Independent Oversight Targeted Review of the Safety Significant Confinement Ventilation System and Review of Federal Assurance Capability at the Plutonium Finishing Plant

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Office of Environment, Safety and Health Assessments
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Acronyms

ALARA	As Low As Reasonably Achievable
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Plan
CARB	Corrective Action Review Board
CAS	Condition Assessment Survey
CFR	Code of Federal Regulations
CHPRC	CH2M Hill Plateau Remediation Company
CM	Corrective Maintenance
CR	Condition Report
CRAD	Criteria, Review and Approach Document
CRRS	Condition Reporting and Resolution System
CSE	Cognizant System Engineer
CVS	Confinement Ventilation System
CY	Calendar Year
DA	Design Authority
D&D	Deactivation and Decommissioning
DF	Design Feature
DNFSB	Defense Nuclear Facilities Safety Board
DOE	U.S. Department of Energy
dP	Differential Pressure
DSA	Documented Safety Analysis
EM	Environmental Management
EMP	Enhanced Maintenance Plan
ESRB	Executive Safety Review Board
FR	Facility Representative
FY	Fiscal Year
HEPA	High Efficiency Particulate Air
HRB	Hazard Review Board
HSS	Office of Health, Safety and Security
HVAC	Heating, Ventilation, and Air Conditioning
IA	Independent Assessment
IEA	Independent Enterprise Assessments
ISM	Integrated Safety Management
ISMS	Integrated Safety Management System
JCI	Johnson Controls, Inc.
JCS	Job Control System
LCO	Limiting Condition of Operation
MA	Management Assessment
MOA	Memorandum of Agreement
MOP	Management Observation Program
NCO	Nuclear Chemical Operator
NMMP	Nuclear Maintenance Management Program
NSPEB	Nuclear Safety Performance Evaluation Board
OA	Operational Awareness
OOD	Operations Oversight Division
OFI	Opportunity for Improvement
Pdm	Predictive Maintenance
PFP	Plutonium Finishing Plant
PM	Preventive Maintenance

QA	Quality Assurance
RITS	Richland Issue Tracking System
RL	Richland Operations Office
SAC	Specific Administrative Control
S/CI	Suspect/Counterfeit Item
SDD	System Design Description
SE	System Engineer
SEPM	System Engineer Program Manager
SHR	System Health Report
SME	Subject Matter Expert
SMP	Safety Management Program
SOE	Stationary Operating Engineers
SOM	Shift Operations Manager
SR	Surveillance Requirement
SS	Safety Significant
SSC	Structures, Systems, and Components
SSO	Safety System Oversight
SSW	Senior Supervisory Watch
TSR	Technical Safety Requirement
USQ	Unreviewed Safety Question
VSS	Vital Safety System
WD	Work Document
w.g.	Water Gauge
WSA	Work Site Assessment

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1.0 PURPOSE

The U.S. Department of Energy (DOE) Office of Independent Enterprise Assessments (IEA) was established in May 2014 and assumed responsibility for managing the Department's Independent Oversight Program from the Department's former Office of Health, Safety and Security (HSS). Prior to creation of IEA, HSS conducted an independent review of the safety significant (SS) Confinement Ventilation System (CVS) at the Plutonium Finishing Plant (PFP). Located at the Hanford Site, PFP is operated by CH2M Hill Plateau Remediation Company (CHPRC) under contract to the U.S. Department of Energy Office of Environmental Management (EM) Richland Operations Office (RL). Independent Oversight also reviewed the performance of DOE oversight, as appropriate, to provide input for its evaluation of the effectiveness of the Federal assurance capability. This Independent Oversight review was performed on site from February 3-13, 2014.

2.0 SCOPE

This targeted review of management of safety systems evaluated the effectiveness of processes for operating, maintaining, and overseeing the performance of a selected safety system at PFP, specifically the safety significant Confinement Ventilation System (System 25A). The review consisted of an evaluation of the procedures and processes used to demonstrate ongoing operability and reliability of the systems and specific evaluation of the implementation of those procedures and processes for a sample of components within those systems. The review focused on the implementation of PFP's safety basis as it relates to the SS CVS (System 25A); the review did not evaluate the adequacy of the documented safety analysis (DSA). Independent Oversight also evaluated the effectiveness of DOE safety system oversight (SSO) and the effectiveness of the Federal assurance capability. Key observations and elements from this review are presented in Section 5.0.

Selected objectives and criteria from the following sections of HSS Criteria, Review and Approach Document (CRAD) 45-11, Revision 3, *Safety Systems Inspection Criteria, Approach, and Lines of Inquiry*, were used to define the scope of this targeted review:

IV. Maintenance
V. Surveillance and Testing
VI. Operations
VII. Cognizant System Engineer and Safety System Oversight
VIII. Safety System Feedback and Improvement.

This review also evaluated the effectiveness of both the contractor and field office programs in managing and maintaining safety system performance. The review team used the following criteria from HSS CRAD 45-21, Revision 1, *Feedback and Continuous Improvement Inspection Criteria and Approach – DOE Field Element*, to collect and analyze data on field office oversight activities for evaluation of the effectiveness of the Federal assurance capability:

- DOE Field Element Line Management Oversight Inspection Criteria 1-6
- DOE Field Element Facility Representative Program Inspection Criteria.

3.0 BACKGROUND

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 of Energy. The Independent Oversight program is described in and governed by DOE Order 227.1B, *Independent Oversight Program*, and a comprehensive set of internal protocols, operating practices, inspectors' guides, and process guides.

In a memorandum from the Chief Health, Safety and Security Officer to DOE senior line management dated November 6, 2012; HSS identified "Safety Class or Safety Significant Structures, Systems and Components" as an Independent Oversight targeted review area for 2013. The memorandum also stated that the areas would be further defined in associated Independent Oversight review plans. In addition, the memorandum stated that the performance of DOE oversight would be evaluated during the targeted reviews to provide input to the overall evaluation of DOE's Federal assurance capability. The review of safety systems will cover several DOE sites to ensure that Independent Oversight has sufficient information to provide insights into DOE-wide performance. When all the selected DOE sites have been reviewed, Independent Oversight will prepare a report summarizing the conclusions of the assessment regarding the overall status of safety system management throughout the DOE complex, common issues, and lessons learned.

Independent Oversight selected the PFP CVS as the SS system to be evaluated during this review. The CVS identified in the DSA and the Technical Safety Requirements (TSR) is also known as the Heating, Ventilation, and Air Conditioning (HVAC) System (System 25A). The HVAC system provides the building confinement ventilation safety function for certain PFP buildings (234-5Z, 236-Z, and 242-Z). The HVAC function is essential for accident consequence mitigation and has an active role in lowering the source term from an accidental release of radioactive material. The function of active confinement components is supported by various Structures, Systems, and Components (SSC) within System 25A. These SSC are identified as either active Engineered Safety Features or passive Design Features (DF) within the DSA and TSR.

Although the review focused primarily on the SS CVS, Independent Oversight considered additional systems during field observations as necessary to obtain a clearer perspective for evaluating implementation of some of the CRADs.

4.0 METHODOLOGY

Independent Oversight completed the targeted review through detailed document reviews and an onsite review of contractor safety system engineering, operations, maintenance, and feedback and improvement activities; system material condition; and field office oversight of the selected safety class and/or SS system. The review included observation of contractor and/or field office personnel during facility walkthroughs, safety system walk downs, maintenance work package workability walk downs, surveillance tests, and contractor assessments or observations of maintenance on the safety system. The Independent Oversight team also performed detailed reviews of documentation associated with completed surveillance tests, assessments of safety system performance, and maintenance history for the selected safety system. To evaluate contractor and field element feedback and improvement processes, Independent Oversight also reviewed development, implementation, and evaluation of corrective actions and dissemination and review of program and process documents; interviewed responsible managers and staff; and evaluated samples of process outputs, such as assessment reports, issues management

documentation, trend and performance indicator reports, incident and event analysis reports, and lessons-learned publications.

The targeted review process was divided into several stages, including onsite and offsite planning, onsite data gathering activities, report writing, validation, and review. Planning included discussions with responsible site personnel, determination of the details of safety systems to be reviewed, scheduling of the review, collection of applicable site procedures and documents, and document reviews. After the onsite data collection period, a draft independent review report identifying overall perspectives, deficiencies, and opportunities for improvement (OFIs) was prepared and made available to line management for review and feedback. Finally, the results of the review were briefed to key managers, consistent with site needs.

5.0 RESULTS

5.1 CHPRC Maintenance

The overarching objective for the maintenance programs is:

Objective: Maintenance activities are properly planned, scheduled, and performed to ensure that safety systems can reliably perform their intended safety functions when required.

Overall, the reviewed CHPRC NMMP and implementing procedures applicable to PFP were found to be consistent with the requirements of DOE Order 433.1B and 430.1B, and adequate to maintain acceptable levels of CVS operability, availability, and reliability. Further, observed performance and reviewed procedures, WDs, and records demonstrated a strong maintenance program with no significant performance problems. The observed PFP maintenance activities were properly planned, scheduled, and performed. The PM program for the PFP HVAC is generally effective, and the backlogs of both CM and PM activities for SS SSCs are maintained at acceptably low levels. OFIs were identified in assuring the availability of SSC maintenance histories, acknowledging the existence of significant work record feedback where appropriate, expanding the scope of allowed work in certain WDs, and ensuring acknowledgement of TSRs constraints on the allowed scope of planned maintenance activities.

Independent Oversight reviewed selected elements of the CHPRC maintenance program in detail. These included: plans and programs; corrective, preventive, and predictive maintenance; periodic inspections; maintenance configuration control and conduct; and procurement processes, including provisions for precluding introduction of suspect or counterfeit items (S/CIs). These elements are discussed in more detail in the following subsections and the specific criteria that were evaluated are also provided.

Nuclear Maintenance Management Plan and Program

Criterion: The safety system is included in the nuclear facility maintenance management program and the DOE approved Nuclear Maintenance Management Plan required by DOE Order 433.1B, and is maintained in a condition that ensures its integrity, operability, and reliability.

PFP is currently involved in facility deactivation and decommissioning (D&D) activities with planned completion in fiscal year (FY) 2016. Maintenance of SS SSCs is adequately addressed in the DOE-approved CHPRC nuclear maintenance management program (NMMP), *Nuclear Maintenance Management Program* (*NMMP Description Document, PRC-MP-MN-40443*, in accordance with DOE Order 433.1B, *Maintenance Management Program for DOE Nuclear Facilities*). The NMMP also

supports compliance with DOE Order 430.1B, *Real Property Asset Management*, as it relates to maintenance of those assets. The NNMP references and is supported by multiple implementing procedures. Each of the following implementing procedures was reviewed against the approved NMMP and found to be acceptable:

- PRC-PRO-WKM-12115, *Work Management* – This procedure adequately identifies the roles, responsibilities, processes, requirements, and expectations for work management at CHPRC facilities. Work planning, scheduling, and execution are conducted using a graded approach with two forms of work instructions and four priority levels. According to the procedure, long form work instructions, versus short form, require detailed work instructions and are used for activities that are not skill-based, involve a temporary change or facility modification, affect Safety Class or SS Systems, Structures or Components (SSCs), contain Hold Points or Limiting Condition for Operation (LCO) entry/exit instructions, require or implement Specific Administrative Controls (SACs), or involve intrusive troubleshooting. Priority Level 1 work packages require immediate use of resources to prevent imminent danger to personnel, an environmental release, damage to plant equipment, or restore conditions to those required in the Safety Basis.

- PRC-PRO-EN-2001, *Facility Modification Package Process* – This procedure adequately identifies the responsibilities and process for developing, approving, and assembling the release for work documentation packages; procurement of required equipment and components; and providing engineering support for field work and necessary changes of modification packages.

- PRC-PRO-WKM-079, *Job Hazard Analysis* - This procedure adequately defines the expectation and responsibilities for performing job hazard analysis and establishes the minimum requirements for integrating activity-based job hazard analysis into all field work. The job hazard analysis process is used to identify, evaluate, control, and communicate potential hazards and environmental impacts relative to discrete work activities/tasks to be performed.

- PRC-PRO-WKM-40004, *Hazard Review Board* - This procedure adequately defines the expectation and responsibilities for screening planned work activities to identify those work activities (particularly complex, high-hazard tasks) that could benefit from the Project Hazard Review Board (HRB) process. The HRB process provides a method for reviewing the adequacy of planned safety measures to be implemented for select work activities. HRBs are convened to promote positive contributions toward performing work safely and provide an opportunity for the project management team to demonstrate their standards and expectations towards work instructions, and for personnel who lead the work activities.

- PRC-PRO-MN-19304, *Periodic Maintenance Process* - This procedure adequately describes the CHPRC periodic maintenance program. The procedure defines the responsibilities and processes for establishing the periodic maintenance need, determining the performance frequency, developing the work instructions, implementing the periodic maintenance activity, responding to out of tolerance results, extending the performance period, periodic review of the program, and making necessary program changes.

- PRC-PRO-WKM-14047, *Pre-Job Briefings and Post-Job Reviews* - This procedure adequately establishes the expectation and assigns responsibilities for performing formal (documented) and informal pre-job and post-job reviews. It affirms that pre-job briefings and post-job reviews are fundamental to the PFP implementation of the integrated safety management system (ISMS).

- PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items* – This procedure adequately establishes the responsibilities and processes for minimizing the introduction of and identifying, documenting, dispositioning, reporting, controlling, and disposing of suspect/counterfeit items (S/CIs) and defective items.

- PRC-PRO-QA-246, *Management Assessment* - This procedure assigns the responsibilities and the processes to plan, perform, and report the performance of management assessment (MA) activities.

- PRC-PRO-MN-35415, *Real Property Asset Management Maintenance* - This procedure defines the process for assessing and maintaining the condition of assets in a manner that promotes operational safety, worker health, environmental compliance, property preservation and cost-effectiveness while meeting the program missions. It defines the requirements for conducting Condition Assessment Surveys (CASs), inputting and reconciling results in the Condition Assessment Information System, identifying needed maintenance, and uploading deferred maintenance information into DOE's Facility Information Management System.

DOE Order 433.1B recognizes maintenance as a safety management program (SMP) in accordance with 10 CFR 830.204. Chapter 3 of the PFP D&D DSA, HNF- 15500, Revision 8, identifies the SMPs for the PFP, including the programs for initial testing, surveillance, and maintenance. The DSA indicates that the facility maintenance program establishes a balance between corrective and preventive maintenance (PM) that provides a high degree of confidence that aging facility equipment is identified and corrected, that equipment life is optimized, and that the maintenance program is optimized. The DSA appropriately identifies the key elements of the program pertaining to safety SSCs. Specifically, it requires identification of safety SSCs or other vital safety systems (VSSs) in the nuclear facility safety basis, periodic inspections for aging and obsolescence, configuration management, and a maintenance prioritization process to ensure system operability, availability and reliability.

