

**Independent Oversight Review of the
Sodium Bearing Waste Treatment Project-
Integrated Waste Treatment Unit Contractor
Operational Readiness Review**



June 2012

**Office of Safety and Emergency Management Evaluations
Office of Enforcement and Oversight
Office of Health, Safety and Security
U.S. Department of Energy**

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Acronyms

C-ORR	Contractor Operational Readiness Review
CR	Core Requirement
CRAD	Criteria, Review, and Approach Document
CRO	Control Room Operator
CRR	Carbon Reduction Reformer
CWI	CH2M-WG Idaho, LLC
DMR	Denitration Mineralization Reformer
DOE	U.S. Department of Energy
DSA	Documented Safety Analysis
EAL	Emergency Action Level
ECC	Emergency Communications Center
EOC	Emergency Operations Center
FM	Factory Mutual
GAC	Granulated Activated Carbon
HEPA	High Efficiency Particulate Air
HSS	Office of Health, Safety and Security
ICP	Idaho Cleanup Project
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IP	Implementation Plan
IVR	Implementation Verification Review
IWTU	Integrated Waste Treatment Unit
LCO	Limiting Condition for Operation
LSS	Life Safety Systems
MSA	Management Self-Assessment
OFI	Opportunity for Improvement
ORR	Operational Readiness Review
OSO	Outside Support Operator
POA	Plan of Action
SAC	Specific Administrative Control
SAR	Safety Analysis Report
SBWTP	Sodium Bearing Waste Treatment Project
SMP	Safety Management Program
SSC	Structures, Systems, and Components
SSIS	Safety-Significant Instrumented System
STD	Standard
TSR	Technical Safety Requirement
UK	United Kingdom

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1.0 PURPOSE

This report documents the U.S. Department of Energy (DOE) Office of Enforcement and Oversight (Independent Oversight), within the Office of Health, Safety and Security (HSS), independent review of the Sodium Bearing Waste Treatment Project-Integrated Waste Treatment Unit (SBWTP-IWTU) contractor Operational Readiness Review (C-ORR). The review was performed by the HSS Office of Safety and Emergency Management Evaluations and was intended to assess the effectiveness of the C-ORR process as implemented for the SBWTP-IWTU. This review also provides additional data regarding verification processes for the implementation of safety bases and safety basis controls at the Idaho Site.

The review was conducted at the Idaho Site from February 27 to March 6, 2012. This report discusses the background, scope, results, and conclusions of the review, as well as opportunities for improvement (OFIs) and items identified for further follow-up by HSS.

2.0 BACKGROUND

Activities and operations at the Idaho Site are divided into two primary contracts: the Idaho National Laboratory (INL) and the Idaho Cleanup Project (ICP). The DOE Idaho Operations Office provides direction and oversight for the design and operation of INL and ICP nuclear facilities for the DOE Headquarters Offices of Nuclear Energy (NE) and Environmental Management (EM), respectively. Included in the scope of the ICP are the Idaho Nuclear Technology and Engineering Center (INTEC) and the SBWTP-IWTU. Currently, the primary contractor responsible for the management and operation of INTEC and SBWTP-IWTU, as well as most other ICP facilities, is CH2M-WG Idaho, LLC (CWI).

DOE Order 425.1D, *Verification of Readiness to Startup or Restart Nuclear Facilities*, specifies the conditions and circumstances under which a readiness review is required as part of a new nuclear facility startup process. DOE Standard (STD) 3006-2010, *Planning and Conducting Readiness Reviews*, provides standardized methods and approaches for planning and conducting such readiness reviews that are applicable to both contractors and DOE. DOE-STD-3006-2010 describes acceptable methods for meeting the requirements of DOE Order 425.1D, one of which is for the responsible contractor to perform an operational readiness review (ORR) of the new facility, followed by the DOE's ORR. DOE-STD-3006-2010 provides additional guidance regarding the steps necessary to carry out these successive reviews. Because the SBWTP-IWTU will be a newly started nuclear facility, both DOE Order 425.1D and DOE-STD-3006-2010 are applicable, and CWI is the contractor responsible for coordinating and executing an ORR in advance of DOE.

