC plant personnel did not report this situation that may have required a caution tag. (See **Deficiency D-BNI/WTCC-6**.) Effective use of caution tags ensures that operators are aware of equipment that may have known precautions or limitations that can impact plant operations. In addition, timely repair of safety-related equipment is imperative to ensure that plant safety systems can effectively perform their intended safety function when needed. BNI/WTCC entered this condition into its issues management system and attached a caution tag to correct the condition.

Lockouts and Tagouts Conclusions

BNI/WTCC has established and generally implemented effective LOTO practices that meet the requirements for controlling hazardous energy sources to protect personnel. The observed LOTO activities were performed in accordance with established procedures, and facility personnel demonstrated the proper attention to detail. Additionally, BNI/WTCC's caution and miscellaneous tag program is generally adequate to inform and alert personnel to pertinent information. However, BNI/WTCC did not complete several required LOTO surveillances and an audit in 2022 and 2023. Further, personnel who verify tags do not ensure that tag information is legible and complete, and a caution tag was not placed on a faulty valve controller, potentially contributing to the cause of an event.

3.10 Independent Verification

This portion of the assessment evaluated BNI/WTCC's operator practices for implementing independent verification.

Procedure 24590-WTP-GPP-RACO-CO-0010, *Independent Verification*, adequately addresses DOE Order 422.1, attachment 2, requirement 2.j. This procedure also adequately implements the LOTO requirements specified in DOE Order 422.1, attachment 2, requirement 2.i. The independent verification of a lockout installation was observed for LOTO permits WTP-24-283 and WTP-23-1787 to ensure that each check was separated by time and distance and constituted an actual identification of the component and determination of component position using the direction detailed in attachment 2 of 24590-WTP-GPP-RACO-CO-0010. Further, three reviewed work packages[3] demonstrated adequate implementation of independent verification for safety-related room thermostat instrument channel calibrations. Specifically, the SOM and the shift technical engineer (STE) conducted independent reviews of the surveillance results to determine whether "as left" calibration readings met specified acceptance criteria. The reviewed calibration data sheets showed that the "as found" readings were out of specification for several of the calibration surveillances; however, the work package instructions did not require the end user, SOM, or STE to generate a work order, notify engineering, or enter the condition into the issues management system to evaluate the condition (e.g., potential for significant instrument drift following calibration). (See **OFI-BNI/WTCC-8**.)

Independent Verification Conclusions

BNI/WTCC has implemented an effective independent verification process to verify that critical equipment configuration is in accordance with controlling documents, consistent with DOE Order 422.1, attachment 2, requirement 2.j.

3.11 Logkeeping

This portion of the assessment evaluated BNI/WTCC's logkeeping procedures and processes, which are meant to ensure thorough, accurate, and timely recording of events and equipment information for performance analysis and trend detection.

Procedure WTCC-WTP-GPP-RACO-CO-0011, *Logkeeping*, adequately addresses DOE Order 422.1, attachment 2, requirement 2.k, and appropriately specifies which positions, by title, are required to maintain narrative logs. Facility round sheets also appropriately provide for recording narrative entries in addition to facility data. The reviewed logs and round sheets were adequate, with legible entries and properly recorded late entries and correction of entries. Narrative logs from October 16, 2023, through January 18, 2024, met the requirements of WTCC-WTP-GPP-RACO-CO-0011. Additionally, real-time reviews of logs were conducted during interviews and walkdowns during the onsite portion of the assessment. Each of the logs appropriately contained a daily summary of key equipment status, changes in key equipment status, receipt of plant alarms, shift turnover and reliefs, documentation of abnormal events and conditions, and other important data specified in governing procedures.

[3] Work Order 24590-WTP-COWP-WC-23-02274, *LAW LMP-PSV-1642-INSP/RPL ANN*, March 30, 2023
Work Order 24590-WTP-COWP-WC-23-03727, *LAW PPJ THERM SAFE RM CAL*, August 14, 2023
Work Order 24590-WTP-COWP-WC-23-06333, *LAW LOP COIL PSV RMOV RPLAC ANN*, August 3, 2023

Logkeeping Conclusions

BNI/WTCC's logkeeping practices result in adequately recorded events and equipment information important to facility operations. BNI/WTCC personnel adequately performed logkeeping in accordance with governing procedures.

