

Attachment I



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PO Box 1600  
Richland, WA  
99352

August 16, 2011

CHPRC-1103433A R1

Ms. Jenise C. Connerly, Contracting Officer  
U.S. Department of Energy  
Richland Operations Office  
Post Office Box 550  
Richland, Washington 99352

Dear Ms. Connerly:

CONTRACT NUMBER DE-AC06-08RL14788 –TRANSMITTAL OF SURVEILLANCE  
REPORT PLANNING AND EXECUTION OF RADIOLOGICAL WORK (S-11-SED-CHPRC-  
PFP-002)

- References:
1. Letter, J. C. Connerly, RL, to J. G. Lehew III, CHPRC, "Contract No. DE-AC06-08RL14788 – Transmittal of Surveillance Report Planning and Execution of Radiological Work (S-11-SED-CHPRC-PFP-002)," 11-SED-0124, 1103433 A, dated July 7, 2011.
  2. Letter, J. C. Connerly, RL, to J. G. Lehew III, CHPRC, "Contract No. DE-AC06-08RL14788 – Plutonium Finishing Plant (PFP) Conduct of Operations Reactive Surveillance," 11-ODD-0029, 1103431, dated July 7, 2011.

Pursuant to the referenced correspondence, this letter transmits CHPRC's response to the Planning and Execution of Radiological Work Surveillance, performed by RL at the Plutonium Finishing Plant (PFP) between February 14 and April 29, 2011. This letter provides the results of the cause evaluation that demonstrates the basis for the corrective action plan and extent of condition review. Corrective actions include process/programmatic actions as well as focused actions necessary to alleviate the specific issues noted during the surveillance.

CHPRC appreciates acknowledgement that actions initiated in March, in response to preliminary feedback from RL, have been beneficial at addressing technical issues and improving radiation protection involvement in work planning.

Relative to overarching deficiencies in the Work Planning process noted in this Surveillance, Phase II of CHPRC's improved work control process/procedure was launched company-wide, including PFP, on June 20, 2011. Specific process improvements relative to scope of work clarity, hazard control specificity, and Subject Matter Expert involvement are integral to that change.

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Since the revised work planning process is currently in effect, corrective actions relative to work control process weaknesses noted in the February to April timeframe are believed to be inherent in the new CHPRC work control program.

A second RL surveillance relative to conduct of operations weaknesses at PFP, Reference 2, was received concurrently with this surveillance report. That surveillance included conduct of operations issues listed in Finding 11 of the Planning and Execution of Radiological Work Surveillance but expanded upon those issues with additional examples where conduct of operations was not appropriately deployed. Correspondingly, corrective actions associated with conduct of operations were developed according to a separate causal analysis for the scope-specific surveillance to ensure a comprehensive evaluation. Actions from that evaluation are included in this response. RL approval authority associated with Finding 11 of the Planning and Execution of Radiological Work Surveillance will be propagated to the corrective actions associated with the PFP Conduct of Operations Reactive Surveillance.

Additionally, CHPRC will perform a common cause analysis of work control and conduct of operations issues across the company to review/evaluate recent operational events for commonalities/common causes related to work control implementation at CHPRC. The evaluation will include comparing/aligning the results of this evaluation against on-going corrective actions to determine if any new causes or performance trends are developing and/or if additional evaluation and corrective actions are necessary.

Technical questions should be directed to T. E. Bratvold at 373-2360, and contractual questions should be directed to M. V. Bang at 372-0528.

Sincerely,

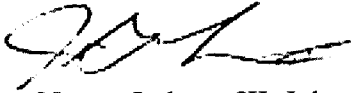
John G. Lehew III  
President and  
Chief Executive Officer

teb/kes

Attachment

RL - R. J. Corey  
R. M. Gordon  
J. A. Frey  
B. M. Pangborn  
S. A. Sieracki

**Electronically Approved by:**



UserName: Lehew III, John (h0041746)

Title: President and Chief Executive Officer

Date: Wednesday, 17 August 2011, 11:51 AM Pacific Time

Meaning: Sign as John G. Lehew, III

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ATTACHMENT

CHPRC-1103433A R1  
CONTRACT NUMBER DE-AC06-08RL14788

**CORRECTIVE ACTION PLAN AND EXTENT OF CONDITION REVIEW FOR  
S-11-SED-CHPRC-PFP-002  
CR-2011-2196**

Consisting of 14 pages,  
including this cover page

**CORRECTIVE ACTION PLAN AND EXTENT OF CONDITION REVIEW FOR  
S-11-SED-CHPRC-PFP-002**

**ROOT AND CONTRIBUTING CAUSES**

The following root causes (RCs) and contributing causes (CCs) were identified using the barrier analysis and Why-Staircase methods for S-11-SED-CHPRC-PFP-002-CO1 and the associated Findings and Observations identified in the Surveillance.

**RC-01:** CHPRC and Plutonium Finishing Plant (PFP) did not effectively manage change associated with the PFP shift to Demolition and Deconstruction (D&D) work scope and the increase in scope made possible by American Recovery and Reinvestment Act (ARRA) funding.

Collectively, a preponderance of the underlying causal factors contributing to the aggregate of immediate causal factors associated with the concern contain or conclude in elements representative of ineffective change management. Inadequacies in Conduct of Operations, radiological controls, and oversight deficiencies at the management and program level exacerbated the condition.

**CC-01:** The PFP radiological control (RadCon) organizational structure was ineffective to assure effective implementation.

RC-01 was exacerbated by deficiencies in management's ability to cause programmatic expectations to adequately flow down to implementing work process documents and to the workers who perform the work. Project and Program managers did not successfully collaborate to ensure program requirements and expectations were implemented. Positional authority from the program was ineffective.

**CC-02:** PFP Conduct of Operations culture was less than adequate.

RC-01 was exacerbated by Conduct of Operations deficiencies at the project and company level. Since contract award and through early 2011 several CHPRC issues and events were related to deficiencies in radiological work execution. Between March 29 and May 24, 2011, PFP noted a number of events that indicated that a potential negative trend existed related to procedure compliance. This prompted initiation of CR-2011-1707, "*Potential Trend Related to Failure to Follow Procedure/Work Instructions.*" A Root Cause Evaluation (RCE) team was chartered to determine if common causes or underlying issues existed for the recent events.

CHPRC has experienced a number of work control and conduct of operation issues in recent years. The actions to address these issues and the collective causes have not fully prevented recurrence. Recent work control and Conduct of Operations issues (events), some with radiological consequences to workers have occurred, as CHPRC continues to implement comprehensive work control and Conduct of Operations corrective actions to effect a cultural change (improvement) within the CHPRC work force. CHPRC initiated CR-2011-1810,

*“Common Cause(s) of Work Control and Conduct of Operations Issue.”* to evaluate this issue using common cause analysis methods.

## **EXTENT OF CONDITION**

The root and contributing causes identified relative to the overall concern are believed to be transportable throughout CHPRC projects. Therefore, both PFP-specific and company level corrective actions are provided.

## **ACTIONS**

The RCE team identified actions to address RC-01, CC-01 and CC-02. No Remedial Actions were identified and five Preventive Actions (PAs) are necessary to address the Root Cause and Contributing Causes (beyond those actions taken for the individual events).

Additionally, it was noted that the Integrated Corrective Action Plan (ICAP) is designed to address programmatic and cultural shortcomings related to work management. The ICAP corrective actions are complete and have been implemented across CHPRC. Those actions address the issues management problems identified during this analysis.

The following PAs were developed to prevent the recurrence of this event and focus on impacts to the RadCon Organizational Structure, Change Management, and Conduct of Operations.

The following five PAs address the Root and Contributing Causes.

- **PA-01:** Develop and implement process to promote the successful planning, communication, and implementation of change to achieve desired results.

The process should communicate management expectations and tools to evaluate when it is necessary or advisable to evaluate the potential impacts/risk of change on a CHPRC project. The process will focus on changes impacting personnel, processes, or performance with predicative and reactive entry modes. The process should challenge radiological control management with a series of questions in anticipation of change implementation, or in response to indicators that existing mitigating efforts are inadequate, that may result in detrimental, unexpected, or unacceptable consequences, and to identify corrective or mitigating action to avoid those consequences. The process should also interface with the existing CHPRC Risk Management procedure (PRC-PRO-PC-40079) to ensure that radiological control change management evaluations are considered for impacts to existing assumptions and evaluations relative to mitigating project technical, cost, and schedule risks throughout the life of the project. Fundamental elements should include:

- Assessment of risk and complexity
- Validation of the need for change
- Development of a Change Management Plan
- Implementation of the change
- Post implementation effectiveness review

- **PA-02:** Centralize the RadCon program. Realign accountability lines from Project Line management to the Radiological Control program to enhance collaboration and balancing of requirements and production goals and to promote consistency across project lines.
- **PA-03:** Perform a needs analysis to determine training needs related to PA-01. Develop new, or incorporate into existing training, the results of the analysis. When complete, administer the necessary training.
- **PA-04:** Perform a Common Cause analysis of Work Control and Conduct of Operations Issues across CHPRC.

CHPRC has experienced a number of work control and conduct of operation issues in recent years. The actions to address these issues and the collective causes have not fully prevented recurrence. CHPRC initiated CR-2011-1810 to initiate the common cause analysis.

- **PA-05:** Implement the preventive actions identified by the causal analysis performed in response to CR-2011-1707.

Between March 29 and May 24, 2011, PFP noted a number of events which indicated that a potential negative trend existed related to procedure compliance. This prompted initiation of CR-2011-1707. An RCE Team was chartered to determine if common causes or underlying issues existed for the recent events.

Note: PA-04 and PA-05 address the conduct of operations issues identified at PFP and leverage improvement in this element throughout CHPRC respectively.

## ISSUE/ACTION MATRICES

Two Causal Reconciliation Matrices are provided. Attachment 1 for the Concern and Attachment 2 for the specific Findings and Observations requiring RL closure. The information is presented as requested by DOE RL Contractor Requirements Document (CRD) O 470.2B (Supp Rev 2.), "*Independent Oversight and Performance Assurance Program.*" Disposition of actions and closure will be performed in accordance with PRC-PRO-QA-052," *Issues Management.*" The information and dates associated with action planning, responsible party assignment and completion are tracked in the Condition and Reporting Resolution System (CRRS).

Current CR review and closure verification information may be retrieved at:

[https://xiproduct.rl.gov/businessobjects/enterprise115/InfoView/scripts/documentXML.aspx?token=&cmdP1=untitled\\*310502530\\*0\\*\\*\\*&cmd=askView&cmdBlock=all&cmdP2=](https://xiproduct.rl.gov/businessobjects/enterprise115/InfoView/scripts/documentXML.aspx?token=&cmdP1=untitled*310502530*0***&cmd=askView&cmdBlock=all&cmdP2=)



ATTACHMENT 1: CAUSAL RECONCILIATION MATRIX (CR-2011-2196)

Applicable Cause(s)	Action	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Expected Results	Effectiveness Review Criteria
RC-01	PA-01	<p>Develop a radiological control management change management process, based on industry standards, that focuses on changes impacting personnel, processes, or performance.</p> <p>Fundamental elements should include:</p> <ul style="list-style-type: none"> <li>• Assessment of risk and complexity</li> <li>• Validation of the need for change</li> <li>• Development of a Change Management Plan</li> <li>• Implementation of the change</li> <li>• Post implementation effectiveness review</li> </ul> <p>The process should also interface with the existing CHPRC Risk Management procedure (PRC-PRO-PC-40079) to ensure that radiological control change management evaluations are considered for impacts to existing assumptions and evaluations relative to mitigating project technical, cost, and schedule risks throughout the life of the project.</p>	Copy of new process/procedure.	12/31/2011	TE Bratvoid	The effects of impending changes are anticipated/ managed such that performance is positively impacted.	The Change Management process is utilized. Results indicate that changes to programs, processes, procedures, organizations, and work conditions are thoroughly evaluated.
CC-01	PA-02	<p>Centralize the RadCon program. Realign accountability lines from Project Line management to the Radiological Control program to enhance collaboration and balancing of requirements and production goals and to promote consistency across project lines.</p>	Copy of radiological protection organizational chart reflecting a centralized organizational structure.	11/30/2011	TL Vaughn	The CHPRC RadCon Program effectively implemented at PFP and balance of projects	<p>Both project and program radiological control personnel demonstrate collaborative and effective regard for compliantly completing work and Line management customers recognize "healthy tension" with RadCon. Management Observation Program and Work Site Assessment identify a reduction in the overall rate of PFP events related to not following the procedure/work instructions.</p> <p>Management Observation Program and Work Site Assessment identify a reduction in the overall rate of events related to PFP</p> <p>Radiological work planning process issues. The CHPRC RadCon Program effectively implemented at PFP and balance of projects.</p>
CC-01	PA-03	<p>Perform a needs analysis to determine training needs related to PA-01. Develop new, or incorporate into existing training, the results of the assessment. When complete, administer the necessary training.</p>	Copy of training needs analysis.	1/31/2012	TE Bratvoid	The organization understands and provides the requisite training needed to educate and inform affected employees of the new requirements.	Affected employees possess a comprehensive working knowledge of the new requirements, expectation and/or processes. Workers understand their roles and responsibilities.

Applicable Cause(s)	Action	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Expected Results	Effectiveness Review Criteria
CC-02	PA-04	Perform a Common Cause analysis of Work Control and Conduct of Operations Issues across CHPRC.	Copy of the common cause analysis.	9/30/2011	GM Grant	Perform a common cause analysis using a team approach to review/evaluate recent operational events to determine commonalities/common causes related to work control implementation at CHPRC. The evaluation will include comparing/aligning the results of this evaluation against on-going corrective actions (i.e., Integrated Corrective Action Plan (ICAP), and occurrence reporting) to determine if any new causes or performance trends are developing and/or if additional evaluation and corrective actions are necessary.	Common cause analysis is complete and analysis identifies that existing corrective actions are appropriate or additional corrective actions are identified and loaded into CRRS.
CC-02	PA-05	Refer to Attachment 2 (Finding 11 Portion)					

ATTACHMENT 2: CORRECTIVE ACTION PLAN FOR FINDINGS AND OBSERVATIONS

S-11-SED-CHPRC-PFP-002 Surveillance Ref	Resultant CR(s) (* indicates Process/Program Action)	Date Identified	Cause Codes	Corrective Action(s)	Closure Requirements	Action Owner	Action Status/Due Date
S-11-SED-CHPRC-PFP-002-F01: Less than adequate analysis of hazards has occurred at PFP resulting in airborne radioactivity above the protection factor of the respiratory protection worn and multiple events involving spread of contamination. Investigation revealed a programmatic deficiency in hazards analysis existed	CR-2011-0380	1/27/2011	A5B2C08 - Incomplete / situation not covered A3B2C03 - Situation incorrectly identified or represented resulting in wrong rule used	Develop and implement a Technical Evaluation which establishes the expectation to calculate the airborne estimates unmitigated and applies a consistent methodology of hazard controls to mitigate the hazards.  CA1) Develop radiological hazard analysis and appropriate controls training for qualified Radiological Work Planners. a. Training must address how to appropriately determine hazards before mitigation; b. address the use of ventilation and associated calculations; c. address the use and types of containments; and d. address proper use and documentation of the results.  CA2) Ensure Waste and Fuels workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.  CA3) Ensure D&D workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.  CA4) Ensure Soil and Ground Water workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.  CA5) Ensure assigned PFP workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.	Copy of issued Technical Evaluation.  Copy of training material. Copy of training rosters for qualified radiological work planners.	CK Bean  KW McLain	Complete 6/09/2011  Due: 11/11/2011
	CR-2011-2008	6/22/2011	A6B1C03 - Training Deficiency, No Training Provided, Work incorrectly considered "skill of the craft"	CA1) Develop a tool for performing airborne radioactivity estimates based on the guidance in PRC-0994-CDMP-001.  CA2) Provide the tool for performing airborne radioactivity estimates in the Radiological Work Planning procedure(s).	Copy of revised procedure PRC-PRO-RP-40109 showing overt requirement to perform airborne calculations as part of the radiological work planning process.  Copy of new airborne estimating tool.	KW McLain	Complete 7/05/2011
	CR-2011-0408	2/1/2011	A3B3C01 - Attention was given to wrong issues				

<p><b>S-11-SED-CHPRC-PFP-002-F02:</b> Scope of Work was not always adequately defined at the activity level for hazards analysis, resulting in less than adequate radiological controls identification and implementation.</p>	<p>CR-2010-1477A</p>	<p>05/22/2010</p>	<p>A4B1C01 - Management policy/guidance/expectations not well defined, understood or enforced A4B5C09 - Change-related documents not developed or revised</p>	<p>This Significant CR included a 21 action CAP which included revision to, and associated training on, the new work control program within CHPRC. This was implemented across the company on 06/20/2011. Revised PRC-PRO-WKM-12115, associated training, and Guide.</p>	<p>Copy of Revised work planning procedure (PRC-PRO-WKM-12115), associated Guide (PRC-GD-WKM-12116), and training completion rosters for affected individuals.</p>	<p>JC Hoffman</p>	<p>Complete 06/20/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F03:</b> The "flexible" Decontamination and Demolition (D&amp;D) work packages resulted in "flexible" radiological controls in the work packages, which resulted in the actual controls being determined in the field by individuals not qualified in radiological hazards analysis resulting in inadequate hazards controls. Roles and responsibilities for determining radiological controls were not clearly defined.</p>	<p>CR-2011-0466</p>	<p>1/28/2011</p>	<p>A3B2C04 - Previous success in use of rule reinforced continued use of rule A4B3C11 - Inadequate work package preparation A3B2C04 - Previous success in use of rule reinforced continued use of rule</p>	<p>Communicate to FWSs the need to verify the size of items they are planning to dispose of in a 55 gallon drum. Perform a walk down of work packages that have a similar waste stream to work package 2Z-10-03825 to verify that the proper planning/controls are in place.</p>	<p>Closure statement that field work supervisors were directed to verify size of items prior to attempting to place into waste drums. Closure statement indicating that a walk down of work packages with a similar waste stream was performed and that reviewed packages were verified to have appropriate controls.</p>	<p>BC Leonard BC Leonard</p>	<p>Complete 4/14/2011 Complete 5/18/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F04:</b> Engineering controls were not adequately incorporated to control airborne radioactivity and spread of contamination for some work activities, resulting in high airborne radioactivity and spreads of contamination. Engineering staff were not always adequately engaged in the radiological engineering of the work.</p>	<p>CR-2011-0939</p>	<p>3/16/2011</p>	<p>A4B1C02 - Job performance standards not adequately defined A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable</p>	<p>CA1 Issue RadCon Technical Evaluation (TE) regarding Radiological Engineering Methods at PFP. TE should include benchmarking with other DOE contractors for consistency of approach and rigor. CA2 Provide Briefing to PFP, Radiological Engineering and Health Physicist staff on the Technical Evaluation for radiological engineering at PFP. CA3 Evaluate a representative sampling of medium and high hazard work packages, using the attached checklist (reviewform.docx), at all projects other than PFP to verify adequacy of controls relative to the associated hazard CA4 Issue formal expectations to Radiological Engineering and Industrial Hygienists relative to the selection of containment as the first choice of hazard controls for breaching radioactive systems. CA5 Establish radiological air quality information board that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Copy of issued Technical Evaluation. Copy of briefing provided to PFP radiological work planners. Copy of attendance rosters for PFP radiological work planners. Copy of the extent of condition review performed at WFMP, D&amp;D, S&amp;GW. Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls. Closure statement indicating that radiological air quality information board has been established at PFP that presents results of Quarterly Tracking &amp; Trending analysis to project personnel</p>	<p>CK Bean</p>	<p>Complete 6/17/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F05:</b> Training and qualification of radiological work planners was found less than adequate. Training did not adequately cover applied radiological hazards analysis.</p>	<p>CR-2011-1029</p>	<p>3/24/2011</p>	<p>A5B2C08 - Incomplete/situation not covered</p>	<p>Revise RWP's and BWP's to consistently include High Contamination Area (HCA) postings/controls for entries based on work scope and location to ensure compliant postings and controls are deployed for work. CA1 Revise work package 2Z-10-2068 to include the utilization of a down drafter, surveys and fixatives, during cutting activities of the glovebox. CA2 Evaluate the AMW to address higher contamination levels for 242-Z. Incorporate necessary changes in work package 2Z-10-2068.</p>	<p>Closure statement indicating RMA/RMC lines have been posted as HCA/ARA and associated RWPS and BWPs revised accordingly.</p>	<p>CK Bean</p>	<p>Complete 7/12/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F06:</b> Engineering staff were not always adequately engaged in the radiological engineering of the work.</p>	<p>CR-2011-1223</p>	<p>4/6/2011</p>	<p>A5B2C08 - Incomplete/situation not covered</p>	<p>CA1 Develop a tool for performing airborne radioactivity estimates based on the guidance in PRC-0904-CDMP-001. CA2 Provide the tool for performing airborne radioactivity estimates in the Radiological Work Planning procedure(s).</p>	<p>Copy of revised work package 2Z-10-2068. Copy of revised AMW for package 2Z-10-2068.</p>	<p>RL Garcia</p>	<p>Complete 5/6/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F07:</b> Engineering staff were not always adequately engaged in the radiological engineering of the work.</p>	<p>CR-2011-0408</p>	<p>2/1/2011</p>	<p>A3B3C01 - Attention was given to wrong issues</p>	<p>Copy of revised procedure PRC-PRO-RP-40109 showing overt requirement to perform airborne calculations as part of the radiological work planning process. Copy of new airborne estimating tool.</p>	<p>Copy of revised procedure PRC-PRO-RP-40109 showing overt requirement to perform airborne calculations as part of the radiological work planning process. Copy of new airborne estimating tool.</p>	<p>KW McLain</p>	<p>Complete 7/05/2011</p>

Due: 11/11/2011	KW McLain	Copy of training material. Copy of training rosters for qualified radiological work planners	Complete 7/05/2011
<p>CR-2011-2008</p> <p>6/22/2011</p> <p>A6B1C03 - Training Deficiency, No Training Provided. Work incorrectly considered "skill of the craft"</p>	<p>CA1) Develop radiological hazard analysis and appropriate controls training for qualified Radiological Work Planners. a. Training must address how to appropriately determine hazards before mitigation; b. address the use of ventilation and associated contaminants; c. address the use and types of documentation of the results</p> <p>CA2) Ensure Waste and Fuels workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.</p> <p>CA3) Ensure D&amp;D workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.</p> <p>CA4) Ensure Soil and Ground Water workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.</p> <p>CA5) Ensure assigned PFP workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.</p>	<p>Copy of revised procedure PRC-PRO-RP-40109 showing overt requirement to perform airborne calculations as part of the radiological work planning process.</p> <p>Copy of new airborne estimating tool.</p>	<p>Complete 7/05/2011</p>
<p>CR-2011-0408</p> <p>2/7/2011</p> <p>A3B3C01 - Attention was given to wrong issues</p>	<p>CA1) Issue RadCon Technical Evaluation (TE) regarding Radiological Engineering Methods at PFP. TE should include benchmarking with other DOE contractors for consistency of approach and rigor.</p> <p>CA2) Provide Briefing to PFP Radiological Engineering and Health Physicist staff on the Technical Evaluation for radiological engineering at PFP.</p> <p>CA3) Evaluate a representative sampling of medium and high hazard work packages, using the attached checklist (reviewform docx), at all projects other than PFP to verify adequacy of controls relative to the associated hazard.</p> <p>CA4) Issue formal expectations to Radiological Engineering and Industrial Hygienists relative to the selection of containment as the first choice of hazard controls for breathing radioactive systems.</p> <p>CA5) Establish radiological air quality information board that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Copy of issued Technical Evaluation.</p> <p>Copy of briefing provided to PFP radiological work planners.</p> <p>Copy of attendance rosters for PFP radiological work planners.</p> <p>Copy of the extent of condition review performed at WFMP, D&amp;D, S&amp;GW.</p> <p>Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls.</p> <p>Closure statement indicating that radiological air quality information board has been established at PFP that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Complete 6/17/2011</p>
<p>CR-2011-0939</p> <p>3/16/2011</p> <p>A4B1C02 - Job performance standards not adequately defined A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable</p>	<p>S-11-SED-CHPRC-PFP-002-F06: PFP did not have a procedure on how to perform airborne radioactivity estimates for hazards analysis and work planning. The CHPRC technical basis document for workplace air monitoring did not address estimating airborne radioactivity levels for hazard analysis and work planning.</p>	<p>Copy of issued Technical Evaluation.</p> <p>Copy of briefing provided to PFP radiological work planners.</p> <p>Copy of attendance rosters for PFP radiological work planners.</p> <p>Copy of the extent of condition review performed at WFMP, D&amp;D, S&amp;GW.</p> <p>Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls.</p> <p>Closure statement indicating that radiological air quality information board has been established at PFP that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Complete 6/17/2011</p>