In accordance with the guidance of DOE-STD-3006-2010, the CWI C-ORR team made their approved plan of action (POA) effective on February 14, 2011. After completing a management self-assessment (MSA) on November 2, 2011, CWI line management prepared a formal Readiness to Proceed Memorandum and issued it to DOE line management on February 27, 2012, thereby indicating that all prerequisites identified in the POA had been met. On February 27, 2012, the CWI C-ORR team began carrying out their review in accordance with their implementation plan (IP); the C-ORR was completed on March 9, 2012.

3.0 SCOPE

The Independent Oversight program comprises one element of DOE's multi-faceted approach to oversight, as described in DOE Policy 226.1, *Department of Energy Oversight Policy*. Effective oversight, including independent oversight, of DOE Federal and contractor operations is an integral part of the Department's responsibility as a self-regulating agency to provide assurance of its safety and security posture to its leadership, its workers, and the public. The Independent Oversight program is designed to enhance DOE safety and security programs by providing DOE and contractor managers, Congress, and other stakeholders with an independent evaluation of the adequacy of DOE policy and requirements and the effectiveness of DOE and contractor line management performance in safety and security and other critical functions as directed by the Secretary. DOE Order 227.1, *Independent Oversight Program*, defines the Independent Oversight program, which HSS is responsible for implementing.

Commensurate with the purpose of DOE Order 227.1, HSS Independent Oversight assessed the performance of the C-ORR by evaluating the activities the C-ORR team used to determine how and to what degree SBWTP-IWTU met the Core Requirements (CRs), as set forth by DOE Order 425.1D and implemented through their approved POA and IP. By choosing a sampling of these CRs and conducting "shadow" oversight of the C-ORR team as they performed their review, Independent Oversight was able to compare the C-ORR team's methods to DOE Order 425.1D requirements and DOE-STD-3006-2010 guidance. In addition, the existence of any gaps between what Independent Oversight observed or found, and the C-ORR team's observations and findings, was independently assessed.

Also as a part of this review, Independent Oversight collected data regarding how this ORR process, as carried out by the contractor, contributes to verifying appropriate implementation of safety basis controls. In September of 2011, Independent Oversight conducted an appraisal of the Idaho Site contractor and Federal IVR processes, which examined the extent to which such processes have been developed and employed; that effort was the first phase of a two part targeted review. The targeted IVR review examines Idaho Site IVR processes in the context of DOE Guide 423.1-1A, *Implementation Guide for Use in Developing Technical Safety Requirements*, Appendix D, *Performance of Implementation Verification Reviews (IVRs) of Safety Basis Controls*. The data collected during this review will be used as input to Phase 2 of the Independent Oversight report documenting that effort. Phase 2 of the IVR independent review, planned for later this year, will focus on Objectives 3 through 6 of criteria, review, and approach document (CRAD) HSS CRAD 45-39, Rev. 1, *Implementation Verification Review of Safety Basis Hazard Controls: Inspection Criteria, Activities, and Lines of Inquiry*.

4.0 RESULTS

The following sections discuss the observations made by Independent Oversight during its review of the C-ORR process. As noted above, Independent Oversight assessed the C-ORR in accordance with the requirements of DOE Order 425.1D, the guidance of DOE-STD-3006-2010, and other best practices, as implemented through their approved POA and IP.

In preparing for the startup and the C-ORR, CWI completed an extensive safety basis implementation plan using FRM-579, *ICP Project Change Implementation Strategy*, to guide the implementation, including an internal independent verification of completion. As required by the CWI startup procedure, preparations for the C-ORR included the conduct of an MSA. The MSA plan contained sufficiently detailed objectives, criteria, and tasks to verify the readiness of the facility's personnel, procedures, and equipment for operation and satisfied the C-ORR prerequisites. The plan included review of safety

management programs and selected functional support areas, training of personnel, and verification of objective evidence for the tasks supporting the MSA evaluation criteria. Management review boards were used to confirm completion of the tasks. The plan also included one week of operation under the conditions expected during a readiness review.