TSR Section 5.9, "Safety Management Programs," adequately indicates that "Initial Testing, In-Service Surveillance, and Maintenance," are SMPs. In accordance with TSR requirements, the overall safety function of the SMPs must be maintained through the implementation of all applicable key attributes of the SMPs. Further, PFP management must ensure facility-level assessments are performed as required by the continuous improvement process of the ISMS, and that data from the facility-level ISMS assessments will be provided to the appropriate program manager for tracking and trending, and corrective action management.

Corrective, Preventive and Predictive Maintenance

Criterion: Maintenance processes for the system are in place for corrective, preventive, and predictive maintenance and to manage the maintenance backlog; and the processes are consistent with the system's safety classification.

The computer based Job Control System (JCS) properly contains the work document (WD) records of the corrective, preventive, and predictive maintenance (Pdm) and modification activities performed on PFP SSCs. However, retrieving complete maintenance histories from the JCS for SS HVAC components proved troublesome, particularly because of the sheer volume of records, the multiple components frequently maintained by individual repetitive use WDs, some WDs not associated with all the equipment that was worked upon, and WDs not entered into JCS during the period of transition from transcribing and scanning the documents. Recognizing the need for this information, engineering developed a maintenance history listing for each exhaust fan through the end of FY2012 by reviewing JCS WDs. (See **OFI Maint-1.**)

Independent Oversight review of a System 25 Component Results List demonstrated that the JCS properly contained the required Master Equipment List. Review of the System 25 System Design Description (SDD) also confirmed it contained the System 25 Safety Equipment List, which identifies the SS SSCs associated with the HVAC supply and exhaust fans, high efficiency particulate air (HEPA) filters, dampers, and support components.

A search of a JCS database printout revealed that many corrective maintenance (CM) and PM work packages were generated and implemented for the SS HVAC system within the last three years. Reviewed WDs were generally limited to corrective and PM and required surveillances. PFP has not invested significant effort in Pdm and given the limited remaining life of PFP, this decision is sound.

Periodic Inspections

Criterion: The system is periodically inspected in accordance with maintenance requirements.

The operating condition of PFP HVAC equipment is routinely assessed during operator rounds (as discussed further in Section 5.3). Periodic testing and surveillances of safety related HVAC equipment required by the PFP TSR is appropriately scheduled, performed and the results reviewed as discussed in Section 5.2. The HVAC system engineers (SEs) periodically inspect PFP System 25 SSCs during routine walk downs and develop quarterly system health reports. Further, SEs must document walk downs at least quarterly in their system notebooks and Condition Reporting and Resolution System (CRRS) documents must be written to address identified problems (see Section 5.4 for more information on system notebooks). In addition, Condition Assessment Surveys of the PFP facilities including the condition of the HVAC are appropriately scheduled, conducted, assessed and documented at least annually.

Maintenance Configuration Control and Conduct of Maintenance

Criterion: Maintenance activities associated with the system, including work control, post-maintenance testing, material procurement and handling, and control and calibration of test equipment, are formally controlled to ensure that changes are not inadvertently introduced, the system fulfills its requirements, and that system performance is not compromised.

To evaluate the implementation of the maintenance program, Independent Oversight reviewed six recently completed maintenance packages (WDs), including one maintenance package with work completed and awaiting final closeout, and one maintenance package in the initial stages of planning to evaluate implementation of the program. Five were for CM, two for PM, and one for Pdm although listed as a PM. The latter Pdm implements a requirement of the DOE approved Enhance Maintenance Program for the PFP CVS that was imposed after the catastrophic failure in August 2011 of an exhaust fan that had exceeded its planned operational life.

Generally the packages conformed to the CHPRC maintenance and work control program requirements. All packages except the reviewed maintenance package in planning (Repair SS Fire Barriers) involved essential CVS equipment. All reviewed WDs included the appropriate forms, i.e., Pre-Job Briefing Checklist, Worksite Hazard Analysis, Unreviewed Safety Question (USQ) Nuclear Safety Screening, Technical Procedure, Work Record, etc. As permitted by PRC-PRO-WKM-40004, *Hazard Review Board*, and PRC-PRO-WKM-14047, *Pre-Job Briefings and Post-Job Reviews*, only one of the reviewed WDs had been deemed sufficiently complex and hazardous to warrant a prior HRB review and a formal post-as low as reasonably achievable (ALARA)/ post-job review. The remaining reviewed WDs included required hazard analysis and control documentation (Radiological Work Permits, Worksite Hazard

Analyses, Congested Area Checklists, Confined Space Entry Permits, Lock Outs/Tag Outs, etc.), the results of which were appropriately addressed in the included pre-job briefing checklists.

The only reviewed example of a formal post-ALARA/ post-job review involved replacement of aged HEPA filters, provided thorough work activity feedback, and included review and approval signatures by both a radiological planner and a JCS representative. Although PRC-PRO-WKM-14047, *Pre-Job Briefings and Post-Job Reviews,* recognizes the importance of post-job feedback to the integrated safety management (ISM) process (Section 1.2 of the procedure states that the "… process is a fundamental element for the ISMS core function of feedback and continuous improvement at the activity level. Formal and informal feedback shall be used to discuss work performance, identify needed corrections, and communicate opportunities to improve the planning and safe execution of the work process"), it did not require a formal post-job review for the other reviewed WDs. Despite clear narrative in each work record documenting worker experiences, challenges, and recommendations for implementing the reviewed WDs, approved WD-Post Work Review sections did not appropriately acknowledge that "Work Record Feedback Exists." (See **OFI Maint-2.**)

Work Document 2Z-13-03100 was written to support repetitive adjustments, repairs, or replacements of the electrically driven exhaust fan components (fans, motors, and inlet dampers). It specifies that the work package was not to be used for troubleshooting, replacement of the fans as a whole, or for modifications. Contrary to the defined scope of this Work Document it was used on 12/13/2013 for replacement/inspection of an EF-7 Fan Bearing. Inspection is not specifically called out as an authorized activity and could be viewed as a form of troubleshooting. (See **OFI Maint-3.**)

Work Document 2Z-13-09078, *(PM-EM) 12M 291-Z EF-2 through EF-9 Impeller Inspection. PFP-MN-52738*, allows stopping all electric supply and exhaust fans, relying instead on use of the two turbine driven emergency exhaust fans to provide the necessary HVAC and confinement ventilation negative pressure gradient. TSR 3.2.1, Confinement Ventilation, Action B, "Normal ventilation exhaust provided by 291-Z electric exhaust fans has been lost," requires the electric fans to be restored or a recovery plan to be initiated within 8 hours. The Electric exhaust fans were secured on 2/6/2014 and remained secured well past the 8 hour window. Although the Shift Operations Manager (SOM) log appropriately identified the WD as the required recovery plan, as was the PFP practice of referencing the WD for embedded resolution/retest requirements, the PM section titled "Tech. Spec/OSR Requirements Reference" stated "N/A" versus TSR 3.2.1. (See **OFI Maint-4.**)

Ongoing work activities were observed during the review and compared to maintenance program procedures to evaluate adherence to the program. Assessed activities included work planning, pre-job briefings, post maintenance testing, and post-job reviews. Independent Oversight followed the performance of Work Document 2Z-13-09078 involved in setting up and inspecting the CVS exhaust fan impellers to the extent allowable by the creation of an airborne radioactive area once a fan hatch was opened. The pre-job briefing discussions, coordination of lock-out/tag-out activities, and sequencing of work activities between involved staffs during performance of the work were effective. The results of the inspections, which included new but not unexpected potential crack indications, were documented and recorded on film for subsequent review and follow-up. Independent Oversight concluded that the assessed activities were appropriately conducted. Plans to address the identified CVS exhaust fan conditions were under development at the end of Independent Oversight's review.

PRC-PRO-WKM-14047, *Pre-Job Briefings and Post-Job Reviews,* establishes the expectation that each job will include an informal (routine) or formal (documented) pre-job review. The level of risk, complexity, and familiarity of the work team with an activity is used to determine the amount of detail and formality required. Independent Oversight observed two pre-job briefings, which were thorough and addressed the work to be conducted; the hazards associated with the job; and the controls that would be

used to control those hazards. Worker involvement and participation in the briefings were noted to be a strength and a positive indication of employee/worker engagement at PFP. All reviewed completed work packages had a documented pre-job review, and pre-job meetings with involved staff and these meetings were observed by Independent Oversight to be effective

Work planners are required to use PRC-GD-WKM-12116, *Work Planning Guide*, to develop requested Work Documents (WDs). Independent Oversight observed an "early group Team Work Planning session" designed to gather baseline information to support planning of a "Long Form, Repetitive Use" WD for "Repair Safety Significant Fire Barriers." The purpose of planning a Repetitive Use WD was to provide a procedure that enveloped the majority of safety and regulatory requirements that could be invoked by the Partial Release process with minimal additions necessary for individual fire barrier challenges. The Guide recommends using the Team Work Planning process to bring together the various field workers, regulatory and support functions, technical authority, and supervision into the work planning function. The Guide indicates that for complex work, the Team Work Planning process must be invoked as early in the planning effort as possible to help define the scope and sequence of work and facilitate the understanding of the work by all parties involved. The session was scheduled on the Plan of the Day and lead by the assigned planner, involved appropriate participants and safety organization representatives, included reading a draft of the WD, and then a planner lead discussion of the rationale for the WD steps and sequence. The planner also used the planning team session to determine whether the WD should be developed as skill based or as more complex work, and to walk through the Automated Job Hazard Analysis computer input. Discussion from the participants was observed and included the appropriate level and content of questions and recommendations and overall, demonstrated the value of the team planning process.

CHPRC publishes a monthly Contractor Assurance System report that includes PFP work management, corrective and PM performance metrics and assessments. The latest available report (December 2013) rated PFP Work Planning, Work Performance, and Hazard Control Development and Implementation less than adequate against established CHPRC goals. The report also documents various PFP maintenance statistics, including overdue and extended PMs, CM backlog, and timeliness of closure of work packages (i.e., less than or greater than 30 days). The 4th Quarter FY2014 PFP System 25 System Health Report (SHR) shows an improving trend in PM packages, with three overdue PM packages, none of which were believed to impact system operations, operability, or essential equipment availability. The SHR also showed that thirteen System 25 CM packages were open at the end of the 4th Quarter, up from eleven in the previous quarter. Although many of the corrective and PM packages were ready to work, implementation priority competes with ongoing D&D work needs and availability of specific craft resources.

Procurement and Suspect/Counterfeit Items

Criterion: Requirements are established for procurement and verification of items and services. Processes are established and implemented that ensure that approved suppliers continue to provide acceptable items and services.

An adequate set of requirements has been established for procurement and verification of items and services**.** PRC-PRO-AC-40478, *Procurement of Materials*, defines the process for procuring quality level materials to support planned maintenance and modifications. PRC-PRO-AC-123, *Requesting Materials or Services*, defines the process for procuring non-commercial materials and fabrication services. PRC-PRO-EN-129, *Controlling Spare Parts Inventory*, provides the process for the identification, review and approval, procurement, and inventory management of spare parts and spare equipment. Interviews with the System 25 SEs and review of program documents confirmed that the SEs are responsible for ensuring that adequate number and types of spare parts are established in inventory to maintain HVAC operability,

reliability, and availability through inventory of the identified parts. The SEs receive weekly System 25 specific reports of spare parts inventories and spare parts reorder analysis. The SEs are tasked with determining what to order and whether the list or quantities of required spare parts need to be revised.

The CHPRC process for ensuring that suspect/counterfeit items (S/CIs) are not introduced into PFP credits certain features of the CHPRC procurement system, including receipt inspection, to screen out and prevent suspect/counterfeit items (S/CIs) from entering and being used in the facility. S/CI training is discussed in the site's S/CI procedure. Section 3.2, Training, of PRC-PRO-QA-301, *Control of Suspect/Counterfeit and Defective Items*, indicates that managers are responsible for ensuring employees complete appropriate S/CI training when placed in job categories that have the potential to identify or make decisions regarding S/CI as part of their normal work scope. This training includes prevention, detection, processing and disposition of S/CIs. Reviewed maintenance and engineering personnel training records confirmed that the required S/CI training has been completed.

Processes for ensuring supplier quality are identified in PRC-PRO-QA-3144, *Supplier Quality Assurance Program Evaluation*, which includes requirements to ensure that approved suppliers continue to provide acceptable items and services. The program requires CHPRC to evaluate the supplier's capability to provide items or services in accordance with the requirements of the procurement documents before awarding a contract and to review the adequacy of supplier performance annually.

5.2 CHPRC Surveillance and Testing

The overarching objective for the surveillance and testing programs is:

Objective: Surveillance and testing activities are properly performed in accordance with TSR Surveillance Requirements (SRs) and Specific Administrative Controls (SACs).

Overall, surveillance and testing activities for the selected CVS were properly performed in accordance with TSR SRs. Surveillance and testing of the system demonstrates that the system is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria. However, inconsistencies occur between SR testing procedures and inclusion of specific acceptance criteria and an apparent discrepancy exists in TSR Section 3.2.1.

Independent Oversight reviewed selected elements of the CHPRC surveillance and testing program in detail. These included: TSR requirements in surveillance procedures, system parameters confirmed by surveillance procedures, adequacy of acceptance criteria, and instrumentation measurement and test equipment. These elements are discussed in more detail in the following subsections and the specific criteria that were evaluated are also provided.

TSR Requirements in Surveillance Procedures

Criterion: Surveillance and testing of the system demonstrates that the system is capable of accomplishing its safety functions and continues to meet applicable system requirements and performance criteria.

The ventilation system is a safety significant system credited in the PFP DSA for source term reduction to lower the dose to the co-located worker. In order to accomplish this function, the system differential pressures must be maintained such that in the event of a postulated accident the system flow is directed from lesser contaminated areas of the plant to increasingly greater contaminated areas and ultimately through a final stage High Efficiency Particulate Air (HEPA) filter. To ensure that the system can reliably perform this function, periodic system condition inspections, HEPA filter tests, and calibration of

alarms and system instrumentation are performed along with daily differential pressure (dP) readings. In addition, an annual engineering evaluation of the Building 234-5Z E-3 and E-4 HEPA filter rooms is performed.

Independent Oversight performed a detailed review of all of the procedures that implement the TSR SRs for the PFP ventilation and found them to properly implement the specific requirements outlined above and provide a framework for demonstrating the system is capable of accomplishing its safety functions. However, a few areas needing improvement were noted.