<p><b>S-11-SED-CHPRC-PFP-002-F07:</b> The contractor radiological staffing resources were less than adequate to accommodate personnel losses and planned accelerated decontamination and demolition work.</p>	<p>CR-2011-1243</p>	<p>4/7/2011</p>	<p>A4B3C02 - Insufficient supervisory resources to provide necessary supervision</p>	<p>CA1) Procure or reallocate Radiological Engineers to be available for AHWAs. In addition to the additional radiological engineers, 3 additional RadCon supervisors were assigned to PFP.</p>	<p>Copy of organization chart showing additional resources.</p>	<p>CK Bean</p>	<p>Complete 5/06/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F08:</b> The Hanford Combination Neutron Dosimeter (HCND) was not assigned to multiple individuals that met the criteria for monitoring as specified in the Hanford technical basis document. The CHPRC procedure did not fully incorporate monitoring criteria from the Hanford External Dosimetry Technical Basis Manual</p>	<p>CR-2011-1303*</p>	<p>4/19/2011</p>	<p>A5B3C07 - Facts wrong/requirements not correct</p>	<p>Incorporate monitoring criteria from the Hanford External Dosimetry Technical Basis Manual in procedure PRC-PRO-RP-379.</p>	<p>Copy of revised procedure PRC-PRO-RP-379.</p>	<p>KW McLain</p>	<p>Due: 9/30/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F09:</b> Technical errors were identified in five out of nineteen External Dosimetry Investigation Reports (EDIRs)</p>	<p>CR-2011-0841</p>	<p>3/8/2011</p>	<p>A5B3C01 - Lack of written communication A4B1C01 - Management policy guidance/expectations not well-defined, understood or enforced</p>	<p>CA1) Document review of CY10 dose reports relative to dosimeter type and exchange frequency, including evaluation of annual neutron exposures exceeding 80 mrem in 2010; determine if HCND was assigned. Based on CY11 dose estimates, evaluate potential for workers to exceed 100 mrem neutrons in FY11 and ensure HCNDs are assigned appropriately. Also document exchange frequency against CY10 dose reports, PRC-379 exchange criteria, and CY11 dose projections. Identify any changes made based on this evaluation. CA2) Evaluate PFP dosimetrist evaluation (CA-1) and provide direction regarding type and frequency change direction.</p>	<p>Copy of evaluation. Closure statement indicating action taken regarding type and frequency of TLD use at PFP.</p>	<p>TE Bravold</p>	<p>Complete 4/27/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F10:</b> Airborne radioactivity monitoring results at PFP were not adequately reviewed to ensure individuals likely to receive a committed effective dose of 0.1 rem or more from all occupational radioactive intakes in a year were appropriately monitored through the</p>	<p>CR-2011-1283*</p>	<p>4/18/2011</p>	<p>A6B1C01 - Decision not to train A4B3C01 - Insufficient time for worker to prepare task A5B3C01 - Lack of written communication A4B3C04 - Too few workers assigned to task</p>	<p>CA1) Revise the procedure to provide clarity for required documentation for the investigation package, require the projects to submit the EDIR within 14 days, and require a peer review of all the EDIR at the project level. CA2) Develop process overview material and implement a briefing for everyone that has to complete or review the EDIRs. CA3) Provide additional instruction on how to fill out the EDIRs on the Hanford Site Forms. CA4) Correct the EDIRs that were identified by DOE in the OA (five EDIRs) and the EDIRs that were identified during the EOC (13 EDIRs).</p>	<p>Copy of revised procedure PRC-PRO-RP-40068. Copy of briefing materials for personnel completing EDIRs. Copy of briefing rosters for personnel performing EDIRs. Copy of EDIR instruction sheet associated. Closure statement that EDIRs have been corrected, reviewed, and forwarded to PNNL for records retention.</p>	<p>KW McLain</p>	<p>Due: 9/30/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F10:</b> Airborne radioactivity monitoring results at PFP were not adequately reviewed to ensure individuals likely to receive a committed effective dose of 0.1 rem or more from all occupational radioactive intakes in a year were appropriately monitored through the</p>	<p>CR-2011-0865*</p>	<p>3/7/2011</p>	<p>A4B1C02 - Job performance standards not adequately defined A4B1C01 - Management policy guidance/expectations not well-defined, understood or enforced</p>	<p>CA1) Revise FSP-PFP-5-8, Procedure 14.18 to ensure tracking/trending of routine air sampling is done to the 2% DAC criteria and includes criteria to perform investigations when above the criteria. CA2) Revise PRC-PRO-RP-40031 to ensure tracking and trending of routine air sampling is done to the 2% DAC criteria.</p>	<p>Copy of revised procedure FSP-PFP-5-8, Procedure 14.18. Copy of revised procedure PRC-PRO-RP-40031.</p>	<p>KW McLain</p>	<p>Complete 5/10/2011</p>

<p>internal dosimetry program.</p> <p><b>S-11-SED-CHPRC-PPF-002-F11:</b> Less than adequate conduct of operations was observed. Failures to follow procedures contributed to generation of airborne radioactivity and low level uptakes.</p>	<p>CR-2011-0936</p>	<p>3/7/2011</p>	<p>A4B2C02 - Insufficient supervisory resources to provide necessary supervision A4B1C04 - Management follow-up or monitoring of activities did not identify problems A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable - A4B2C01 - Too many administrative duties assigned to immediate supervisor</p>	<p>CA1) Provide formal management expectations for health physicist/radiological engineering staff serving as PPF project points of contact for functional elements of the RadCon Program.  CA2) Complete/document review of radiological work permits to determine additional RWPs (Z-899 already revised based immediate corrective actions) that should require bioassay for personnel working in contaminated areas (i.e., potential to exceed 100 mrem/year outside of a posed airborne radioactivity area based on air sample tracking/trending).  CA3) Generate tracking and trending charts for the rolling year ending March 2011.  CA4) Evaluate trending data to determine potential for an individual to receive 100mrem in the last year without being included in the bioassay program.</p>	<p>CK Bean</p>	<p>Complete 6/22/2011</p>
<p>CR-2011-0554</p>	<p>2/15/2011</p>	<p>A4B3C11 - Inadequate work package preparation A3B2C04 - Previous success in use of rule reinforced continued use of rule</p>	<p>Perform a walk down of work packages that have a similar waste stream to work package 22-10-03825 to verify that the proper planning/controls are in place.</p>	<p>BC Leonard</p>	<p>Complete 5/18/2011</p>	
<p>CR-2011-1810-</p>	<p>05/31/2011</p>	<p>TBD</p>	<p>Perform a common cause analysis using a team approach to review/evaluate recent operational events to determine commonalities/common causes related to work control implementation at CHPRC. The evaluation will include comparing/aligning the results of this evaluation against on-going corrective actions (i.e. Integrated Corrective Action Plan (ICAP), and occurrence reporting) to determine if any new causes or performance trends are developing and/or if additional evaluation and corrective actions are necessary.</p>	<p>GM Grant</p>	<p>Due 09/30/2011</p>	
<p>CR-2011-1707</p>	<p>5/24/2011</p>	<p>A4B1C01 - Management policy guidance/expectations not well-defined, understood or enforced A4B1C06 - Previous industry or in-house experience was not effectively used to prevent recurrence A4B1C09 - Corrective action for previously identified problem or event was not adequate to prevent recurrence A3B2C02 - Signs to stop were ignored and step performed incorrectly</p>	<p>PA1. Develop a new PPF procedure to require: 1) During the Pre-job briefing Field Work Supervisor (FWSs) shall read aloud the words of the tasks expected to be performed during the day's activities. 2) FWSs shall conduct an interactive pre-job briefing with the work team on the written work steps to be performed for each work evolution. This includes specific questioning on the tasks to be performed. 3) Pre-job attendees sign the CHPRC Pre-Job Briefing Checklist after the FWS has asked if the work team clearly understands their job responsibilities and are qualified for the work assigned. Signature on this form acknowledges that the workers understand the work tasks as they are written.</p>	<p>TC Otten</p>	<p>Due 12/07/2011</p>	

	<p>4) FWSs shall be able to declare which work step they are working at any given time.</p> <p><b>PA2:</b> PFP Vice President to conduct a documented briefing of expectations for Directors, Managers and FWSs to reiterate the requirement to perform work within defined controls. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1)</li> <li>• Definition of verbalism compliance</li> <li>• Expectations for Walkability Walkdowns.</li> <li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li> <li>• Review of stop work responsibility.</li> <li>• Expectation to share the briefing with PFP personnel.</li> </ul> <p><b>PA3:</b> PFP Vice President to conduct a documented briefing of expectations for personnel performing MOPs to reiterate the purpose and requirements of the program. This includes, but is not limited to SSOs. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1).</li> <li>• Purpose of the MOP/SSO program is to identify weaknesses and opportunities for improvement. Additionally, SSOs provide immediate feedback and mentoring to FWSs and work teams.</li> <li>• The importance of maintaining independence.</li> <li>• Expectations for Walkability Walkdowns.</li> <li>• Review of requirements for review of written instructions prior to performance of work in the facility.</li> <li>• Definition of verbalism compliance.</li> <li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li> <li>• Review of stop work responsibility.</li> </ul> <p><b>PA4:</b> Revise PFP SSO procedure, FSP-PPP-5, 8, 2, 6 to:</p> <ul style="list-style-type: none"> <li>• Identify FWS past work performance (e.g., failure to perform work per procedure/work instruction) as a factor to be considered when determining whether continuous SSO coverage is required.</li> <li>• Require that the specific work package steps that will be worked during the observation are documented in the SSO record to ensure the observer understands the steps to be worked.</li> </ul> <p><b>PA5:</b> Perform a Training Needs Analysis (TNA) related to Actions 1, 2 and 3.</p> <p><b>PA6:</b> Develop new, or incorporate into existing training, the results of the Training Needs Analysis conducted in Action 5.</p> <p><b>PA7:</b> Conduct the first session of the new or revised training developed in Action 6.</p> <p><b>PA8:</b> Institute the conduct of a quarterly workshop for</p>	
<p>avere that the training is available (e.g. email) as objective evidence.</p> <p><b>PA-07:</b> Copy of training/attendance roster.</p> <p><b>PA-08:</b> Copy of attendance roster from the first Quarterly workshop for FWSs and a proposed schedule for FY 2012 as objective evidence.</p> <p><b>PA-09:</b> Copy of attendance roster from the first Quarterly workshop for SSOs and a proposed schedule for FY 2012 as objective evidence.</p>		



<p><b>S-11-SED-CHPRC-PPF-002-F12:</b> Required radiological hazard controls for work were not consistently documented on the AMW as specified by the form's instructions.</p>	<p>CR-2011-0939</p>	<p>3/16/2011</p>	<p>A4B1C02 - Job performance standards not adequately defined A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable</p>	<p>FWSs to discuss challenges encountered in the field. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.  PA9 - Institute the conduct of a quarterly workshop for those who perform Senior Supervisory Oversight (SSOs) to discuss challenges encountered in the field and techniques for providing feedback to work teams. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.  CA1) Issue RadCon Technical Evaluation (TE) regarding Radiological Engineering Methods at PFP. TE should include benchmarking with other DOE contractors for consistency of approach and rigor. CA2) Provide Briefing to PFP Radiological Engineering and Health Physicist staff on the Technical Evaluation for radiological engineering at PFP. CA3) Evaluate a representative sampling of medium and high hazard work packages, using the attached checklist (reviewform.docx), at all projects other than PFP to verify adequacy of controls relative to the associated hazard. CA4) Issue formal expectations to Radiological Engineering and Industrial Hygienists relative to the selection of containment as the first choice of hazard controls for breaching radioactive systems. CA5) Establish radiological air quality information board that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Copy of issued Technical Evaluation. Copy of briefing provided to PFP radiological work planners. Copy of attendance rosters for PFP radiological work planners. Copy of the extent of condition review performed at WFMP, D&amp;D, S&amp;GW. Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls. Closure statement indicating that radiological air quality information board has been established at PFP that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>CK Bean</p>	<p>Complete 6/17/2011</p>
	<p>CR-2011-1934</p>	<p>6/16/2011</p>	<p>A4B3C09 - Work planning not coordinated with all departments involved in task</p>	<p>Review draft work packages to ensure that radiological mitigative actions have been consistently incorporated into both work documents and AMW.</p>	<p>Copy of review.</p>	<p>B Oldfield</p>	<p>Due: 8/29/2011</p>
	<p>CR-2011-1935</p>	<p>6/16/2011</p>	<p>A4B3C09 - Work planning not coordinated with all departments involved in task</p>	<p>Review draft work packages to ensure that radiological mitigative actions have been consistently incorporated into both work documents and AMW. The review should include assuming that all appropriate radiological mitigative actions are documented in the AMW and are incorporated into the technical work documents.</p>	<p>Copy of review.</p>	<p>B Oldfield</p>	<p>Due: 8/29/2011</p>
<p><b>S-11-SED-CHPRC-PPF-002-001:</b> Job Specific RFPs, were written broadly and generically to cover multiple work packages</p>	<p>CR-2011-1621</p>	<p>5/16/2011</p>	<p>A5B2C05 - Ambiguous instructions/requirements</p>	<p>Revise RFPs described in the MOP associated with this CR (see PFR WPMOPresills.pdf)</p>	<p>Listing of RFPs revised and associated changes made.</p>	<p>CK Bean</p>	<p>Due: 8/29/2011</p>
<p><b>S-11-SED-CHPRC-PPF-002-002:</b> The facility's technical basis for use of plutonium values as an indicator of when to perform beryllium monitoring did not identify and evaluate plutonium-beryllium sources, as a potential source of beryllium in the facility.</p>	<p>CR-2011-2368</p>	<p>7/7/2011</p>	<p>A5B2C03 - Data/computations wrong/incomplete</p>	<p>Revise beryllium hazards assessment/technical basis to document alpha:Be expected ratio associated with PuBe source spill.</p>	<p>Copy of revised beryllium hazards assessment.</p>	<p>CK Bean</p>	<p>09/30/2011</p>

<p>S-11-SEB-CHPRC-PFP-002-003: Poor practices were identified in multiple EDIRs reviewed.</p>	<p>CR-2011-1283</p>	<p>4/18/2011</p>	<p>A6B1C01 - Decision not to train worker to prepare task A4B3C01 - Insufficient time for communication A3B3C01 - Lack of written communication A4B3C04 - Too few workers assigned to task</p>	<p>CA1) Revise the procedure to provide clarity for required documentation for the investigation package, require the process to submit the EDIR within 14 days, and require a peer review of all the EDIR that the project level. CA2) Develop process overview material and implement a briefing for everyone that has to complete or review the EDIRs. CA3) Provide additional instruction on how to fill out the EDIRs on the Hanford Site Forms. CA4) Correct the EDIRs that were identified by DOE in the OA (five EDIRs) and the EDIRs that were identified during the EOC (13 EDIRs).</p>	<p>Copy of revised procedure PRC-PRO-RP-40068 Copy of briefing materials for personnel completing EDIRs. Copy of briefing rosters for personnel performing EDIRs. Copy of EDIR instruction sheet associated. Closure statement that EDIRs have been corrected, reviewed, and forwarded to PNNL for records retention</p>	<p>KW McLain</p>	<p>Date: 9/30/2011</p>
	<p>CR-2011-1304</p>	<p>4/19/2011</p>	<p>A4B3C05 - Insufficient number of trained or experienced workers assigned to task A4B3C02 - Insufficient time allotted for task A4B4C07 - Too many concurrent tasks assigned to worker</p>	<p>Correct the EDIRs from 2010 with identified errors which result in a change to the recorded dose and submit to PNNL.</p>	<p>Closure statement that EDIRs have been corrected, reviewed, and forwarded to PNNL for records retention.</p>	<p>KW McLain</p>	<p>Complete 6/20/2011</p>

Attachment II


**ROOT CAUSE EVALUATION REPORT**

**8/4/2011**

**CR-2011-1707**


**Potential Trend Related to Failure to Follow Procedure/Work Instructions**

Team Lead:

  
S. G. Gibson, Issues Management  
Specialist, PFP Closure Project

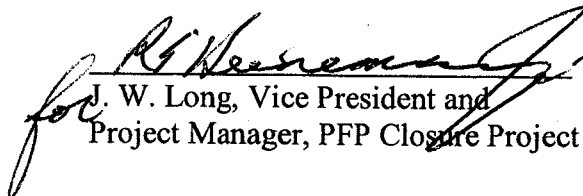
Date: 8/9/11

Responsible Manager:

  
T. C. Oten, Director, Engineering and  
Technical Support, PFP Closure Project

Date: 8/4/11

CARB Approval:

  
J. W. Long, Vice President and  
Project Manager, PFP Closure Project

Date: 8/4/11

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**ATTACHMENTS**

- ATTACHMENT A*, Description of Event Conditions
- ATTACHMENT B*, Initial Commonality Matrix of CRs
- ATTACHMENT C*, Commonality Review of Applicable CRs
- ATTACHMENT D*, Commonality Review of Applicable CRs by Cause Nodes
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- ATTACHMENT F*, Commonality Review of Applicable CRs by Human Performance Error Precursors
- ATTACHMENT G*, S-11-OOD-PFP-002 Reactive Surveillance Crosswalk
- ATTACHMENT H*, Barrier Analysis
- ATTACHMENT I*, Why Tree Analysis
- ATTACHMENT J*, Corrective Action Plan Matrix

## 1.0 PROBLEM STATEMENT AND EXECUTIVE SUMMARY

### 1.1 Problem Statement

Recently, the Plutonium Finishing Plant Closure Project (PFP) has experienced a negative trend related to Conduct of Operations issues with failure to follow procedure/work instructions in the field. Failure to follow the procedures/work instructions can lead to a recognized hazard being unmitigated, or in some cases, creation of a hazard which did not previously exist.

### 1.2 Executive Summary

This evaluation was initiated following discussion at a PFP Continuous Improvement meeting regarding apparent failures to follow procedure/work instructions. During the meeting it was noted that between March 29, 2011 and May 24, 2011, a number of events occurred which indicated a negative trend related to procedure compliance. This prompted initiation of CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions*. A Root Cause Evaluation (RCE) team was chartered to determine if there were common causes for the recent events.

The team began by identifying a list of 25 events/conditions which exhibited some element of a requirement not being followed. The list was then evaluated to focus on events/conditions that were related to failures to follow procedure/work instructions during field execution. Issues that were identified and corrected before field work began were excluded since they demonstrated the desired behavior by the work team of stopping and fixing problems prior to performing work. Based on an evaluation of each of the events the list was reduced to 12 events/conditions. Further evaluation of these 12 events/conditions for common causes identified one Direct Cause (DC-01), one Root Cause (RC-01) and two Contributing Causes (CC-01 and CC-02):

**DC-01:** PFP work teams have not consistently performed work steps as written or stopped work when the work steps could not be worked as written.

**RC-01:** PFP Management has not effectively implemented expectations for procedure compliance or consistently verified expectations for procedure compliance in the field.

**CC-01:** Techniques which foster behaviors related to procedure/work instruction compliance were provided during training, but not required or reinforced in the field.

**CC-02:** Previous actions to prevent procedure compliance issues have not been effective.

Recent improvements in the implementation of the Issues Management process led to the determination that no further corrective action is required for CC-02 at this time. Nine Preventive Actions (PAs) were developed to address RC-01 and CC-01.

**PA1:** Develop a new PFP procedure to require:

- 1) During the Pre-Job briefing Field Work Supervisor (FWSs) shall read aloud the words of the tasks expected to be performed during the day's activities.
- 2) FWSs shall conduct an interactive pre-job briefing with the work team on the written work steps to be performed for each work evolution. This includes specific questioning on the tasks to be performed.
- 3) Pre-job attendees sign the CHPRC Pre-Job Briefing Checklist after the FWS has asked if the work team clearly understands their job responsibilities and are qualified for the work assigned. Signature on this form acknowledges that the workers understand the work tasks as they are written.
- 4) FWSs shall be able to declare which work step they are working at any given time.

**PA2:** PFP Vice President to conduct a documented briefing of expectations for Directors, Managers and FWSs to reiterate the requirement to perform work within defined controls. The briefing will include the following:

- New requirements for compliance with written instructions (see PA1).
- Definition of verbatim compliance.
- Expectations for Workability Walkdowns.
- Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.
- Review of stop work responsibility.
- Expectation to share the briefing with PFP personnel.

**PA3:** PFP Vice President to conduct a documented briefing of expectations for personnel performing MOPs to reiterate the purpose and requirements of the program. This includes, but is not limited to SSOs. The briefing will include the following:

- New requirements for compliance with written instructions (see PA1).
- Purpose of the MOP/SSO program is to identify weaknesses and opportunities for improvement. Additionally, SSOs provide immediate feedback and mentoring to FWSs and work teams.
- The importance of maintaining independence.
- Expectations for Workability Walkdowns.
- Review of requirements for review of written instructions prior to performance of work in the facility.
- Definition of verbatim compliance.

- Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.
  - Review of stop work responsibility.
- PA4:** Revise PFP SSO procedure, FSP-PFP-5-8, 2.6 to:
- Identify FWS past work performance (e.g., failure to perform work per procedure/work instruction) as a factor to be considered when determining whether continuous SSO coverage is required.
  - Require that the specific work package steps that will be worked during the observation are documented in the SSO record to ensure the observer understands the steps to be worked.
- PA5:** Perform a Training Needs Analysis (TNA) related to Actions 1, 2 and 3.
- PA6:** Develop new, or incorporate into existing training, the results of the Training Needs Analysis conducted in Action 5.
- PA7:** Conduct the first session of the new or revised training developed in Action 6.
- PA8:** Institute the conduct of a quarterly workshop for FWSs to discuss challenges encountered in the field. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.
- PA9:** Institute the conduct of a quarterly workshop for those who perform as SSOs to discuss challenges encountered in the field and techniques for providing feedback to work teams. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.