The MSA was conducted in parallel with startup preparation activities. To ensure early identification of issues, the MSA began in August 2011 with an estimated duration of three months. The MSA included observation of performance of all the surveillance tests. The initial operational performance review, conducted in November 2011, identified a significant number of pre-start findings. CWI also identified a number of engineering issues requiring resolution during the system startup and testing phase. The MSA pre-start findings were subsequently closed, and an additional evaluation of plant operations was conducted in February 2012. The MSA was completed the week before the C-ORR began, and the MSA final report was issued during the corporate review.

The C-ORR was completed in accordance with the scope and depth identified in the approved POA (PLN-3485). Appropriately, the POA included each core requirements specified in DOE Order 425.1D, as well as a significant list of prerequisites (at least one for each core requirement) for the C-ORR. The C-ORR team used a suitably detailed IP, which contained an adequate scope and depth, added an objective to address the startup test program, and involved an extensive set of CRADs. The C-ORR team members, including a team leader, a senior advisor, and 14 subject matter experts, were very experienced, included a number of members with previous readiness review experience, and had an appropriate level of technical expertise and qualification. The C-ORR schedule also included a significant number of operational activities, comprising nearly all of the operations that could be performed in the facility's current status, several operational drills, an emergency drill, maintenance activities, and surveillance tests. The C-ORR team's POA and IP were thorough and well-documented. However, the review approach used sampling to verify the implementation of safety basis hazard controls, including both engineered controls and specific administrative controls (SACs), rather than a complete review of the surveillance test procedures.

Independent Oversight conducted oversight of the C-ORR team by shadowing and observing a number of operational activities, including those related to operations, fire protection, radiation protection, and safety basis hazard control implementation. The following sections summarize Independent Oversight's observations in the context of the C-ORR POA CRs that the observed activity was intended to address.

CR 1: Safety Management Program (SMP)-Radiological Protection

The C-ORR assessment of the SBWTP-IWTU radiological protection SMP included the observation of various work evolutions that required coverage by facility radiation control personnel. Independent Oversight shadowed the C-ORR team while they observed many of these evolutions, including the continuous air monitor check, various drills, and high efficiency particulate air (HEPA) prefilter replacement. The C-ORR concluded that the SBWTP-IWTU radiological protection objective was partially met. This conclusion was largely due to various deficiencies in the conduct of outside support operators (OSOs) and radiation control technicians, as well as the execution of simulated radiological work. Independent Oversight observed the improper use of airlocks, persistently out-of-service radiation monitoring equipment, and inconsistent survey practices. The C-ORR team noted these same shortcomings, which led, in part, to a C-ORR pre-start finding. Independent Oversight agrees with the pre-start finding identified by the C-ORR team.

The C-ORR team did not commit the expected effort to reviewing PLN-3657, *IWTU Shielding Integrity Examination*, Rev. 1, its implementation, and associated reports (e.g., RPT-996, *IWTU-Shielding Integrity Examination*, Rev. 0). To address inconsistencies between the as-built structures and the original

shielding design, the SBWTP-IWTU project did considerable work to evaluate and disposition deficiencies in the facility shielding; Independent Oversight considered a careful and complete independent review of this effort to be important to ensuring that the radiological protection program will adequately protect workers once the source term is introduced to the facility. The C-ORR team did, however, review the MSA evaluation of this shielding re-verification effort and interview MSA team members regarding this issue.

CR 1: SMP-Maintenance

The C-ORR asked to observe the fire systems being tested, since there were no scheduled maintenance evolutions to demonstrate this type of work. The annual system test of the fire alarm pull stations, TEM-62, was selected and performed by the Life Safety Systems (LSS) group, who are responsible for the inspection, testing, and maintenance of the fire protection systems for SBWTP-IWTU. The LSS technicians were familiar with the procedure and building fire systems. LSS demonstrated a high level of knowledge and competence during the system testing, as indicated by their responses to questions from the C-ORR evaluator. Areas for improvement identified by the C-ORR involved notifying facility occupants regarding the disabling of the fire alarm system before the test, and performing steps out of sequence. One criterion that was not documented in the procedure or recognized by the C-ORR evaluator during this evolution was the verification of the time for the fire alarm signal to be received at the offsite monitoring station, as required by the National Fire Protection Association. Independent Oversight conveyed this information to the DOE management team, and the procedure was later revised to address this issue.