- Test procedure ZSE-25A-109, *Filter Room Inspection*, performs an inspection on initial installation and once every five years thereafter, to verify no damage, structural distress or degradation has occurred to rooms housing final HEPA filters. Independent Oversight reviewed the procedure and concludes that the procedure directs the performance of an acceptable inspection and includes a review of the results by the assigned system engineer to determine if the inspection results are satisfactory. However, the procedure refers to the 1989 version of the ASME standard (ASME-N510-1989) instead of the 2002 version referenced in the TSR Bases Section (page A 3.2-17). **(See OFI-CH2MHill-Surv&Test-1.)** There has only been one performance of this test within the last 18-months and the results were satisfactory. No filter room inspections were performed during the on-site review.

- The plant ventilation system is divided into multiple zones (1, 3, 3A, 3B, and 4). Each of the zone dPs must be verified daily to ensure proper system operability. The daily dP verifications are performed through operating procedure ZSE-25-101, *Ventilation Zone Pressure Surveillance, System 25*. After detail review of the procedure, Independent Oversight found that the procedure adequately implements the requirements of TSR Section 3.2, Confinement Ventilation. However, the procedure (which is classified as reference use) contained two minor errors. First, section 1.5, TSR Applicability, lists a TSR SR that does not exist (i.e., 3.2.1.4.1.4). This should be SR 3.2.1.5.1.4. Second, the performance section of the procedure (i.e., section 4.5.1) states, *Verify that the 242-Z Zone 3 pressure is at least 0.12 inches w.g. negative with respect to atmospheric pressure as directed by the Shift Operations Manager to satisfy one of the following frequencies.* This is in conflict with TSR SR 3.2.1.5.1.2 which states *VERIFY the pressure differential in 242-Z Zone 3A (Control Room) and Zone 4 (Tank Room) areas*. The performance section step (4.5.1) should refer to Zone 3A and Zone 4 areas versus Zone 3 areas. The data sheets for step 4.5.1 correctly reference the Zone 4 Tank Room but refers to the Control Room as being in Zone 3 instead of Zone 3A. **(See OFI-CH2MHill-Surv&Test-2.)**

- SR procedure ZSE-25A-102, *234-5Z Ventilation System Zone 3 Pressure Control Calibration System 25A*, calibrates the system 25 SSCs associated with 234-5Z Zone 3 implement TSR section 3.2.1 requirements. The procedure includes calibration for Zones 3A and 3B. Independent Oversight review of calibration procedures against SR 3.2.1.5.3 and found the procedures to adequately perform the necessary calibrations to support continued operability of the confinement ventilation function. However, the PFP TSR does not specifically identify Zones 3A and 3B as requiring calibration. **(See OFI-CH2MHill-Surv&Test-3.)**

There are no Specific Administrative Controls (SAC) associated with the PFP HVAC System 25A. However, there is a SAC related to the confinement function credited in the DSA. SAC 5.17.1, Confinement Barrier Door Control Requirements, requires that confinement barrier doors to normally remain closed. When doors are opened to access various areas of PFP, only one door of an airlock door is to be opened at a time. The SAC does allow for certain specific exceptions such as, emergencies or special circumstances with limitations on the types of facility activities that can occur and durations limited to 30 minutes or less. Only one exception is allowed at a time. This helps ensure the integrity of

the confinement barrier to support the confinement function credited in the DSA. This SAC provides an adequate control measure to ensure proper facility configuration is maintained so that the ventilation system can perform its intended function.

Independent Oversight reviewed the SR test packages for the last 18 months preceding the on-site review (30 test packages) for System 25A, Ventilation, and found no issues. All packages were complete and acceptably performed.

The combination of Annual HEPA filter testing, frequent monitoring of zone dPs, annual set point verification and instrument calibration, and annual engineering evaluation of the confinement function provide acceptable assurance of the continued reliability of the confinement ventilation system credited in the DSA for source term reduction. Surveillance and testing activities are properly performed in accordance with TSR Surveillance Requirements and SACs.

System Parameters Confirmed by Surveillance Procedures

Criterion: Surveillance and test procedures confirm that key operating parameters for the overall system and its major components remain within safety basis and operating limits.

The key operating parameters of the CVS 25A are to 1) maintain HEPA filtration efficiencies greater than or equal to those assumed in the DSA (97% for Buildings 234-5Z and 242-Z and 99% for Building 236-Z), 2) maintain proper zone dPs, and 3) properly set and calibrated instruments and recorders to control and monitor system dPs.

SR test procedures have been developed and implemented for each of the credited HEPA filters to ensure adequate Filter efficiency of 99.95%. For example, Technical Procedure ZSE-25A-001, *Aerosol Test of E-4 Filter Room 309*, tests the integrity of the Room 309 Zone 4 final stage HEPA. Independent Oversight performed a detailed review of the aerosol test procedures and found them to be consistent with the industry standard except as noted in the technical justifications for Building 234-5Z.

Proper zone dPs (SRs 3.2.1.5.1.1, 3.2.1.5.1.2, 3.2.1.5.1.4, and 3.2.1.5.1.5) are verified through operating procedure ZSE-25-101, *Ventilation Zone Pressure Surveillance, System 25*. After a detailed review of the procedure, Independent Oversight found that the procedure adequately implements the requirements of TSR Section 3.2, Confinement Ventilation for zone dP verification.

Procedures have also been developed and implemented to verify each of the credited ventilation zone pressure indications and alarm set points and operation of the alarms (e.g., ZSE-25A-102, *234-5Z Ventilation System Zone 3 Pressure Control Calibration System 25A).* These verifications are performed to satisfy SR 3.2.1.5.2 and are performed following annual calibration of credited Zone 3 pressure indications. Independent Oversight reviewed these procedures and determined that they contain proper prerequisites, procedure steps, and return-to-normal to demonstrate that the SSCs are properly functioning.

Annual calibration of credited System 25A instruments and alarms is performed under a number of procedures (e.g., ZSE-25A-106, *Zone 1 to Zone 3 DPI and Recorder Calibration*, for Building 234-5Z and ZSE-25-105, *Calibration Verification of 242-Z dP Gauges*, for building 242-Z). Independent Oversight reviewed these procedures and determined that they were suitable for the calibration of dP gauges. No instrument failures have occurred within the last 3 years, confirming the reliability of the instruments and the validity of annual instrument calibration frequency.

Based on detailed reviews of the surveillance and test procedures described above, Independent Oversight

concluded that the procedures adequately contain and confirm the key operating parameters so that the system is maintained within the safety basis and operating limits.

Adequacy of Acceptance Criteria

Criterion: The acceptance criteria from the surveillance tests used to confirm system operability are consistent with the safety basis.

Most of the SR test procedures for System 25A (Ventilation) include acceptance criteria that is in-line with the safety basis and these test confirm that the system is operable and able to perform as designed. For example, SR 3.2.1.1.1 test procedures for final stage HEPA filter leak testing include the specific TSR stated acceptance criteria of < 0.05%. SR test procedure ZSE-25A-002, *Aerosol Test of E-4 Filter Room 310, 234-5Z System 25A*, Step 4.12.13 states, *If Calculated Percent Penetration (final recorded value)is less than 0.05%, Then Check "Yes" on Data Sheet 6 – TSR Data*. Data Sheet 6 clearly states that TSR acceptable penetration is less than 0.05% which also agrees with TSR SR 3.2.1.1.1.

Independent Oversight reviewed each of the SR procedures and found the procedures were adequate to verify that TSR criteria have been met except as noted below:

Although the SR procedures contain proper prerequisites, procedure steps, and return-to-normals to demonstrate SSCs are properly functioning, the acceptance criteria being verified is not specifically identified in several procedures. **(See OFI-CHPRC-Surv&Test-4.)**

- SR 3.2.1.1.2 requires visual inspection of the condition and configuration of Building 234-5Z. Most aspects of the TSR acceptance criteria are covered in Steps 4.2 (upstream inlet inspection) and 4.3 (downstream outlet inspection) of implementing procedure ZSE-25A-109, *Filter Room Inspection*. However, the procedure does not fully establish a specific correlation between the TSR specific acceptance criteria in the implementing document, which could create confusion and possible omission of an aspect of the TSR stated acceptance criteria.

- SR 3.2.1.3.1 requires verification of one 234-5Z Zone 4 exhaust HEPA filter room in service, and SR 3.2.1.4.1 requires verification of three 234-5Z Zone 3 exhaust HEPA filter rooms each on a quarterly basis. Operating procedure ZO-060-117, *Power and Ventilation Equipment Surveillance*, implements these SRs. Data Sheet 6 – Required Levels and Available Essential Equipment indicates one Zone 4 and three Zone 3 filter rooms are essential equipment with a reference to SR 3.2.1.3.1 and 3.2.1.4.1. However, the TSR acceptance criteria are not explicitly included in the procedure.

- Step 4.3.30 of SR procedure ZSE-25A-102 records the alarm set point as being in agreement with the M&TE as documented on the applicable PM/S Data Sheet (which is not part of the procedure) instead of specifically identifying the value (e.g., 0.09 inches w.g. for Building 234-5Z Zone 3).

Other inconsistencies were identified in SR procedure ZSE-25A-102 including in Section 1.1 Purpose, which states that *Non-TSR work is identified by NOTES*. No such notation of Non-TSR related equipment calibration and testing could be found. This inconsistency existed in all of the SR testing procedures associated with SR 3.2.1.5.2. In addition, Data Sheet 1 refers to a procedure step (4.11.5b) that does not exist. Step 5.11.5b is the correct reference. (See **OFI-CHPRC-Surv&Test-5.**)

Instrumentation Measurement and Test Equipment

Criterion: Instrumentation and measurement and test equipment for the system are calibrated and maintained.

In each of the calibration and set point verification procedures, listing of required measuring and test equipment (M&TE) is prescribed and verified as being within proper calibration frequency. Independent Oversight found that all credited dP gauges and dP pressure control equipment/alarms were within the specified calibration frequency. Independent Oversight also reviewed CVS instrumentation maintenance history records for the last 5 years and found no adverse trend in CM for this equipment.

As part of field observations during the onsite assessment, Independent Oversight checked the calibration of all credited instrumentation and a sample of M&TE used for instrument calibration and found no issues.

5.3 CHPRC Operations

The overarching objective for operations is:

Objective: Operations are conducted in a manner that ensures the safety systems are available to perform their intended functions when required.

Overall, observed operations were conducted in a manner that ensures the availability of safety systems to perform the intended safety functions when required. Reviewed procedures are technically accurate and complete, and operator training for the CVS is sufficient to meet DOE Order 426.2 except for initial and continuing TSR training. Operators are knowledgeable, exhibit a high level of competence in their knowledge of the safety systems, and their training was up-to-date. However, management attention is needed to correct an operator training deficiency; improvement is needed in shift turnover, operator round, and the use of 3-way communications during normal and emergency operating conditions. In addition, revision to agreements with organizations providing interrelated processes is needed to ensure compliance with DOE Order 422.1 section 2.m.

Within the operations element, Independent Oversight reviewed procedure quality, operations personnel training and knowledge, and conduct of operations. These elements are discussed in more detail in the following subsections and the specific criteria that were evaluated are also provided.

Procedure Quality

Criterion: Procedures are technically accurate to achieve required system performance for normal, abnormal, remote shutdown, and emergency conditions.

PFP operations are conducted 24 hours per day, 7 days a week using operating crews on rotating 12-hour shifts. Each shift is comprised of a SOM, two operators called Stationary Operating Engineers (SOE), one Nuclear Chemical Operator (NCO), and a Radiological Control Technician (RCT). The SOEs operate/control the PFP ventilation system with one SOE always stationed in the PFP control room located on the 3rd floor of PFP (Building 234-5Z). The NCOs are responsible for glovebox operation activities. The SOM is the manager responsible for operational activities in all areas of PFP and authorizes the start of work activities occurring during the shift.

Independent Oversight reviewed the set of operating procedures for the PFP ventilation system and found these procedures are technically accurate to achieve required system performance for normal and

emergency operating conditions. There are no procedures designated as abnormal or remote shutdown procedures applicable to PFP. Two key operating procedures govern the normal operation of the PFP ventilation system. ZO-060-102, *Shutdown and Start Up 236-Z/234-5Z Normal Ventilation System,* provides detailed instructions to start the 236-Z/234-5Z ventilation system from a reduced flow condition, including starting fan sequence and control system checks. This procedure also provides instructions for the proper shut down sequence to maintain building zone negative pressures. This procedure is used for start-up and both planned and controlled shut down of ventilation system. The procedure is technically effective in maintaining proper zone dPs and the overall flow through HEPA filtration and out the 291-Z stack. However, a few sections of the procedures contain unnumbered action steps, which are important to the successful performance of the procedure: (See **OFI-CHPRC-Ops-1,**)

- Section 4.5, Start Up Ventilation (Two Turbines Running), contains approximately seven un-numbered action steps prior to the first numbered step (4.5.1).

- Section 4.6, Start Up Ventilation (One Turbine Running), also contains approximately seven un-numbered action steps prior to the first numbered step (4.6.2); also there is no step numbered 4.6.1.

The second normal operating instruction for System 25A is ZO-060-100, *Operate Ventilation Controls*. This procedure is a *Reference Use* procedure relied upon for normal operation of the ventilation system from the Power Control Room in Building 234-5Z. The procedure guides the operators in switching between the automatic and manual settings of the pressure controller to control zone pressures. Turbine exhaust fan operation is also covered in the event that a turbine is out of service and the SOM must direct one-turbine operation. In addition, the procedure addresses starting and stopping supply and exhaust fans in various configurations. This procedure provides adequate direction for normal ventilation control. However, the complexity of the procedure and ensuring that the proper section of the procedure is entered indicates that the procedure should be re-categorized as a continuous use procedure.

ZSE-25-101, *Ventilation Zone Pressure Surveillance, System 25*, is a procedure used anytime the SOM wants to verify that building zone pressures are within TSR specifications, or following maintenance work that could affect system zone pressures. It is also used to meet TSR zone pressure verification SRs.

PFP has four alarm response procedures related to ventilation included on Alarm Panels F, J, K, and L. The procedures are appropriately categorized as Continuous Use and discuss any automatic actions that occur upon reaching the alarm set point. The procedures identify operator actions, expected indications, and possible causes for each alarm. Those alarms related to TSR compliance are appropriately identified and include the specific TSR LCO section related to the alarm/condition. Independent Oversight reviewed each procedure and found them to provide adequate responses to associated ventilation alarms.

Two Emergency Response procedures are related to the ventilation system. The first is *Loss of Building Automatic Pressure Control* (ZPR-019) and the second is *Loss of Ventilation* (ZPR-006). These procedures are also categorized as Continuous Use procedures and include appropriate procedure steps/actions to address the respective casualties except as noted below.