The overall lesson to be learned from this evaluation is that managers must specifically define and verify standards for procedure/work instruction compliance in the field. This fosters Conduct of Operations behaviors which promote consistent adherence to management expectations to perform the work step as written or stop work.

## **2.0 EVENT DESCRIPTION**

Based on a number of issues over a short period of time related to formality of operations during the use of technical work documents, DOE-RL initiated a reactive surveillance in early May, 2011. The surveillance, S-11-OOD-PFP-002, *Use of Technical Work Documents (TWDs)*, resulted in one Concern and four Findings:



- S-11-OOD-PFP-002-COI: Formality of operations during use of TWDs at PFP is not consistent and this results in inadequate performance.
- S-11-OOD-PFP-002-FO1: During removal of a conveyer glovebox once used to move materials between rooms 235B and 230C personnel did not establish Airborne Radioactivity Area (ARA) controls when required by work package. [OA-365551]
- S-11-OOD-PFP-002-F02: During doorway opening reconfiguration for room 179, ARA controls were not implemented as required by the work package. [OA-373791]
- S-11-OOD-PFP-002-F03: A technical work document limitation about qualified personnel was not complied with during glovebox decontamination activities. [OA-374011]
- S-11-OOD-PFP-002-F04: Other examples of TWD noncompliances or use of an inadequate TWD were noted during reviews of the Operational Awareness Database and the Condition Reporting and Resolution System. [OA-36707, 36883, 36967, 36965, 36819, 37108, 37262, 36774, and 371271]

Condition Report CR-2010-1707 was initiated on May 24, 2011 following feedback from the DOE Facility Representatives regarding initiation of their reactive surveillance and discussion at a PFP Continuous Improvement meeting regarding the need to investigate and evaluate possible commonalities related to failures to follow procedure/work instructions. During the meeting, a review of performance metrics indicated that between March 29, 2011 and May 24, 2011, a number of events occurred which indicated a negative trend related to procedure compliance.

Utilizing the list of initial events, a search of the Condition Report and Resolution System (CRRS), and the information provided in the draft reactive surveillance (the final report was transmitted July 7, 2011), a total of 25 events/conditions were selected to be evaluated against the problem statement. ATTACHMENT A, *Description of Event Conditions*, identifies the 25 Condition Reports (CRs) that were evaluated and provides a brief description of each of the 25 CR issues.

It should be noted that during the conduct of RCE for CR-2011-1707, CHPRC Safety, Health, Security, and Quality initiated CR-2011-1810, *Common Cause(s) of Work Control and Conduct of Operations Issues* which identified a similar, programmatic issue that affected all CHPRC projects.

### 3.0 HISTORICAL REVIEW

During the past year the issue of procedure compliance has been identified several times as a significant problem at PFP. Two of the higher level CRs which address the issue are:

- CR-2010-1447, *Management Directs Safety Stand Down and Curtailed Non-Min Safe Activities at PFP.*
- CR-2010-2424, *Work Management and Conduct of Work Performance Recurring Issues at the PFP.*

CR-2010-1447 documents that on May 13, 2010, all work at PFP, except Minimum Safe Activity, was curtailed due to recent events. At that time PFP management directed a Safety Stand Down, and a Group 4, Subgroup B Operations (6) SC-4 Occurrence was categorized (i.e., facility or operations shutdown directed by management for safety reasons). A representative sample of events from July 21, 2009 to May 12, 2010 were reviewed and PFP management determined that significant safety and conduct of operations concerns existed in at least five key areas, one of which was "Compliance with procedures, other work documents."

CR-2010-2424 (EM-RL--CPRC-PFP-2010-0024, *Work Management and Conduct of Work Performance Recurring Issues at the PFP*) was initiated on August 8, 2010, less than 90 days after CR-2010-1447 was initiated. Initiation of a recurring "R" report was based partially on management's conclusion that the issues identified under CR-2010-1447 had not been fully addressed. CR-2010-2424 was screened as "Significant" and a RCE was conducted. Two of the Root Causes identified were directly related to procedure compliance:

1. RC1: *"Error reduction at PFP has not been effective because management expectations for Hazards Identification and Control, Work Planning, Work Management, and Work Execution are not fully understood by the work team."*

The RCE report for CR-2010-2424 explained that *"the message by the management team at PFP is clear that the top priority is to work safely, stop when unsure, have a questioning attitude and follow processes. Despite this clear message, events have occurred at PFP where the actions by the work team were contrary to this message. From interviews and observations it is clear that people know the words, but do not fully understand how that message is applied to their daily activities. Absent constant observation, coaching and mentoring, expectations will be interpreted based on the mindset and experience of the individual. At PFP the message is clear and known, but the application is lacking."*

2. RC2: *"Error reduction at PFP has not been effective because the work team displays overconfidence which, when combined with a lack of clear understanding of the application of expectations, results in a lack of a consistent questioning attitude and conservative decision making."*

The RCE report for CR-2010-2424 also explained that *"in a majority of the Condition Reports evaluated, the issue was either caused by or made more severe by the work team making an assumption and proceeding vs.*

*truly questioning the issue at hand, conservatively evaluating the potential impact of that issue and conducting the proper analysis of the issue prior to proceeding. With a highly skilled, experienced work team, the tendency is to quickly problem solve in the field and not stop, fall back and truly evaluate a situation. While that behavior was probably adequate in the steady state operations and maintenance mode of the past, the complexity and potential risk of the work, coupled with the constantly changing conditions make this an unacceptable way of performing work."*

Actions were developed and implemented to address these root causes. Selected actions of CR-2010-1477, *CHPRC Work Process Discipline* and CR-2010-1658, *CHPRC Failure to Meet Minimum Safety Performance Requirements* were also cited as addressing some portion of RC1 and RC2 of CR-2010-2424. With the exception of two Effectiveness Reviews scheduled for completion in early August 2011, the actions for CR-2010-2424 have been completed in CRRS and are being implemented at PFP and across CHPRC. Actions to increase oversight and provide real-time feedback in the field regarding management expectations for work management were completed by implementation of a Senior Supervisory Oversight (SSO) program in September 2010. Actions to improve PFP's ability to accurately identify and formulate preventive actions through the use of the Corrective Action Management system were completed in January 2011. Improvements to address deficiencies in the preparation of work packages and the work management process were fully implemented June 20, 2011.

Although the corrective actions for CR-2010-2424 were not expected to be fully effective until approximately six months after completion of the various preventive actions, the continuing trend of issues related to a lack of procedure compliance in the field warranted further immediate action. One event, which occurred in late March 2011 and is documented in CR-2011-1176, *Contamination in Rooms 230-C and/or 235-B Led to Positive Nasal*, resulted in four workers receiving an internal dose. Based on an initial evaluation of this event and other recent events, PFP management implemented several immediate corrective actions. The PFP Vice President conducted a briefing with all FWS to reemphasize the necessity of procedure compliance, and required that the FWSs sign an affidavit acknowledging that they understood the requirements for procedure compliance and would comply with those requirements. Work was not released until the briefings and affidavits were completed. After this event, PFP Issues Management and Continuous Improvement personnel continued to track incidents related to procedure compliance. During the period from March 29, 2011 to May 24, 2011, a series of events were noted which indicated that a negative trend was developing related to compliance with written procedure and work instruction compliance. This prompted initiation of CR-2011-1707.

#### **4.0 ASSESSMENT PERFORMANCE**

##### **4.1 CHPRC Assessments**

The RCE for CR-2010-2424 performed a detailed examination of assessment performance prior to August 9, 2010. This included a review of the Integrated

Evaluation Plan (IEP) for FY 2010 assessments and examined Management Assessments, Integrated Assessments, Worksite Assessments, Audits, Surveillances and Management Observations, and concluded that "with the exception of the Management Observation Program ... and the Worksite Assessment Program, the Assessment program at PFP have not been effective in identifying performance issues."

The issue of assessment adequacy was considered important enough to be identified as one of the Contributing Causes for CR-2010-2424:

*"CC1: Independent and Management Assessments have not been effective at identifying performance issues at PFP.*

*No assessments have been conducted on the Corrective Action Management process at PFP in the last year. Only two Independent Assessments have been performed in FY 2010. In general, Management Assessments have not identified existing performance issues. There have been no Management or Independent Assessments performed in the areas of work control and work management to help identify challenges in the implementation of those processes."*

Corrective Actions identified from other CRs which were to address CC1 of CR-2010-2424 were as follows:

*CR-2010-1477, Action 12: "Evaluate the 5 (part 5 is applicable to CC1) recommendations in Section 7.0 of the RCA from action 10 (of CR-2010-1477) to determine that causes in the report are addressed and what additional corrective actions need to be developed and tracked through CRRS."*

*CR-2010-1658, Action 17: "Complete a review of CHPRC Independent Assessment and Project Self-Assessment Functions, including utilizing both CHPRC and corporate resources. The main purpose of the review is to determine how these programs are being implemented and determine if additional changes are needed to improve CHPRC's critical self-assessment process."*

Review of these actions indicates that process improvements are ongoing and are being tracked to completion through their own individual CRs. The final Effectiveness Review due date for this issue is July 31, 2011. No further action is required at this time to address the CHPRC assessment issue.

#### **4.2 DOE Operational Awareness and Surveillance**

S-11-OOD-PFP-002 is a reactive surveillance which was initiated in early May, 2011. The summary of the surveillance states:

*On March 28, and on May 7, work which required Airborne Radioactivity Area (ARA) controls was completed without use of the controls required by the work packages. The TWD for each work activity required implementation of ARA controls. During the work on March 28, a significant loss of contamination control occurred. Internal depositions of radioactive material have been confirmed for four workers involved with the work activity on March 28. Following the March 28, event; a briefing and a three slide handout was provided to attendees at the 0630 morning management meeting on March 29. The briefing focused on management expectations for following TWDs, the release of work packages, the expectation for incorporation of conservative radiological controls that are protective of workers into everyday business, and a review of the circumstances for four 'events' that took place on March 28. The four events were the loss of contamination control in 230C and 235B, leaking drum in 236Z, bottle cart failure and high levels of radioactive contamination found on port ring of glove box 145-1. Prior to release of work packages on March 29, the Field Work Supervisors (FWSs) were required to sign an affidavit showing receipt of the briefing and their commitment to management's expectations. Management's expectation for complying with TWDs had been discussed at numerous briefings since the CHPRC became the contractor responsible for PFP on October 1, 2008 (including the initial orientation for PFP employees on October 1, 2008).*

*CHPRC issue management personnel had made it clear prior to March 29, that use of a briefing as a standalone corrective action should not be relied on prevent recurrence. The affidavit was apparently viewed by PFP management as an additional action which could be relied on to prevent recurrence. However, it was not clear to the FRs that signing the affidavit was more sustainable than signing an attendance rooster.*

*On May 7, work associated with removal of door 215 and adjacent wall area was conducted without implementation of ARA controls specified in the work instruction. Upon identification of this noncompliance, direction was provided by the Shift Operations Manager (SOM) to place the work in a stable configuration. The action taken by the work team to place the work in a stable configuration was to complete the remaining work tasks installing support framing on wall cut area, once again without implementing ARA controls.*

*On May 12, a similar noncompliance with a TWD occurred during Aspigel use. The procedure for Aspigel required four qualified personnel to be assigned to the work activities covered by the procedure. Aspigel work activities were performed with only two qualified personnel assigned to the work team. In addition to the three instances (March 28, May 7, and May 12) of TWD noncompliances that were the triggers for recognizing that formal communication about TWD use was needed, the FRs have identified other oversight activities performed by FRs since March 29, that noted noncompliances with TWDs. The FRs also searched the Condition Reporting and Resolution Reporting System (CRRS) database and identified instances of TWD noncompliances identified by CHPRC personnel in CRRS since March 29. This reactive surveillance was completed in response to the March 28, May 7, and May 12 instances of TWD noncompliance and the reviews of the Operational Awareness (OA) and CRRS databases. RL is concerned that formality of operations during use of TWDs is not consistently implemented at PFP.*

S-11-OOD-PFP-002 references a total of 17 OAs and provides additional evidence of the negative trend in compliance with TWDs over the same time period evaluated by this common cause analysis. A review of the initiating documents for the 12 CRs ultimately chosen for analysis indicates that 50% of the problems with procedure compliance in the field were identified by OAs and 50% were either self-identified by PFP or an event occurred which revealed the condition. ATTACHMENT G, S-11-OOD-PFP-002, *Reactive Surveillance Crosswalk*, provides a tabulation of the referenced OAs, associated CRs, and identification of the initiating organization.

## 5.0 PROBLEM ANALYSIS

### 5.1 Analysis Description

The chartered RCE team was comprised of the following members:

*Responsible Manager:*

- Tim Oten, PFP Engineering and Technical Support Director

*Cause Evaluation Team Leader:*

- Shawn Gibson, PFP Issues Management Specialist

*Cause Team Members:*

- John Carranco, PFP Deputy Project Manager
- Pete Owen, PFP Conduct of Operations Manager
- James Brack, PFP Safety Basis and Performance Oversight Director
- Terry Hunter, PFP Work Control Manager
- Kathleen Jennings-Mills, PFP Engineering Manager
- Mike Ford, PFP Issues Management Specialist

The overall objective for a root common cause analysis is to identify common elements between distinct, unique events or issues. The underlying elements can be anything from a common failure mode to a common cause. The methodology the team used to determine common cause is similar to other cause analysis methodologies used to perform organizational and programmatic diagnostics to determine weakness that transcend individual events/issues.

The RCE Lead developed the initial list of 25 CRs, reviewed the documents, and conducted interviews with many of the individuals involved. The interviewees included Responsible Managers, Issues Management personnel assigned to the CR, and work team members. The team chose to revise the original charter problem statement to read, "Recently, the Plutonium Finishing Plant Closure Project (PFP) has experienced a negative trend related to Conduct of Operations issues with failure to follow procedure/work instructions "in the field" to incorporate the focus on field performance. The RCE team then reviewed the associated CRs to obtain a more thorough understanding of the events. During this review the team sought to answer two questions which were specifically chosen to focus the evaluation on the issue of procedure noncompliance in the field:

- 1) Was there an issue where a procedure or work instruction was not followed in the field?
- 2) Did a document or procedure problem exist prior to release of a work package or use of an approved/issued procedure in the field?

The responses to these questions are documented in ATTACHMENT B, *Initial Commonality Matrix of CRs*. During the course of the review, the team concluded that issues identified and corrected before field work began would be excluded from further evaluation since the work team demonstrated the desired behavior of stopping and fixing problems prior to performing work. Additionally, since CHPRC is currently in the process of implementing numerous work management improvements the team determined that issues which were the result of weaknesses in the preparation of work packages would be excluded, and the focus of further evaluation would be on the 12 events/conditions in which there was some form of failure to follow procedure/work instructions in the field.

Further evaluation of the 12 events was performed to identify common types or causes of failure. ATTACHMENT C, *Commonality Review of Applicable CRs* provides additional detail of the results of the evaluation and identifies areas where a particular failure was common to 50% or more of the events/conditions. Of the 12 events, the team noted that 50% changed some portion of the work document after the document was released for work. Some of these revisions were to compensate for habit patterns or other human performance error precursors; others were to account for process flaws which contributed to the failure to follow work instructions in the field. These process issues will be addressed by the work management improvements presently underway.

The team also noted that 92% of the applicable events involved Human Performance Issues. Based on the high percentage of human errors the team chose to focus on Human Performance breakdowns. Each of the 12 events were reviewed against human performance error precursors that fall under the general categories of task demands, individual capabilities, work environment and human nature to identify commonalities among the events. The results of the review are provided in ATTACHMENT F, *Commonality Review of Applicable CRs by Human Performance Error Precursors*, and indicate a high degree of commonality in two areas. Approximately 75% of the events have some contribution from "lack of or unclear standards," which is generally related to management expectations and requirements for procedure compliance. Approximately 83% of events are associated with "complacency/overconfidence," which is related to complacency due to previous success and confidence in workers' ability to adapt to conditions. It was also noted that about 25% of the events resulted in documented disciplinary action.

The team then reviewed the documents again for any commonality in causes. However, only two of the 12 had undergone formal causal analysis at the time of the review. For the purpose of grouping the issues, two team members (trained cause evaluators), determined the applicable cause codes. The codes were determined to the "B" node since the "A" nodes do not provide adequate detail for further analysis. The results of this review are summarized in ATTACHMENT D, *Commonality Review of Applicable CRs by Cause Nodes*. Four "B" nodes were found to have at least 50% commonality among the 12 CRs:

**A3B1 - Human Performance - Skill Based Error:**

This usually takes the form of a mental lapse. The individual knew the right action to take (through training or experience), but failed to take the action.

**A3B2 - Human Performance - Rule Based Error:**

This involves two types of errors: 1) The rule exists and the worker was aware of it, but the worker failed to read the words; and 2) The rule exists, but the worker was not aware it existed. This second type of error usually occurs when an individual relies on stored knowledge/experience when determining their actions.

**A4B1 - Management Problem - Management Methods:**

The cause codes applied fell in two areas: 1) Management expectations for procedure compliance were not well-defined, understood, or enforced; and 2) Corrective actions for this known problem had not prevented Procedure Noncompliance.



**A5B2 - Communications LTA - Written Communication Content LTA:**

This code was applied not necessarily as a "true cause", but as a trend code for when work document revision was recognized as being required during corrective action development.

As discussed previously, the written communication cause code, A5B2, is considered to be addressed by the work management program improvements currently underway.

A Barrier Analysis was conducted to examine the Management Methods and Human Performance Issues identified based on binning of the cause codes. The results of the analysis are provided in ATTACHMENT H, *Barrier Analysis* and in Section 5.2, *Barrier Analysis Results*. The barriers which were intended to prevent or mitigate these problems were identified and were grouped in one of four categories. Some of the identified barriers qualified as meeting the definition of more than one category. The four types of barriers were defined as:

- **Management Expectations** - Defined as those barriers which set management expectations related to procedure compliance. This focuses on how effectively management communicates its expectations, verifies expectations are understood and implements actions to correct behavior inconsistent with expectations.
- **Organizational Performance** - Defined as those barriers which establish organizational alignment by defining Roles, Responsibilities, Accountabilities, and Authorities (R2A2s) for procedure compliance.
- **Programmatic Procedures & Processes** - Defined as those barriers which establish the appropriate procedures and processes.
- **Individual Performance** - Defined as the trained, qualified personnel performing work evolutions. This focuses on how effectively the individual workers, supervisors and managers implemented these concepts in the field.

Taken as a whole, the barriers identified by the RCE team were judged Less Than Adequate (LTA) in some way. The next section of the report describes the results of those breakdowns in more detail. A Why Tree Analysis (ATTACHMENT I) was utilized to determine the causes for the breakdowns. The causes developed from the Why Tree Analysis are discussed in Sections 5.3 through 5.5.

**5.2 Barrier Analysis Discussion/Results**

The Barrier Analysis (ATTACHMENT H) focused on those barriers which were thought to be in place to ensure procedure compliance.

**5.2.1 Management Expectations**

This section discusses those barriers which are set in place through the communication of management expectations for compliance with procedures. It focuses on how effectively management communicates its

expectations, verifies expectations are understood and implements actions to correct behavior inconsistent with expectations.

PPF Management has communicated its expectation for procedure compliance in a number of ways. These include, but are not limited to:

- ISMS CF-4 - Perform Work Within Controls
- Hanford General Employee Training/CHPRC General Employee Training (HGET/CGET)
- Supervisor's Training
- Various Briefings, Safety Topics, Weekly Tailgates, etc.
- Work Management Procedures
- FSP-PPF-0821, *Conduct of Operations*
- Trained/Qualified Field Work Supervisors
- Use of Appropriate HR Actions

Methods used to provide real-time feedback and verify expectations are understood and implemented by the workforce include:

- Conduct of Work Mentor
- Senior Supervisory Oversight
- Manager Oversight and Mentoring
- PFP Procedure Compliance Affidavit

In cases where there is sufficient evidence that expectations have been communicated and understood, but not followed, appropriate Human Resource action is taken.

Taken as a whole the communication of expectations, verification of understanding and implementation of expectations, and correction was judged to be LTA. Management's expectation for complying with written instructions began with the initial orientation for CHPRC employees on October 1, 2008 and has been continually reinforced in various forms since that time. Expectations for procedure compliance are defined in various procedures including PRC-PRO-MS-589, *CH2M Hill Plateau Remediation Company Procedures*; PRC-PRO-WKM-12115, *Work Management*; PRC-PRO-14047, *Pre-Job Briefings and Post-Job Reviews* (see also Section 5.2.3, *Programmatic Procedures and Processes*).

Workers clearly understand that "procedure compliance is mandatory" and that they must "follow the procedure as written and stop if unsure," but knowing the words has not translated into consistent performance.

Various forms of training have been provided which emphasize procedure compliance. This includes Person-in-Charge (PIC) Qualifications, Nuclear Chemical Operator (NCO) Qualifications, etc. Concepts and examples of techniques for following a procedure such as three-way communication and initialing of steps as they are being performed are discussed in some classes, but in many cases are simply presented as good

practices or the students perceive these as "not really the way we do it." These good practices are not required by the training class and once the personnel are in the field, the application of these methods has been inconsistent.

As initially discussed in the evaluation of CR-2010-2424, ISMS Core Function 4 (CF-4), "Perform Work within Controls" appears to be understood as a concept and the preponderance of work performed meets the expectation of CF-4. However, in specific instances individuals performed tasks in ways that did not follow the written work instructions. There may have been deficiencies in the work instructions, but the work was not stopped and the instructions were not followed verbatim. Workers did not recognize they were deviating, or they recognized it and felt that deviation was allowed within the intent of the words, potentially placing themselves at risk.

Reviews of previous cause evaluations in CRRS and interviews with some of the individuals involved indicate there is potentially a mixed message being given by management. The expectation to "stop when unsure" may have been communicated, but the equally strong, reinforced message appears to be praise for the work being accomplished.

The use of a PFP mentor has proven to be very effective in modifying the behavior of FWSs who had not fully internalized management expectations for various field activities. Additionally, the implementation of the SSO program had an immediate impact on the safety of work being performed, provided an opportunity to provide oversight in the field and immediate feedback to the FWSs and workers. However, as the SSO program has matured it has become apparent that the observers need to be more cognizant of their role as the keepers and champions of management expectations as they relate to procedure compliance in the field. The use of an affidavit signed by the FWSs was also implemented, with limited success, to document their commitment to Management's expectations and acknowledge that failure to follow written instructions verbatim is considered Serious Misconduct per the CHPRC Standards of Conduct.

A review of the number of disciplinary actions taken as a percentage of the total number of events related to procedure noncompliance does not provide any useful insights. Except in the most obvious examples of procedure noncompliance, the near term emphasis will continue to be on effectively communicating and verifying in the field management's expectations for verbatim compliance.

### 5.2.2 Organizational Performance

This section discusses those barriers which establish organizational alignment by defining R2A2s for procedure compliance.

Roles, responsibilities, accountability and authority for procedure compliance are typically defined in many of the same tools that Management uses to set its expectations. These include, but are not limited to:

- Hanford General Employee Training/CHPRC General Employee Training (HGET/CGET)
- Supervisor's Training
- Various Briefings, Safety Topics, etc.
- PFP Procedure Compliance Affidavit
- Work Control Procedures
- FSP-PFP-0821, *Conduct of Operations*
- Discussions During Workability Walkdowns
- Defined Roles in Procedures/Work Instructions
- Discussions at Pre-Job Briefings

No issues were noted with the definition of R2A2s or the organizational structure. Senior Management, PFP Management, Supervisors, and workers appear to know the concepts and expectations for procedure/work instruction compliance in the field; however, consistent application has been lacking. This is described in more detail under Section 5.2.4, *Individual Performance*.