3.12 Turnover and Assumption of Responsibilities

This portion of the assessment evaluated BNI/WTCC's operational shift and operator relief turnover processes to verify the thorough, accurate transfer of information and responsibilities at shift or operator relief.

BNI/WTCC has established and implemented adequate shift and operator relief turnover processes to provide for continued safe operations. Procedure 24590-WTP-GPP-RACO-CO-0012, *Turnover and Assumption of Responsibilities*, provides adequate direction for conducting shift turnovers, including shift relief, in accordance with DOE Order 422.1, attachment 2, requirement 2.l. The observed shift turnovers demonstrated that sufficient time is allowed for oncoming operations personnel to review logbooks and other document updates and discuss any information contained in the turnover documentation. Interviews and observations showed that personnel were familiar with the expectations for turnover, including turning over activities in progress. During observations, operations personnel demonstrated effective transfer of equipment status from the outgoing shift to the incoming shift in accordance with 24590-WTP-GPP-RACO-CO-0012.

Within the previous six months, BNI/WTCC has implemented a Deputy SOM position with an offset schedule to foster continuity and mentoring. Personnel spoke highly of this program and its benefits, especially regarding system configuration. Additionally, control room operators exhibited exceptional plant knowledge. A good questioning attitude and knowledge of scheduled or recently performed work were observed during turnover activities.

BNI/WTCC has developed an operator aid to help standardize turnover for non-supervisory watchstations without a checklist. Personnel did not use this tool and, in most cases, were not aware of it. Most operators used a combination of running log summaries to brief their relief. BNI/WTCC management stated that the goal for the facility is to have turnover checklists for all watchstanders identified on the watchbill.

Despite the generally adequate performance of turnovers, the following weaknesses were observed:

- In several observed instances, unofficial operator log summaries were used for shift turnover and not retained as records. (See **OFI-BNI/WTCC-3**.)
- Procedure 24590-WTP-GPP-RACO-CO-0012 does not capture the turnover activities completed in eSOMS or provide direction for situations when eSOMS is unavailable (e.g., verifying qualification, accepting watch).
- In two instances, an operator did not review eSOMS or cover shift orders before accepting the watch.
- Designated mid-shift relief watchstanders do not routinely attend shift turnovers. (See **OFI-BNI/WTCC-9**.)

Turnover and Assumption of Responsibilities Conclusions

BNI/WTCC has established and implemented adequate shift and operator relief turnover processes. Additionally, BNI/WTCC operations personnel generally performed adequate turnovers during the observed shift changes and worker replacements.

3.13 Control of Interrelated Processes

This portion of the assessment evaluated BNI/WTCC's control of interrelated processes through established operating practices that support facility safety or operations.

Contrary to DOE Order 422.1, attachment 2, requirement 2.m, BNI/WTCC has not established and implemented operating practices for the control of interrelated processes. (See **Finding F-BNI/WTCC-2**.) Without practices to control interrelated processes, facility safety or operations could be adversely affected. The interviewed BNI/WTCC operators and SOMs stated that the control of interrelated processes is covered in training even though no formal program exists. Procedure 24590-WTP-GPP-RAOP-OP-0034, *Interfacing Systems Program Requirements*, provides guidance on the control of interrelated processes, but the procedure was recently cancelled. The interviewed managers could not explain why the document was cancelled or whether a successor document is in development.

Control of Interrelated Processes Conclusions

BNI/WTCC has not established and implemented operating practices for the control of interrelated processes.

3.14 Required Reading

This portion of the assessment evaluated BNI/WTCC's required reading program to verify that operators are updated on equipment, document changes, lessons learned, and other important information.

Procedure 24590-WTP-GPP-RACO-CO-0014, *Required Reading*, adequately addresses required reading in accordance with DOE Order 422.1, attachment 2, requirement 2.n. This procedure appropriately requires BNI/WTCC to identify the material to be distributed via required reading, the individuals who are required to read distributed material, and documentation of proper distribution and timely completion.