PFP operations drill program consists of monthly drills performed by each shift crew including normal operating shifts (A-D) and the permanent day shift crew. Until October 2013, the emergency management organization conducted the drills. The drills are now administered by the operations organization. The drills are scheduled and managed using the PFP Operations *Tickle File* procedure (FSP-PFP-0821 Chapter 19). This procedure guides the implementation of various routine operations tasks that must be accomplished on a scheduled periodicity (e.g., weekly, bi-weekly, monthly, quarterly). The Operations Director must ensure that the items are completed as listed, and has to sign

off on the completed monthly tickle file and approve any deviations for the scheduled items. Independent Oversight reviewed documentation of completed drills for the past year and found no issues.

Three simulated operation drills were conducted at the request of Independent Oversight in the PFP control room. The Independent Oversight reviewer selected the drill scenarios. A day shift SOE conducted the drill scenarios, leaving the on-shift SOE to monitor the actual control panel indications during the drill scenarios. The operations drill coordinator controlled the conditions, and the on-shift SOM participated as needed.

For the first scenario, alarm response for *High/Low Supply Plenum Pressure Alarm,* the SOE went to the correct alarm response procedures, *Alarm Responses for Panel K Alarms* (ZO-060-813) and then to *Respond to Panel J Alarms* (ZO-060-820), but appeared to struggle to follow the procedure step-by-step. Immediately after he was informed that the Low Supply Pressure Alarm was activated, he stated, *I know what this is. It is frost build-up on the inlet screens*. This statement was made even though the procedure listed loss of instrument air as another possible cause for the alarm. (See **OFI-CHPRC-Ops-2.**)

During the middle of the first scenario, the SOE simulated a call to the SOM who was also in the control room at the time. During the simulated call, three-way communication was not used by the SOE to convey alarm information to the SOM and to acknowledge directions from the SOM. (See **OFI-CHPRC-Ops-3.**)

At the conclusion of the first scenario, Independent Oversight and PFP operations personnel discussed operations performance. The above weaknesses were disclosed to and understood by the participants.

The second scenario was the first of two emergency response drills involving Loss of Building Automatic Pressure Control (ZPR-019). In this example, supply and exhaust fans continued to run. The SOE could choose from one of two actions to address the casualty (Option 1 or Option 2) as directed by the SOM. However, the SOE never contacted the SOM to inform him of the casualty (loss of automatic pressure control). (See **OFI-CHPRC-Ops-4.**)

The procedure is laid out based on responsibilities (SOE and SOM), but does not interface between the two sets of actions. During this simulated emergency response drill, the SOE pulled out the correct procedure (ZPR-019) and, after being informed that both supply and exhaust fans were running, went to the correct step where he stated that he would then execute Option 1, shutting down all supply and exhaust fans. He further stated that he would have been uncomfortable performing Option 2, which quickly transfers all pressure controllers from automatic to manual settings. After the scenario, Independent Oversight and PFP operations personnel discussed operations performance. During this scenario, the SOE once again failed to use proper three-way communication. (See **OFI-CHPRC-Ops-3.**)

The third scenario was the modified version of the second scenario (Loss of Building Automatic Pressure Control, ZPR-019), but this time caused by Loss of Ventilation (ZPR-006). The SOE participating in the drill correctly entered procedure ZPR-019, and performed SOE action step 1, which states *If loss of normal ventilation has occurred, then perform ZPR-006, Loss of Ventilation.*

Although the procedure did not specify that the SOE should inform the SOM, the SOE participating in the drill simulated a call to the SOM. The SOM simulated reporting to the control room and began assisting the SOE with the SOE actions listed in ZPR-006, and at one point the two engaged in an unplanned reader-worker approach to executing the SOE actions. At no time during the scenario were effective communications used between the SOE and SOM. As the SOM would read an action, the SOE would perform the action without acknowledging or repeating back the information conveyed by the SOM reading from the procedure. (See **OFI-CHPRC-Ops-3.**)

The alarm and emergency response procedures include the correct actions operators must perform, but fail to address the communications necessary between the SOEs and SOMs that ensure steps are executed consistently as intended. (See **OFI-CHPRC-Ops-4.**)

Operations Personnel Training and Knowledge

Criterion: Operations personnel are trained on procedure use, proper system response, failure modes, and required actions involved in credible accident scenarios in which the system is required to function. Operations personnel are knowledgeable of system design and performance requirements in accordance with the facilities safety basis.

Operations personnel operating the ventilation system 25A receive initial and requalification training every two years. The training consists of core training in ten separate areas including detailed systems training, acronyms and terminology, and operator responsibilities (e.g., watch standing, alarm/emergency response, verbal communication, logkeeping, procedure use). Section 9 of the core training program is entitled *Technical Safety Requirements (TSR).* There are six subsections under TSR and six learning objectives. Each of the learning objectives is mapped into the accompanying qualification card for SOEs. Subsection 9.6, *Training to Technical Safety Requirements,* states that PFP training provides operating personnel with the initial and continuing TSR training in accordance with the requirements specified in FSP-PFP-1121, *Plutonium Finishing Plant Training Administration*. However, a learning objective is not assigned to this section and is not included on the qualification card; the contractor was unable to provide evidence to affirm that the training requirement listed in subsection 9.6 was being implemented. The PFP training administration document (FSP-PFP-1121) mentioned above no longer exists. Although the training requirement is not being implemented, the operators are exposed to DSA and TSR changes as part of the annual update roll-out process. (See **Finding-CHPRC-Ops-1.**)

In addition to core training, the SOEs are qualified through an on-the-job training (OJT) and job performance evaluation (JPE) process. The SOEs are evaluated on 150 OJT items covering every normal alarm response, emergency procedure, and 103 JPEs. The SOEs repeat this qualification card and take a comprehensive written examination every two years. Independent Oversight reviewed the training records for 13 of the 17 SOEs and found that all of the operators were up-to-date with their training and qualification except where noted earlier.

SOMs also complete core training and OJT activities. In addition, they receive initial and continuing training on the PFP TSR. Independent Oversight reviewed the training and qualification records for 4 of 7 SOMs and identified no issues.

The operations staff observed were found to be very knowledgeable of PFP systems, DFs, and failure modes. The failure modes were addressed in alarm and emergency response procedures for the ventilation system, which are included in the initial and continuing training program.

Configuration Control

Criterion: Formal processes have been established to control safety system equipment and system status to ensure proper operational configuration control is maintained in accordance with DOE O 422.1, Conduct of Operations.

CHPRC implements the requirements for controlling safety system equipment and safety system status through PRC-PRO-OP-40122, *Control of Equipment and System Status*. System operating procedures contain a system alignment checklist to guide the operators in establishing correct component positions.

In addition, safety class/SS equipment and systems are functionally tested in accordance with TSR SRs prior to be being placed in service. The PFP ventilation system contains two fixed mechanical dampers; proper system configuration can be monitored using system instrumentation and alarms. Once the systems have been placed into service, a detailed set of operator rounds is performed twice a day to maintain on-going control of equipment and system status. Occasionally, remote air-operated manual dampers require adjustment. These adjustments are directed by the SOM and are documented in the control room log. Independent Oversight reviewed the logbook entries for the period of January 13, 2014 through February 4, 2014, but found no damper adjustments documented for that period. When safety systems are taken out of service for maintenance or testing, corresponding TSR LCO action statements are entered and post-maintenance tests are subsequently performed to re-establish operational requirements.

Independent Oversight evaluated the process used at PFP for TSR SR scheduling and control and found the process to be very effective. PFP has an administrative procedure that contains processes for maintaining compliance with safety basis requirements, FSP-PFP-5-8, 13.3, *Safety Basis Requirements Compliance*. Included in this procedure are requirements to ensure the timely scheduling and execution of TSR surveillances. The process requires the work management database to track the schedule and performance of the SR tests. It also requires that the SOMs track SR completion as part of their turnover checklist. The work control team is further required to promptly update databases to reflect completed TSR compliance procedures. Finally, in order for a SR test to be allowed into the 25% extension period, approval by PFP Operations Manager and concurrence by the Design Authority (DA) is required. A review of the Occurrence Reporting and Processing System database did not find a missed SR test within the last 5 years. Independent Oversight also observed the SOM turnover process and noted that the SR database printout was in the SOM turnover notebook and was covered during each of the three turnovers observed during the onsite assessment.

During the onsite review, Independent Oversight examined other aspects of Conduct of Operations implementation including operator turnover, log keeping, round sheets, and control of interrelated processes. Generally, compliance with DOE Order 422.1, *Conduct of Operations*, was found to be acceptable except as noted below.

Independent Oversight observed control room operator rounds on February 3, 2014. During these operator rounds, the SOE noted that all cooler controllers for PFP supply fans (8) had expired gauge calibrations. Each one expired on 10/10/2013. The operator stated that the readings taken on the controller are red-circled on each of the bi-hourly entries, and they have been red-circled since 10/10/2013, however, no action has been taken to correct the out of calibration condition. Further inquiry by Independent Oversight revealed that the items (which are not SS) were a low priority since the controllers were not required until the outside ambient temperature reached 60 degrees F. Despite the fact that the equipment was not presently needed, calibration lapse of equipment is an unsound practice.

Steam leaks were also identified during the rounds on five of eight supply fans. While the round sheet noted the leak problem, it was not considered an out of specification item on the round sheet and was not red-circled but should have been. Independent Oversight inquired whether the round sheet information was routed to the SE and maintenance for correction. The SOM stated that the first time the condition is red-circled or noted on the round sheet, the SOMs generally send an e-mail to engineering noting the condition. Subsequently, Independent Oversight learned that the SE routinely reviewed the round sheet information. (See **OFI-CHPRC-Ops-5.**)

Independent Oversight observed an additional set of operator rounds on February 4, 2014, which involved rounds outside the control room and the 3rd floor of Building 234-5Z. At one point during the rounds, the SOE inspected the oil level in one of the plant air compressor reservoirs and found it to be low. He

removed the cap and saw that the level was quite low. He obtained the proper oil nearby and refilled the reservoir to a proper level. He then checked the *condition status* of the operating compressor on the shift check as being satisfactory and continued with the checks. The performance of the SOE was discussed with the SOM, who concurred that the item should have been checked as a failed condition and red circled with a remark that the oil level was restored. (See **OFI-CHPRC-Ops-5.**)

The operator turnover is performed using a prepared checklist authorized by the Operations Director. The checklist does not contain key items identified in CHPRC procedure PRC-PRO-OP-28033, *Turnover and Assumption of Responsibilities*, such as review of applicable round sheets and logs. (See **OFI-CHPRC-Ops-6.**)

During an observation of an SOE shift turnover, Independent Oversight noted that the on-coming SOE did not review the SOE log entries or the round sheets from the previous shift. This contradicts PRC-PRO-OP-28033, Step 3.2 which requires on-coming personnel to review *Round sheets from the previous shift* and *Narrative logs from the previous 24 hours or since the last shift on duty*. This procedure is credited in the CHPRC Plateau Conduct of Operations Matrix to comply with DOE Order 422.1, Conduct of Operations, Section 2.l, *Turnover and Assumption of Responsibilities.* (See **OFI-CHPRC-Ops-7.**)

Another issue related to operator turnover was identified where SOEs were completing the turnover and officially assuming the shift from the off-going SOE and then leaving the control room to attend the shift briefing. Independent Oversight identified twelve entries since January 13, 2014 where operators assumed the shift then left the control room to attend the shift brief leaving the control room attended by the off-going operator who had officially turned over that responsibility. The on-coming control room SOE should not assume shift duties until he/she can actually monitor control room conditions. (See **OFI-CHPRC-Ops-7.**)

Independent Oversight further reviewed the PFP Conduct of Operations applicability matrix. The *Plutonium Finishing Plant Closure Project Conduct of Operations Applicability Matrix*, CHPRC-01137, and Revision 1 was issued on May 2, 2013. The purpose of the revision was to address changes from the former DOE Order 5480.19 to the new DOE Order 422.1. The sections covering specific requirement 2.m, *Control of Interrelated Process*, do not address the control of interrelated processes associated with the organizations that operate those interrelated processes. This requirement of DOE Order 422.1 was the only item that substantively changed from the previous Order (DOE Order 5480.19). Specific requirement 2.m under DOE Order 422.1 defines responsibilities for the control of interrelated processes, including those of the nuclear facility operators and the personnel who operate/control the interrelated processes. This requirement establishes responsibilities for both the nuclear facility operators and the personnel operating/controlling interrelated processes to ensure that impacts to the nuclear facility are minimized. This includes defining interrelated processes for each nuclear facility, personnel responsibilities and knowledge, and lines of communication between nuclear operators and interrelated process personnel. The lines of communication between organizations ensure that nuclear facility operations personnel communicate concerns about performance of interrelated processes to those operating/controlling those processes. Most important, these lines of communication are used to communicate any process problems to the affected nuclear facilities in a timely manner so that actions can be taken to prevent adverse effects on facility safety.

Section 2.m has been appropriately addressed for PFP operations personnel. However, the facility has not ensured that organizations operating the interrelated processes have also addressed the requirements of Section 2.m for PFP. For example, one of the interrelated processes (steam) is provided by Johnson Controls, Inc. (JCI). A memorandum of agreement (MOA) is in place between CHPRC Plateau and JCI, but it does not address the requirements of interrelated processes under DOE Order 422.1. JCI is not required to define the responsibilities for their operating staff regarding impacts to PFP related to the

steam supplied by JCI. JCI is not required to provide training to their steam plant operators on how loss of steam affects the systems at PFP. Lastly, the MOA does not address requirements for communication of planned and unplanned steam outages and other steam system upset conditions to PFP operations. (See **OFI-CHPRC-Ops-8.**)

5.4 CHPRC Cognizant System Engineer Program

The overarching objective for the: Cognizant System Engineer (CSE) program is:

Objective: The CSE program and methods are effective in ensuring safety systems can reliably perform as intended.

Overall, the CHPRC System Engineering Program and the reviewed implementing procedures were found to be consistent with the requirements of DOE Order 420.1B. A review of contractor training records documented that all three SEs assigned to the PFP CVS were trained and qualified in accordance with CHPRC System Engineering Program requirements. Further, the reviewed PFP HVAC SE program was well managed and implemented, despite the challenges of maintaining the operability, reliability, and availability of CVS equipment well past its design life. In particular, the performance and demonstrated capabilities of the assigned CVS SEs was noted as a program strength. Although OFIs were identified, no significant performance problems were observed.

Within the CSE element, Independent Oversight reviewed the CSE program, CSE training and qualifications, CSE roles and responsibilities, VSS assessments, and operations and maintenance technical support. The review of these elements is consistent with the inspection activities defined in the safety systems CRAD for the CSE element.