### 5.2.3 Programmatic Procedures & Processes

This section discusses those barriers established through the implementation of appropriate procedures and processes. The procedures and processes include, but are not limited to:

- Work Control Procedures
- FSP-PFP-0821, *Conduct of Operations*
- Discussions during Workability Walkdowns
- Defined Roles in Procedures/Work Instructions
- Discussions at Pre-Job Briefings

One particular challenge at PFP is that supervisors are frequently so familiar with the work to be performed that, at times, they can become comfortable working to the intent of the work instructions rather than working strictly to the words as written. Because PFP has a number of highly skilled, experienced workers, this practice has been proven to be successful in the past.

Expectations for procedure compliance are defined in various procedures: including PRC-PRO-MS-589, *CH2M Hill Plateau Remediation Company Procedures*; PRC-PRO-WKM-12115, *Work Management*; and PRC-PRO-

14047, *Pre-Job Briefings and Post-Job Reviews*; etc. Procedures are classified as either administrative, reference use, or continuous use. Administrative procedures are typically reviewed and trained to prior to work being conducted in the field. They are not typically taken to the field. Reference use procedures are trained to prior to work being conducted in the field and are required to be available for reference in the field. In many cases, demonstrated knowledge and ability to perform the work steps of Reference Use procedures is part of a qualification package. Only two of the 12 CRs showed signs of breakdowns in the use of reference use procedures. Continuous use procedures made up the balance of the breakdowns. Continuous use procedures (including work instructions in work packages) are expected to be in the field and followed step-by-step. While the procedure was reportedly in the field in every CR evaluated, a method of ensuring that each step was conducted as written was not used.

During the review it was noted that methods and techniques that increase awareness of work steps being performed, such as having the worker read the specific words of the work steps or initialing the steps as they are being performed, are not typically implemented in continuous use work documents. Institutionalization of these or similar techniques would improve PFP's performance as it relates to procedure/work instruction compliance.

#### **5.2.4 Individual Performance**

This section discusses the trained, qualified personnel performing work evolutions and focuses on how effectively the individual workers, supervisors and managers implemented these concepts in the field. These include, but are not limited to:

- Conduct of Work Mentor
- SSOs
- Trained/Qualified Field Work Supervisors
- Manager Oversight and Mentoring

Each of these individual barriers is discussed separately:

##### **Conduct of Work Mentor:**

There is a Conduct of Work Mentor assigned to PFP. While there is no quantitative data to assess effectiveness, the evidence of changed FWS behavior in the field is more than adequate to establish that the mentor is highly effective.

##### **SSO:**

SSOs are in place to perform oversight and provide real-time feedback to the work teams. This involves monitoring

performance in the field to ensure that management's expectations are being met. Of the 12 events evaluated, only three had SSO oversight. In those three events the SSO was not familiar with the work instructions, did not correct the noncompliant behaviors or recognize that procedure noncompliance existed until after the work had been performed.

**FWS:**

FWSs direct the field teams who perform the work and are cognizant of the work scope. FWSs may be so familiar with the work to be performed that, at times, they can become comfortable working to the intent of the words rather than forcing themselves to work strictly to the words as written. Because PFP has a number of highly skilled, experienced workers, this practice has been proven to be successful in the past.

In many specific instances work teams did not recognize that they were deviating, or they recognized it and felt that deviation was allowed within the intent of the words, potentially placing themselves at risk.

**Workers:**

Workers focus on their portion of the task. This is appropriate, but in some cases they rely on the FWS to verbally describe the task to be conducted as opposed to knowing how the task is described in writing. This allows working to the intent rather than the words. Workers either did not recognize that they were deviating, or they recognized it and felt that deviation was allowed within the intent of the words, potentially placing themselves at risk.

**Managers:**

Review of CRRS and interviews with some of the individuals involved indicates that CHPRC and PFP are sending potentially mixed messages. The expectation to "stop when unsure" may have been communicated, but the stronger, reinforced message appears to be praise for the work being accomplished.

ATTACHMENT F, *Commonality Review of Applicable CRs by Human Performance Error Precursors*, identified the human performance error precursors and found two main areas of commonality:

- Nine of the 12 events showed that the error precursor of "Task Demands: Lack of or unclear standards" existed. This human performance error precursor is related to management expectations and requirements for "procedure compliance." The typical message is stated as "Perform the work as written or stop work."

The delivery of this message has not been effective in ensuring procedure compliance. This is further evaluated in ATTACHMENT I, *Why Tree Analysis*.

- Ten of the 12 events showed that the error precursor of "Human Nature: Complacency/Overconfidence" existed. This human performance error precursor is related to low-risk perception, complacency due to previous success, and confidence that a skilled/experienced workforce can adapt to the conditions. These precursors have directly led to situations where workers believe they have the skills to deal with issues that come up. This is further evaluated in ATTACHMENT I, *Why Tree Analysis*.

#### 5.2.5 Barrier Analysis Results

The Barrier Analysis evaluated barriers intended to prevent noncompliance with procedures and grouped them into one of four categories. Three categories were identified as ineffective barriers to procedure noncompliance events: Management Expectations, Programmatic Procedures and Processes, and Individual Performance. Within these three categories the ineffective barriers can be further broken down and summarized as follows:

- *Ineffective Communication of Expectations for Procedure Compliance.* Examples include mixed messages regarding the importance of productivity and safety, lack of reinforcement of the importance of HPI tools for instilling a questioning attitude and to stop when unsure.
- *Ineffective Use of Methods and Techniques to Increase Awareness of Work Steps Being Performed in the Field.* Examples of methods and techniques include the use of three-way communication, initialing work steps as they are performed, having work instructions in-hand during field work.
- *Ineffective Verification That Expectations for Procedure Compliance are Understood and Deficiencies are Identified Before They Result in an Event.* The primary example is less than adequate SSO observer preparation and performance.

The first conclusion of the Barrier Analysis is that management has not effectively communicated its expectations for procedure compliance. This does not mean the message has not been communicated to the FWSs and their teams. PFP Management has stated expectations for procedure compliance repeatedly, they have stopped work to reinforce expectations, and the FWSs were required to sign an affidavit indicating they

understand the expectation for procedure compliance and the consequences for noncompliance. The SSO program was instituted to provide real time feedback of expectations in the field. The FWSs and workers know the concepts for compliance in the field. What are missing, according to the second conclusion of the Barrier Analysis, are the methods and techniques to increase awareness of the written work steps when working in the field. The communication has not been effective because it has not provided the tools required to implement the concepts. The third conclusion of the Barrier Analysis is that the method for verifying that expectations are understood and applied in the field in a real time manner has not been effective because the SSO observers are not performing effectively.

### 5.3 Why Tree Analysis Results

The Why Tree Analysis looks at this issue from a different perspective but reaches essentially the same conclusion. ATTACHMENT I, *Why Tree Analysis*, describes the logic flow which answers the question: "Why have PFP work teams not demonstrated consistent adherence to management expectations to perform the work step as written or stop work?"

The first level of the tree notes that while most work performed at PFP meets expectations, some does not. The noncompliant work is generally due to one of the following three reasons:

- 1) The work team did not recognize that they needed to revise the written instruction,
- 2) The work team did not recognize that they were deviating from the written instruction,
- 3) The work team recognized that they were deviating from the written instruction, but felt that deviation was allowed within the "intent" of the words.

The next level of the tree looks at working to the intent of the work instruction. An example of the mindset of working to the intent of words was found during the conduct of the RCE for CR-2011-1176. It was found that many Workability Walkdowns are being conducted by the work team with a mindset that asks "Do the words allow us to do the work the way we want to?" as opposed to "Can the work be performed as written?" These are fundamentally different questions with significantly different answers and consequences.

Regardless of the reasons for not following the words, the results were the same. Work performed which was not strictly following the words did not have a consistent consequence. Consequence does not necessarily mean that the work team was not held accountable. It is used in a broader sense and may mean that there was no worker injury or that the manager was not aware of the noncompliance.



The Manager may not have been aware simply because the task was successfully completed. In some cases, the Manager was aware that the task was completed in a way that did not follow the written word, but no corrective action was documented to correct the behavior. The Why Tree Analysis (supported by anecdotal evidence) concluded that this was based on a low consequence, or lack of consequence, and the focus was on the successful completion of the work.

#### 5.4 Direct Cause

**DC-01: PFP work teams have not consistently performed work steps as written or stopped work when the work steps could not be worked as written. (A3B2C02, ISMS CF-4)**

The preponderance of work performed at PFP meets the expectation to perform the work as written or stop work. However, in a number of specific instances, individuals performed tasks in ways that did not follow the written work instructions. There may have been deficiencies in the work instructions, but the work was not stopped and the instructions were not followed verbatim. Workers did not recognize that they were deviating, or they recognized it and felt that deviation was allowed within the intent of the words, potentially placing themselves at risk.

#### 5.5 Root Cause

**RC-01: PFP Management has not effectively implemented expectations for procedure compliance or consistently verified expectations for procedure compliance in the field. (A4B1C01, ISMS CF-1 and CF-5)**

Management has not effectively communicated its expectations for procedure compliance. The communication has not been effective because it has not provided the tools required to implement the concepts. Also, the method for verifying that expectations are understood and applied in the field in a real time manner has not been effective

There has been an extremely low incidence of actual consequence (worker injury or other) and a focus on the successful completion of the work. Focus on the successful completion of work sends a mixed message regarding management's expectations for the importance of productivity and safety.

Three overall breakdowns were identified which were identified as components of the root cause:

- 1) LTA communication of expectations for procedure compliance,
- 2) Failure to require specific methods to encourage procedure compliance, and
- 3) Failure to verify that expectations for procedure compliance are understood and/or deficiencies are identified before they result in an event.

## 5.6 Contributing Causes

**CC-01: Techniques which foster behaviors related to procedure/work instruction compliance were provided during training, but not required or reinforced in the field. (A4B1C06, ISMS CF-3)**

Various forms of training are provided to the FWSs and workers which emphasize procedure compliance. This includes Person-in-Charge (PIC) Qualifications, Nuclear Chemical Operator (NCO) Qualifications, etc. Concepts and examples of techniques for following procedures such as three-way communication and initialing of steps as they are being performed are shown in some classes, but in many cases are simply presented as good practices or the students perceive these as "not really the way we do it." These are not presented as required and once the personnel are in the field, the application of these methods has been inconsistent.

**CC-02: Previous actions to prevent procedure compliance issues have not been effective. (A4B1C09, ISMS CF-5)**

The RCE team concluded that this issue is being addressed under the completion of actions to address RC3 of CR-2010-2424:

"PFP has not been experiencing a reduction in error rates because the overall strategy for use and benefits of a corrective action management system is not effectively understood."

No further corrective action is required for CC-2 at this time.

## 5.7 Extent of Condition

Based on discussions with the CHPRC Safety, Health, Security, and Quality (SHS&Q) organization, it was determined that procedure compliance issues exist to some degree at all CHPRC facilities. During the conduct of the RCE for CR-2011-1707, CHPRC SHS&Q initiated CR-2011-1810, *Common Cause(s) of Work Control and Conduct of Operations Issues* which identified a similar, programmatic issue for CHPRC.

The actions developed as a part of this RCE are focused on correcting behaviors at PFP. Actions to address the larger programmatic issues across CHPRC will be developed as part of the root cause analysis for CR-2011-1810.

## 6.0 CORRECTIVE ACTIONS

The RCE team discussed and identified actions to address RC-01 and CC-01. A review of completed and ongoing Corrective Action Plans (CRRS and discussions with other Root Cause Evaluation teams) was then performed to determine if any ongoing actions from other events were the same as those actions identified for this event. Preventive Actions 1, 2, 3 and 5 of CR-2011-1176 were identified and credited as Preventive Actions for RC-01 (see PA2, PA3, and PA4). The remainder of the preventive actions developed by the RCE team to address RC-01 and CC-01 are also required. The following suite of Preventive Actions was developed to prevent the recurrence of this event and focuses on management communicated and consistently reinforced standards for procedure compliance.

No Remedial Actions were identified and nine Preventive Actions (PAs) are necessary to fully address the Root Cause and Contributing Causes (beyond those actions taken for the individual events). One final action is not corrective, but is to determine the effectiveness of the Corrective Action Plan (CAP).

PA1 and PA4 are expected to define a clear set of expectations, methods and requirements for those performing work in the field and SSOs observing that work. This will ensure that work teams are aware of the words as they are written and to be performed. It will also ensure that SSOs clearly understand their role in the process of providing immediate feedback. Defining these expectations and requirements will provide a basis for revising existing training to recognize these as required and not merely good practices. PA2 and PA3 will provide accountability for personnel to understand the requirement to perform work within defined controls. PA5 will define the proper location for including these new requirements in training, and PA6 and PA7 will implement the recommendations of PA5. PA8 and PA9 are designed to provide ongoing and repeated reinforcement of the standards and expectations for procedure compliance, as well as provide forums to discuss challenges encountered in the field.

### 6.1 Preventive Actions

#### PA1

##### Action Statement:

Develop a new PFP procedure to require:

- 1) 1) During the Pre-Job briefing Field Work Supervisor (FWSs) shall read aloud the words of the tasks expected to be performed during the day's activities.
- 2) FWSs shall conduct an interactive pre-job briefing with the work team on the written work steps to be performed for each work evolution. This includes specific questioning on the tasks to be performed.
- 3) Pre-job attendees sign the CHPRC Pre-Job Briefing Checklist after the FWS has asked if the work team clearly understands their job responsibilities and are qualified for the work assigned. Signature on

this form acknowledges that the workers understand the work tasks as they are written.

4) FWSs shall be able to declare which work step they are working at any given time.

Closure Requirements:

Provide a closure statement describing what action was taken with a copy of the new or revised procedure as objective evidence.

Actionee:

Ken Walker

Expected Completion Date:

9/16/2011

## PA2

Action Statement:

PFP Vice President to conduct a documented briefing of expectations for Directors, Managers and FWSs to reiterate the requirement to perform work within defined controls. The briefing will include the following:

- New requirements for compliance with written instructions (see PA1).
- Definition of verbatim compliance.
- Expectations for Workability Walkdowns.
- Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.
- Review of stop work responsibility.
- Expectation to share the briefing with PFP personnel.

Closure Requirements:

Provide a closure statement describing what action was taken with a copy of the briefing material, identification of individuals requiring the briefing and evidence of completion. (Completion Roster or Attendance Roster) as objective evidence.

Actionee:

Jerry Long

Expected Completion Date:

9/7/2011

## PA3

Action Statement:

PFP Vice President to conduct a documented briefing of expectations for personnel performing MOPs to reiterate the purpose and requirements of the program. This includes, but is not limited to SSOs. The briefing will include the following:

- New requirements for compliance with written instructions (see PA1).
- Purpose of the MOP/SSO program is to identify weaknesses and opportunities for improvement. Additionally, SSOs provide immediate feedback and mentoring to FWSs and work teams.
- The importance of maintaining independence.

- Expectations for Workability Walkdowns.
- Review of requirements for review of written instructions prior to performance of work in the facility.
- Definition of verbatim compliance.
- Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.
- Review of stop work responsibility.

**Closure Requirements:**

Provide a closure statement describing what action was taken with a copy of the briefing material, identification of individuals requiring the briefing and evidence of completion. (Completion Roster or Attendance Roster) as objective evidence.

**Actionee:**

Jerry Long

**Expected Completion Date:**

9/7/2011

**PA4****Action Statement:**

Revise PFP SSO procedure, FSP-PFP-5-8, 2.6 to:

- Identify FWS past work performance (e.g., failure to perform work per procedure/work instruction) as a factor to be considered when determining whether continuous SSO coverage is required.
- Require that the specific work package steps that will be worked during the observation are documented in the SSO record to ensure the observer understands the steps to be worked.

**Closure Requirements:**

Provide a closure statement describing what action was taken with a copy of the SSO procedure as evidence.

**Actionee:**

Ken Walker

**Expected Completion Date:**

8/31/2011

**PA5****Action Statement:**

Perform a Training Needs Analysis (TNA) related to Actions 1, 2 and 3.

**Closure Requirements:**

Provide a closure statement describing what action was taken with a copy of the TNA Report as objective evidence.

**Actionee:**

Dave Riddle

**Expected Completion Date:**

10/12/2011

**PA6**

## Action Statement:

Develop new, or incorporate into existing training, the results of the Training Needs Analysis conducted in Action 5.

## Closure Requirements:

Provide a closure statement describing what action was taken with a copy of the new or revised training materials and evidence that Project Management is aware that the training is available (e.g. email.) as objective evidence.

## Actionee:

Dave Riddle

## Expected Completion Date:

11/9/2011

**PA7**

## Action Statement:

Conduct the first session of the new or revised training developed in Action 6.

## Closure Requirements:

Provide a closure statement describing what action was taken with documentation (e.g. training roster) as objective evidence.

## Actionee:

Tim Oten

## Expected Completion Date:

12/14/2011

**PA8**

## Action Statement:

Institute the conduct of a quarterly workshop for FWSs to discuss challenges encountered in the field. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.

## Closure Requirements:

Provide a closure statement describing what action was taken with a copy of the meeting attendance roster for the first workshop and a proposed schedule for FY 2012 as objective evidence.

## Actionee:

Bob Leonard

## Expected Completion Date:

10/12/2011

**PA9**

## Action Statement:

Institute the conduct of a quarterly workshop for those who perform Senior Supervisory Oversight (SSOs) to discuss challenges encountered in the field and techniques for providing feedback to work teams. A topic of

the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.

**Closure Requirements:**

Provide a closure statement describing what action was taken with a copy of the meeting attendance roster for the first workshop and a proposed schedule for FY 2012 as objective evidence.

**Actionee:**

Pete Owen

**Expected Completion Date:**

10/12/2011

## **6.2 Effectiveness Review Plan**

Effectiveness for the overall plan will be determined in two stages:

First, a Work Site Assessment (WSA) will be conducted approximately one month after conduct of the first workshops. The WSA will determine if the specific techniques are fostering the procedure compliance behaviors, or if different techniques should be implemented.

Second, an Effectiveness Review (ER) will be conducted using the following criteria:

- 1) Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that work teams understand the expectation to perform work as written or stop work.
- 2) Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that personnel conducting MOPs understand the program requirements as well as their role in assessment/oversight and providing feedback.

This review requires documentation within 90 days after the final Preventive Action is due to be complete (effectiveness review no later than 3/6/2012).

## **7.0 LESSONS LEARNED**

Managers must specifically define and verify standards for procedure/work instruction compliance in the field. This fosters Conduct of Operations behaviors which promote consistent adherence to management expectations to perform the work step as written or stop work.

## 8.0 DOCUMENTS REVIEWED

- CR-2010-1447, *Management Directs Safety Stand Down and Curtailed non-Min Safe Activities at PFP.*
- CR-2010-1477, *CHPRC Work Process Discipline.*
- CR-2010-1658, *CHPRC Failure to Meet Minimum Safety Performance Requirements.*
- CR-2010-2424, *10(2b) SC-2 (R) Occurrence - Work Management and Conduct of Work Performance Recurring Issues at the PFP.*
- CR-2011-0795, *3A(3) SC-3 Occurrence: Materials Moved through Door 109 without Implementing Periphery Confinement Controls.*
- CR-2011-1091, *TRU MIXED waste package labeling discrepancies.*
- CR-2011-1176, *Contamination in Rooms 230-C and/or 235-B Led to Positive Nasal.*
- CR-2011-1201, *Exiting contamination area (CA) with PPE (one full set).*
- CR-2011-1208, *Boundary and Posting Violation.*
- CR-2011-1211, *MOP: Waste Packaging Instructions did not Address Correct Work Package.*
- CR-2011-1213, *Cam Alarm While Loading an SWB in Room 146.*
- CR-2011-1224, *Contamination in Room 263 Duct Level.*
- CR-2011-1233, *Work Package Instructions were not Followed and were Incomplete.*
- CR-2011-1327, *Ergonomic Hazards Associated with Transferring Waste Boxes from Duct Level to First Floor Have not Been Adequately Addressed.*
- CR-2011-1340, *AIR SAMPLING RECORDS DO NOT CONTAIN ALL REQUIRED INFORMATION.*
- CR-2011-1342, *AIR SAMPLING RECORDS DO NOT CONTAIN ALL REQUIRED INFORMATION.*
- CR-2011-1351, *Work Package Requirements Not Followed.*
- CR-2011-1352, *Issues with Work Control Boundaries and PPE.*
- CR-2011-1353, *Work Package Clarifications*
- CR-2011-1414, *OVERDUE ANNUAL REVIEW OF TECHNICAL EVALUATION.*
- CR-2011-1493, *ALARA Management Worksheet Revisions not Incorporated in Work Instructions.*
- CR-2011-1494, *Last Minute Changes to Radiological Work Permits Continue to be Observed.*
- CR-2011-1498, *Out of Calibration Rotameters in-service at PFP.*
- CR-2011-1620, *Missed Work Step Involving Airborne Radiological Area.*
- CR-2011-1622, *Work Package Compliance.*
- CR-2011-1663, *Number of Qualified Personnel Performing Aspigel Procedure Didn't Match Directions.*
- CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions.*
- CR-2011-1810, *Common Cause(s) of Work Control and Conduct of Operations Issues.*



- CR-2011-1909, *Five Instances of Specific Administrative Control Combustible Control Requirement Non Compliances were Identified.*
- CR-2011-1924, *Potential Breach of Hazardous Energy Control Boundary During Maintenance for Exhaust Fan 1/291-Z.*
- CR-2011-1939, *Tagout Authorization Form Block 12 Not Signed.*
- CR-2011-1957, *Maintenance was Performed Without Installing a Chain Vice as Required.*
- CR-2011-1989, *Respiratory Protection Cartridges Used Were Not The Type Required By The Work Package.*
- FSP-PFP-0821, *Conduct of Operations*
- S-11-OOD-PFP-002, *Use of Technical Work Documents.*

NOTE: The Associated Files and OAs for each CR were also reviewed.