While the procedure is adequate, the reviewed required reading log and records exhibit sporadic review and inadequate recordkeeping, contrary to the requirements of Procedure 24590-WTP-GPP-RACO-CO-0014. (See **Deficiency D-BNI/WTCC-7**.) Inadequate implementation of required reading could result in operators who are not updated on information important to facility safety. BNI/WTCC self-identified these issues during the November 2023 assessment 24590-WTP-SV-OP-23-030, *Line Surveillance of Required Reading*, and entered them into the local issues management system; however, corrective actions have been ineffective. During interviews, personnel self-identified the need for program improvement. To aid in this improvement, a new program coordinator was assigned in December 2023.

Required Reading Conclusions

BNI/WTCC has established required reading program requirements that, if properly implemented, would ensure that assigned operators and workers are properly updated on facility requirements, changes, lessons learned, or other needed information. However, implementation is not adequate, as the required reading log and records show sporadic review and inadequate recordkeeping.

3.15 Timely Instructions/Orders

This portion of the assessment evaluated BNI/WTCC's practices for timely written direction and guidance from management to operators.

Procedure 24590-WTP-GPP-RACO-CO-0015, *Timely Instructions and Orders*, adequately addresses DOE Order 422.1, attachment 2, requirement 2.o, including appropriate circumstances for the use of timely instructions and orders, designated levels of review and approval, configuration control, distribution to appropriate personnel, and documentation of their receipt and understanding.

While the procedure is adequate, reviews of shift and standing orders were not documented as having been performed, contrary to Procedure 24590-WTP-GPP-RACO-CO-0015. (See **Deficiency D-BNI/WTCC-8**.) Not reviewing shift orders with operations shift personnel could result in information important for safe operations not being disseminated to shift personnel. BNI/WTCC self-identified this issue during the May 2023 assessment 24590-WTP-SV-OP-23-0009, *Line Surveillance Of 24590-WTP-GPP-RACO-CO-0015, Timely Instructions and Orders*, but it has not been corrected. Further, the reviewed shift orders used language that read like procedural directions, but omitted references to implementing procedures in those entries. (See **OFI-BNI/WTCC-10**.)

Timely Instructions/Orders Conclusions

BNI/WTCC has established timely instruction/order program requirements that, if properly implemented, would ensure timely written direction and guidance from management to operators. However, BNI/WTCC is not documenting the required reviews of shift and standing orders.

3.16 Technical Procedures

This portion of the assessment evaluated BNI/WTCC's processes for developing technical procedures, the adequacy of selected procedures, and implementation of procedures associated with observed evolutions.

BNI/WTCC has adequately established processes for developing and maintaining accurate, understandable written technical procedures, and provides appropriate standards for procedure use as required by DOE Order 422.1, attachment 2, requirement 2.p. Procedure 24590-WTP-GPP-RACO-CO-0020, *Technical Procedure Administration*, fully incorporates requirements for procedure development and control. Procedure 24590-WTP-GPP-RACO-CO-0021, *Technical Procedures Writer's Standard*, provides the appropriate guidance for procedure format, content, and consistent use of terms. Additionally, 24590-WTP-GPP-RACO-CO-0016, *Technical Procedure Use and Adherence*, provides appropriate direction to ensure disciplined operations in the use of procedures.

The reviewed technical procedures were generally adequate. Four reviewed procedures contained the requisite content specified in 24590-WTP-GPP-RACO-CO-0020. However, shift order 24590-WTP-OSFTO-COPS-24-0029, *Operations Shift Order*, dated February 26, 2024, includes "management directions" with performance steps that do not follow the guidance in 24590-WTP-GPP-RACO-CO-0021, section 6.4, and without the levels of review identified in 24590-WTP-GPP-RACO-CO-0020, section 6.5.f.

The observed evolutions demonstrated generally adequate implementation of associated technical procedures. During turnover and pre-job briefings, managers appropriately demonstrated their support of the pause-work and stop-work processes. Operations personnel were observed appropriately using aspects of self-checking and placekeeping techniques when implementing continuous use procedures in the control room. During the observed operator watchstanding activities and interviews, operators

generally demonstrated strict compliance with procedures and a willingness to pause activities if there was a question about the procedure or an unanticipated equipment response. For example, during the performance of step 7.1 in procedure 24590-WTP-COWP-WC-23-06061, for aligning quench spray to the caustic scrubber, the Melter 1 operator directing field performance was observed strictly complying with the procedure and appropriately paused execution when the procedure reached a step requiring a prescribed amount of flow that could not be achieved; a procedure change was then properly requested. The observed pre-job briefing for the filling of argon vessel A from a vendor tanker truck was well attended by affected organizations, including operations, vendor personnel, industrial hygiene, and supervision. The pre-job briefing was interactive; was conducted in accordance with the pre-job briefing checklist; and included a detailed discussion of potential hazards, critical steps, and required PPE. In general, the filling of the argon vessel A was well executed according to procedure 24590-LAB-BAG-SOM-0001-02-003, *Filling Lab Argon Liquid Vessels*. The observed work activity demonstrated good use of three-way communication and the circle/slash method to demonstrate completion of work steps.