CSE Program

The CHPRC *System Engineer Program*, PRC-PRO-EN-16331, Rev-4 is designed to ensure continued operational readiness of VSSs to meet their safety functional requirements and performance criteria, and is compliant with DOE Order 420.1B, *Facility Safety*. (Although DOE Order 420.1C is the latest revision, it has not yet been incorporated into the PFP contract.)

DOE Order 420.1B requires that "System design basis documentation and supporting documents must be compiled and kept current using formal change control and work control processes…" Further, it requires that "Key design documents must be identified and consolidated to support facility safety basis development and documentation." DOE-STD-3024-98, *Content of System Design Descriptions*, PRC-PRO-EN-20050, *Engineering Configuration Management,* and the SE Program procedure provides guidance on key design documents that should be maintained to support operations, maintenance and configuration management of VSS SSC. FSP-PFP-0848, Rev-1.13, *PFP Engineering Documents Supporting the Safety Basis,* requires an update of each System Description Document in the 4th Quarter of the calendar year (CY). The HVAC SEs revised the System 25 System Description Document (SDD) HNF-SD-CP-SDD-005, *Definition and Means of Maintaining the Ventilation System Confinement Portion of the PFP Safety Envelope,* in February 2014. Although the revised System 25 SDD meets the expected level of content defined in DOE Standards, the update was not timely and the SE Program required VSS reporting table did not specifically assign the SEs responsibility for maintaining the System 25 SDD. (See **OFI SE-1.**)

CSE Training and Qualifications

The PFP CVS is a VSS that is designated by the DSA as SS. DOE Order 420.1B requires SEs to be trained and qualified as required be DOE Order 5480.20A, now replaced by DOE O 426.2, *Personnel Selection, Training, Qualification and Certification Requirements for U.S. Department of Energy Nuclear Facilities.* The SE program requires the assignment of an engineering management approved SE for each VSS that is selected, trained and qualified as required by PRC-PRO-EN-20051, *Engineering Selection, Qualification, and Training.* PFP Engineering has assigned three fully qualified SEs (including one recently qualified SE) for the HVAC VSS. Review of the training records for the HVAC SEs confirmed they were all appropriately selected, trained and qualified and continue to participate in required reading and continuing training.

CSE Roles and Responsibilities

The SE program assigns the SE the role of the VSS DA and the responsibilities for managing the Configuration Baseline, evaluating system status and performance, providing VSS technical support to Operations and Maintenance, maintaining complete cognizance of the assigned system(s), establishing and ensuring adequate VSS spare parts, and authoring and maintaining a SE Notebook, VSS walk down documentation, and the quarterly SHR. A January 2014 revision of the SE Program now requires the SE, with support of the System Engineer Program Manager (SEPM), to perform and document a comprehensive VSS Annual Assessment Report, to be completed by the end of March each year. The SEPM is also required to annually report a summary of the SE program performance, including strengths, weaknesses, and future focus/plans.

The reviewed PFP System 25, HVAC SE Notebook, is well maintained and documented, and serves as an excellent set of references for the SE to use in managing and maintaining the PFP CVS in a state of safe operational readiness. As required by the SE Program procedure, it is organized and contains or references through web links boundary definition documentation, trending plans and results, system walk down reports, operations & maintenance data, SHRs, CRRS documentation, safety basis/regulatory requirements, operating & maintenance procedures, and design/configuration management documentation.

Although effective in many respects, the Independent Oversight review of the HVAC SE Notebook content identified the following concerns:

- The SE program requires performance and documentation in the SE Notebook and in the SHR of at least one VSS walk down per quarter to verify the operational and material status of the system. The Notebook did not include or reference the required documentation of a 4th Quarter FY2013 System 25 walk down. The SHR indicated that a walk down was performed on September 19, 2013, but did not include the information that would normally be expected from a walk down.

- The SE program recommends that the CRRS section of the SE Notebook list all open CRRS items written against any aspect of the VSS or support systems, including the current status of any open action items. The CRRS section of the SE Notebook when originally reviewed contained copies of Non-conformance Reports written against the PFP HVAC system, but did not contain or reference all the other CRRS items written against the HVAC. Many of those other CRRS items were described in the SHR, but did not include those CRRS items closed in previous quarters. Subsequent to identification of this concern, the SE resolved the concern by inserting the CRRS listing from the SHR. (See **OFI SE-2.**)

- The SE program requires that issues identified during field walk downs and occurrences should be processed per PRC-PRO-QA-052, *Issues Management*. However, documentation of the November 19, 2012 HVAC walk down identified deficiencies with proposed SE corrective action, but with no indication the concerns were addressed in Issues Management. (See **OFI SE-3.**)

- The SE program assigns the SE responsibility to maintain the field configuration consistent with the configuration baseline. Documentation of a 12/31/2013 HVAC walk down indicated that the SEs discovered a ventilation modification that was not reflected in configuration baseline documentation. The identified modification involved a 2010 planned temporary addition of a HEPA filter and flexible duct (to support D&D radiological controls) that was connected to an exhaust duct which had previously provided confinement exhaust ventilation for a removed glovebox. The 2010 Work Package used to install the modification was appropriately approved and stated that "This temporary change will be installed for a duration of approximately 2 months." The associated Work Package Engineering (WPE) documentation which defined the planned modification was also appropriately approved, including by a SE who was also a DA, and stated "This change will be tracked as a temporary change and will not be updated on plant configuration drawings; consequently, an FMP (Field Modification Package) is not required." (Although the discovered configuration was not in agreement with configuration managed essential and support drawings, PRC-PRO-EN-20050, *Engineering Configuration Management*, does not require updating essential and support drawings until 30 and 90 days after work completion signoff, respectively.) Further SE review determined the WD used to install the temporary modification had been closed without completing the WD steps that would have removed the temporary modification. The SE immediately initiated a work request in the JCS to perform work to correct the equipment configuration discrepancy and a Condition Report (CR-2014-0023) to document the concern for inappropriate WD closure. The CR concern for closure of the 2010 WD without completing the steps to remove the temporary modification was added to CR-2014-0009, *Adverse Trend Related to Failure to Follow Continuous/Reference Use Technical Work Documents During Field Work*, for the purpose of tracking and closure. Subsequently, the work request initiated by the SE to correct the equipment configuration discrepancy was cancelled, based upon a management determination that the temporary ventilation installation would remain in place with the addition of two additional actions to CR-2014-0023 to support that determination. The two additional actions required closure of an associated ventilation damper and revision of applicable Engineering Drawings to reflect the as-left modification. Further, subsequent review by PFP Nuclear Safety concluded that the approvers of the 2010 Work Package used to install the ventilation modification were correct in concluding the modification did not involve a USQ. Nuclear Safety also concluded that the discovery of the modification did not require entry in to the PISA process. Those conclusions are appropriately based on the PFP safety basis as defined in their D&D DSA that outlines the condition identified by the SEs. CHPRC has not yet determined the actions needed to prevent recurrence of the failure of the SEs to identify the deficiency in configuration management between 12/2010 and 12/2013. Also, entry in the PISA process is warranted when a significant deficiency is identified with a Technical Safety Requirements safety management program (configuration management tracking of temporary modifications). (See **OFI SE-4.**)

Periodic VSS Assessments

The SE must be aware of the overall health of the VSS core and supporting systems and components to ensure that the VSS is capable of operating as designed and as credited by the DSA. The SE program requires the SE to develop and maintain a quarterly SHR in accordance with PRC-STD-EN-40330, *System Health Reports.* The SHR is required to present a concise status of the assigned VSS during the most recent quarter and data from the previous quarters in key performance areas for comparison. This supports system performance trending and identification of issues that require attention. The reviewed 1st Quarter FY2014 PFP System-25 Ventilation System SHR was well documented and very informative,

demonstrated an improving trend in performance, and appropriately identified that many of the major system components are well past their design life, requiring substantial corrective and PM effort to maintain operability. However, the review identified the following concerns:

- HNF-51021**,** *the Enhanced Maintenance Plan (EMP) for the Plutonium Finishing Plant (PFP) Exhaust Fans, Motors, and Steam Driven Turbines in 291 –Z* (EMP*),* was developed and implemented to address safety concerns associated with the operability and reliability of PFP exhaust fans and motors and steam driven turbines following the catastrophic failure of exhaust fan EF- 1 in August 2011**.** The EMP program at PFP was designed to ensure the operability and reliability of the PFP exhaust ventilation equipment for the duration of the PFP Closure Project, currently slated for completion in the late 2015 timeframe. The March 2012 DOE/RL letter approving CHPRC-01637, *Justification for Continued Operation (JCO)-291-Z Exhaust Fan Failure,* contained a condition for approval requiring that quarterly SHRs provide documentation and discussion of vibration and temperature monitoring results. Although both vibration and temperature monitoring was performed, data recorded and graphed, and the results emailed to all the interested parties, as indicated by reviewed e-mail, only the results of vibration monitoring were presented and discussed in the SHR. (See **OFI SE-5.**)

- Reviewed vibration and temperature monitoring data and trends demonstrated their value as Pdm tools. Increasing bearing vibration levels precipitated increased attention, adjustments in alignments, support bolt torque and belt tensioning, lubricant replacement, and bearing replacement, with resulting decrease in vibration levels. Two exhaust fans were also limited to emergency use only based on an increasing bearing vibration trend until maintenance could be performed. Temperature monitoring plots could be enhanced as a PdM tool by plotting the measured bearing temperature, the bearing temperature limit and the differences between measured bearing temperatures and the ambient temperature surrounding the bearing. The plotted difference between the measured bearing temperature and the ambient temperature provides a better indicator of bearing and lubricant condition. (See **OFI SE-6.**)

- The SHR standard requires that the "Design Issues/Life Cycle Recommendations" section of the SHR describe any design issues or deficiencies that are impacting availability or reliability that have not already been addressed in another section of the report, and to list any permanent design modifications that were in progress or completed during the quarter. However, the reviewed 1st Quarter FY2014 SHR did not list the still open permanent modification work package to "Install Adjustable Stops on E-3 Filter Room Dampers." Although the work was completed in December 2013, the work package remains open awaiting completion of the Modification Impact Review that requires a revision to the configuration controlled SDD. (See **OFI SE-7.**)

The SE is responsible for identifying and maintaining spare parts information for the assigned VSS. PRC-PRO-EN-129, *Controlling Spare Parts Inventory*, assigns the SE in the role of the DA the responsibility to identify and maintain a list, define the critical attributes, create the requisitions for initial purchase and replenishment, coordinate the resolution of identified deficiencies and non-conformances, and ensure sufficient inventory of needed spare parts to sustain continued VSS operability, reliability and availability. The SE periodically reviews the VSS spare part inventory against the HNF-5816, *Spare Parts List*. CR-2013-0316 describes inventory deficiencies identified during an SE review, provides appropriate rationale for not replenishing items not currently being procured, and identifies the need to add a vendor to the Evaluated Supplier List to support potential future spare parts procurement actions. Additional details on the roles and responsibilities of the System 25 SEs in maintaining critical spare parts for the CVS are discussed in Section 5.1 of this report.

Operations and Maintenance Technical Support

The sample of PFP System 25 WDs reviewed in assessing the PFP NMMP (see Section 5.1) demonstrated the SEs are actively involved in defining the work, providing technical input to procedure writers and planners, performing pre-implementation and periodic review of WDs and procedures for technical adequacy, reviewing the adequacy of post-maintenance testing, PM, Pdm and surveillance test results, and identifying and addressing configuration management issues.

PRC-PRO-EN-8323, *Management of HEPA Filter Systems*, governs the life-cycle management of High Efficiency Particulate Air filters and their associated CVSs. The procedure assigns the DA responsibility to establish a surveillance program that assures timely identification of declining CVS component performance, evaluates test results, and determines whether additional work actions are necessary (e.g., filter replacement is warranted based on filter dP, flow, etc.), maintains test records, and trends HEPA filter performance data in accordance with an approved trending plan. Technical procedure ZSE-25A-005, *Aerosol Test of E-3 Filter Room 313, System 25A*, describes the in-place system surveillance leak testing of a final HEPA filter required by TSR SR 3.2.1.1.1. Following performance of the test procedure on 2/5/2014, the SE reviewed the resulting data sheets; entered the raw data into a validated computer program for calculating, plotting, and trending dPs, velocity profiles, total and average flows, and percentage penetration; and verified the adequacy of the HEPA filter performance in comparison with established acceptance criteria.

The SE identified a high and increasing temperature on a turbine driven exhaust fan bearing on January 23, 2014, during a short, less than one hour run, while performing a required Exhaust Fan Vibration Spectral Analysis. The SE had previously identified high temperature with this bearing in late November 2013 when the bearing exceeded 180 degrees F while being run and requested maintenance support to resolve a cooling water flow concern. The concern was not pursued in a timely manner until questions were raised about the turbine driven exhaust fan reliability when needed to run for long periods to support shutting down electrically driven exhaust fans to support planned impeller inspection activities. The concern was resolved when troubleshooting identified a water cooling supply valve that was excessively throttled to limit discharges.

Operators reportedly identified a squeaking noise in the vicinity of a running supply fan motor drive. Maintenance was reportedly notified and was expected to initiate troubleshooting; however, the concern was not brought to the attention of the SEs by the operating shift organization in a timely manner. (See **OFI SE-8.**)

The SE Program procedure was revised and became effective on January 22, 2014, establishing new roles/responsibilities and improving alignment with contract requirements in regard to reporting. The revision replaced the requirement for an annual Project Chief Engineer Report with a VSS Annual Assessment Report due by the end of March. Interviewed SEs were aware that the procedure had been revised because it had been added to their required reading list; however, they were not fully aware of the scope of the new expectations, particularly with respect to a new reporting requirement due by the end of March 2014. Further, Independent Oversight found that without reading the old and revised procedure side by side, what and where changes were made was not clear. (See **OFI SE-9.**)

5.5 CHPRC Safety System Feedback and Improvement

The overarching objective for the feedback and improvement programs is:

Objective: Safety System Feedback and Improvement processes are effective in addressing and preventing the recurrence of safety system issues.