ATTACHMENT A

Description of Event Conditions

CR	Title	Date	Description of Issue (from CR)
1 CR-2011-10795 (Significant)	3A(3) 3C-3 Occurrence: Materials Moved through Door 109 without Implementing Periphery Confinement Controls	3/7/11	On 3/7/2011, while performing work package 22-10-01333, PPF Door Modifications, personnel moved materials into 236-Z (PRF) through Door 109 without implementing the Periphery Confinement Controls of Safety Evaluation Report (SER) (10-SED-0164) as implemented by SOI 10-003 Rev.2, Plutonium Finishing Plant Passive Leak Path Factor.  This potential condition was recognized during a review of ventilation controls for similar work on 3/3/2011 by a System Engineer/Design Authority (DA). The DA questioned that the 3/1/2011 activity may not have been conducted in a manner which was in compliance with SOI 10-003. The DA notified the Shift Operations Manager (SOM) and initial investigation was begun. A meeting was convened and it was determined that the activity had not complied with the SER safety basis control.  In conjunction with the causal analysis an extent of condition will be performed which will also address the RI FR observation identified in OA 36116.  A critique was scheduled.
2 CR-2011-1091 (TUF)	TRUMIXED waste package labeling discrepancies	3/30/11	Multiple waste package drums were noted with labeling discrepancies to the contents inventory datasheet during the performance of the weekly inspections of the CERCLA Waste Management Areas in accordance with ZAP-000-0045, "Inspection of Staged Waste Containers".
3 CR-2011-1176 (Significant)	Contamination in Rooms 230-C and/or 235-B Led to Positive Nasal	3/28/11	On 3/28/2011, following removal of a Plexiglas/steel panel next to Glovebox HC-4 and between Rooms 230C and 235B, contamination was encountered (2K-8K dpm on PPE gloves and shoe covers, and up to 50K dpm on the gasket which was cut to remove the panel). Personnel evacuated the affected area and the airpuffs (These rooms) was then posted ARA. All radiological surveys on personnel were less than detectable except one individual closest to the contamination source. In total, 39 individuals received nasal smears. One individual showed positive low level nasal smear counts. Biosay sampling was ordered.  A critique was held on 3/29/2011.
4 CR-2011-1201 (TUF)	Existing contamination area (CA) with PPE (one full set).	4/6/11	At 9:15 A.M. 2 pipe-fitters were getting ready to leave room 642, the first pipefitter had surveyed his hands & feet with the poppy and then stepped into the RBA. At that time I turned and looked and noticed the pipefitter in the RBA with his full set of PPE (minus the hood). At that time I walked over there and instructed the pipefitter not to move, told him he was standing in the RBA and he needed to turn and go back into the CA. Surveys were done @ the area included the RBA and no contamination was detected. Notifications were made to RadCon Management, a logbook entry was made, and the PIC was standing at the RBA (clean side) when it happened.
5 CR-2011-1208 (Trend Only)	Boundary and Posting Violation	4/6/11	Note: Screened as Trend Only as the issue was addressed via the stated immediate actions.  At approximately 1450 in 2736-ZB Room 641, a pipefitter stepped from a CA to an RBA while still wearing a full set of PPE. Individual was stopped before completely exiting the CA and moved back into the CA. RBA was surveyed and no contamination was found.  DRCM was informed. Reference prior CRs from 0915 of same day for same individual.
6 CR-2011-1211 (Trend Only)	MOP: Waste Packaging Instructions did not Address Correct Work Package	4/6/11	Note: Screened as a Trend Only as the immediate actions taken have corrected the condition.  Management Observation Program (MOP) worksheet MOP-04-2011-001, "Pre job and work activities" was issued by a Plutonium Finishing Plant (PFP) Senior Supervisory Observer (SSO) on 4/4/2011. There were two findings and an Opportunity for Improvement in the MOP worksheet. This Condition Report (CR) addresses the following Finding: Issue number 003:  "In reviewing the documents, it was found that the waste packaging instruction did not address the correct work package. Talked with the FWS and the planner, who said they would address the issues and get them corrected."  See Department of Energy Operational Awareness report OA-36728, issue 9766.
7 CR-2011-1213 (TUF)	Cam Alarm While Loading an SWB in Room 146.	4/5/11	A CAM alarmed while loading a SWB in Room 146. A waste bag was breached during the waste bag movement. 3 personnel had low level contamination on PPE (approximately 200-600 DPM). This was a planned ARA work evolution and all personnel were on respiratory protection. All personnel were surveyed clean, passed PCM and all nasals less than detectable.
8 CR-2011-1224 (TUF)	Contamination in Room 263 Duct Level	4/6/11	During removal of piping system in Room 263 (duct level) of 234-5Z, contamination levels of up to 600,000 dpm were discovered on PPE. This work was being performed on ARA. Affected personnel were undressed and subsequent contamination surveys were all less than detectable. Nasal surveys were also less than detectable. All affected airspaces have been placed on ARA status pending additional entry/survey. A formal Post-Job was conducted.  Summary: During ARA/BCA work in Room 263, day shift crew (Part 9) was performing transfer line cutting operations on a section of 6" casing transitioning to a 3" casing within a glove bag containment. Surveys prior to work, during work and surveys of all waste packages resulted in no detection of contamination. Work team was wearing PAPR hoods with OV chemical canisters. Before exiting, contamination levels of >600K dpm were detected on PPE. Further areas of contamination were then found on the stairway mezzanine and stair hand rails and floor areas in room 262. At that time SOM posted all of 234-5Z, backside ARA/BCA per attachment 1.
9 CR-2011-1233 (TUF)	Work Package Instructions were not Followed and were Incomplete	4/4/11	Department of Energy (DOE) Operational Awareness (OA) report OA-36707, "Stop Work for Breathing Air Work at PFP" was issued by a Plutonium Finishing Plant (PFP) Facility Representative (FR) on 4/4/2011. There was one finding in the report. This Condition Report (CR) addresses the following finding in the report: Issue number: 9754, Finding, "Work package instructions were not followed and were incomplete." The specific comment is as follows:  "A worker did not follow work instructions when installing a whistle alarm. The work instructions did not cover all versions of the whistle in use on bottle carts. See discussion section above for more information. CR-2011-1062 (attached) was initiated to track the response to the bottle cart issues."

CR	Title	Date	Description of Issue (from CR)
10 CR-2011-1327 (TUP)	Ergonomic Hazards Associated with Transferring Waste Boxes from Duct Level to First Floor Have not Been Adequately Addressed	4/20/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-36967 - "Room 263 Recovery Plan Activities" was issued by a Plutonium Finishing Plant (PFP) Facility Representative (FR) on 4/20/2011. There were two findings in the report. This Condition Report (CR) addresses the following finding in the report: Issue number: 9821, Finding: "Ergonomic hazards associated with manually transferring non-standard waste boxes from duct level to the first floor have not been adequately addressed." The specific comment is as follows:</p> <p>"Both the Automated Job Hazard Analyses (AJHA) for ZO-170-061, Package TRU (Transuranic) (TRU) Mixed Waste, and ZZ-10-00679, Transfer Line Removal between Room 230C and 227S, identified awkward posture hazards. AJHA ZZ-4977, for ZO-170-061, identified no specific control for the hazard. AJHA ZZ-5696, for ZZ-10-00679, stated to "Ensure personnel are briefed [sic] to take breaks when needed." Neither specifically addressed the hazard associated with transferring heavy non-standard waste boxes manually from duct level to the first floor.</p> <p>On April 19, Room 263 recovery plan personnel were assigned to transfer six non-standard waste boxes containing between 55 and 100 documented pounds of waste materials from Room 263 to Room 236. The activity was accomplished by four fissile material handlers manually lifting and carrying each box to Door 358, four other fissile material handlers carrying the box from Door 358 to the stairway above Door 561, then two fissile material handlers carrying each box through Door 561, down Stairway 20, and placing each box on a rolling-cart at the bottom of the stairway, which was then used to roll the box to Room 236 where it was off-loaded by two Solid Waste Operations fissile material handlers.</p> <p>At the pre-job briefing personnel were told to be careful while carrying the boxes and use good lifting techniques.</p> <p>While moving the first box down Stairway 20, one of the fissile material handlers missed a step and wrenched his back. Upon completion of the transfer of the box, he notified the Field Work Supervisor of the discomfort he was experiencing from his miss-step. The Field Work Supervisor replaced him in the transfer process and directed him to exit the Contamination Area and be escorted to the onsite medical facility. He was examined at the medical facility and released with no restrictions.</p> <p>Five additional boxes were transferred down the stairway with difficulty, but without incident, by the two remaining fissile material handlers.</p> <p>Following the activity the FR discussed a concern associated with the injury/hazard the activity exposed to personnel with the cognizant D&amp;D (Decontamination &amp; Decommissioning) Manager. The Manager stated they were aware of the hazard and had been working to develop alternate means of carrying the boxes down the stairs that will reduce the hazard to the workers, but have not as yet implemented an alternative. In the meantime they were mitigating the hazard through the briefings of personnel. The manual transport method the FR observed in use was significantly less than optimal for ensuring worker safety/health and warrants timely re-evaluation.</p>
11 CR-2011-1340 (TUP)	AIR SAMPLING RECORDS DO NOT CONTAIN ALL REQUIRED INFORMATION	4/25/11	<p>During closure review of CR-2011-0538, it was determined that the air sampling records for PFP do not contain the serial number of the analytical equipment as required.</p>
12 CR-2011-1342 (TUP)	AIR SAMPLING RECORDS DO NOT CONTAIN ALL REQUIRED INFORMATION	4/25/11	<p>During closure review of CR-2011-0538, it was found that the PFP air sample records do not contain all required information.</p> <p>While the report does contain the filter collection efficiencies for each type of filter, there is no way to determine which filter type was analyzed and therefore which collection efficiency applied to the calculation.</p>
13 CR-2011-1351, CR-2011-1352 & CR-2011-1353 (TUP)(OPI)	Work Package Requirements Not Followed; Issues with Work Control Boundaries and PPE; Work Package Classifications	4/13/11	<p>CR-2011-1351 - A DOE Facility Representative (FR) submitted an Operational Awareness (OA) Report (Rpt #36883-attached) regarding work activities associated with the installation of the South Electrical Substation for PFP Temporary Power. This OA identified one finding and two observations. This CR documents the finding.</p> <p>1) Work step 6.1.14 was not completed; "BACKFILL (partially) conduit trench AND LAY IN marking tape per ECR-10-001849 and FWS direction." The work step does not appear to be properly coordinated with expectations in reference document ECR-10-001849, 13.8 kV Line Extensions for PFP Temporary Power regarding. The expectations of the reference document and work instructions are not clear as written. Though work step 6.1.16 was not applicable during this work activity, if it were, it also would not have been consistent with subject reference document.</p> <p>2) Though the wet method was stated to be used, the taping of the pole did not appear to be used while cutting of yellow-painted poles per the Work Instruction steps 4.1.14 and 6.1.2. This was confirmed with FWS.</p> <p>3) While pouring cement personnel were not observed wearing leather gloves over nitrile gloves as stated in work package, 4.6.1. The FWS discussed with the IH and a field change was later made.</p> <p>4) The work site is taking credit for a first aide type eyewash bottle as an eye wash station. This does not meet the intent of eye wash station as required for work involving pouring concrete per Industrial Hygiene.</p> <p>CR-2011-1352 - A DOE Facility Representative (FR) submitted an Operational Awareness (OA) Report (Rpt #36883-attached) regarding work activities associated with the installation of the South Electrical Substation for PFP Temporary Power. This OA identified one finding and two observations. This CR documents the first observation.</p> <p>Work control boundaries and required PPE were discussed in the pre-job and multiple times in the field yet issues were observed. Boundaries were not established prior to the start of work. Unauthorized personnel were observed entering work control boundaries without permission and proper PPE. Personnel were observed ducking under boundary ropes. Inconsistent PPE was observed to be worn in the work boundary.</p> <p>CR-2011-1353 - A DOE Facility Representative (FR) submitted an Operational Awareness (OA) Report (Rpt #36883-attached) regarding work activities associated with the installation of the South Electrical Substation for PFP Temporary Power. This OA identified one finding and two observations. This CR documents the second observation.</p> <p>1) Work step 4.1.13 discusses worker ergonomic hazards including power tool vibration and other hazards. It goes on to state, "when operating power tools during wall/door removal activities, wear anti-vibration gloves" The FR questioned IH of the need for the anti-vibration gloves while operating other equipment such as a "soil-whacker" or some other soil compacting device. The IH representative stated the anti-vibration gloves would be expected for this use also.</p> <p>2) While speaking with a PFP Environmental Compliance Officer regarding concrete rmtate disposition it was identified that material from the guzzler truck that might be considered spoils from sucking up dirt and piled at a nearby location may require additional evaluation from the ECO based on the amount of liquid associated with spoils and where spoils pile is established. Environmental will look into guzzler operations further.</p> <p>3) Work step 4.2.3 in work document number ZZ-10-08170 requires Industrial Safety to be contacted for walkdown prior to work involving a forklift. This work limitation was not completed prior to the use of a forklift to move ecology blocks from the southwest area of PFP to a location near the stack located in the south central area of PFP. This work limitation step was discussed with Industrial Safety and the initial work activity discussion is meant to satisfy this requirement and not intended prior to each forklift related work activity.</p> <p>PFP has a technical evaluations (TE) that are overdue for its annual review/revision.</p>
14 CR-2011-1414 (TUP)	OVERDUE ANNUAL REVIEW OF TECHNICAL EVALUATION	4/28/11	<p>TE-PFP-06-008-4, PFP Workplace Air Monitoring Annual Evaluation and Technical Basis Report was due 01/11/2011</p>

CR	Title	Date	Description of Issue (from CR)
15 CR-2011-1493 (TUF)	ALARA Management Worksheet Revisions not Incorporated in Work Instructions	4/27/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-37127, "Placement of counterbalance into PRF [Plutonium Reclamation Facility] canyon" was issued on 4/27/2011 by a Plutonium Finishing Plant (PFP) Facility Representative (FR). There was one finding and one observation in the report. This Condition Report (CR) addresses the following finding in the report: Issue number: 9844, Finding, "Requirements from AMW [ALARA Management Worksheet] were not incorporated into work instructions after revision to AMW was completed." The specific comment is as follows:</p> <p>"Work instruction 22-10-01682 was reviewed by the HRB [Hazard Review Board] on 1/17/11 and after appropriate comments incorporated approved for release for work. On 4/8/11 AMW 5483 was revised in which "dry run" requirements were specified. These administrative controls specified "Prior to opening door 964 to move the counterbalance into the canyon a 'dry run' will be conducted with personnel in full PPE [Personal Protective Equipment] and supplied air with all equipment in test and to move the counterbalance to the door without opening before the door is opened and counterbalance is moved into the PRF Canyon at a subsequent time." This requirement was not incorporated into the work instructions, and the FWS was not aware of this requirement. The AMW worksheet has boxes in which if checked, specifies "incorporate into work instruction." AMW work controls are required to be incorporated into the work instructions, and were not done after revision of the AMW worksheet."</p>
16 CR-2011-1494 (OFI)	Last Minute Changes to Radiological Work Permits Continue to be Observed	4/27/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-37127, "Placement of counterbalance into PRF [Plutonium Reclamation Facility] canyon" was issued on 4/27/2011 by a Plutonium Finishing Plant (PFP) Facility Representative (FR). There was one finding and one observation in the report. This Condition Report (CR) addresses the following observation in the report: Issue number: 9845, Observation, "Last minute changes to RWP's [Radiological Work Permits] continue to be observed." The specific comment is as follows:</p> <p>"As noted in above write-up, RWP Z-913 was being revised the morning of the pre-job briefing. Personnel were at the briefing waiting for the RCT [Radiological Control] Technician to complete the RWP changes, which caused some of the consternation with personnel at the briefing which led to the work cancellation. Though extenuating circumstances appeared to be somewhat valid, the FWS Reps have observed numerous instances of last minute changes being made to RWP's for various reasons."</p>
17 CR-2011-1498 (Adverse)	Out of Calibration Rotameters in-service at PFP	5/5/11	<p>In reviewing the RadCon logbook, 9 rotameters were identified that are out of calibration during air sample exchange on Tuesday(5/3). An addition 6 rotameters were identified that are either expired or will expire within the next week during air sample exchange on Monday (5/2).</p> <p>The following rotameters are in-place with expired calibrations: Z-282, Z-284, Z-268, Z-259, Z-267, Z-285, Z-276, Z-263, Z-260.</p> <p>Additionally, the following locations are either out of cal or will be this week: Z-046, Z-622, Z-624, Z-623, Z-628, Z-629.</p> <p>These rotameters are used to measure airflow rate through fixed-position air samplers that support the workplace air monitoring program at PFP.</p> <p>Additionally, PFP has established a historical practice of turning power off to CAMs when the calibration has expired but continuing to use the instrument as a fixed head air sampler. Currently, the following rooms have expired CAMs with expired calibrations in item that are being used as fixed head air samplers: Rooms 262, 308, 320, 134, 135, 36, there are also 2 Camberra CAMs in 221d, and 221C being used as fixed heads with no way to see what the flow rate is (electronic display is turned off).</p> <p>The rotameter is calibrated during CAM calibration and the rotameter calibration expires with the CAM (they are a calibrated unit).</p> <p>The calibration recall program was not effective at ensuring this equipment is maintained appropriately.</p>
18 CR-2011-1620 (Adverse)	Missed Work Step Involving Airborne Radiological Area	5/7/11	<p>On 5/7/2011, Door 215 modification work was conducted in the Plutonium Process Support Laboratories (PPSL) area of Building 234-52. The work was conducted using Work Package 22-10-00028, PPSL Wall Modifications and Door Removals. The work steps associated with this evolution included posting the area with Airborne Radioactivity Area (ARA) Controls. This step was not performed; therefore, the work was performed without the required respiratory controls.</p> <p>Initial investigation and the discussions during the formal post-job indicated that the failure to use respiratory controls was directly caused by the Field Work Supervisor "missing" the step. A number of contributing factors were noted:</p> <ol style="list-style-type: none"> <li>1) RadCon Engineering and others recently reviewed the package for Rad controls and the package had been re-screened from medium-risk to low-risk (talks to mind-set).</li> <li>2) Once independent Rad screening and Rad Engineering revision were complete, Work Step 6.6.3 was not updated.</li> <li>3) The FWS briefed the crew verbally to the work steps, but unintentionally slid his finger past the step for ARA and focused on the other work steps.</li> <li>4) During the pre-job, the FWS and crew discussed and concurred that no respiratory equipment was required as the work in this room had been declared low hazard by Rad Engineering.</li> <li>5) The work steps were posted on the wall in the work space, but were not referred to during the actual evolution.</li> <li>6) The crew did not review the actual work steps until after the evolution.</li> </ol>
19 CR-2011-1622 (TUF)	Work Package Compliance	5/4/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-37262, "Removal of the Diesel Generator Underground Storage Tank (UST) and Associated Piping" was issued by a Plutonium Finishing Plant (PFP) Facility Representative (FR) on 5/4/2011. This Condition Report (CR) addresses the following finding in the report: Issue number: 9877, Finding, "Tasks associated with removal of the diesel generator Underground Storage Tank (UST) and associated piping were worked simultaneously despite the work package not providing that latitude." The specific comment is as follows:</p> <p>"On May 4, the Field Work Supervisor (FWS) briefed and conducted work activities associated with both Task 6 and Task 8 of work package 22-09-07547. Working the activities concurrently appeared acceptable from a management and control perspective, but the work package instructions did not specifically allow it. The Work Instruction section (6.0) of the work document led with a Note 1 stating, "All Tasks can be performed per step 5.2.1 sequencing requirements." The step 5.2.1 sequencing requirements stated, "Tasks 1 and 2 can be performed prior to the completion of work package listed in steps 5.2.1.2. Task 3 can be implemented anytime after completion of field work for work package listed in step 5.2.1.3." No further sequencing instructions that would allow simultaneous performance of any tasks subsequent to Task 3 were identified."</p>