CR 1: SMP-Fire Protection

The C-ORR readiness assessment plan identified key documents for the SBWTP-IWTU project to be reviewed to evaluate implementation of the fire protection program. These documents included TSR-100, *ICP Standardized Technical Safety Requirements (TSR) Document*, Rev. 7, AC 5.100.6, Section H, TSR-219, *Technical Safety Requirements for the Integrated Waste Treatment Unit*, and Manual 14a, *Safety & Health-Occupational Safety and Fire Protection*. Several of the fire protection administrative controls were sampled to verify the effectiveness of implementation, including the pre-incident plan, fire barrier inspection, combustible loading, and fire system impairment procedures.

The C-ORR evaluator spent considerable time on the review of the fire barrier program by reviewing completed work packages. The evaluator's view of the program was very positive, recognizing the program as a noteworthy practice.

The C-ORR identified discrepancies in the combustible loading procedure, including the lack of continuity for controls established by the ICP Fire Marshal's review of equipment obstruction to sprinkler spray patterns in limited areas within the building. Independent Oversight identified areas for improvement in the facility's implementation of its approved combustible loading procedure. For example, the procedure did not designate a threshold for combustible loading, and it did not require each permit to quantify the BTU (British Thermal Unit) amounts on each permit so as to determine the severity and thereby define the risk exposure for the facility. Independent Oversight presented this information to the DOE management team, and the procedure was later revised to address the concerns, including specifying when the SBWTP-IWTU fire system engineer would need to approve the combustible loading permit.

During initial facility walkdowns, the C-ORR observed life safety features. The SBWTP-IWTU fire system engineer explained how the project had obtained approvals for the emergency lights to be qualified by a third-party vendor to meet seismic requirements. Although the installation of emergency

lights and exit signage throughout the facility was adequate and met life safety code requirements, the designated egress paths at elevation 205 should have received more attention; personnel accessing this area were exposed to tripping hazards from installed equipment and raised surfaces areas.

Interviews conducted by the C-ORR were well prepared, and effective technical questions were prepared in advance. Appropriate facility people were selected for these interview sessions, including the ICP Fire Marshal, fire protection system engineer, and fire system technicians. Independent Oversight notes that the entire SBWTP-IWTU facility team associated with the fire protection program demonstrated a great deal of ownership for the program and clearly understood their respective roles and responsibilities. It was evident that considerable work had been invested in the development and implementation of the fire protection program, including a comprehensive MSA that involved the ICP Fire Marshal and the SBWTP-IWTU fire system engineer as team members.

Overall, the C-ORR evaluator demonstrated an effective approach for verifying adequate implementation of the SBWTP-IWTU fire protection program through the use of his technical knowledge, sampling of fire protection procedures, and by demonstrating technical inquisitiveness, as observed during facility walkdowns, interviews, and drills. Several key items were found to be incomplete; these included revising the fire hazard analysis, completing system acceptance of the nitrogen purge for the coal silos, and retesting the Very Early Smoke Detection Apparatus (VESDA) system following the closing of the Denitration Mineralization Reformer (DMR) and Carbon Reduction Reformer (CRR) cells. SBWTP-IWTU has committed to track these items to closure as C-ORR pre-start findings.

CR 5: Industrial Safety and Health (also CR 1: SMP-Industrial Safety)

The C-ORR report recognized a need to mature the safety and health practices as the project continues through to full operation. This statement was consistent with Independent Oversight's observation of several unsafe work practices during facility evolutions and drills. The C-ORR also identified all these unsafe work practices except one, which involved operators climbing under barricades and not having established a designated entrance and exit to a work area.