Overall, CHPRC has established and implemented mature feedback and improvement programs and implementing procedures that define the elements of an effective performance assurance system. Safety related processes and performance at PFP are continually evaluated both at the company level through functional area program reviews and independent assessments (IAs) and at the project level through management assessments (MAs) and performance assurance personnel reporting to project management. Feedback and improvement processes are described in management plans (program descriptions) for the Assurance System and the ISMS. CHPRC has developed and is implementing formal management plans and procedures for assessment activities, the management of issues and events, lessons learned, and performance monitoring and measures. Knowledgeable, engaged project performance assurance staff provide project management with guidance, oversight, and analytical feedback concerning processes and performance, and communicate project and company assurance activities and results.
Within the safety system feedback and improvement element, Independent Oversight reviewed the assessment program, issues management, event reporting and analysis, performance indicators, and lessons learned processes. The review of these areas is consistent with the inspection criteria and activities defined in the safety systems CRAD for the safety system feedback and improvement element. Independent Oversight assessed each of these areas against the criteria in CRAD 45-11, Section VIII, with a particular focus on the following criteria:

- The contractor's assurance system has processes in place and effectively monitors and evaluates engineering, configuration management, maintenance, surveillance and testing, operations, and operating experience, including the use of performance indicators/measures, allocation of resources and the identification and application of lessons learned.

- Formal processes are in place and effectively implemented to identify and analyze problems and issues (including operational incidents and events) related to engineering, configuration management, maintenance, surveillance and testing, and operations assurance activities and conditions; to identify, track, monitor, and close corrective actions; and to verify the effectiveness of corrective actions.

- Results of engineering, configuration management, maintenance, surveillance and testing, and operations assurance processes for safety systems are periodically analyzed, compiled and, as appropriate, reported or available to DOE line management as part of contract performance evaluation.

Assessment Program

The CHPRC assessment program is described in management plan PRC-MP-QA-40092 is implemented in accordance with a set of company and project level procedures that detail nuclear safety performance evaluation board (NSPEB) assessments, independent assessments, management assessments (MAs), quality assurance surveillances, work site assessments (WSAs), senior supervisor oversight/monitoring, and management observations. Annual assessment schedules are developed and maintained using a structured, risk-based selection process that includes mandatory (directive/regulatory driven) and discretionary assessments. Some level of formal team leader and performer training is required for all assessment-like activities.

Many safety related assessment activities are performed and documented to identify problems and opportunities for continuous improvement at PFP. Safety related processes and performance at the PFP are continuously evaluated at the company level through functional area program reviews and IAs, MAs, and less formal, but documented, WSAs. PFP project staff also conduct MAs and WSAs. Approximately 50 of these formal assessments have been performed annually at PFP by company and project level staff. The NSPEB conducts periodic comprehensive and rigorous assessments of nuclear safety related

functional areas at each CHPRC project, performed by a team of independent SMEs selected from other projects or institutional level staff. An NSPEB assessment was performed at PFP in 2012 and another is scheduled for the fourth quarter of FY2014. The 2012 assessment identified 39 findings and 15 observations in 10 functional areas and resulted in an overall evaluation of "Meets Expectations." A CHPRC procedure specifies the requirements and expectations for a Management Observation Program (MOP) where project and facility managers conduct documented management observations of high risk activities with a focus on areas such as conduct of operations, TSR compliance, fire protection and work planning, and control. PFP management has established documented expectations for facility managers to perform and document periodic formal field work observations. PFP management has also established and implemented a procedure for a Senior Supervisory Watch (SSW) program for conducting and documenting senior management oversight and mentoring for selected high risk evolutions. A memorandum from the PFP Vice President identifies the designated SSW watch standers (several are from other CHPRC projects), expectations for PFP managers to perform one management observation per week, and expectations regarding documentation of these oversight activities.

Independent Oversight reviewed approximately 25 assessment, surveillance, and WSA reports (both company and project level) conducted in 2011, 2012 and 2013 and approximately 15 recently conducted MOP reports, all related to nuclear safety processes and performance at PFP. In general, the review team considered most of the management, independent, WSA, and NSPEB assessment reports reflected comprehensive and rigorous reviews. The MOP reports were well written, describing detailed observation and evaluation of work activities and practices. Many of the MOP reports identified deficiencies or OFIs and listed the Condition Reports (CRs) written to resolve them.

Notwithstanding the generally well documented oversight activities, some weaknesses were identified by Independent Oversight: (See **OFI-CHPRC-F&I-1.**)

- Few formal assessments (MAs and IAs) are planned, scheduled, or performed by the PFP project. Only one PFP MA was performed in the past two FYs. The documented assessment activities done by PFP personnel were less formal WSAs (approximately 100), QA surveillances (5), or MOPs. Further, all of the MAs performed by company or project personnel at PFP appeared to be for mandatory reviews (regulatory required or designated SMP/Key Attribute assessments).

- Documentation and performance of some PFP related surveillances lacked sufficient rigor**.** An example of the problems identified in the sample of reports included an effectiveness review that identified the wrong CR, addressed only incident-specific corrective actions rather than the actions that constituted recurrence controls, concluding actions adequately address the issues based only on interviews, and failure to identify that an action to submit a lessons learned had apparently not been completed as none was in the PFP or OPEN databases (QA-PFP-SURV- 11-001). Other examples included lines of inquiry and/or criteria used for the assessment were not identified, inadequate or misleading description of the scope and sample content and size (PFP-2012-SURV-10818 and PFP-2013-SURV-12850).

- Company level USQ process MA PFP-2011-MA-10721 did not adequately address implementation through independent verification. The summary conclusions in company level TSR Implementation MA SHS&Q-2012-MA-10768 does not align with the scope and assessment details documented in the report and the executive summary fails to address the one finding identified during the assessment.

- The stated purpose, scope, and results sections of company level maintenance management program MA PTS-2013-MA-12302 state that the program description document "provides a high degree of

confidence that facility equipment degradation is appropriately identified and corrected", but the assessment was strictly a document and process review with no evaluation of field implementation that would confirm that, "High degree of confidence," by verifying that degradation is being identified and corrected.

Issues Management

CHRPC has established an appropriate set of procedures and guides that detail the processes, requirements, and guidance for documenting, categorizing, evaluating (i.e., causal analysis, determining extent of condition, and evaluating corrective action effectiveness) and correcting deficiencies and OFIs using a graded approach. Issues are documented on CRs that provide the fields for documenting the evaluation and resolution of the issues. CHPRC procedure PRC-PRO-QA-052, *Issues Management*, details a comprehensive process for managing issues from identification to closure. Any issue, including noteworthy practices can be documented on a CR which is screened by project or company level Issues Management Representatives and the Issues Management Administrator for DOE reportability, significance level, assignment of trend codes and the responsible manager. Issues are categorized as Significant, Adverse, Track Until Fixed, OFI, or Trend Only, based on a defined set of significance and risk based criteria. The categorization establishes the graded level of rigor and effort applied in the management of the issue. An excellent reference guide provides information on expectations for each element of the issues management process including extent of condition and cause analyses, corrective action development, closure, and effectiveness reviews. Independent Oversight's review of assessment activities and CRs indicated that CHPRC and PFP have applied an appropriately conservative low threshold and graded approach to the formal identification and resolution of problems, including OFIs.

The CHPRC and PFP issues management process includes several layers of management oversight and direct engagement with the management of issues. A chartered Executive Safety Review Board (ESRB) oversees and monitors the effectiveness of SMPs, the QA, and ISM programs. The ESRB meets approximately 20 times annually to be briefed on and make decisions related to various contractor assurance activities and issues such as the health of SMPs, results of NSPEB assessment results, causal analysis results for significant issues, and trend analysis results. Company and project level corrective action review boards (CARBs), an extension of the ESRB, made up of managers from various groups within the organization that meets regularly to evaluate root cause analysis for significant issues, monitor timeliness and progress of the resolution of significant CRs and evaluate effectiveness reviews for significant and adverse CRs. The CARBs also review a sample of apparent cause analyses and reviews trend analysis results. The review team attended a PFP CARB meeting where quarterly performance measures and trend analysis data, prepared by PFP performance assurance staff, were presented and evaluated. The PFP Vice President and PFP managers on the CARB were engaged and interactive in discussing the data presented and future activities and actions to be taken.

Independent Oversight reviewed a sample of approximately 12 completed CRs and associated documentation including causal analyses. The evaluation and specified corrective actions for the reviewed CRs appeared to be appropriate for the significance of the reported issues. Independent Oversight also reviewed five apparent and root cause analysis reports related to incidents and events related to PFP safety class ventilation system components occurring in the past three years. In general these reports were well documented providing details of the incident, historical and process information, and a thorough analysis of causes. In all but one case appropriate corrective and preventive actions were identified. In one report on an incident where suspect/counterfeit replacement parts were identified during receipt inspection the only actions taken were implementation of non-conformance reporting and segregation of the parts without installation. No mention was made of any preventive actions or sanctions against the vendor who provided the deficient parts.

Event Reporting and Analysis

CHPRC has established well defined processes for identifying, investigating, and reporting reportable events and periodically analyzing performance trends for incidents or events as required by DOE directives. Review of event and critique reports by the review team indicated that PFP has established a conservatively low threshold for identifying precursor incidents and events, below DOE occurrence reporting thresholds, and conducting formal critiques or investigations to identify and correct process or performance deficiencies and weaknesses. Thirty-nine critiques were held at PFP in CY2012 and 16 were conducted in CY2013. Independent Oversight reviewed seven critique/investigation reports and associated CRs for incidents occurring at PFP in the past year. The reports presented a comprehensive documentation of the incidents (detailed incident descriptions and timelines and identification of participants and witnesses and associated procedures and activities and actions taken), initial analysis of apparent causes, and suggested corrective/preventive actions. These reports also indicated that many of the incidents were identified and subjected to investigation because of the exercise of a questioning attitude by PFP workers, SMEs, and supervision. As a result, recurrence controls were identified and implemented contributing to continuous safety performance improvement.

Performance Indicators

CHPRC procedure PRC-PRO-QA-24741, *Performance Analysis Process*, adequately details the requirements, processes, and management expectations for responsible program and project managers to analyze data sets and document metrics for monitoring performance and providing senior management and RL with performance information. Safety performance trending is being performed at the PFP and CHPRC level and performance metrics are identified, generated, evaluated and communicated to management, staff, and RL. Communication of trending and performance metric status is provided formally through presentations and discussion at the ESRB, project and company CARB meetings, and trend working group meetings. Independent Oversight reviewed recent PFP project performance reports, which provide comprehensive graphical presentations of performance data related to assessments, issues, conduct of operations, and work management for the project and for organizations within the project, typically for the previous 12 months. While the reports provide data for discussion and review by management, there was no documented analysis or suggested actions for most of the data presented. SME analysis of the data for trends, potential causes, and corrective actions can benefit the discussion and evaluation of performance issues during the management review. (See **OFI-CHPRC-F&I-2.**)

Lessons Learned

CHPRC has established and implemented a robust, structured operating experience/lessons-learned program that identifies, evaluates, and provides for appropriate application of lessons learned generated from external operating experience and internal activities, conditions, and events. Lessons learned are being generated and put into a local PFP database and into the Richland contractor's OPEX database. PFP generated 7 formal internal lessons learned reports in CY2013 and 12 in CY2012.

CHPRC work planning procedure PRC-PRO-WKMM-12115, Work Management, includes responsibilities and action steps for work planners to screen lessons learned sources, identify applicable lessons learned, and incorporate them into work packages. CHPRC procedure PRC-PRO-QA-40165 requires training specialists to identify and incorporate applicable lessons learned into new or revised training plans and materials. Pre-job briefings procedure PRC-PRO-WKM-14047 identifies as a topic for discussion by the FWS during pre-job briefings lessons learned from the previous day or shift, but does not specifically address discussing formal lessons learned documents; however, if applicable lessons learned were included by planners in the work package they may be included in the briefing. (See **OFI-CHPRC-F&I-3.**)

Each workday morning CHPRC conducts a conference call with senior management and project personnel (or other interested parties) to communicate and discuss data collected by the Safety Analysis Center in the Performance Assurance organization. Information presented and discussed can include operational events or incidents, DOE operational awareness (OA) report issues, other safety issues, and lessons learned. This practice provides a timely and beneficial forum for updating various managers on emerging issues and for initiating discussion and coordination of needed actions. Independent Oversight monitored several of these morning calls and noted an appropriate level of communication and engagement by CHPRC managers.

5.6 RL Safety Oversight Program

The overarching objective for the safety oversight program is:

Objective: The safety system oversight program and methods are effective in ensuring safety systems can reliably perform as intended.

In addition to the focused review of the RL SSO program, Independent Oversight performed a broader evaluation of the establishment and implementation of RL nuclear facility oversight programs and processes for conducting oversight of management and operation of nuclear safety systems and RL internal feedback and improvement systems and performance. The review criteria from HSS CRAD 45-21were used for the evaluation of the broader RL oversight program, including the overarching criterion: "DOE field element line management has established and implemented oversight processes that evaluate the adequacy and effectiveness of contractor assurance systems and DOE oversight processes

Overall, RL has established many formal processes, procedures, and guidance describing the requirements and expectations for the basic elements of contractor oversight and self-assessment. Many safety oversight activities are being effectively planned, performed, and documented and FRs and SSOs provide effective continuous, routine OA and surveillance feedback to the contractor and DOE management. These oversight activities are identifying many deficiencies, weaknesses, and OFIs in contractor processes and performance which are communicated to the contractor for resolution. However, management attention is needed to address weaknesses in oversight program documents and in implementation performance. The various oversight program documents do not collectively constitute a comprehensive and cohesive oversight program with clear delineation of requirements and expectations. Issues management processes and procedures are inconsistent and insufficiently detail important elements. Implementation weaknesses included insufficient detail provided in oversight activity reports and inadequate documentation of contractor corrective action verifications. RL management and staff are aware that there are deficiencies in the oversight process and have initiated a set of corrective actions.

Within the DOE oversight element, Independent Oversight reviewed the RL oversight program, assessment and operational awareness activities, the Facility Representative program, management of safety issues, RL evaluation of contractor performance, and ongoing RL oversight improvement initiatives. The review of these areas is consistent with the inspection criteria and activities defined in the safety oversight program element of CRAD 45-11 and with the broader criteria of CRAD 45-21.

RL Oversight Program

RL has defined several management systems providing the framework for oversight of safety activities and performance, including *Contractor Integrated Performance Evaluation, Safety and Health Management*, and *RL Performance Improvement*. Within these management systems are program description documents and implementing process descriptions and procedures with the requirements and action steps for conducting oversight planning, oversight of site contractor programs and performance,

and self-assessment. Attached to these process and procedure documents are sets of guidance information referred to as "exhibits." The program descriptions adequately describe the purpose, authority, roles and responsibilities; a summary of the oversight and self-assessment models and the strategy and activities employed in conducting contractor oversight, including planning, performance, and reporting; and a summary of the functional areas included in the oversight program. An implementing process description and procedure titled *Oversight Planning* details the development of an annual integrated evaluation plan for conducting surveillances, assessments, and OA activities. Another implementing process description, and its associated procedures and guidance exhibits, addresses the performance of contractor oversight detailing assessment and surveillance activities, corrective action management, monitoring of contractor activities (OA), and lessons learned/operating experience.