CR	Title	Date	Description of Issue (from CR)
20 CR-2011-1663 (TUF)	Number of Qualified Personnel Performing Aspigel Procedure Didn't Match Directions	5/13/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-37401, "Aspigel Neutralization in Room 235A-1 Gloveboxes," was issued by a Plutonium Finishing Plant (PFP) Facility Representative (FR) on 5/12/2011. This Condition Report (CR) addresses the following finding in the report: Issue number: 9901, Finding: "A limitation on the number of qualified personnel required to perform the Aspigel decontamination procedure (ZDD-1-005) was not observed during Aspigel removal operations in Room 230A-1 gloveboxes." The specific comment is as follows:</p> <p>"On May 12, while personnel were performing Aspigel removal operations in Room 230A-1 gloveboxes, the FR questioned one of the participating Nuclear Chemical Operators on which of the personnel present were considered Aspigel qualified. He named two.</p> <p>Because ZDD-1-005, Section 2.2.5, states, "A minimum of four qualified (trained) personnel are required for performance of this procedure," the FR pointed out the limitation to the Field Work Supervisor (FWS) and asked him how it was being met. The FWS acknowledged that only two of the personnel present were Aspigel qualified/trained, but stated four were necessary only during Aspigel spraying operations. He determined just two were necessary for Aspigel removal activities. The FWS stated he (who is also the Aspigel Functional Manager), the Aspigel Subject Matter Expert, and the Aspigel Technical Manager had specifically discussed the content of Section 2.2.5 previously and determined that although it was not worded ideally, it was acceptable for their purposes. They considered the intent was although a minimum number of four qualified workers were necessary for one activity (spraying Aspigel) within the procedure, it was not necessary for all the activities. Although the FR understands the technical viability of using two qualified personnel for the activity observed, he considers recent facility events demonstrate the need for unambiguous procedure content where interpretation is neither required nor expected."</p>
21 CR-2011-1992 (Advice)	Five Instances of Specific Administrative Control Combustible Control Requirement Not Complied were Identified	6/8/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-37741, "Implementation of Specific Administrative Control (SAC) 5.18 - Combustible Control," was issued by a Plutonium Finishing Plant (PFP) Facility Representative (FR) on 6/7/2011. There were two findings and two observations in the report. This Condition Report (CR) addresses the following finding in the report: Issue number: 9963, "Five instances of Specific Administrative Control (SAC) 5.18 combustible control requirements non-compliance were identified by the Project's Fire Safety Officer in a two week period." The specific comment is as follows:</p> <p>"Between May 24 and June 6, a PFP project Fire Safety Officer (FSO) identified the following four non-compliance with HNF-15502, Specific Administrative Control 5.18 requirements:</p> <ul style="list-style-type: none"> <li>- During a Fire Safety Officer (FSO) walkdown of Building 234-5Z potential fire areas on May 24, the FSO identified a 36-inch roll of plastic, combustible trash, and a miscellaneous &gt; 1 MW fuel package with inadequate spacing in Room 161. Special Administrative Control (SAC) 5.18 Condition A was logged. Required Action A.1 was taken to correct the non-compliance. The package was reduced to 1 MW with compliant spacing and the Field Work Supervisor (FWS) was asked to move the roll of plastic to a container or combustible storage area.</li> <li>- During a Fire Safety Officer (FSO) walkdown of Building 234-5Z potential fire areas on May 26, the FSO identified the SAC 5.18.2.a.2 requirement to keep fuel packages &gt; 5 feet from material-at-risk (MAR) not being met in Room 235A-3. The Shift Operations Manager (SOM) was notified. Required Action A.1 was taken to correct the non-compliance. One fiberglass ladder was moved, a fuel package reduced, and spacing was restored within 20 minutes.</li> <li>- During a Fire Safety Officer (FSO) walkdown of Building 234-5Z potential fire areas on June 3, the FSO identified in Room 235A-1 a fiberglass step ladder &lt; 3 feet from a glove box containing MAR in the northwest corner of the room. The condition was logged and Required Action A.1 was taken.</li> <li>- Also on June 3, the FSO identified three rolls of plastic and bags &lt; 5 feet from Column C1-D1, a fiberglass ladder and miscellaneous plastic and cardboard &lt; 5 feet from Column F-7 in Room 262. The condition logged and Required Action A.1 was taken.</li> <li>- During a Fire Safety Officer (FSO) walkdown of Building 234-5Z potential fire areas on June 6, the FSO identified in Room 262 three rolls of plastic &lt; 10 feet from exterior wall in NE corner of room and a pile of plastic bags and bucket &lt; 5 feet from column E-8. The condition was logged and required actions were taken.</li> </ul> <p>In each instance identified above Action A.1 of the SAC was entered upon discovery and actions were completed to address the condition prior to expiration of the specified completion time. However, the number of non-compliance identified in a short period and that they were being identified by the project's oversight process rather than by the generators was a concern. The Operations Manager stated on June 7 that investigative meetings would be conducted for each of the identified events."</p>
22 CR-2011-1924 (Advice)	Potential Breach of Hazardous Energy Control Boundary During Maintenance for Exhaust Fan 1/291-Z	6/13/11	<p>On 6/13/2011, it was reported to the PFP Shift Operations Manager that a Field Work Supervisor (FWS) may have breached a Hazardous Energy Control (HEC) boundary while performing final inspection of a drive belt on Exhaust Fan EF-1 in Room 509 of Building 291-Z without having their Authorized Worker Lock (AWL) in place. The appropriate Controlling Organization (CO) Lock was in place and all other workers in the area had hung their AWL.</p> <p>A critique was held on 6/14/2011 which revealed that the FWS was focused on the final inspection of the drive belt and did not recognize the HEC boundary, but that a worker who did have their AWL hung, warned the FWS that they were near the HEC boundary and directed them away. The FWS indicated that they "may have touched the belt", but they were unsure. The worker indicated that the FWS did not touch the belt. Touching the belt would have breached the HEC boundary described by the team. The work team indicated that the HEC boundary was established at the equipment itself.</p>
23 CR-2011-1939 (TUF)	Tagout Authorization Form Block 12 Not Signed	6/16/11	<p>The PFP Controlling Organization Administrator missed signing Tagout Authorization Form (TAF) Block 12 "Lockout/Tagout Work Complete" prior to authorizing the removal of the Lockout/Tagout Boundary as required by DOE-0336 Lockout/Tagout section 5.5.2. The COA had verified with the Field Work Supervisor that the work requiring lockout/tagout was complete and was safe to be removed. The COA recognized this block needed to be signed but failed to recognize it had not been signed prior to releasing the TAF for Lockout/Tagout removal. The Controlling Organization Qualified Worker completed removal of Lock and Tag in accordance with the TAF per Steps 5.5.3 thru 5.5.7 which did not require verification of block 12. All other steps and approval signatures required to remove the Lock and tag were completed as required. This is considered an Administrative Error since the failure of not signing this block did not result in an unsafe condition and the intent of section 5.5 was met.</p>
24 CR-2011-1957 (TUF)	Maintenance was Performed Without Installing a Chain Vice as Required	6/16/11	<p>Department of Energy (DOE) Operational Awareness (OA) report OA-37853, was issued by a Plutonium Finishing Plant (PFP) Facility Representative (FR) on 6/16/2011. There were three findings in the report. The second Finding, issue number: 9987, "Reportable Occurrence (EM-RL-CPRC-PFP-2011-0006): Field Work Supervisor (FWS) entered the work control boundary without first installing an Authorized Worker Lock or conducting a safe-to-work check" is addressed by CR-2011-1924. The third finding "The Controlling Organization Dangers-Do-Not-Operate tag and lock were removed from the isolation device without complete authorization of removal having been properly documented" is addressed by CR-2011-1939.</p> <p>This Condition Report (CR) addresses the first finding, "Maintenance was performed on a 291-Z exhaust fan without first installing a chain vise on the fan shaft as required by the work instruction." The specific comment is as follows:</p> <p>"The FR observed Maintenance personnel adjust the 291-Z Exhaust Fan EF-1 fan drive belt in accordance with work package 2Z-09-02626, Section 7.4.10, stated, "Install chain vise(s) on the fan shaft identified in the partial release to control rotation induced by damper leakage.</p> <ul style="list-style-type: none"> <li>- Use two or more chain vises on the fan shaft when possible.</li> <li>- Use at least one chain vise on the fan shaft at any one item when use of two or more chain vises is not possible."</li> </ul> <p>The workers did not install chain vises to perform the fan drive belt adjustment. They later stated at a critique meeting the chain vises were unnecessary because there was no damper leakage. However, the work package provided no controls/instructions to allow waiver of the chain vise installation."</p>
25 CR-2011-1989 (Trend Only)	Respiratory Protection Cartridges Used Were Not The Type Required By The Work Package	6/16/11	<p>Note: Screened as a Trend Only as this CR was submitted to document an additional data point from an emerging trend where the PFP project is currently conducting a Root Cause analysis for (CR-2011-1707) screened as Significant).</p> <p>A work team did not wear combination cartridges on their respirators as the work package required. The team was removing old transfer flange in hood 227-T in Room 227 of 234-5Z. The work package required the use of a combination HEPA / chemical cartridge as a precautionary measure. The work was performed in an open-faced hood with proper air flow away from the work team. During a work review the following eventing, it was identified that the team had used only regular HEPA cartridges instead of the required combo cartridges.</p> <p>The method of performing the work was changed to be performed within the open-faced hood. During the change process an Industrial Hygienist agreed that the combo cartridges were no longer needed, but the requirement to use the combo cartridges was not removed from the work package.</p>

ATTACHMENT B

Initial Commonality Matrix of CRs

NOTE: Commonality was not reviewed from this version of the matrix. Appendix B removes the Blue issues and further examines commonality.

CR	Title	Date	Failure to Follow in the field?	Issue prior to release?	Document Issue?	Process Issue?	Performance in Field?	Ind. HR actions taken?	Cause Codes	Trend Codes	Associated OAs
2	CR-2011-0793 (Significant) (TUF) TRU MIXED waste package labeling discrepancies	3/7	YES	YES	YES	YES			A3B3C03 A5B4C05	MN06 NS0101 NS0104 MS06 MS09 WM006	36819 36967
3	CR-2011-1091 (Significant) (TUF) Contamination in Rooms 230-C and/or 235-B Led to Positive Nasal	3/28	YES	YES			YES	YES	A1B2C04 A3B3C01 A3B3C06 A4B1C01 A4B3C08	MS06 MS08 RP1405	36555
	CR-2011-1201 (TUF) Exiting contamination area (CA) with PPE (one full set).	4/6					YES		N/A	RP0306	
	CR-2011-1208 (Trend Only) Boundary and Posting Violation	4/6					YES		N/A	MS08 RP-0306	
	CR-2011-1211 (Trend Only) MOP: Waste Packaging Instructions did not Address Correct Work Package	4/6		YES	YES				N/A	MN0401 MN0502 MS09	36728
	CR-2011-1213 (TUF) Cam Alarm While Loading an SWB in Room 146.	4/5		YES					N/A	RP0305	
	CR-2011-1224 (TUF) Contamination in Room 263 Duct Level	4/6		YES	Method to Control Recognized Hazard LTA				N/A	MN05 MS06 RP0305	36774
9	CR-2011-1233 (TUF) Work Package Instructions were not Followed and were Incomplete	4/4	YES	YES	YES	YES	YES	YES	N/A	MS09 CTR01 MN0401	36707
	CR-2011-1327 (TUF) Ergonomic Hazards Associated with Transferring Waste Boxes from Duct Level to First Floor Have not Been Adequately Addressed	4/20		YES		YES			N/A	MN05 MS06 GSD103	36967
	CR-2011-1340 (TUF) AIR SAMPLING RECORDS DO NOT CONTAIN ALL REQUIRED INFORMATION	4/25		YES		YES			N/A	MS06 0073 Requirement flow down to Software	
	CR-2011-1342 (TUF) AIR SAMPLING RECORDS DO NOT CONTAIN ALL REQUIRED INFORMATION	4/25		YES		YES			N/A	MS08 OP1605 QA0404 RP1302	
13	CR-2011-1351, CR-2011-1352 & CR-2011-1353 (TUF)(TUF)(OFI) Work Package Requirements Not Followed, Issues with Work Control Boundaries and PPE, Work Package Clarifications	4/13	YES				YES		N/A	MN0401 MN05 MN06 MS08 OS1602 OS1603 OP1605 MS06 MS08 RP1503	36883
	CR-2011-1414 (TUF) OVERDUE ANNUAL REVIEW OF TECHNICAL EVALUATION	4/28		YES				Requirement flow down to...	N/A		
	CR-2011-1493 (TUF) ALARA Management Worksheet Revisions not Incorporated in Work Instructions	4/27		YES	YES	YES		YES	N/A	MS08 RP1406 MN05	37127
	CR-2011-1494 (OFI) Last Minute Changes to Radiological Work Permits Continue to be Observed	4/27		YES		YES		YES	N/A	MN0501 MS06	37127
	CR-2011-1498 (Adverse) Out of Calibration Rotameters In-service at PPP	5/5		YES	YES	YES		YES	A2B2C01 A4B3C02	MN1001 RP0402	

ROOT/Common Cause Analysis Report

CR-2011-1707

CR	Title	Date	Failure to Follow in the field?	Issue prior to release?	Document Issue?	Process Issue?	Performance in Field?	Ind. HR actions taken?	Cause Codes	Trend Codes	Associated OAs
18	CR-2011-1620 (Adverse) Missed Work Step Involving Airborne Radiological Area	5/7	YES - Change	YES	YES		YES	YES	A3B3C05	OP1605 MN06 MS08 RP1405	37379
19	CR-2011-1622 (TUF) Work Package Compliance	5/4	YES				YES		N/A	MN0401 MS08 OP1605	37262
20	CR-2011-1663 (TUF) Number of Qualified Personnel Performing Aspiget Procedure Didn't Match Directions	5/13	YES		YES	YES	YES		N/A	MS01	37401, 34850, 34482, 34316
21	CR-2011-1909 (Adverse) Five Instances of Specific Administrative Control Combustible Control Requirement Non-Compliances were Identified	6/8	YES		YES	YES	YES		Not Final - Preliminary	FP02 MS08 NS0103	37741
22	CR-2011-1924 (Adverse) Potential Breach of Hazardous Energy Control Boundary During Maintenance for Exhaust Fan 1/291-Z	6/13	YES		YES	YES			Not Final - Preliminary	OP09 MS06	37853
23	CR-2011-1939 (TUF) Tagout Authorization Form Block 12 Not Signed	6/16	YES				YES		N/A	OP09	37853
24	CR-2011-1957 (TUF) Maintenance was Performed Without Installing a Chain Vice as Required	6/16	YES			YES	YES		N/A	MN06 MS08	37853
25	CR-2011-1989 (Trend Only) Respiratory Protection Cartridges Used Were Not The Type Required By The Work Package.	6/16	YES	YES	YES		YES		N/A	RPP04	38013
			12/25	15/25	10/25	13/25	13/25	3/25	See Common Cause Analysis Matrix	See Trend Code Matrix	
			48%	60%	40%	52%	52%	12%			

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Yellow indicates preliminary information that has not been finalized.

ATTACHMENT C

Commonality Review of Applicable CRs

CR	Title	Date	Failure to Follow in the field?	Issue existed prior to release, but was not caught?	Document Issue	Process Issue	Performance in Field Issue	Ind. HR actions taken?	Cause Codes	Trend Codes	Associated OAs
2	CR-2011-1091 (TUF) TRU MIXED waste package labeling discrepancies	3/30	YES				YES	Brief	N/A	MS06 MS09 WM06	36967
3	CR-2011-1176 (Significant) Contamination in Rooms 230-C and/or 235-B Led to Positive Nasal	3/28	YES	YES			YES	YES	A3B2C04 A3B3C01 A3B3C06 A4B1C01 A4B3C08	MS06 MS08 RP1405	36555
9	CR-2011-1233 (TUF) Work Package Instructions were not followed and were incomplete	4/4	YES	YES	YES	YES	YES	YES	N/A	MS09 CTR01 MN0401	36707
13	CR-2011-1351, CR-2011-1352 & CR-2011-1353 (TUF)(OFI) Work Package Requirements Not Followed; Issues with Work Control Boundaries and PPE; Work Package Clarifications	4/13	YES				YES	1-on-1	N/A	MN05 MN06 MS08 OS1602 OS1603	36883
18	CR-2011-1620 (Adverse) Missed Work Step Involving Airborne Radiological Area	5/7	YES - Change	YES	YES		YES	YES	A3B3C05	OP1605 MN06 MS08 RP1405	37379
19	CR-2011-1622 (TUF) Work Package Compliance	5/4	YES				YES	1-on-1	N/A	MN0401 MS08	37262
20	CR-2011-1663 (TUF) Number of Qualified Personnel Performing Aspigal Procedure Didn't Match Directions	5/13	YES		YES	YES	YES		N/A	MS01 OP1602	37401, 34850, 34482, 34316
21	CR-2011-1902 (Adverse) Five Instances of Specific Administrative Control Combustible Control Requirement Non Compliances were Identified	6/8	YES		YES	YES	YES		Not Final - Preliminary	FP02 MS08	37741
22	CR-2011-1924 (Adverse) Potential Breach of Hazardous Energy Control Boundary During Maintenance for Exhaust Fan 1/291-Z	6/13	YES		YES	YES			Not Final - Preliminary	NS0103	
23	CR-2011-1939 (TUF) Tagout Authorization Form Block 12 Not Signed	6/16	YES				YES		N/A	OP09 MS06	37853
24	CR-2011-1957 (TUF) Maintenance was Performed Without installing a Chain Vice as Required	6/16	YES			YES	YES		N/A	MN06 MS08	37853
25	CR-2011-1982 (Trend Only) Respiratory Protection Cartridges Used Were Not The Type Required By The Work Package.	6/16	YES	YES	YES		YES		N/A	RPP04	38013
		12/12	100%	4/12	6/12	5/12	11/12	3/12	See Common Cause Analysis Matrix	See Trend Code Matrix	
				33%	50%	42%	92%	25%			

Yellow indicates preliminary information that has not been finalized.

Areas of at least 50% commonality:

1. Failure to Follow in the Field?  
100% of the 12 conditions involved some form of a "failure to follow procedure/work instructions in the field". This excludes conditions which were recognized prior to release of a work package or use of a procedure in the field.
2. Document Issue?  
Corrective Actions for 50% of the 12 events recognized a need to change some portion of the work document. Some of these revisions were to compensate for Human Nature, others were to account for process flaws that were "set-up factors" for the "failure to follow in the field".
3. Performance in the Field? AND Individual Human Resource Actions Taken?  
92% of the 12 conditions were found to have some component of Human Performance Issues. Whereas only 25% of the conditions involved documenting that the behavior was corrected. This issue warranted further review to examine Human Performance Error Precursors (see ATTACHMENT F).



ATTACHMENT D

Commonality Review of Applicable CRs by Cause Nodes

CR	Title	A1 B1	A1 B2	A1 B3	A1 B4	A1 B5	A2 B1	A2 B2	A2 B3	A2 B4	A2 B5	A2 B6	A3 B1	A3 B2	A3 B3	A3 B4	A3 B5	A4 B1	A4 B2	A4 B3	A4 B4	A4 B5	A5 B1	A5 B2	A5 B3	A5 B4	A5 B5	A6 B1	A6 B2	A6 B3	A7 B1	A7 B2			
2	CR-2011-1091 (TUF)																																		
3	CR-2011-1176 (Significant)																																		
9	CR-2011-1233 (TUF)																																		
13	CR-2011-1351, CR-2011-1352 & CR-2011-1353 (TUF) (TUF)(OFI)																																		
18	CR-2011-1620 (Adverse)																																		
19	CR-2011-1622 (TUF)																																		
20	CR-2011-1663 (TUF)																																		
21	CR-2011-1902 (Adverse)																																		
22	CR-2011-1924 (Adverse)																																		
23	CR-2011-1939 (TUF)																																		
24	CR-2011-1957 (TUF)																																		
25	CR-2011-1982 (Trend Only)																																		

This indicates Cause Codes applied for the purposes of identifying issues that did not occur on any of the listed dates, but were not included in the original report.

Areas of at least 50% commonality:

- A3B1 - Human Performance - Skill Based Error - This usually takes the form of a mental lapse. The individual knew the right action to take (through training or experience), but failed to take this action.
- A3B2 - Human Performance - Rule Based Error - This involves two types of error: 1) The rule exists and the worker was aware of it, but the worker failed to read the words, and 2) The rule exists, but the worker was not aware it existed. This second type of error usually occurs when an individual relies on stored knowledge/experience when determining their actions.
- A4B1 - Management Problem - Management Methods - The cause codes applied fall in two areas: 1) Management expectations for procedure compliance were not well-defined, understood, or enforced, and 2) Corrective actions for this known problem had not prevented Procedure Noncompliances.
- A5B2 - Communications LTA - Written Communications Caused LTA - This code was applied, not necessarily as a "true cause", but as a trend code for when work document revision was recognized as needed during corrective action development.

Commonality Review of Applicable CRs by Trend Codes

CR	Title	AC	CM	CN	CONSTRUCTION	CR	CTR	DC	EMP	EN	EP	FP	GP	HE	LL	MN	MS	NS	OC	OP	OS	OU	POS	PR	QA	RP	SS	TP	TR	WM	
2	CR-2011-1091 (TUF) TRU MIXED waste package labeling discrepancies																X														
3	CR-2011-1176 (Significant) Contamination in Rooms 230-C and/or 235-B Led to Positive Nasal																X									X					
9	CR-2011-1233 (TUF) Work Package Instructions were not Followed and were Incomplete					X																									
13	CR-2011-1351, CR-2011-1332 & CR-2011-1333 (TUF) (TUF) (OFI) Work Package Requirements Not Followed, Issues with Work Control Boundaries and PPE, Work Package Clarifications																X				X										
18	CR-2011-1620 (Adverse) Missed Work Step Involving Airborne Radiological Area																X				X										
19	CR-2011-1622 (TUF) Work Package Compliance																X				X										
20	CR-2011-1663 (TUF) Number of Qualified Personnel Performing Aspiget Procedure Didn't Match Directions																X				X										
21	CR-2011-1909 (Adverse) Five Instances of Specific Administrative Control Combustible Control Requirement Non-Compliances were Identified											X																			
22	CR-2011-1924 (Adverse) Potential Breach of Hazardous Energy Control Boundary During Maintenance for Exhaust Fan 1/291-Z																X				X										
		AC	CM	CN	CONSTRUCTION	CR	CTR	DC	EMP	EN	EP	FP	GP	HE	LL	MN	MS	NS	OC	OP	OS	OU	POS	PR	QA	RP	SS	TP	TR	WM	
23	CR-2011-1939 (TUF) Tagout Authorization Form Block 12 Not Signed																			X											
24	CR-2011-1957 (TUF) Maintenance was Performed Without Installing a Chain Vice as Required																X														
25	CR-2011-1989 (Trend Only) Respiratory Protection Cartridges Used Were Not The Type Required By The Work Package.						1/12					1/12				6/12	10/12	1/12		5/12	1/12										
							8%					8%				50%	83%	8%		42%	8%										

DEEPER DETAIL OF "MN" & "MS" TREND CODES

Analysis Discussion

MAINTENANCE /WORK MANAGEMENT ISSUES

Only 25% of the 12 conditions were recognized during application of trend codes as being related to work package use. Whereas 92% of the conditions, when examined after corrective action development, showed causes/actions related to (see ATTACHMENT C) personnel not following the words. The reasons for not following the words are varied; however, for trending purposes, application of these trend codes could be improved.

33% of the 12 conditions were recognized as having issues with the work document itself. This is consistent with the findings of the evaluation team.

MANAGEMENT SYSTEMS ISSUES

Not Analyzed - Below 50% threshold established by evaluation team.

Not Analyzed - Below 50% threshold established by evaluation team.

Only 50% of the 12 conditions were recognized during application of trend codes as being related to Procedural Noncompliance. Whereas 92% of the conditions, when examined after corrective action development, showed causes/actions related to (see ATTACHMENT C) personnel not following the words. The reasons for not following the words are varied; however, for trending purposes, application of these trend codes could be improved.

Not Analyzed - Below 50% threshold established by evaluation team.

Number of Instances	Code #	Code Title	Code Description
3/6 (50%)	MN0401	Work Package	Use of instructions, documents, and/or pre-approved procedures (e.g., reference use vs. continuous use step-by-step adherence) in a work package for a work activity.
4/6 (67%)	MN05	Work Planning	Work planning involves preparation of work package instructions including related documents, procedures, and walk downs. NOTE: Consider use of MS06 for hazard identification/hazard analysis issues associated with work management.
1/10 (10%)	MS01	Procedure Adequacy	Establishment and communication of requirements in appropriate level of procedure, requirement not incorporated or had no implementing mechanism (flow down). Lack of specific controls, outdated information, and content adequacy. NOTE: Use IP 16 series if technical procedure issue.
3/10 (30%)	MS06	ISM - Hazard Identification / Control Analysis / Control	Identification and analysis of hazards which include establishing controls to mitigate hazards. NOTE: Use with other codes, as applicable.
6/10 (60%)	MS08	ISM - Perform Work Within Controls	Adherence to procedure requirements.
2/10 (20%)	MS09	ISM - Feedback and Improvement	Managers, supervisors, and workers confirm readiness before operations begin and monitor performance throughout the work activity life cycle.

ATTACHMENT F

Commonality Review of Applicable CRs by Human Performance Error Precursors

CR	Title	Individual Capabilities										Work Environment										Human Nature									
		High workload (memory requirements)	Time Pressure (In a hurry)	Simultaneous, multiple tasks	Repetitive actions / Monotony	Irrecoverable actions	Unclear goals, roles, or responsibilities	Lack of or unclear standards	Unfamiliarity with task / First time	Lack of knowledge (mental mode)	New technique not used before	Imprecise communication habits	Lack of proficiency / Inexperience	Unsystematic problem-solving skills	"Can do" attitude for crucial task	Illness or fatigue	Distractions / Interruptions	Changes / Departure from routine	Confusing procedure / Vague guidance	Confusing displays / controls	Work-arounds / OOS Instrumentation	Hidden system response	Unexpected equipment conditions	Lack of alternative indication	Stress	Habit patterns	Assumptions	Complacency / Overconfidence	Mind set (Intention)	Inaccurate risk perception	Mental shortcuts (biases)
2	CR-2011-1091 (TUF)				X																										
3	CR-2011-1176 (Significant)		X			X																									
9	CR-2011-1233 (TUF)																														
13	CR-2011-1351, CR-2011-1352 & CR-2011-1353 (TUF)(TUF)(OFI)			X																											
18	CR-2011-1620 (Adverse)			X																											
19	CR-2011-1622 (TUF)																														
20	CR-2011-1663 (TUF)		X																												
21	CR-2011-1909 (Adverse)		X	X																											
22	CR-2011-1924 (Adverse)																														
23	CR-2011-1939 (TUF)		X																												
24	CR-2011-1957 (TUF)																														
25	CR-2011-1989 (Trend Only)																														
			1/12	5/12	3/12	3/12	1/12	5/12	5/12	5/12	9/12	1/12	1/12	0/12	0/12	3/12	1/12	3/12	0/12	0/12	0/12	1/12	0/12	0/12	0/12	0/12	10/12	3/12	5/12	0/12	0/12
		8%	42%	25%	25%	8%	8%	42%	42%	75%	8%	8%	0%	0%	25%	8%	25%	0%	0%	0%	8%	8%	0%	0%	0%	33%	25%	42%	0%	0%	

Areas of at least 50% commonality:  
 Task Demands: Lack of unclear standards;  
 This human performance error precursor is related to management expectations and requirements for "procedure compliance". The typical message resembles: "Perform the work as written or stop work."  
 The delivery of this message has not prevented Procedure Non-compliance.