While observed evolutions were generally adequate, the following examples were identified where the procedure use standards of 24590-WTP-GPP-RACO-CO-0016 were not followed and did not or could not have resulted in the intended outcome:

- During an observed performance of 24590-WTP-COWP-WC-23-05123, *Obtain water samples from the Melter 1 SBS to provide a baseling* [sic] *for conductivity and chemical analysis*, in which operators take a sample from the submerged bed scrubber (SBS) system, an operator inappropriately manipulated a temporarily installed, unlabeled ball valve to throttle sample flow rather than needle valve LOP-V-10094 as specified in the work instruction. (See **Deficiency D-BNI/WTCC-9**.) Manipulation of equipment contrary to procedures could expose workers to hazards or create upset plant conditions. EA identified the improper valve manipulation and alerted the field work supervisor and SOM, both of whom were present observing the work. After being made aware of the incorrect valve manipulation, the operators appropriately stopped, placed equipment in a safe configuration, and determined the correct path forward to complete the work activity in accordance with procedure requirements. In addition to the incorrect valve manipulation, several associated issues that may have contributed to the procedure noncompliance were observed:
    - The label identifying needle valve LOP-V-10094 was affixed to a cover plate that had been removed, so there was no fixed identification of the valve (see figure 2). Operators did not verify that the designator of the valve to be manipulated matched the valve specified in the work instruction prior to valve operation.
    - The temporary ball valve that the operator was improperly using to throttle sample flow was part of a hose/fitting assembly that the SOM stated had been installed under step 4.4.5 of 24590-WTP-COWP-WC-23-05123, which allowed for the use of unspecified "extra fittings…for ease of sampling" (see figure 3). However, this step had been marked not applicable ("N/A") in the field copy of the work instruction.
    - The temporarily installed hose/fitting assembly had been left installed for an extended period of time and was not tracked as a temporary modification or otherwise identified with a tag or label to provide operators with information about its purpose or operation.