The Facility Representative (FR) program is adequately detailed in a description document and the Operations Oversight Division (OOD) has developed FR instructions describing implementation of program elements including reporting, standing orders, and master oversight plan development and use. OOD has also developed a suite of over 100 surveillance guides providing checklists for evaluating technical and functional elements in areas including worker safety, nuclear safety, maintenance, conduct of operations, engineering, and quality and performance assurance.

In addition, RL has adequately established formal processes and procedures for safety documentation review and approval, training, and qualification for personnel performing oversight and functional area program descriptions for areas such as engineering, radiation protection, fire protection, and criticality safety. Another set of process descriptions and procedures addresses contactor performance evaluation and conditional payment of fee, profit, or incentives in contracts. A set of processes and procedures address the management of external oversight, RL self-assessment, the management of corrective actions for issues related to RL performance and processes, and RL performance metrics. RL has also developed and maintained an ISMS description document describing implementation of DOE P 450.4, *Safety Management System Policy*.

Although the program and process descriptions and implementing procedures in general adequately describe the overall contractor oversight program, many of these documents are out of date; many of them date back to 2008 and 2009 and reference previous organizations and superseded conditions such as combined RL and contractor integrated assessment plans. In addition, many actions that are written as requirements are contained in the undefined "exhibit" documents that are primarily guidance documents. For example, an exhibit in the *Oversight Planning* crosscutting process document titled *Implementation Strategies*, although containing a number of guidance (i.e., "should") statements, specifies numerous action steps phrased as requirements and responsibilities (e.g., "personnel will," "RL will," "the Contractor Oversight and Evaluation Planning Point of Contact is responsible for…."). The OOD (FRs) processes and actual practices for planning and conducting OA activities are not well integrated into the RL office level oversight documents. (See **OFI-RL-F&I-1.**)

Assessment and Operational Awareness Activities

The *Integrated Evaluation Planning* details the development and quarterly updating of an annual schedule for the conduct of surveillances, assessments, and OA activities. An attached exhibit, *Implementation Strategies*, describes the approach to be employed in the development and maintenance of the resulting Integrated Evaluation Plan (IEP). RL has defined the conduct of assessment and OA activities in step-by-step procedures within the *Oversight Performance* crosscutting process document. Separate procedures provide generally adequate step-by-step instructions for the conduct of technical surveillances and technical assessments, defined as "formal" oversight, and monitoring of contractor activities by FRs and SMEs, defined as "informal" oversight. Supporting exhibits describe additional expectations and guidance such as templates for assessment plans, reports, and notification and transmittal letters to the

contractor; the conduct of assessments, surveillance, and OA activities; entrance and exit meetings; and for documenting issues. In addition, RL has developed the *DOE Operational Awareness HLAN Application and Database User's Guide* (Rev 4, January 6, 2009) to describe the use of the tracking tool for documenting OA activities and issues identified during those activities. RL has also established adequate step-by-step procedures for the conduct of independent assessments and MAs of RL processes and performance.

Although these documents provide a description of processes and step-by-step procedures for assessment and OA planning and performance, they are dated with respect to organizational references, include actions phrased as requirements in guidance documents, and the procedures do not address some important elements of the process. For example, the planning and technical surveillance procedures do not address the selection, conduct, and documentation of "core" surveillances performed each quarter by the FRs or the FR oversight planning process called "Master Oversight Plans" (MOPs). The surveillance and assessment procedures contain two unrelated and non-sequential actions in a single action step (i.e., preparation of a transmittal letter and tracking of corrective actions). Issues are not identified as a required record in the "Records Capture Table" in the surveillance and assessment procedures. The *Monitoring Contractor Activities* procedure contains a number of discrepancies, including the following: (See **OFI-RL-F&I-1.**)

- It does not address the FR MOP process requirements.

- Step 10 is an action step related to the documentation of "management walkthroughs" in the OA database. However, management walkthroughs are not described in other RL oversight program, process, procedural, or exhibit documents.

- Step 12 contains unclear and inconsistent instructions for the management of issues identified during OA activities. These problematic directions include the communication of issues, "Informally to the contractor," but also, "Formal communication and documentation of "significant," issues in formal surveillance or assessment reports without defining or providing guidance regarding what constitutes significance.

- Step 13 is an information step describing the purpose of OA reports, but with no defined action.

- Step 14 states that, "At a minimum," enter OA reports that identify issues in the OA database, implying that reports that do not identify issues may not need to be entered into the database in conflict with Step 10 that specifies that OAs be documented in the database. Also, the provision does not address actions to be taken in addition to the, "Minimum," entry of issues.

- Step 15 of the monitoring procedure references actions to take for, "Issues with a significance >2," without reference to where significance determination is defined. See the following section in this report on issues management for more detail on this issue.

Many planned, opportunistic, routine, and reactive assessment, surveillance, and OA activities are performed and documented by FRs and SMEs. Almost 100 surveillances and assessments and 230 documented OAs were conducted in FY2013. This oversight activity identifies contractor process and performance issues and opportunities for continuous improvement. Self-assessments are scheduled and performed. Independent Oversight reviewed 15 RL formal surveillance and assessment reports and approximately 85 OA reports, primarily related to CHPRC and PFP, but with some samples from K-Basins (a CHPRC project) and RL contractor Washington Closure Hanford LLC. In general, the reports reflect substantive oversight activities that are identifying deficiencies and OFIs. However, RL

surveillance reports, especially FR core surveillance reports, often lack sufficient analysis of results. The rollup of issues from OA reports to project-specific surveillance reports to core surveillance reports has resulted in surveillance reports having less content and structure than defined in the oversight process and surveillance procedure. Facility specific and core surveillance reports typically do not provide a description of what specific criteria were evaluated (other than a reference to an FR surveillance guide), a description of the results as they relate to the criteria in those guides, or a collective analysis or characterization of what the results mean. Typically the results are simply a general statement of process/performance adequacy or inadequacy and a listing of the observations and findings identified. In addition, as discussed in the following section of this report on the management of safety issues a number of deviations from requirements and repetitive deficiencies were non-conservatively identified as observations. (See **OFI-RL-F&I-2.**)

Facility Representative Program

RL currently has three fully qualified FRs assigned to the PFP. The assigned FRs rotate on-call duties to provide the facility with around the clock response. Training records reviewed were complete and in order. The FRs in interviews demonstrated knowledge of DOE requirements and facility-specific knowledge of the PFP. As noted above in the discussion of assessment and OA activities, the FRs assigned to PFP are active in the facility monitoring work and facility conditions. As noted above, reports reflect substantive oversight activities that are identifying deficiencies and OFIs. However, FR surveillance reports often lack sufficient analysis of results. (See **OFI-RL-F&I-2.**)

Management of Safety Issues

Several RL documents describe the requirements and actions for managing issues identified during oversight activities and from external oversight. A *Corrective Action Management* procedure in the *Oversight Performance* crosscutting process describes the requirements and action steps for documenting issues (concerns, findings, and observations) identified during "formal" oversight activities (surveillances and assessments), determining whether corrective action plans (CAPs) are required from the contractor, logging the issues for tracking, communicating issues to the contractor and managing CAPs, and verifying and closing completed corrective actions. The *Verification of Implementation of Corrective Actions* exhibit "establishes a process" (requirements and guidance) for evaluating the adequacy of contractor corrective action implementation identified during surveillances and assessments (formal oversight) including documentation review, informal and formal oversight activities, and documentation of the verification activities and results as an OA report, e-mail, or formal correspondence to the contractor. The *Monitoring Contractor Activities* procedure addresses the documentation and management of issues identified during OA activities ("informal oversight") and an *Issue Documentation* exhibit describes expectations and actions for handling findings and observations from OA activities. The DOE OA HLAN Application and Database User's Guide describes the use of the OA database for documenting OA activity reports and issues from all oversight activities. This user's guide and the OA database provide fields and definitions (matrix of issue types, significance level, safety and operational impact and injury) for six significance classifications.

Although this collection of process, procedure, and guidance documents provides many requirements, expectations and advice for managing issues identified during oversight activities, they do not constitute a comprehensive, consistent and effective issues management system. Different procedures and guidance documents provide direction for handling issues identified by the source of the issue (i.e., "formal" or "informal" oversight) rather than providing a consistent approach to managing all issues based on their significance. Directions related to issues from formal oversight are addressed in a step-by-step procedure, but most of the direction for handling issues from OA activities is in an exhibit guidance document or the database user's guide. The Corrective Action Management procedure specifies issues from formal

oversight are to be entered into the Richland Issue Tracking System (RITS), but the surveillance and assessment procedures specify that issues are entered into the OA database and no documents specify issues from OA activities be input to RITS. In several documents actions are specified for "significant" issues without any definition, examples, or a threshold for significance. (See **OFI-RL-F&I-3.**)

RL does not have a formal procedure providing the criteria and requirements for determining the significance of safety issues that establishes the rigor of management review and action. There is a single unreferenced notation in an action step of the *Monitoring Contractor Activities* procedure requiring closure statements for issues with a significance greater than 2, with no explanation or reference to how that significance level is determined. In addition, that notation is in conflict with the user's guide that indicates closure field is opened for issues with a significance level of 3 or greater. The determination and use of "significance levels" for issues (both findings and observations) is not sufficiently defined and inconsistently applied. The criteria and guidance for the six categorization levels, an unnecessarily large number of levels, is insufficient for consistent application by users. The practical use of this grading process is also obscure and insufficiently defined. For CY 2013, 90 percent of OA reported issues (findings and observations) were rated and categorized as level 1—the lowest level for a finding—and none were categorized above a 2, which would otherwise prompt an RL closure statement field in the OA database. However, many of these findings and observations, initially documented in OA reports, have been rolled into facility specific surveillance reports and again rolled up into "core surveillance" reports, with formal transmittal to the contractor and required RL staff verification/closure. Issue significance levels are not reflected in surveillance reports or cover letters sent to the contractor or documented in RITS.

A step in the *Monitoring Contractor Activities* procedure specifies that contractor activity monitors (i.e., FRs or SMEs) are to coordinate with assistant managers or FRs to determine the best course of actions for findings, including informal communication, without further guidance or direction. This unstructured approach to managing safety issues introduces subjectivity and inconsistency into the process and results.

The *Monitoring Contractor Activities* procedure and the *Issue Documentation* exhibit specify that, if certain conditions are met, an OA activity is to be documented as a surveillance or assessment rather than an OA report, even though the oversight activity that identified the issue was "informal." This expectation results in an after performance change in the type of oversight with the only change being the type of issue identified rather than changing the oversight approach to comply with the RL surveillance procedure. Further, the criteria include a finding that that indicates a "functional area problem." However, most findings would be indicative of a functional area problem, and a review of a sample of OA identified issues indicates that many functional area findings in OA reports are not being documented in surveillance reports. The OA database has fields for trend, cause, and ISM codes, but does not define or describe the intent or use of these fields, although they are being filled by RL staff. Lack of definition, use, or guidance information can result in inconsistent and inaccurate data.

The corrective action management procedure and the referenced "exhibit" on verification of implementation of corrective actions inadequately and inappropriately define the expectations and requirements for closure of contractor issues when specified in surveillance and assessment reports. Both documents refer to verification and validation of corrective actions when RL specifies in assessment and surveillance reports that lead assessor closure of contractor actions is required. The exhibit also describes the responsibility of RL staff to evaluate the effectiveness of the corrective actions in several places. The oversight documents do not define or make a distinction between verification and validation and do not provide any guidance or direction on what constitutes determining effectiveness. Determining effectiveness is probably not warranted for most of the issues requiring RL staff closure and often involves a significant level of effort to properly perform. (See **OFI-RL-F&I-3.**)

The RL Corrective Actions crosscutting procedure describing the requirements for RL to manage issues identified by external entities does not sufficiently address important elements of issues management such as extent of condition and causal analysis. For example, the procedure does not specify when these analyses must be performed, the rigor needed (e.g., apparent cause or root cause analysis), or the method of analysis documentation. No requirements for training or qualification for personnel performing causal analysis are identified. (See **OFI-RL-F&I-3.**)

The Independent Oversight team's review of issues in the OA database and in RL OA, surveillance, and assessment reports indicates that the threshold for documenting findings and observations is very low providing a valuable data set for contractor performance evaluation and communication of high expectations to the contractors. The RL staff is communicating expectations to the contractor and are tracking and performing documented verifications (in OA reports and RITS) of contractor corrective/preventive actions for most RL identified contractor issues at the concern or finding level (regardless of the significance level specified for the issue).

However, there were a number of weaknesses in the documentation and management of safety issues. The description of issues in oversight reports sometimes lack sufficient detail to fully characterize the issue. In some cases, apparent deviations from requirements, by definition a finding, were identified as observations. For example, the description of a finding where the recorded test data in a fire protection test procedure was outside of the acceptance parameters specified in the procedure did not identify the data that was out of specification, the specified parameters, or the actual reading (OA45770). Three issues in OAs 45704 and 45699 were identified as observations but were described as deviations from requirements. For example, confined space and electrical hazards identified in a completed work package data sheet had not been addressed in the Worksite Hazard Analysis included in the work package. Other mischaracterized issues included partial work release forms for completed work that had not been signed as accepted by operations and missing data sheets for the partial release form in a completed work package. (See **OFI-RL-F&I-3.**)

Independent Oversight reviewed the closure information for the 13 concerns (the highest level of issue identified by RL indicative of a programmatic breakdown or widespread problems) that had been closed since August 1, 2011 and identified several discrepancies. Deficiencies in documentation of closure were identified for many of these issues. Several concerns were closed without identifying what was done to verify/validate the action (e.g., "per e-mail from XX" or "completed actions were found complete"). One issue was closed although the OA report noted that the contractor had done their own effectiveness review and had generated additional deficiency reports and was implementing additional corrective actions. Three issues were closed with notations that additional oversight was needed or follow up surveillances or assessment would be performed, with no specific date or report number or mechanism to ensure subsequent review was conducted. Few of the closure statements addressed any review of the effectiveness of the corrective actions. In addition, the team noted that actions for resolving five concerns that had been identified between 16 and 43 months before this review had not been closed and for three of these issues the contractor's closure status was identified in the database as "delinquent." None of the five had updates on status of actions or in progress reviews by RL. (See **OFI-RL-F&I-3.**)

Contractor Performance Evaluation

RL performs structured, monthly, quarterly, and annual contractor safety performance evaluations and communicates results to the contractor. This performance analysis information is used for future oversight planning. RL contracts are not structured or managed using a typical award fee contractor evaluation process where safety performance elements are evaluated annually to adjust fee payments. RL contracts have a "conditional payment of fee" process where RL can make deductions to fee payments for unsatisfactory safety performance using a formal justification process. This mechanism has been used a

number of times to sanction contractors for failing to meet DOE requirements and expectations for safety performance.