Human Nature: Complacency / Overconfidence;  
 This human performance error precursor is related to previous success, and confidence that a skilled/experienced workforce can adapt to the conditions. These precursors have directly led to situations where workers believe they have the skills to "deal with" issues that come up.

S-11-00D-PFP-002 Reactive Surveillance Crosswalk

CONCERN: S-11-00D-PFP-002-C01: Formality of operations during use of TWDs at PFP is not consistent and this results in inadequate performance.

FINDING #	FINDING STATEMENT	ASSOCIATED OAs	ASSOCIATED CRs	SOURCE OF INITIATION (Date/PA)	COMMENTS
S-11-00D-PFP-002-F01	During removal of conveyor glovebox once used to move materials between room 235B and 230C personnel did not establish Airborne Radioactivity Area (ARA) controls when required by work package.	OA-36555	CR-2011-1176	PA Date: 6/19/11	OPEN - Significant ESRB - 7/19/11
S-11-00D-PFP-002-F02	During doorway opening reconfiguration for room 179, ARA controls were not implemented as required by the work package.	OA-37379	CR-2011-1620	PA Date: 6/19/11	OPEN - Adverse EOC identifies other instances of failure to follow procedure/work and the initiation of CR-2011-1707
S-11-00D-PFP-002-F03	A technical work document limitation about qualified personnel was not complied with during glovebox decontamination activities.	OA-37401	CR-2011-1663	PA Date: 6/19/11	CLOSED - TUF
S-11-00D-PFP-002-F04	Other examples of TWD noncompliances of use of an inadequate TWD were noted during reviews of the Operational Awareness Database and the Condition Reporting and Resolution System.  Note: List of OAs in this section of the matrix.	OA-36707 OA-36883  OA-36967 OA-36965 OA-36819 OA-37108 OA-37262 OA-36774 OA-37127	CR-2011-1233 CR-2011-1351 CR-2011-1352 CR-2011-1353 CR-2011-1091 No CR CR-2011-0795 CR-2011-1452 CR-2011-1622 CR-2011-1224 CR-2011-1493 CR-2011-1494	PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11	OPEN - TUF CLOSED - TUF CLOSED - TUF CLOSED - OFI CLOSED - OFI No CR, actions resolved OPEN - Significant OPEN - TUF CLOSED - TUF CLOSED - TUF CLOSED - TUF CLOSED - TUF CLOSED - OFI
S-11-00D-PFP-002-F04 (cont.)	Other examples of TWD noncompliances of use of an inadequate TWD were noted during reviews of the Operational Awareness Database and the Condition Reporting and Resolution System.  Note: List of CRs in this section of the Matrix.		CR-2011-1201 CR-2011-1208 CR-2011-1211 CR-2011-1213 CR-2011-1340 CR-2011-1342 CR-2011-1414 CR-2011-1498	PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11 PA Date: 6/19/11	

NOTE: Listed CRs are being considered as part of the common cause analysis. CR-2011-1707, Potential Trend Related to Failure to Follow Procedure/Work Instructions; Analysis underway - results of Root Cause Analysis, EOC and CAP are due in CRRS by 7/31/11. Those highlighted have been determined and binned for commonality of a "failure to follow procedure/work instruction in the field" (see ATTACHMENT C).

NOTE: The following CRs listed have been determined to be included in the Common Cause Analysis bin of CR-2011-1707 for commonality of a "failure to follow procedure/work instruction in the field":

- CR-2011-1909, Five Instances of Specific Administrative Control ...
- CR-2011-1924, Potential Breach of Hazardous Energy Control ...
- CR-2011-1939, Tagout Authorization Form Block 12 Not Signed ...
- CR-2011-1957, Maintenance was Performed Without Installing ...
- CR-2011-1989, Respiratory Protection Cartridges Used ...

ATTACHMENT H

Barrier Analysis

Threat	Management Barriers	Organizational Barriers	Programmatic Barriers	Individual Barriers	Adequacy	Evaluator Comments
Procedure Noncompliances can lead to any number of unmitigated hazards. The issue is: How do we attempt to prevent people from working contrary to the written instruction?	ISMS CF-4 - Perform Work Within Controls				LTA	The ISMS Core Functions appear to be understood as concepts and the preponderance of work performed meets the expectation of CF-4. However, in many specific instances, individuals performed tasks in ways that did not follow the written work instructions. There may have been deficiencies in the work instructions, but the words were not being followed verbatim. Workers did not recognize that they were deviating, or they recognized it and felt that deviation was allowed within the "intent" of the words, potentially placing themselves at risk. Review of CRRS and interviews with some of the individuals involved, indicated that CHPRC and PFP are sending potentially mixed messages. The expectation to "stop when unsure" may have been communicated, but the stronger, reinforced message is the praise for the amount of work accomplished toward production goals. 25% to 50% of the instances which were procedure noncompliances had some form of behavior correction (one-on-one mentoring or appropriate HR actions). Work completion has been rewarded regardless of how it was accomplished. Success in some cases is due to either the experience and skill of the work team, regardless of the work package content, or the skill of the work team in overcoming deficiencies in the work documents.
	HGET/CGET	HGET/CGET			LTA	HGET/CGET is Computer-Based Training (CBT) taken once per year, contains limited emphasis on procedure compliance and is not something that is "worked to" in the field. The consistent reinforcement of ISMS CF-4 is a better implementation of the expectations and R2A2s which are addressed by this CBT.
	Supervisor's Training	Supervisor's Training			LTA	Training for Supervisors/Managers emphasizes procedure compliance in many forms. Again, this training provides general concepts and does not describe specific practices to "work to" in the field. The consistent reinforcement of ISMS CF-4 is a better implementation of the expectations and R2A2s which are addressed by this training.
	Various Briefings, Safety Topics, etc.	Various Briefings, Safety Topics, etc.			LTA	Management's expectation for complying with written instruction had been communicated numerous times in a myriad of ways. This began with the initial orientation for PFP employees on 10/12/2008 and has been reinforced in various forms. Workers clearly understand that "procedure compliance is mandatory" and that they must "follow the procedure as written and stop if unsure", but knowing the work has not translated into consistent performance.
	Affidavit	Affidavit			LTA	Review of CRRS and interviews with some of the individuals involved, indicates that CHPRC and PFP are sending potentially mixed messages. The expectation to "stop when unsure" may have been communicated, but the stronger, reinforced message is the praise for the amount of work accomplished toward production goals. Less than 25% of the instances which were procedure noncompliances had some form of behavior correction (one-on-one mentoring or appropriate HR actions). Work completion has been rewarded regardless of how it was accomplished. Success in some cases is due to either the experience and skill of the work team, regardless of the work package content, or the skill of the work team in overcoming deficiencies in the work documents.
	Work Control Procedures	Work Control Procedures	Work Control Procedures		LTA	The week of 3/29/11, FWSs were required to sign an affidavit documenting their commitment to management's expectations and recognizing that failure to follow written instruction verbatim is considered Serious Misconduct per the CHPRC Standards of Conduct.
	FSP-PPP-0821	FSP-PPP-0821	FSP-PPP-0821		LTA	10 of the 12 events chosen as procedure noncompliances occurred after Supervisors signed this document.
	Workability Walkdown	Workability Walkdown	Workability Walkdown		LTA	Although the expectations and R2A2s defined in the various Work Control procedures (PRC-PRO-WKM-12115, 12116, 079, 14047, etc.) provide specific responsibilities, they are administrative procedures. This means that they are not specifically "worked to" in the field.
	Written Procedure/work instruction	Written Procedure/work instruction	Written Procedure/work instruction		LTA	Although the expectations for Conduct of Operations, R2A2s and some specific processes are defined in the chapters of FSP-PPP-0821, this is an administrative procedure. This means that they are not specifically "worked to" in the field. Workers are expected to know and perform these behaviors and processes.
	Pre-Job Briefing	Pre-Job Briefing	Pre-Job Briefing		LTA	Another discovery during the investigation associated with CR-2011-1176 was that workability walkdowns are being conducted with a slightly different mindset than intended. The intent of a workability walkdown is to verify, "Can the work be performed as written?" In many cases, the work team performing the walkdown approaches the task by asking the question, "Do the words allow us to do the work they way we want to?" This is a fundamentally different question which drives the behavior of working to the intent of the words, not the actual words themselves.
	Conduct of Work Mentor	Conduct of Work Mentor	Conduct of Work Mentor		LTA	During conduct of the critique for CR-2011-1176, it was discovered that there are activities which have typically been performed "between the steps". Further investigation during the RCE for CR-2011-1176 revealed that it is common for workers to set up (minor tasks) in preparation for performing a procedural work step. This encourages a culture where it is acceptable to sometimes work "between the steps". This would imply that it has become common to perform work that is not specifically called for by the words in the procedure/work instruction. This type of work was only performed in cases where the set up was perceived to be low-risk. Any perception of elevated (medium or high-risk) appears to have prompted more formal changes as required.
	SSO	SSO	SSO		LTA	A second type of failure is closely related to the first. In many cases, workers felt empowered to work to the "intent" of the words. This was sometimes due to being involved in the planning. Other times, it was due to a belief that since they were a Subject Matter Expert, they could adjust the activity as long as they were being safe. In these instances, they intended to modify the words, but did not do so prior to the work.
	FWS	FWS	FWS		LTA	Other instances of not following the work instruction took the form of working steps concurrently or out of sequence, when this was not specifically allowed by the words.
					LTA	A third realization occurred during the investigation associated with CR-2011-1176: many workers are not reading the actual words associated with the procedure. FWS describe the tasks during the pre-job briefings, and workers focus on their portion of the task. While this may be appropriate for some tasks, in some cases it has led to a situation where the FWS paraphrases the task. Verbatim describing the task to be conducted allows working to the intent rather than the words.
					Worked	There is only one Conduct of Operations Mentor assigned to PFP. While there is no quantitative data to assess effectiveness, the evidence of changed FWS behavior in the field is more than adequate to establish that the mentor is highly effective.
					LTA	SSOs are in place to perform oversight. This involves monitoring performance in the field to ensure that Management's expectations are being met. In the 12 events, many did not have SSO oversight. In the events which did have SSO coverage, the SSO did not correct the behaviors and in many cases did not recognize that procedure noncompliance existed until after the work had been performed.
					LTA	FWSs direct the work. As described in the Written Procedure/work instruction, Workability Walkdown, and Pre-Job Briefing sections, FWSs are cognizant of the work scope. FWSs are so familiar with the work to be performed that, at times, they can become comfortable working to the intent of the words, rather than forcing themselves to work strictly to the words as written. Because PFP has a highly skilled, experienced workforce, this practice has been successful more times than it has not.
					LTA	As described in the ISMS CF-4 section, in many specific instances, individuals performed tasks in ways that did not follow the written work instructions. There may have been deficiencies in the work instructions, but the words were not being followed verbatim. Workers did not recognize that they were deviating, or they recognized it and felt that deviation was allowed within the "intent" of the words, potentially placing themselves at risk.

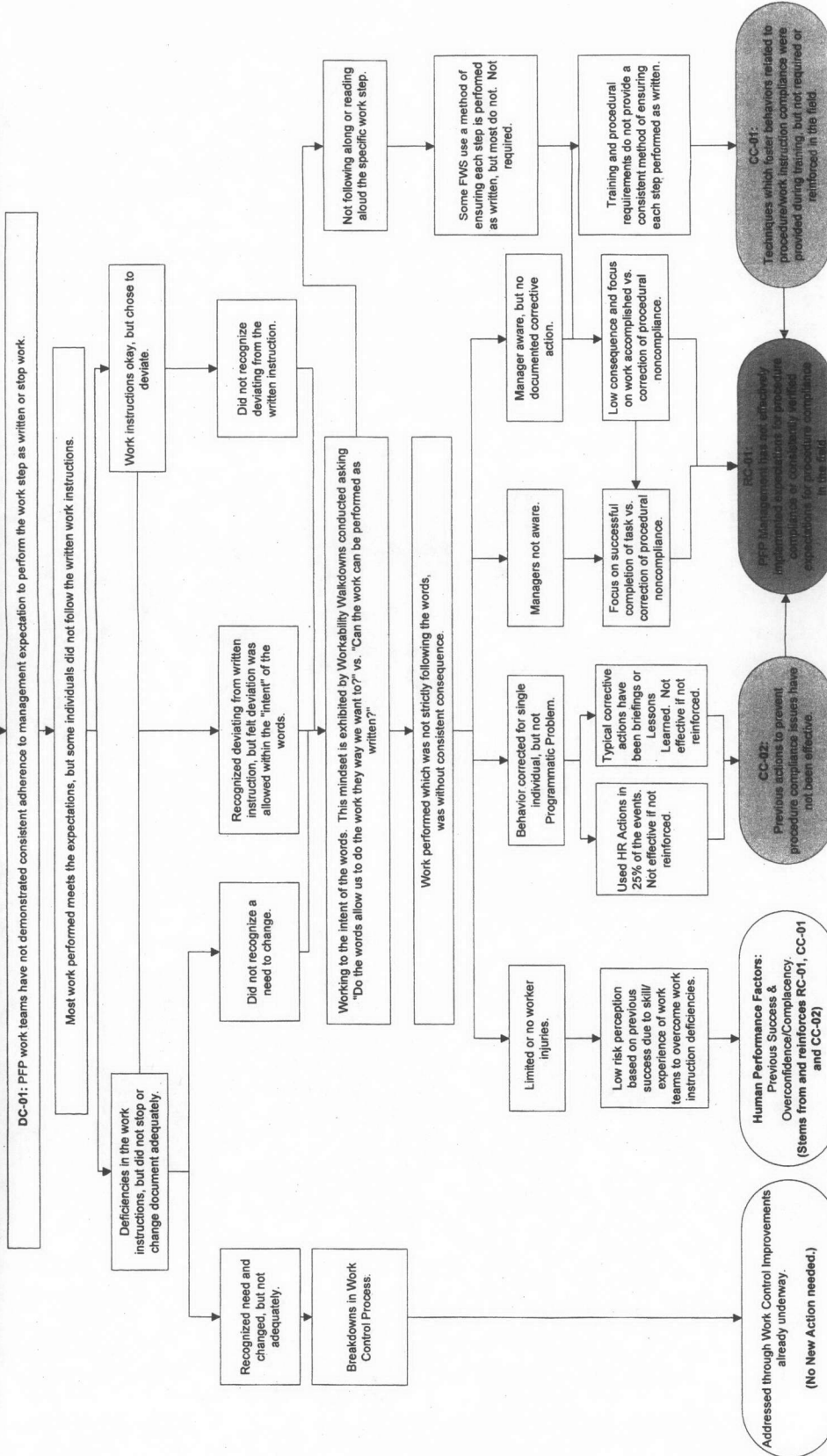
ROOT/COMMON CAUSE ANALYSIS REPORT

Evaluator Comments

Procedure Noncompliances can lead to any number of unmitigated hazards.  The issue is: How do we attempt to prevent people from working contrary to the written instruction?	Management Barriers	Organizational Barriers	Programmatic Barriers	Individual Barriers	Adequacy	Evaluator Comments
				Workers	LTA	Workers focus on their portion of the task. While this may be appropriate, in some cases it has led to a situation where they rely on the FWS to verbally describe the task to be conducted as opposed to knowing how the task is described in writing. This allows working to the intent rather than the words.  Workers did not recognize that they were deviating, or they recognized it and felt that deviation was allowed within the "intent" of the words, potentially placing themselves at risk.
	Manager			Manager	LTA	Review of CRFS and interviews with some of the individuals involved, indicates that CHPRC and PFP are sending potentially mixed messages. The expectation to "stop when unsure" may have been communicated, but the stronger, reinforced message is the praise for the amount of work accomplished toward production goals. Less than 25% of the instances which were procedure noncompliances had some form of behavior correction (one-on-one mentoring or appropriate HR actions). Work completion has been rewarded regardless of how it was accomplished. Success in some cases is due to either the experience and skill of the work team, regardless of the work package content, or the skill of the work team in overcoming deficiencies in the work documents.  This contrary message is usually reinforced as a focus by Managers who's interaction with the team involves "When is that going to be done?" and "What help do you need from me to overcome the obstacles you're encountering?" When the majority of interaction between Manager and work crews revolve around "getting past problems" instead of resolving the problems, this can give workers the impression that the focus is on getting the job done, not getting the job done following the written word verbatim. This again reinforces the mindset of "Do the words allow us to do the work they way we want to?" --working to the intent of the words, not the actual words themselves.
	Appropriate HR Actions				LTA	Appropriate Human Resource actions can take many forms. This can include Disciplinary Review Boards, formal counseling, etc. For the purposes of this evaluation, the RCE Team also included documented one-on-one mentoring as a very low-level type of recognition that a human performance problem existed.  Documentation could only be found for 25 - 50% of the events. It is possible that private corrections of the behaviors occurred, but no evidence or interview evidence was found in those other 6 events.  NOTE: HR actions typically are not viewed as "Preventive" in nature as they are more about culpability, not accountability. Culpability is reactionary, whereas accountability involves setting the Roles/Responsibilities and enforcing consistent standards of conduct.

### ATTACHMENT I Why Tree Analysis

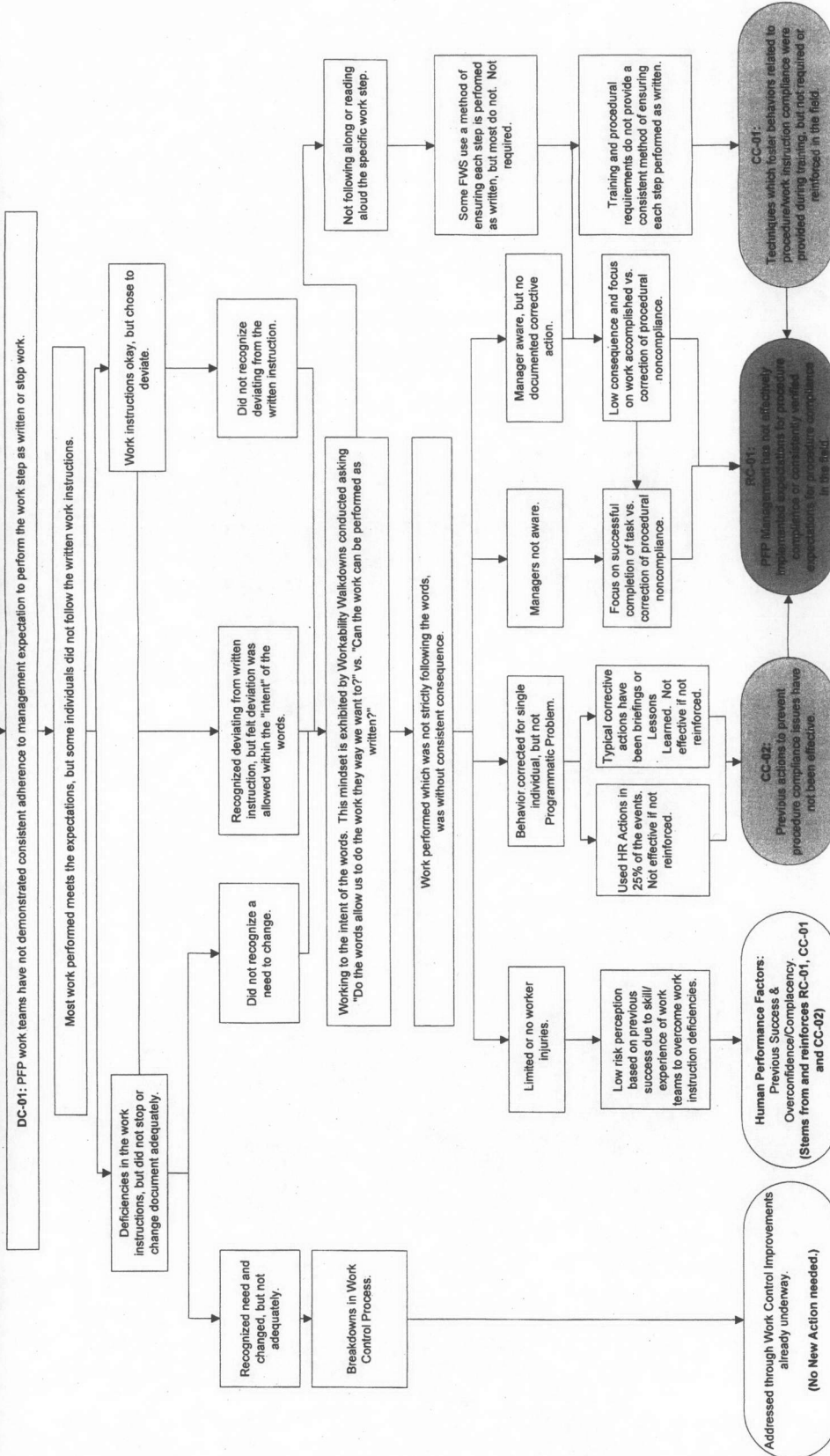
Problem Statement: Recently, the Platinum Finishing Plant Closure Project (PFP) has experienced a negative trend related to Conduct of Operations issues with failure to follow procedure/work instructions in the field.





ATTACHMENT I  
Why Tree Analysis

Problem Statement: Recently, the Plutonium Finishing Plant Closure Project (PFP) has experienced a negative trend related to Conduct of Operations issues with failure to follow procedure/work instructions in the field.



Action #	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Applicable Causes	Cause Codes	Expected Results	Effectiveness Review Criteria
PA 2	<p>PPP Vice President to conduct a documented briefing of expectations for Directors, Managers and FWSs to reiterate the requirement to perform work within defined controls. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1).</li> <li>• Definition of verbatim compliance.</li> <li>• Expectations for Workability Walkdowns.</li> <li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li> <li>• Review of stop work responsibility.</li> <li>• Expectation to share the briefing with PFP personnel.</li> </ul>	<p>Provide a closure statement describing what action was taken with a copy of documented discussion material, identification of individuals requiring the briefing and evidence of completion. (Completion Roster or Attendance Roster) as objective evidence.</p>	9/7/2011	Jerry Long	RC-01	A4B1C01	This is expected to provide accountability for personnel to understand the requirement to perform work within defined controls.	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that work teams understand the expectation to perform work as written or stop work.

Action #	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Applicable Causes	Cause Codes	Expected Results	Effectiveness Review Criteria
PA 3	<p>PPF Vice President to conduct a documented briefing of expectations for personnel performing MOPs to reiterate the purpose and requirements of the program. This includes, but is not limited to SSOs. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1).</li> <li>• Purpose of the MOP/SSO program is to identify weaknesses and opportunities for improvement. Additionally, SSOs provide immediate feedback and mentoring to FWSSs and work teams.</li> <li>• The importance of maintaining independence.</li> <li>• Expectations for Workability Walkdowns.</li> <li>• Review of requirements for review of written instructions prior to performance of work in the facility.</li> <li>• Definition of verbatim compliance.</li> <li>• Review of similar events at PPF including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li> <li>• Review of stop work responsibility.</li> </ul>	<p>Provide a closure statement describing what action was taken with a copy of documented discussion material, identification of individuals requiring the briefing and evidence of completion. (Completion Roster or Attendance Roster) as objective evidence.</p>	9/7/2011	Jerry Long	RC-01	A4B1C01	This is expected to provide accountability for personnel to understand the requirement to perform work within defined controls.	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that personnel conducting MOPs understand the program requirements as well as their role in assessment/oversight and providing feedback (related to the briefed topics).