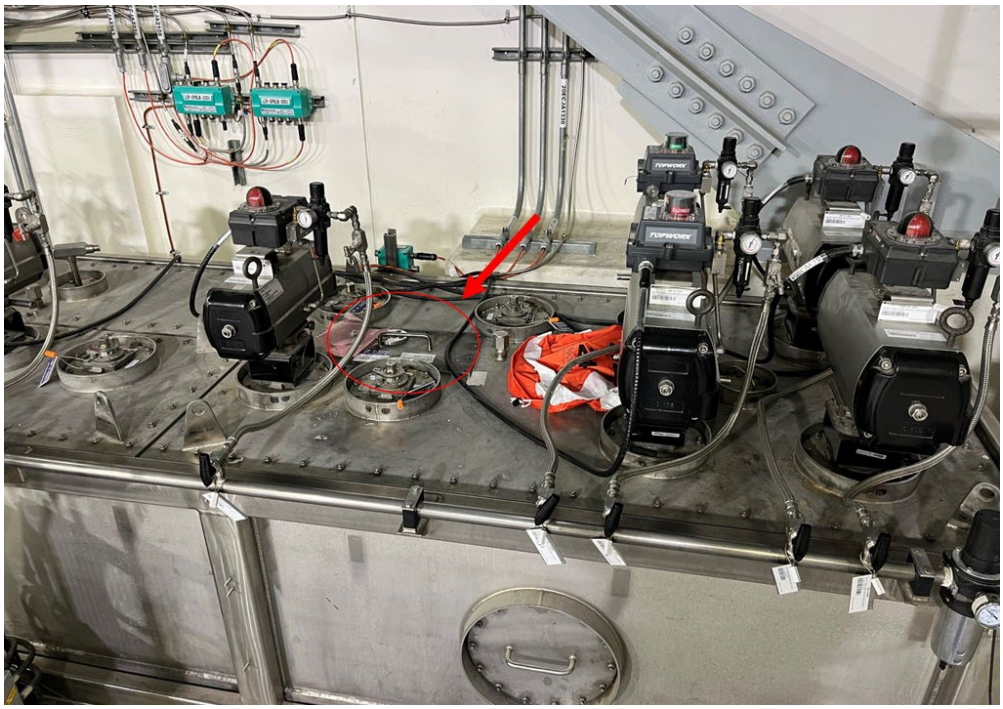

Figure 2 – Valve LOP-V-10094 is beneath the orange foreign material exclusion (FME) cover. The label identifying the valve is on the removed cover plate, circled in red.

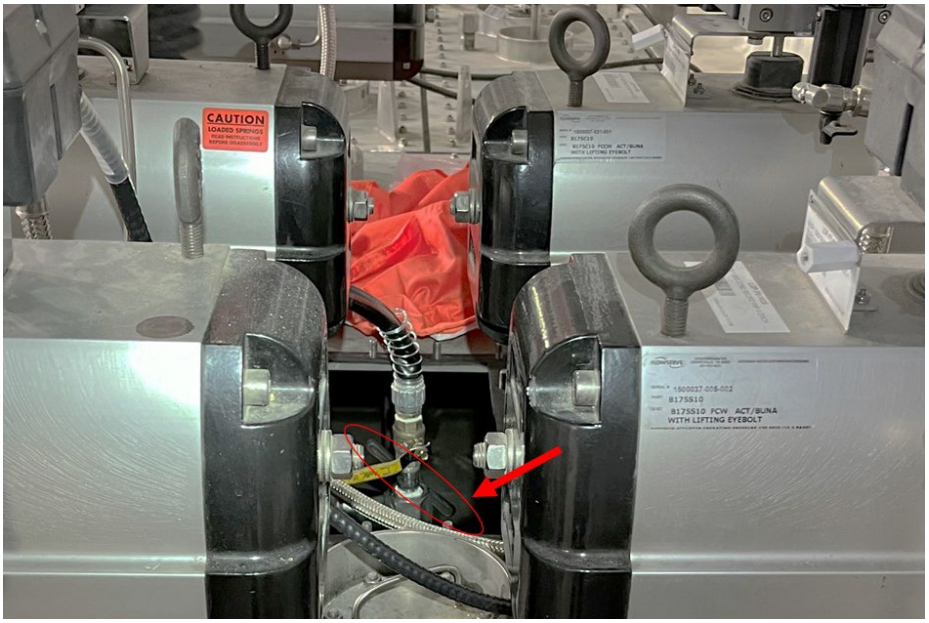

Figure 3 – Temporarily installed hose/fitting assembly on LOP-V-10094. The valve operator for needle valve LOP-V-10094 is circled in red (behind the hose/fitting assembly). The valve operator for the temporary ball valve is the yellow handle in the foreground.

- At the completion of filling of the argon vessel A according to BNI/WTCC procedure 24590-LAB-BAG-SOM-0001-02-003, a problem was encountered with a stuck open drain valve on the tanker truck. A brief timeout was taken to inform the first line supervisor of the situation. Following the timeout, the vendor attempted to use a long pair of pliers to free the stuck valve, resulting in breaking

of the valve and suspension of the procedure. The potential hazards (e.g., personal injury or catastrophic cryogenic release) from the use of the pliers were discussed with BNI/WTCC personnel at the job site. However, the first line supervisor stated that the vendor is responsible for operating truck equipment and that BNI/WTCC does not direct or supervise vendor operations. (See **OFI-BNI/WTCC-11**.) Additionally, contrary to DOE Order 422.1, attachment 2, requirement 2.b.(2), personnel did not use proper PPE during all work steps in procedure 24590-LAB-BAG-SOM-0001-02-003. Specifically, the two operators and truck driver doffed their PPE before the hose was secured in the truck. During placement of the hose in the truck, a small stream of cryogenic fluid spilled out of the hose near the workers, representing a risk to personal injury (e.g., direct skin contact with cryogenic fluids). A subsequent discussion with WTCC revealed that the tank filling procedure did not specifically address placement of the hose in the truck and allowed personnel to doff their PPE before taking down the barrier tape. (See **Deficiency D-BNI/WTCC-10**.) Not wearing the required PPE could result in worker injury and/or death.