RL Oversight Improvement Initiatives

RL recognizes that safety oversight planning and execution processes are fragmented and inconsistently applied by the various organizations that perform safety oversight and that communication between organizations and personnel responsible for oversight. In the fall of 2013 a team of approximately 10 RL Safety and Environment SMEs performed a formal value stream mapping exercise of RL oversight planning and execution. This effort was structured review to identify the current state of the processes and performance, identify the desired future state, and develop a path forward to that future state. This team developed a charter, goals and objectives, deliverables, and a definition of the scope and processes to be used to conduct the analysis. Three basic actions for the path forward input to the RL commitment tracking system included the following:

- Improve the upfront planning and information sharing, including establishing an oversight planning process similar to the FR MOP process for all oversight organizations and improving internal communications and teaming for oversight.

- Provide training and standardized methods and performance for more consistent reporting and issues management in the OA database.

- Improve oversight tools and technology including an accessible, integrated, web-based database to replace the current OA database and interim OA database improvements to integrate with new/revised oversight processes.

Management support, application of sufficient resources, and timely and thorough execution of these improvements should incorporate the corrective actions and recurrence controls needed to address the deficiencies and weaknesses identified in this Independent Oversight review.

6.0 CONCLUSIONS

Overall, CHPRC has established and implemented the programs and processes necessary for effective management of the PFP CVS. PFP programs and procedures are generally adequate, and the activities observed by Independent Oversight were properly planned, scheduled, and executed. Surveillance test activities observed were consistent with the approved safety basis documents and the CSE program was found to be effective in ensuring continued operational readiness of identified systems to meet safety function requirements and performance criteria. PFP operations, maintenance, and CSE staff observed and/or interviewed were knowledgeable and properly trained to ensure that CVS was at an acceptable level of equipment reliability. CHPRC has established and implemented a generally robust performance assurance program for evaluating nuclear safety processes and performance at PFP. Many assessment-like activities are planned and scheduled using a structured process and are performed and documented as scheduled and in a generally comprehensive and rigorous manner. Safety issues are being identified and effectively evaluated and resolved using a graded approach. Incidents and events, including those below DOE occurrence reporting thresholds are being formally documented and investigated with recurrence controls identified and implemented. Internal lessons learned are being identified, documented, shared and, along with external lessons learned, screened for inclusion in WDs and training. CHPRC is identifying and correcting process and performance deficiencies and identifying and implementing OFIs.

Management attention is needed in some areas of implementation of the programs and processes used to

ensure the continued readiness of PFP safety systems. For example, operator initial and continuing training on the PFP TSR has not been performed as required by the SOE training qualification standard. Improvement is also needed in operator rounds and shift turnover performance, verbal communications during emergency conditions, and correcting procedure inconsistencies.

RL has established many formal processes, procedures, and guidance describing the requirements and expectations for the basic elements of contractor oversight and self-assessment. Many safety oversight activities are being effectively planned, performed, and documented by RL technical staff including formal surveillances, assessments, and safety related document reviews. In addition to formal assessments, RL FRs and SSOs provide effective continuous, routine OA and surveillance feedback to the contractor and DOE management. These oversight activities are identifying many deficiencies, weaknesses, and OFIs in contractor processes and performance which are communicated to the contractors for resolution, including RL verification of closure for many issues.

Notwithstanding the defined oversight program and generally effective implementation, management attention is needed to address weaknesses in oversight program documents and implementation performance. RL management and staff are aware of oversight process deficiencies. Prior to this review, RL conducted a formal team process review, and initiated a set of corrective actions addressing many of the same OFIs identified by Independent Oversight. RL is revising and supplementing their collection of process, procedure, and guidance documents intending to result in a comprehensive and cohesive oversight program with clear delineation of requirements and expectations. The revision process underway at RL also addresses the issues management processes and procedures. Guidance documents are being reviewed and revised to identify and eliminate inconsistencies and expand guidance on important elements such as issue significance and to clarify the distinction between guidance and requirements. RL is also addressing implementation weaknesses such as insufficient detail in oversight activity reports, especially with regard to the analysis of results and identification of evaluation criteria and inadequate documentation of contractor corrective action verifications.

7.0 FINDINGS

Findings represent identified deviations from the regulatory or procedural requirements. These must be addressed by the site office and contractor management formally with an appropriately graded analysis of the causes and extent of condition, followed by development and implementation of a CAP, effectiveness evaluation, and closure.

CH2M Hill Plateau Remediation Company

Finding-CHPRC-Ops-1: Contrary to the established operator training program for SOEs, initial and continuing TSR training is not being conducted as described in subsection 9.6 of the SOE training program.

8.0 OPPORTUNITIES FOR IMPROVEMENT

This Independent Oversight review identified the following OFIs. 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.

CH2M Hill Plateau Remediation Company

OFI-CHPRC-Surv&Test-1: The procedure and TSR bases references to ASME-N510 should be revised to the correct version of the standard.

OFI-CHPRC-Surv&Test-2: Procedures classified as "reference use" implementing nuclear safety requirements should be reviewed frequently to ensure their accuracy.

OFI-CHPRC-Surv&Test-3: TSR 3.2.1 does not include calibration of Zone 3A and 3B dP and alarms in SR 3.2.1.5.3.

OFI-CHPRC-Surv&Test-4: The SR procedures for SRs 3.2.1.1.2, 3.2.1.3.1, 3.2.1.4.1, and 3.2.1.5.2, should be revised to include the specific TSR acceptance criteria.

OFI-CHPRC-Surv&Test-5: SR Testing Procedures should be reviewed to correct inconsistencies.

OFI-CHPRC-Ops-1: ZO-060-102, Shutdown and Start Up 236-Z/234-5Z Normal Ventilation System, sections 4.5 and 4.6 should be revised to ensure that each step has only one action.

OFI-CHPRC-Ops-2: Jumping to conclusions during off-normal conditions may result in incomplete execution of alarm response procedures.

OFI-CHPRC-Ops-3: Three-way communications should be employed when giving and receiving important operational information to prevent miscommunication and human error.

OFI-CHPRC-Ops-4: Alarm and emergency response procedures should be revised to include communications steps to ensure that operator and shift manager actions are performed as intended.

OFI-CHPRC-Ops-5: Operators should recognize, document, and report abnormal conditions.

OFI-CHPRC-Ops-6: Contrary to the requirements of PRC-PRO-OP-28033 which implements DOE Order 422.1, Section l, *Turnover and Assumption of Responsibilities*, SOE checklists do not include key documents to be reviewed during shift turnover.

OFI-CHPRC-Ops-7: PFP SOE shift turnover performance should be improved.

OFI-CHPRC-Ops-8: CHPRC Plateau should revise existing agreements with outside organizations providing interrelated processes to PFP to provide the identification of interrelated process operator responsibilities, training, and communication requirements to ensure that PFP fully meets the intent of DOE Order 422.1.

OFI Maint-1: The NMMP requires that component work histories are available to determine recurring equipment failures, historical problems, and CM solutions. Because some JCS maintenance histories are incomplete, the result in part, due to the use of WDs that do not list all the equipment that was worked upon, consider revising the WD release cover sheet and JCS maintenance histories to identify all the equipment that was worked upon.

OFI Maint-2: Given the recognized importance of post-job feedback to the ISM process and the frequent failure of the WD-Post Work Review section to acknowledge that "Work Record Feedback Exists," consider reinforcing the expectation that the Post Work Review approver

reviews the work record and acknowledges the existence of any significant feedback (such as in the recorded work document narrative), where appropriate.

OFI Maint-3: Given that repetitive use WD 2Z-13-03100 was written to support adjustments, repairs, or replacements of the electrically driven exhaust fan components (fans, motors, and inlet dampers) while prohibiting troubleshooting, consider revising the defined scope of allowed uses to include inspection to avoid procedure compliance concerns.

OFI Maint-4: Given that repetitive use WD 2Z-13-09078 allows stopping electric supply and exhaust fans that support compliance with TSR 3.2.1, Confinement Ventilation, consider replacing the "N/A" under "Tech. Spec/OSR Requirements Reference" with TSR 3.2.1 to serve as a regulatory compliance precaution.

OFI SE-1: Although SEs understand they are responsible for maintaining and periodically revising their assigned VSS SDD, consider revising the SE Program procedure to clearly assign that responsibility to the SEs in the 4th Quarter of the CY, as required by FSP-PFP-0848.

OFI SE-2: Although the system notebook is a collection of information that is used as a tool by the SE and is not a controlled document, consider reinforcing the expectations for the minimum amount of information and appropriate level of detail to be included in the notebook (e.g., at least one documented VSS walk down per quarter and listing of all open CRRS items written against any aspect of the VSS or support systems, including the current status of any open action items).

OFI SE-3: Although SEs have authored, provided input, and/or proposed corrective actions for multiple CRRS documents, consider reinforcing the expectation that SEs should ensure identified deficiencies are documented in the issues management process to support trending whether corrective action is already planned or been taken.

OFI SE-4: Although a System 25 SE identified in December 2013 and took appropriate action to address a ventilation modification that was not consistent with required configuration managed baseline documentation for which SEs are responsible, the discrepant configuration was installed in or shortly after December 2010, and had not been identified during that 3 year period by the SEs during their periodic formal and informal system walkdowns. CHPRC needs to identify actions to prevent recurrence of the failure of the SEs to identify deficiencies in configuration management in a timely manner. CHPRC needs to review implementation of the PISA process when significant deficiencies are identified with a Technical Safety Requirements safety management program.

OFI SE-5: Although exhaust fan bearing vibration and temperature monitoring was performed, data recorded and graphed, and the results emailed to all the interested parties, only the results of vibration monitoring were presented and discussed in the 1st Quarter FY 2014 SHR. Ensure future quarterly SHRs present and discuss the results of both vibration and temperature monitoring as required by the DOE condition of approval for the revised EMP.

OFI SE-6: Although reviewed exhaust fan bearing vibration and temperature monitoring data plots demonstrated their value as Pdm tools, consider enhancing the utility of the temperature monitoring plots by plotting both the raw data for comparison to bearing temperature limits and the difference in temperature between that measured and the ambient temperature surrounding the bearing to remove the effect on bearing temperature by significant swings in ambient temperature.

OFI SE-7: Although the reviewed System 25 SHRs contained a wealth of data and performance analysis and generally met the expectations of the PRC-STD-EN-40330, *System Health Reports,* consider reinforcing the expectation that the "Design Issues/Life Cycle Recommendations" include a list of any modification work packages directly affecting the VSS where field work has not been completed and/or the Facility Modification Package is still open.

OFI SE-8: Although operators performing rounds identified a squeaking noise in the vicinity of a CVS supply fan drive, the noise was not reported to the SEs in a timely manner and reportedly went away, although how the resolution occurred was not clear to those interviewed. Consider providing guidance to shift operations to report to SEs the identification and any response taken to any identified VSS equipment performance concerns regardless of apparent significance.

OFI SE-9: Although revisions of CHPRC procedures include a summary description of the changes made, the substance of the changes may not be recognized if the change description lacks detail, the requirements of the old procedure revision are familiar, there is no obvious change in title, format or length, and no document markings on what has changed. To avoid failure to communicate new performance expectations and minimize the time that a procedure user could waste trying to identify what really changed, consider annotating revised procedures with vertical bars in the document margins corresponding to where changes have been made.

OFI-CHPRC-F&I-1: Strengthen assessment performance at PFP. Specific actions to consider include:

- Review the rationale for and appropriateness of the disproportionate scheduling and performance of WSAs rather than MAs.

- Establish a formal review process to evaluate and grade the quality of completed assessment, surveillance, and WSA reports, at least on a sample basis, and provide feedback to performers and their managers.

OFI-CHPRC-F&I-2: Perform and document SME analysis of trend data, identify trend status using indicators such as stop light colors or trend arrow schemes, and identify suggested actions where appropriate prior to presentation to management.

OFI-CHPRC-F&I-3: Consider revising PRC-PRO-WKM-14047 to specifically mention the review of applicable lessons learned in the FWS pre-job briefing discussions.
Richland Office

OFI- RL-F&I-1: Perform a rigorous review, restructuring and updating oversight procedures. Specific actions to consider include:

- Establish a well-defined hierarchy of formal documents (e.g., policies, plans, program and process descriptions, procedures, and guidance) to ensure effective and consistent delineation of requirements and guidance.

- Ensure a clear distinction is made between requirements and guidance and that all requirements are included in the step-by-step procedures.

- Ensure that pertinent terminology (e.g., surveillance, assessment, OFIs) is formally defined.

- Include in the review consideration of the definition, titles, and format for "exhibits" and other guidance documents.

- Strengthen the RL oversight planning process to include mechanisms similar to the MOP used by OOD.

- Strengthen and define in oversight procedures the analysis of CAS data to focus and prioritize contractor oversight activities.

- Manage the implementation of the oversight planning and execution improvement initiative corrective actions in a formal project management manner using a work breakdown structure to ensure clear understanding of what is to be done, by whom, when actions are to be complete, and what the deliverable is. Ensure oversight personnel receive training on new and revised processes, procedures, requirements, and expectations. Perform close monitoring of initial performance and products to ensure management expectations are being achieved.

OFI- RL-F&I-2: Ensure that oversight reports clearly identify the criteria used and provide sufficient analysis of the results to better characterize and summarize the overall significance and substance of the results in addition to listing findings and observations.

OFI- RL-F&I-3: Strengthen issues management processes, procedures, and performance. Specific actions to consider include:

- Convert the current Corrective Action Management procedure into an "Issues" management procedure to better detail the overall issues management process and required action steps.

- Ensure that all issues are categorized by type and significance and managed based on the substance of the issue and not the source of the issue (i.e., surveillances, assessments, OA).

- Review, simplify, and revise the significance categorization process and criteria and incorporate that into the formal procedure.

- Ensure that all requirements are put into procedures, not guidance documents or user's guides.

- Ensure the proper use of and define terminology such as significant, verification, validation, and effectiveness.

- Clarify the expectations for and provide oversight over accurate designation of issues as findings or observations.

- Clarify what is required for review and closure of contractor corrective actions for RL identified issues.

- Strengthen the procedure for correction of RL issues to address extent of condition and causal analysis.

Appendix A
Supplemental Information

Dates of Review

Scoping Visit: September 3-5, 2013

Onsite Review: February 3-13, 2014

Office of Independent Enterprise Assessments Management

Glenn S. Podonsky, Director, Office of Independent Enterprise Assessments
William A. Eckroade, Deputy Director, Office of Independent Enterprise Assessments
Thomas R. Staker, Director, Office of Environment, Safety and Health Assessments
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