CR 6: Defined Safety Envelope and Defined Structures Systems, and Components (SSC) & CR 7: Safety SSC Operability Surveillance Program & Verification

The objectives of CRs 6 and 7 are to verify that facility safety documentation is in place to describe the facility's "safety envelope," that the implementation of facility safety documentation has been verified and is current, and that a program is in place to confirm and periodically reconfirm the condition and operability of vital safety systems. Several C-ORR team members accomplished these objectives through a suitable variety of actions, including document reviews, observations of a sample of maintenance/surveillance tests, and interviews. The C-ORR team observed the performance of two safety-significant instrumented system (SSIS) semiannual tests (the instrument proof test and the instrument loop test) for one of the three SSISs in the facility under review. Independent Oversight also observed the two tests. Several C-ORR team members were involved in observing the entire task over a two-day period, but no individual C-ORR team member observed the entire evolution; seeing the test in its entirety was important, since this proved to be a challenging evolution for one of the few safety-significant systems in the facility. (See opportunities for improvement **OFI-1** and **OFI-2**.) Nonetheless, the C-ORR team members were adequately prepared to assess the evolutions that they did observe, and they made critical observations of instrument technician and quality inspector performance. The C-ORR team identified four pre-start findings related to these CRs.

In addition to his review of the fire protection safety management program, the fire protection C-ORR evaluator was responsible for assessing the startup test planning for one safety-significant system and

confirming that CWI had appropriately verified multiple POA prerequisites; however, the evaluator was not specifically assigned to review the safety analysis report (SAR) and TSRs and, possibly as a result, did not extend his review to include the safety functions of the linear detection fire system for the Granulated Activated Carbon (GAC) beds. The nuclear and criticality safety review included a limited review of this system, which resulted in identifying a finding (NCSE-F-001) that was associated with the TSR surveillance for the adsorber bypass valve. Independent Oversight did not observe coordination between the fire protection and nuclear criticality safety C-ORR team evaluators. Coordination between these two reviewers and their respective functional areas could have provided a more detailed and integrated analysis, given the significant amount of technical analysis that was developed for this system. Independent Oversight noted areas for improvement in the technical baseline for the linear detection system. For example, there does not appear to be a technical analysis to support the TSR surveillance crediting the fire system as being operable when two adjoining linear detectors are impaired. Further, EDF-9104, *Granular Activated Carbon Bed Cooling Calculations*, Rev. 0, identifies the fire size that would be detected based on the spacing of the detectors but does not address the credit for the impaired fire detectors.

Independent Oversight found that the overall strategy for mitigating a carbon/coal bed fire was technically sound and appropriate for this hazard, which represents a high risk for the facility. The facility's use of two independent means of fire detection systems (carbon monoxide monitoring and the linear detection system) is consistent with recognized fire protection standards and requirements, including Factory Mutual (FM) data sheets and United Kingdom (UK) standards, both of which are applicable. The contractor recognized that there is limited guidance on effective controls to protect against carbon/coal bed fires, and FM data sheets and the UK standards provide additional insights and lessons learned for dealing with this hazard.

CR 9: Operating Procedures and Safety Limits

The objective of this CR is to ensure that adequate and accurate procedures and safety limits are approved and in place for operating the process systems and utility systems. The C-ORR team reviewed all the key operational procedures, and then scheduled and observed a full suite of the operations that could be performed, including, for example, product vault handling, bell crane operation, liquid transfers, canister filling and handling, and mode changes. Independent Oversight observed that C-ORR team members were well prepared to observe the evolutions, were appropriately positioned to witness important tasks, and made critical observations of operator performance. The C-ORR team identified and discussed a number of issues and observations related to the evolutions. Independent Oversight also observed that the evolutions were generally performed satisfactorily, were conducted in accordance with procedures (though some improvements could be made), and demonstrated the operators' preparation to conduct the startup activities. Operators were found to be very familiar with the operating procedures, well-versed in communications, and prepared to stop work and obtain clarification or direction when encountering questions about procedural steps. Although the C-ORR team observed a large number of operations, they could not observe an important evolution with radiological control implications (movement of a loaded vault to vault storage) because of an equipment problem that developed during the C-ORR.