- During an observed walkdown of a planned performance of procedure 24590-WTP-COWP-WC-23-07803, *B83 PCW Motor Lubrication*, a preventive maintenance activity to lubricate a cooling tower fan motor and manually rotate the fan, the foreman explained the planned method for rotating the fan, which had been used previously but was contrary to the job hazard analysis for the job. The foreman delayed the job performance and resolved the issue with Industrial Safety personnel.

Technical Procedures Conclusions

BNI/WTCC has adequately implemented processes for establishing, maintaining, and using written technical operating procedures. However, examples were observed where procedure development and use standards were not followed and could have exposed workers to unanalyzed hazards.

3.17 Operator Aids

This portion of the assessment evaluated BNI/WTCC's practices for managing and using operator aids.

BNI/WTCC has established an adequate process for providing accurate, current, and approved operator aids. Procedure 24590-WTP-GPP-RACO-CO-0017, *Operator Aid*, adequately addresses DOE Order 422.1, attachment 2, requirement 2.q, with instructions for developing and implementing accurate, current, and approved operator aids. Operator aids appropriately receive management approval and serve as necessary and useful conveniences that do not alter or conflict with approved procedures or controlled documents. Additionally, operator aids do not obscure equipment, are administratively controlled, and undergo periodic review for adequacy, continued utility, and correctness. The interviewed personnel were aware of the requirements for operator aids.

While the procedure was adequate, a review of 12 of 22 operator aids associated with LAW, LAB, and BOF revealed the following weaknesses:

- Multiple operator aids in the control room were either not mounted or not in the listed area.
- The issuance of operator aids is not documented in timely orders as required by 24590-WTP-GPP-RACO-CO-0017.
- The interviewed personnel lacked familiarity with the operator aid for shift turnover, as discussed in section 3.12 of this report.

Reviews of program assessments showed that BNI/WTCC self-identified most of these issues in assessment 24590-WTP-SV-OP-23-024, *Line Surveillance of Operator Aids, August 2023*, within the

local issues management system. EA had also previously identified deficiencies in operator aids. The continued presence of these issues indicates that corrective actions have been ineffective.

Operator Aids Conclusions

BNI/WTCC has established an adequate process for providing accurate, current, and approved operator aids. However, BNI/WTCC has not taken adequate measures to ensure that management and personnel comply with the process, including review of operator aids.

3.18 Component Labeling

This portion of the assessment evaluated BNI/WTCC's practices for clear, accurate equipment labeling.

BNI/WTCC has established and implemented an adequate process for equipment labeling. Procedure 24590-WTP-GPP-RACO-CO-0018, *Component Labeling*, adequately addresses the requirements of DOE Order 422.1, attachment 2, requirement 2.r. Procedure 24590-WTP-GPP-RACO-CO-0019 provides further details concerning required information for the various types of temporary labels. Interviewed facility managers and operators were aware of their roles and responsibilities regarding component labeling. In most cases, the observation of facility equipment demonstrated that labels were properly applied, were durable, and contained the required information, enabling facility personnel to accurately identify equipment. Walkdowns of the facility confirmed that valves, instruments, piping, and other SSCs exhibited the appropriate labels. Walkdowns also confirmed adequate maintenance of component labels, ensuring that lost or damaged labels are promptly identified and replaced, and all observed permanent component labels were in good condition.

While many observed component labels and tags were adequate, numerous examples of deficient equipment labeling/tagging were identified, contrary to 24590-WTP-GPP-RACO-CO-0018. (See **Deficiency D-BNI/WTCC-5**.) Inadequate labeling or incomplete facility tags can result in personnel injury, indeterminate status of equipment, and unsafe facility conditions. Specifically:

- During SBS sampling, personnel were observed manipulating the wrong valve. The label used was not permanently affixed to the component or to the other valve in the enclosure. Instead, it was attached to a cover plate above the component that had been removed. See further discussion in section 3.16 of this report.
- Pipes in the steam plant lacked flow-direction indication.
- Labeling for temporary modifications and temporary equipment were not always used, even when left installed between activities.

Component Labeling Conclusions

BNI/WTCC has established and implemented an adequate process for equipment labeling. However, numerous examples of deficient labeling of components were observed.

3.19 Federal Oversight

This portion of the assessment evaluated the adequacy of DOE Hanford's oversight of BNI/WTCC's WTP conduct of operations program implementation, including program oversight and oversight of field activities.

DOE Hanford oversight is performed using DOE-PRO-PAI-50085, *Integrated Oversight*. Facility Representatives (FRs) in the ORP Operations Oversight Division (OOD) provide oversight of WTP facility operations. FR oversight is performed in accordance with DOE-PPD-PAI-51864, *Facility Representative Program*. A new WTP facility-specific FR qualification standard incorporates the change of chemical safety controls from the documented safety analysis to the chemical safety management program (CSMP) and includes CSMP-specific criteria.

FR staffing remains below full staffing levels, but substantial progress is being made toward achieving full staffing. EA reviewed the most recent staffing analyses for OOD, dated November 2022 and December 2023, which were performed in accordance with DOE-STD-1063-2021, *Facility Representatives*. At the time of the 2023 analysis, OOD staffing for WTP was 75% of the analyzed staffing requirements and 50% of the qualified staffing requirement. WTP Federal FRs are supported by four government service support contract staff to ensure adequate oversight of WTP facility operations. In interviews, OOD leadership described plans in place to bring additional FRs on board.

DOE Hanford procedure DOE-PRO-PAI-50085, *Integrated Oversight*, implements DOE Order 226.1B, *Implementation of Department of Energy Oversight Policy*. Interviews and a review of a sample of oversight documents demonstrated that DOE Hanford periodically reviews elements of BNI/WTCC's conduct of operations program. OOD assessment planning is fluid, using more reactive assessments than scheduled activities. This reactive nature of oversight planning was previously discussed in EA report *Independent Assessment of Safety Management Program Development at the Hanford Site Low-Activity Waste Facility, August 2022*. (See **OFI-DOE Hanford-1**.)

Oversight results are entered into DOE Hanford's integrated oversight system (IOS) as operational awareness activities, surveillances, or assessments in accordance with DOE-PRO-PAI-50085. Once performed, the results of these reviews are documented as required in the integrated Contractor Assurance System (iCAS) and transmitted to BNI/WTCC for action as appropriate.

Federal Oversight Conclusions

DOE Hanford provides generally effective oversight of BNI/WTCC's conduct of operations program implementation. Continued attention to staffing and qualification of oversight personnel is warranted, particularly for operations oversight as WTP facilities begin high-hazard operations.

4.0 BEST PRACTICES

No best practices were identified during this assessment.

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 has not established and implemented operations practices that ensure accurate, unambiguous communications by providing adequate communications systems for emergency and normal operations and ensuring that all personnel are promptly notified of facility emergencies. (DOE Order 422.1, att. 2, requirement 2.d, and 24590-WTP-GPP-RACO-CO-0004)

Finding F-BNI/WTCC-2: BNI/WTCC has not established and implemented operating practices for the control of interrelated processes. (DOE Order 422.1, att. 2, requirement 2.m)

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 has not "[a]nnually or more frequently, set auditable, measurable, realistic, and challenging safety, environmental, and operations goals" or "developed action plans to achieve" those goals. (24590-WTP-GPP-RACO-CO-0001, secs. 6.1.3.d and 6.1.3.e)

Deficiency D-BNI/WTCC-2: BNI/WTCC did not complete an event notification ("heads up") for a procedural violation or personnel error with actual or potential personnel injury, facility damage, or facility safety degradation. (DOE Order 422.1, att. 2, requirement 2.g, and 24590-WTP-GPP-RAOP-OR-0001, att. 2, *Conduct of Operations Events* section)

Deficiency D-BNI/WTCC-3: BNI/WTCC did not generate a fire impairment for fire door L-0226-1, which was known to be deficient. (NFPA 80 and 24590-WTP-GPP-RAFP-FP-0002)

Deficiency D-BNI/WTCC-4: BNI/WTCC did not complete two required quarterly LOTO surveillances in 2022, three required quarterly LOTO surveillances in 2023, and the annual LOTO audit in 2023. (DOE Order 422.1, att. 2, requirement 2.i, and 24590-WTP-GPP-RAOP-OP-0032, sec. 6.1.6)