CR 10: Emergency Response, Management, and Drill Program

This CR is intended to verify that a routine operations drill program and an emergency management drill and exercise program have been established and implemented. The C-ORR team scheduled and observed the conduct and critique of an evaluated emergency preparedness (EP) drill and various other operations drills conducted by SBWTP-IWTU personnel and the INTEC emergency management organization. The observed drills were reasonably well-planned, though the C-ORR team noted that the facility needed to develop and execute a wider variety of drills. The C-ORR did not view the drills as

particularly challenging, believing that the drill scenarios could be expanded to include other elements of facility operations. Independent Oversight concurs with these views.

GAC Fire Drill

The C-ORR observed several weaknesses during this drill, including operator knowledge of the manual deluge valve for the GAC fire suppression system and the interface with the fire department. The C-ORR team considered that the fire department's use of a hammer on a break-away lock is not an acceptable solution to access the locked deluge valve, due to the potential that the fire department could damage other fire system components in the process. Because this equipment supports the safe operation of a safety-significant system, Independent Oversight agrees with this observation.

Independent Oversight found the C-ORR team's review of the operations drill to be very deliberate and focused, revealing a high level of scrutiny intended to ensure that all aspects of the drill were evaluated using a balanced approach. Similarly, the C-ORR process for the review of the drill performance and facility grading was very thorough and effective. Minor observations made by Independent Oversight that were not identified by the C-ORR included the fact that the alarm response procedure for a fire in the GAC (EAR-284) did not indicate the valve number for the OSO to operate the manual deluge system for the GAC and did not verify that the "ABZ" drain valves from the HEPA are open and water is draining to the collection tank. Independent Oversight later discussed this information with the DOE management team.

Emergency Preparedness Drill

The EP drill involved response to a nitric acid spill and injured person. The C-ORR team observed the drill from several venues, including the facility control room, the incident scene, and the emergency communications center (ECC). Independent Oversight observers were stationed at the incident scene, the ECC, and the emergency operations center (EOC). Overall, the C-ORR team's observation and assessment of the evaluated drill were satisfactory, though some improvements could be made. For example, C-ORR team observers should be given specific actions to observe and evaluate based on their assigned positions; also, as manpower permitted, the EOC activities should have been observed by the C-ORR team. The INTEC and C-ORR teams' determination that the drill performance was satisfactory may be appropriate, but both the C-ORR team and Independent Oversight observed a significant number of weaknesses that indicated a less than mature emergency program. Problems with communicating and executing a change in protective actions during the drill were not identified in either the INTEC or C-ORR team evaluations, and a number of performance issues were identified at the incident command post. Further, the C-ORR report did not capture that EOC Consequence Assessment was not used for its intended purpose – i.e., to independently confirm the ECC's selection of protective measures, which are based on emergency action levels (EALs). As observed by Independent Oversight, EOC Consequence Assessment did calculate accident releases and confirm protective measures, and the ECC did base the selection of protective measures on EALs; however, this information was not effectively communicated between the EOC and ECC.

5.0 CONCLUSIONS

Overall, the C-ORR was executed as planned by an experienced, critical C-ORR team that followed the approved POA and IP. The C-ORR team observed a significant number of work activities and was well prepared to evaluate the observed evolutions. The degree of rigor applied to the C-ORR was appropriate for the initial startup of a one-of-a-kind process, and the assessment results are properly documented in both a detailed outbrief and final report. The findings and recommendations are well documented, and,

for the most part, designation of findings is adequately justified. Nevertheless, though a contractor-led, independent verification review and an MSA were performed in preparation for the C-ORR, the C-ORR pre-start findings indicate that implementation of the safety basis controls was not yet complete at the time that the C-ORR began. Also, the C-ORR IP included only a sample of the important maintenance and surveillance tests for the SSISs. Because SBWTP-IWTU has very few safety-significant systems, Independent Oversight concluded that a full review of each safety-significant system and its associated surveillance procedures would have been appropriate to include in the C-ORR IP. It is possible that by prescribing a two-week review time frame, the guidance expressed in DOE-STD-3006-2010, Section 8.5, *Contractor Operational Readiness Reviews*, places undue constraint on the optimal execution of the ORR.

6.0 OPPORTUNITIES FOR IMPROVEMENT

The C-ORR was executed by an experienced team and with an appropriate degree of rigor. However, this Independent Oversight review identified the following opportunities for improvement (OFIs) when conducting future ORRs. These potential enhancements are not intended to be prescriptive or mandatory. Rather, they are offered to the site to be reviewed and evaluated by the responsible line management organizations and accepted, rejected, or modified as appropriate, in accordance with site-specific program objectives and priorities.

OFI-1: Independent Oversight believes that whenever appropriate, a C-ORR should observe a complete vertical slice of as many safety-class and safety-significant system surveillances and calibrations as possible.

With regard to the safety basis core requirement, DOE-STD-3006-2010, Appendix 3, *READINESS REVIEW WRITING GUIDE*, provides useful guidance for completing a well-sampled review. In part, page 3-21 offers the following:

Note: A vertical slice of at least two safety-related functions should be subject to comprehensive evaluation, from the identified hazard through implementation of the selected control. In addition, in conjunction with the Maintenance functional area, at least two SSCs will be subject to a vertical slice, from determination of the safety function, required surveillances and calibrations, development of the TSRs and subsequent procedures, and the records of accomplishment determining that the SSCs were operable. If the selected safety functions involve SACs, those also should be subject to the vertical slice approach to ensure they are appropriate and adequately implemented.

OFI-2: For implementation of a new safety basis, the scope of the readiness review should be founded on an evaluation of the previously conducted implementation reviews and adjusted when there are indications that the verification process was not fully effective.

7.0 FOLLOW-UP ITEMS

This assessment identified two items for follow-up by Independent Oversight:

- Continue to maintain awareness of the ORR process for the SBWTP. To this end, Independent Oversight shadowed the DOE ORR that began on March 26, 2012. Independent Oversight will produce a report to document that assessment.
- Examine DOE-STD-3006-2010 and associated policies regarding ORRs to determine whether

improvements can be made, specifically with respect to the timing and prescribed time of completion for such reviews. To this end, the HSS lead for developing readiness review guidance was contacted and intends to discuss expectations for ORR timing at the next ORR Workshop.

Appendix A Supplemental Information

Dates of Review

Onsite Review: February 27 – March 6, 2012

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Appendix B
Documents Reviewed and Interviews and Work Evolutions Shadowed