Deficiency D-BNI/WTCC-5: BNI/WTCC does not ensure that all tag information is verified to be legible and complete. (DOE Order 422.1, att. 2, requirements 2.i.(2) and 2.r; 24590-WTP-GPP-RACO-CO-0019, sec. 6.3.4.d; and 24590-WTP-GPP-RACO-CO-0018)

Deficiency D-BNI/WTCC-6: BNI/WTCC plant personnel did not report a situation that may have required a caution tag as required by procedure. (DOE Order 422.1, att. 2, requirement 2.i.(2), and 24590-WTP-GPP-RACO-CO-0019, sec. 6.2.1)

Deficiency D-BNI/WTCC-7: The BNI/WTCC required reading log and records exhibit sporadic review and inadequate recordkeeping. (DOE Order 422.1, att. 2, requirement 2.n, and 24590-WTP-GPP-RACO-CO-0014)

Deficiency D-BNI/WTCC-8: BNI/WTCC is not documenting reviews of shift and standing orders as having been performed. (DOE Order 422.1, att. 2, requirement 2.o, and 24590-WTP-GPP-RACO-CO-0015)

Deficiency D-BNI/WTCC-9: BNI/WTCC operators did not perform work in accordance with procedures. (DOE Order 422.1, att. 2, requirement 2.p; 24590-WTP-GPP-RACO-CO-0016; and 24590-WTP-COWP-WC-23-05123)

Deficiency D-BNI/WTCC-10: BNI/WTCC did not ensure that personnel wore the required PPE during all work steps in procedure 24590-LAB-BAG-SOM-0001-02-003. (DOE Order 422.1, att. 2, requirement 2.b.(2))

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 adding the positions of Day Shift SOM and Deputy SOM to 24590-WTP-GPP-RACO-CO-0001, including specifics on the division of roles and responsibilities.

OFI-BNI/WTCC-2: Consider developing a suite of metrics or key performance indicators to measure operational safety and quality performance to augment existing measures of compliance and project milestones.

OFI-BNI/WTCC-3: Consider adding the weekly status list, which details the activities completed or in progress from the previous week, to the SOM turnover procedure and retaining the document as a record.

OFI-BNI/WTCC-4: Consider providing operators with timely orders, procedure revisions, and other notifications via eSOMS, rather than verbally or on paper, to ensure delivery to the appropriate audience and access to the information when needed.

OFI-BNI/WTCC-5: Consider providing additional training to first line supervisors and SOMs on the "heads up" notification process and associated timeliness guidelines.

OFI-BNI/WTCC-6: Consider performing a 100% field audit of all tags to ensure that tags are legible and not truncated.

OFI-BNI/WTCC-7: Consider developing a strategy to evaluate all hanging plant tags prior to the operational readiness review.

OFI-BNI/WTCC-8: Consider developing a requirement to evaluate situations where the "as found" calibration readings are out of specification.

OFI-BNI/WTCC-9: Consider requiring the presence of assigned mid-shift relief personnel during turnover to ensure communication of facility status information and to facilitate effective mid-shift relief.

OFI-BNI/WTCC-10: Consider revising requirements for timely orders to ensure that any procedures being implemented by the timely order are appropriately referenced and periodically verified.

OFI-BNI/WTCC-11: Consider whether there should be additional training or procedural guidance for BNI/WTCC employees to address situations where a potential unsafe act by a vendor could result in an adverse impact to worker safety, the environment, or the public.

DOE Hanford

OFI-DOE Hanford-1: Consider scheduling oversight activities on a proactive basis and correspondingly updating those activities as facility testing completes and commissioning schedules solidify.

Appendix A
Supplemental Information

Dates of Assessment

February 12 – March 7, 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
Kimberly G. Nelson, Director, Office of Worker Safety and Health Assessments
Jack E. Winston, Director, Office of Emergency Management Assessments
Brent L. Jones, Director, Office of Nuclear Engineering and Safety Basis Assessments

Quality Review Board

William F. West, Advisor
Kevin G. Kilp, Chair
Christopher E. McFearin
Shannon L. Holman
William A. Eckroade

EA Site Lead for Hanford Site

Eric A. Ruesch

EA Assessment Team

Eric A. Ruesch, Lead
Brannen J. Adkins
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Frank A. Inzirillo
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