Documents/Records Reviewed

- PLN-3485, Contractor Operational Readiness Review Plan of Action for the Integrated Waste Treatment Unit, Rev. 2, 2/11
- RPT-761, IWTU-Shielding Verification Review, Rev. 0, 10/10
- PLN-3657, IWTU Shielding Integrity Examination, Rev. 1, 5/11/11
- SDD-235, IWTU-Shielded Cells and Radiation Control, Rev. 3, 10/13/11
- RPT-996, IWTU-Shielding Integrity Examination, Rev. 0, 2/11
- MSA Task RP 1.1.1, Radiological Control Design Review, 8/23/11
- EDF-10253, IWTU Engineering Evaluation of Radiological Shielding Integrity Examination Results, Rev. 1, 2/12
- Integrated Waste Treatment Unit Contractor Operational Readiness Review Implementation Plan, Rev. 1, 2/12
- CCN 313202, Memorandum from William Lloyd to Frank McCoy; Subject: Readiness to Proceed Memorandum, 2/27/12
- TPR-7912, IWTU – Product Vault Handling, Rev. 9, 2/12
- TPR-7926, IWTU – Bell Crane Operation, Rev. 4, 2/12
- TPR-7915, IWTU – Liquid Transfers, Rev. 6, 2/12 (with Document Field Change 129304)
- TPR-7905, IWTU – Normal Operations, Rev. 3, 2/12
- TPR-7911, IWTU – Canister Filling and Handling, Rev. 6, 2/12
- IWTUDR09, Operations Drill Guide: Respond to a TSR/LCO [Limiting Condition of Operation] Scenario, 3/12
- IWTUDR01, Operations Drill Guide: Respond to a GAC Bed Fire, 3/12
- INTED.D.006, ORR Emergency Response Evaluated Drill, Rev. 1, 3/12
- MWO 00640179 01, Perform Proof Test on SSIS2, High Temperature Protection System, 3/12
- DDS-1064, Configuration Data Sheet for IWTU SIF-2
- PLN-3722, Management Self-Assessment Plan for Startup of the Integrated Waste Treatment Unit, Rev. 4, 11/11
- Report of the CWI Contractor Operational Readiness Review for Initial Startup of the Integrated Waste Treatment Unit (Conducted February 27 – March 9, 2012), 3/15/12
- SAR-219, Documented Safety Analysis for the Integrated Waste Treatment Unit, Rev. 3
- TSR-219, Technical Safety Requirements for the Integrated Waste Treatment Unit, Rev. 0
- Safety Evaluation Report for the Documented Safety Analysis and Technical Safety Requirements (SAR-219 Rev. 3 and TSR-219 Rev. 0) for the Integrated Waste Treatment Unit (CPP-1696) at the Idaho Nuclear Technology and Engineering Center, 2/11
- TSR-100, ICP Standardized Technical Safety Requirements (TSR) Document, Rev. 7
- SAR-100, ICP Standardized Safety Analysis Report (SAR) Chapters, Rev. 8, 12/10
- MCP-1519, ICP Projects Requirement Change Implementation, Rev. 8, 7/11
- FRM-579, Integrated Waste Treatment Unit Safety Basis Implementation
- The Annual PM on IWTU 1696 Manual Fire Alarms
- TSR-100, Rev.7, ICP Standardized Technical Safety Requirements (TSR) Document
- EAR – 283, IWTU – Abnormal Condition Response, Rev, 4
- EAR – 284, IWTU – Alarm Response, Rev, 10
- EAR – 285, IWTU – Emergency Response, Rev, 6
- IWTU Manageable List of Open Items, Rev 2

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- CPP- 1696 (Pre Fire Plan), 12-24-20122
- TSR-100, ICP Standardized Safety Requirements (TSR) Document , Rev 7
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- Linear Heat Detector Analysis for Placement on IWTU GAC Vessels, EDF-9239, Rev 0
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- PLN-3350, IWTU Startup Plan, Rev 6
- TPR-7906, IWTU – Shutdown, Rev 3
- TPR-7904, IWTU- Receiving and Adding Bed Material, Rev 3
- INL/INT-10-12550, INL Fire Department Emergency Response Baseline Needs Assessment, Rev 1
- TPR-7904, IWTU Training, OSO Final OJT [On-the-Job Training] Checklist, Rev 00
- Integrated Waste Treatment Unit, Granular Activated Carbon Bed Cooling Calculations, EDF-9104, Rev 0
- Coal and Charcoal Storage, FM Property Loss Prevention Data Sheets, 8-10, 2003
- Structural Evaluation of IWTU GAC Vessel Under Postulated Fire Conditions, EDF-9008, Rev 2
- Critical Spare Parts List for the Integrated Treatment Unit Project, EDF-10184, Rev 0

Interviews (Observed C-ORR Team)

- Cognizant System Engineer (SIF)
- Process System Engineer
- Environment, Safety, and Health Manager

Demonstrations (Observed C-ORR Team)

- C-ORR Team Meetings
- Vault Movement from the Product Storage Building to the Load Station
- Operator Rounds and Surveillances
- Canister Placement into Cell 0 using the Transfer Bell Crane
- Emergency Management Evaluated Drill – Nitric Acid Spill
- Simulated Transfer from the New Waste Calcining Facility to the Integrated Waste Treatment Unit
- Transfer Product from the Off-Gas Filter and Process Gas Filter to the Product Receiver Cooler
- Canister Filling
- Operations Drill: Respond to a TSR/LCO Scenario (Linear Heat Detector Fault)
- Operations Drill: Respond to a Granular Activated Carbon Bed Fire
- High Temperature Protection System Proof Test on SSIS 2