Action #	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Applicable Causes	Cause Codes	Expected Results	Effectiveness Review Criteria
PA 8	Institute the conduct of a quarterly workshop for FWSs to discuss challenges encountered in the field. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.	Provide a closure statement describing what action was taken with a copy of the meeting attendance roster for the first workshop and a proposed schedule for FY 2012 as objective evidence.	10/12/2011	Bob Leonard	RC-01 CC-01	A4B1C01 A4B1C06	Provide ongoing and repeated reinforcement of the standards and expectations for procedure compliance, as well as provide a forum for Supervisors to discuss challenges encountered in the field and Managers to provide mentoring and guidance on issues which have not been dealt with on a day-to-day basis	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that work teams understand the expectation to perform work as written or stop work.
PA 9	Institute the conduct of a quarterly workshop for those who perform Senior Supervisory Oversight (SSOs) to discuss challenges encountered in the field and techniques for providing feedback to work teams. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.	Provide a closure statement describing what action was taken with a copy of the meeting attendance roster for the first workshop and a proposed schedule for FY 2012 as objective evidence.	10/12/2011	Pete Owen	RC-01 CC-01	A4B1C01 A4B1C06	Provide ongoing and repeated reinforcement of the standards and expectations for procedure compliance, as well as provide a forum for SSOs to discuss challenges encountered in the field and Conduct of Operations personnel to provide mentoring and guidance on areas of focus and techniques for providing feedback to work teams.	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that personnel conducting MOPs understand the program requirements as well as their role in assessment/oversight and providing feedback (related to the briefed topics).

#	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Other Actions (Not Linked to a Cause)	Expected Results
10	Perform a Work Site Assessment (WSA) of the new requirements defined in Action 1. Add Actions if needed.  Methodology for the WSA should include: <ul style="list-style-type: none"> <li>Interview with SSOs, FWSs and work teams.</li> <li>Observation of pre-job briefings and field work evolutions.</li> </ul>	Provide a statement describing the results of the WSA with a copy of the WSA as evidence.	11/16/2011	Tim Oten		Determine if the specific techniques are fostering the procedure compliance behaviors, or if different techniques should be implemented.
11	Perform an Effectiveness Review per the plan described in Section 6.2 of the Root Cause Evaluation Report.	Provide a closure statement describing the results of the Review with a copy of the effectiveness review as objective evidence. Add actions if needed.	3/6/2012	Tim Oten		N/A

# CHPRC CONDITION REPORT FORM

Status: Analysis

CR NUMBER: CR-2011-2196

Issue Identification and Processing		
<b>Initiator:</b> Wegner, David B	<b>Initiating Document:</b> S-11-SED-CHPRC-PFP-002	<b>Date Identified:</b> 7/12/2011
<b>Title of Issue:</b> C01: The Radiological Work Planning Process at PFP		
<b>Description of Issue:</b> The radiological work planning process at PFP was less than adequate resulting in inadequate analysis of radiological hazards, inadequate use of engineering controls for some work activities, airborne radioactivity levels that exceeded the maximum protection factor of the type of respiratory protection used, multiple low level uptakes of plutonium, and spreads of contamination. CHPRC programmatic deficiencies in the work planning process contributed to less than adequate planning at PFP.		
<b>Requirements Not Met: (Orders, Requirements, Procedures)</b>	<b>Responsible Project/Program:</b> PFP CLOSURE PROJECT	
<b>Date Submitted:</b> 7/12/2011	<b>Other Related Documents:</b>	
<b>Immediate Action(s) Taken:</b> TBD		
<b>Recommended Corrective Actions:</b>		
<b>Initiator Comments:</b> Tom Bratvold - Curt Bean		
<b>Associated Files</b> AddRLVerification.pdf ChangeAnalyst.pdf CR-Matrix-RLVerificationAdditions.pdf S-11-SED-CHPRC-PFP-002.pdf		

Issue Significance, Analysis, Extent of Condition, Action Assignment, and Closure		
<b>Significance Level:</b> Significant	<b>Date Submitted to Responsible Manager:</b> 7/12/2011 - Bean, Curtis K	<b>Date CAP was approved by Responsible Manager/Delegate:</b>
<input type="checkbox"/> ORPS	<input checked="" type="checkbox"/> Compliance Determination	<input type="checkbox"/> NTS
<b>PAAA Compliance Determination Number:</b>		
<b>Significant Level Justification:</b> Screened as Significant.  The CR documents programmatic deficiencies at the PFP Project in regards to radiological work planning that has resulted in the identification of numerous conditions over the past year. PRC-PRO-QA-052, Table 1 describes the programmatic breakdown of a safety management program as Significant which will necessitate the performance of analysis to determine the root cause, an extent of condition review and an effectiveness review of actions designed to reduce the probability of recurrence.  DBW		
<b>Assigned To:</b> Berkenbile, Michael	<b>Date Assigned:</b> 7/13/2011	
<b>Extent of Conditions:</b> The extent of condition is identified in the Root Cause Evaluation Report. See attached file ( )		
<b>Causal Analysis Method Used:</b> Root	<b>Analysis Completion Date:</b> 9/23/2011	
<b>Analysis Results:</b> The analysis results are contained in the Root Cause Evaluation Report. See attached file ( )		

<b>Trend Codes:</b> MS06 - Hazard Identification/Analysis RP1405 - Rad. Work Planning- Implementation MN1201 - Work Planning MN05 - Work Planning
<b>Cause Codes:</b> A4B1C02 - Job performance standards not adequately defined A4B1C03 - Management direction created insufficient awareness of impact of actions on safety / reliability A1B1C04 - Necessary design input not available
<b>PAAA/851 Citations:</b>
<b>ISMS:</b> CF-A - Define the Scope of Work CF-D - Perform Work within Controls CF-E - Provide Feedback and Continuous Improvement

Corrective Action Items	
<b>Action #:</b> 1	<b>Actionee:</b> Bratvold, Tom
<b>Action Statement:</b> Develop a change management process according to PRC-PRO-MS-589 for radiological control managers.  The process will be founded on industry standards and focus on changes impacting radiological control personnel, processes, and performance. Fundamental elements should include: <ul style="list-style-type: none"> <li>• Assessment of risk and complexity</li> <li>• Validation of the need for change</li> <li>• Development of a Change Management Plan</li> <li>• Implementation of the change</li> <li>• Post implementation effectiveness review</li> </ul> The process will interface with the existing CHPRC Risk Management procedure (PRC-PRO-PC-40079) to ensure that radiological control change management evaluations are considered for impacts to existing assumptions and evaluations relative to mitigating project technical, cost, and schedule risks throughout the life of the project.	<b>Due Date:</b> 12/31/2011
<b>Closure Requirements:</b> Copy of new process/procedure.	
<b>Action Taken:</b>	<b>Completed Date:</b>
<b>Action Approved By:</b>	<b>Action Approval Date:</b>

<b>Action #:</b> 2	<b>Actionee:</b> Vaughn, Terry L
<b>Action Statement:</b> Centralize the RadCon program. Realign accountability lines from Project Line management to the Radiological Control program to enhance collaboration and balancing of requirements and production goals and to promote consistency across project lines.	<b>Due Date:</b> 11/30/2011
<b>Closure Requirements:</b> Copy of radiological protection organizational chart reflecting a centralized organizational structure.	
<b>Action Taken:</b>	<b>Completed Date:</b>
<b>Action Approved By:</b>	<b>Action Approval Date:</b>

<b>Action #:</b> 3	<b>Actionee:</b> Bratvold, Tom
<b>Action Statement:</b> Perform a needs analysis to determine training needs related to PA-01 according to PRC-PRO-TQ-40165. Based on needs analysis, develop new, or incorporate into existing training, the results of the needs analysis. When complete, administer the training to the highest ranking radiological control manager/director in each project and the program.	
<b>Due Date:</b> 1/31/2012	
<b>Closure Requirements:</b> Copy of training needs analysis; Copy of training material; Copy of training rosters for the highest ranking radiological control manager/director in each project and the program.	
<b>Action Taken:</b>	<b>Completed Date:</b>
<b>Action Approved By:</b>	<b>Action Approval Date:</b>

<b>Action #:</b> 4	<b>Actionee:</b> Grant, Gary M
<b>Action Statement:</b> Perform a Common Cause analysis of Work Control and Conduct of Operations Issues across CHPRC.	
<b>Due Date:</b> 9/30/2011	
<b>Closure Requirements:</b> Copy of the common cause analysis and identification of any additional corrective actions resulting from analysis.	
<b>Action Taken:</b>	<b>Completed Date:</b>
<b>Action Approved By:</b>	<b>Action Approval Date:</b>

<b>Action #:</b> 5	<b>Actionee:</b> Bean, Curtis K
<b>Action Statement:</b> Verify implementation of the preventive actions identified by the causal analysis performed in response to CR-2011-1707, Potential Trend Related to Failure to Follow Procedure/Work Instructions.	
<b>Due Date:</b> 12/31/2011	
<b>Closure Requirements:</b> Closure statement and objective evidence supporting the conclusion.	
<b>Action Taken:</b>	<b>Completed Date:</b>
<b>Action Approved By:</b>	<b>Action Approval Date:</b>

**CAUSE EVALUATION REPORT**

**Aug 25, 2011**

**The Radiological Work Planning Process at PFP  
(CR-2011-2196)**

Team Leader: \_\_\_\_\_ Date: \_\_\_\_\_  
M.J. Berkenbile  
Issues Management

Responsible Manager: \_\_\_\_\_ Date: \_\_\_\_\_  
C.K. Bean  
Director, Radiological Health and Safety

Responsible Manager: \_\_\_\_\_ Date: \_\_\_\_\_  
T.E. Bratvold  
Director, Worker Protection Program

ESRB: \_\_\_\_\_ Date: \_\_\_\_\_  
J. G. Lehew, President  
CHPRC



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## EXECUTIVE SUMMARY

DOE surveillance S-11-SED-CHPRC-PFP-002, *Planning and Execution of Radiological Work*, was completed on April 29, 2011. The objective of the surveillance was to evaluate the adequacy of planning and execution of radiological work at the Plutonium Finishing Plant Closure Project (PFP). The surveillance of the work planning process included a review of the identification, analysis and control of radiological work hazards. The surveillance reviewed work planning resources and the development of radiological work packages. The DOE-RL surveillance report identified deficiencies in the planning and execution of radiological work at PFP and CHPRC programmatic deficiencies in the work planning process. The surveillance documented one Concern, 12 Findings and four Observations.

Following receipt of the surveillance report on July 7, 2011, CHPRC submitted Condition Report (CR) CR-2011-2196. CHPRC screened the Concern as Significant. CHPRC and PFP chartered a Root Cause Evaluation (RCE) team to evaluate the Concern and determine why work activities at PFP related to the radiological work planning process resulted in airborne radioactivity levels that exceeded the maximum protection factor for the type of respiratory protection used, multiple intakes of plutonium, and spreads of contamination. The Charter is provided in Attachment 7.

Evaluation of the condition identified one Root Cause (RC-01) and two Contributing Causes (CC-01 and CC-02):

**RC-01:** CHPRC and PFP did not effectively manage change associated with the PFP shift to Demolition and Deconstruction (D&D) work scope and the increase in scope made possible by ARRA funding.

**CC-01:** The PFP and radiological control (RadCon) organization and Project RadCon organizational structure was ineffective to assure implementation of an effective RadCon program.

**CC-02:** PFP Conduct of Operations culture was less than adequate.

Five preventive Actions (PAs) are necessary to address the Root Cause and Contributing Causes:

- **PA-01:** Develop a change management process according to PRC-PRO-MS-589 for radiological control managers.
- **PA-02:** Centralize the RadCon program. Realign accountability lines from Project Line management to the Radiological Control program to enhance collaboration and balancing of requirements and production goals and to promote consistency across project lines.
- **PA-03:** Perform an assessment to determine training needs related to PA-01. Develop new, or incorporate into existing training, the results of the assessment. When complete, administer the necessary training.
- **PA-04:** Perform a Common Cause analysis of Work Control and Conduct of Operations Issues across CHPRC.

- **PA-05:** Implement the preventive actions identified by the causal analysis performed in response to CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions*.

A recent Surveillance of the radiological control improvement initiative at PFP concluded that PFP has made progress addressing many of the issued identified in the RL Surveillance, most notably in the areas of compliance and quality assurance. The surveillance noted continued need for improvement in management systems and work planning.

## 1.0 PROBLEM STATEMENT

Work activities at PFP related to the radiological work planning process resulted in airborne radioactivity levels that exceeded the maximum protection factor for the type of respiratory protection used, multiple intakes of plutonium, and spreads of contamination.

## 2.0 EVENT DESCRIPTION

DOE surveillance S-11-SED-CHPRC-PFP-002, *Planning and Execution of Radiological Work*, was completed on April 29, 2011. The objective of the surveillance was to evaluate the adequacy of planning and execution of radiological work at PFP. The surveillance of the work planning process included a review of the identification, analysis and control of radiological work hazards. The surveillance reviewed work planning resources and the development of radiological work packages. The DOE-RL surveillance report identified deficiencies in the planning and execution of radiological work at PFP and CHPRC programmatic deficiencies in the work planning process. The surveillance documented one Concern, 12 Findings and four Observations.

Following receipt of the surveillance report on July 7, 2011, CHPRC submitted CR-2011-2196. CHPRC screened the Concern as Significant. CHPRC and PFP chartered a Root Cause Evaluation (RCE) team to evaluate the Concern:

S-11-SED-CHPRC-PFP-002-CO1:

The radiological work planning process at PFP was less than adequate resulting in inadequate analysis of radiological hazards, inadequate use of engineering controls for some work activities, airborne radioactivity levels that exceeded the maximum protection factor of the type of respiratory protection used, multiple low level uptakes of plutonium, and spreads of contamination. CHPRC programmatic deficiencies in the work planning process contributed to less than adequate planning at PFP.

## 3.0 HISTORICAL REVIEW

An historical review was completed that examined previous incidents germane to CR-2011-2196. The following data sources were reviewed:

- Hanford Information and Lessons Learned System (HILLS)
- CHPRC Condition Reporting and Resolution System (CRRS)

A review of HILLS yielded one documents germane to the event. HILLS article 2008-RL-HNF-0041, *Inadequate Work Package Definition Results in Radiological Uptake*, was

published December 2008. No information was found indicating the bulletin had resulted in a CR for action.

Approximately 30 Condition Reports (CRs) were identified to be directly related to the Findings substantiating the Concern. Each of the CRs reviewed is listed in Attachment 4. The aggregate of corrective actions for these events was evaluated to determine if the actions have mitigated the Findings and ultimately reduced the probability of recurrence of the condition identified by each Finding and the Concern. In addition, the team reviewed other recent actions taken by CHPRC. These actions are summarized in section 5.0.

#### 4.0 EVALUATION OF ASSESSMENT PERFORMANCE

Team members reviewed assessments in the CHPRC Integrated Evaluation Plan (IEP) database from 2009 to present related to radiological work planning. The following assessments identified program and/or facility-specific areas of improvement in regard to radiological work planning and documentation.

- Independent assessments CHPRC-PO-IA-09-01, *Independent Assessment of the Plutonium Finishing Plant Closure, D&D, and Infrastructure Project*, CHPRC-PO-IA-09-02, *Independent Assessment of the Waste & Fuels Management Project*, CHPRC-PO-IA-09-09, *Independent Assessment of the Soil and Groundwater Remediation Project* and CHPRC-PO-IA-11-01 *Independent Assessment of the D&D Project*, were performed during the period. These assessments identified facility-specific opportunities for improvement in radiological work planning. The actions taken by each project to address the facility-specific radiological planning issues did not prevent the condition evaluated in this assessment.
- CHPRC-PO-IA-09-01, *Independent Assessment of the Plutonium Finishing Plant Closure, D&D, and Infrastructure Project*, identified a cross-cutting change management issue; a need to improve PFP Project's execution of change management. The assessment and related CR (CR-2009-0316) advised that a failure to address the issue with potentially more significant changes and dynamic personnel shifts could limit the Project's performance. The CR was screened as an Opportunity for Improvement (OFI). The actions taken to address the issue did not prevent the events evaluated in this causal evaluation.
- Management assessments of CHPRC projects (SHS&Q-RC-09-MA-024, *Management Assessment of Radiological Protection Program Verification for ISMS/EMS Phase II*, and SGRP-MA-09-012, *Management Assessment of Planned Work Instructions, Enhanced Work Planning (S&GW)*, were performed in 2009. Assessment SHS&Q-RC-09-MA-024 was performed as part of preparation for the ISMS Phase II verification. The assessment evaluated program implementation requirements and identified facility-specific areas for improvement. Collectively, the assessments did not identify issues, which if corrected, would have prevented the events evaluated in this causal evaluation.
- DOE/RL-2010-26, *Integrated Safety Management System Phase II Verification*. The ISMS review team concluded that the overall work planning, hazards analysis, and control selection processes were established and understood, although tailoring of specific controls to low-risk, routine work could be improved. Efforts to strengthen work planning processes were warranted. The assessment did not identify issues,

which if corrected, would have prevented the events evaluated in this causal evaluation.

## **5.0 SUMMARY OF RECENT ACTIONS**

CHPRC and PFP have evaluated and taken action to correct a large number of RadCon and Work Management issues in the recent months (February through June 2011). A timeline of these issues is presented as Attachment 10.

Additionally, a Surveillance of the radiological control improvement initiative at PFP was performed June 27 through July 8, 2011 to evaluate progress (see SHS&Q-2011-SURV-10682). This surveillance concluded that PFP has made progress in many aspects of the improvement initiative, most notably in the areas of compliance and quality assurance. The surveillance noted continued need for improvement in management systems and work planning. The condition reporting and resolution system is being used to address recommendations from this review.

## **5.1 RADCON PROGRAM ACTIONS**

On March 4, 2011, discussion between CHPRC and DOE-RL senior managers identified specific RL concerns resulting from the ongoing (at that time) surveillance of the planning and execution of radiological work at PFP. Based on those discussions, CHPRC management assigned the Director of Worker Protection Programs (DWPP) to PFP to initiate improvements within PFP's RadCon organization.

The DWPP assembled a team of six additional seasoned RadCon professionals from the Safety, Health, Security, and Quality (SHS&Q) organization with specific expertise in radiological hazards analysis and control development. The personnel were re-assigned to PFP to strengthen the radiological engineering staffing level and skills mix and to provide immediate support to radiological hazards analysis and control functions in the PFP organization. Three of the re-assigned personnel were Certified Health Physicists (CHPs) with roughly 80 years of combined radiological control experience. Collectively, the re-assigned staff brought nearly 150 years of radiological control experience to PFP.

Starting on March 5, 2011, the team of six focused on reviewing work packages to ensure adequate controls and personal protective equipment (PPE) were included in work packages to safely complete the work. A compensatory measure was established through the shift office (Release Authority) to preclude any work packages from being released for work until one of the external reviewers had verified adequacy of protective features. The team of six developed a work package review checklist to enable consistent evaluation of work documents. In many instances, work packages included sufficient protective measures for work crews but the associated radiological hazards analysis, documented in the ALARA management worksheet (AMW), was lacking appropriate justification supporting the selected controls. Additionally, many work documents included too much latitude in the hazard control set creating inconsistent use of controls and enabling selection of hazard controls in the field by workers that were not appropriately trained to make those decisions. Within a couple of weeks, the team of six transitioned to a holistic revision approach for work documents. Rather than simply verifying protective controls existed in a work document and making changes where that was not the case, the effort was changed to start anew with the hazards analysis process, developing commensurate controls, and documenting the analysis and control features with the associated AMW. Once the updated hazards analysis and control set

was complete, work documents were revised to provide specific controls tailored to the work activity and eliminate prior flexibility where unwarranted.

On March 7, the DWPP arrived at PFP and began focusing on organizational improvements to enable long-term success of PFP. The DWPP developed a 57-action improvement plan based on DOE-RL feedback from the March 4 meeting and feedback from the team of six review efforts. Although the primary focus was on radiological protection, specific actions pertaining to the beryllium program were also included. The improvement effort focused on three primary elements: people, processes, and performance. Highlights from the improvement initiative are listed below and the entire plan is included as Attachment 11.

▪ **People**

Three additional radiological engineers were added to PFP. Two of these resources were reassigned from other CHPRC work and the third hired from offsite. One individual was a CHP with prior PFP experience. Three additional RadCon first-line supervisors were hired for PFP, establishing a reasonable span of management for the organization of ~15:1, and the vacant facility RadCon Manager position was filled. Four additional industrial hygienists were also brought to PFP, reassigning them from other CHPRC projects and the Industrial Hygiene Program organization. Newly hired staff proceeded through training and qualification with urgency to expedite their benefit to the organization.

▪ **Processes**

Multiple actions were taken to correct process controls. Highlights include

- Developing a technical basis for radiological engineering methods, including appropriate use of ventilation, with corresponding training of the radiological engineers on hazards analysis and control methods contained therein.
- Revising procedures governing the tracking and trending of air sample data and selection of dosimeter type/frequency to correct deficiencies.
- Revising the temporary shielding procedure to ensure compliant deployment for upcoming work in remote mechanical A (RMA) and remote mechanical C (RMC) lines where dose rates are more significant than in most portions of the facility and short-term use shielding will be heavily relied upon to maintain worker exposures as low as reasonably achievable (ALARA).
- Issuing a series of formal expectations to radiological control and industrial hygiene staff members to ensure performance expectations were clear and consistent. One of the critical expectations for radiological engineers and industrial hygienists was direction to use total containment for contaminated system breaches as their first choice for those activities. Inherent in this expectation for increased use of engineered control was aligning approval authority for deviation from total containment to the highest authority in the radiological control and industrial hygiene organization, specifically the Director of Radiological, Hygiene, and Safety.

- Providing external review of beryllium (Be) and radiological work permits, BWPs and RWPs, respectively, and revising these critical permits accordingly. Radiological monitoring task descriptions were revised to require collection of characterization samples and enable continuing evaluation of radiological hazards throughout the facility.

Additional opportunities for improvement were identified in the radiological work planning process and procedures. It was determined at the time that the improvements would be captured in the development of a new Radiological Work Planning procedure, KDD-PRO-RP-40109, which would replace the existing site-wide procedures PRC-PRO-RP-40108 and PRC-PRO-RP-40109 and would accompany improvements and revision to the site-wide work management process for CHPRC (PRC-PRO-WKM-12115). The work management process improvement was to be implemented using a two-phase graded approach to full site implementation. Phase 1 released the procedures for use at 100K Decontamination and Demolition (D&D), allowing a period of use and feedback. Phase 2, originally scheduled to occur approximately two months after Phase 1, released the new procedures to all of CHPRC, after incorporation of lessons learned and feedback from Phase 1. The procedure KDD-PRO-RP-40109, *100K D&D Radiological Work Planning*, contained the identified improvements and was released for use in October 2010 as part of Phase 1. Since site-wide use of the new radiological work planning procedure was tied to the release of Phase 2 of the new work management process, each delay in commencing Phase 2 caused a subsequent delay in the release of the new Radiological Work Planning procedure. The existing site procedures remained relatively untouched during this time period, awaiting the total replacement of the procedures that would occur in Phase 2. Two revisions did, however, occur to the existing site-wide PRC-PRO-RP-40109 procedure. In early 2010 a revision occurred to provide clarification of radiological system breach requirements and approved engineered controls. A second revision occurred in April 2011 to provide expanded review criteria for hazard analysis and control selections, require performance of dose estimates and airborne calculations, and clarified engineered controls approved for breaching radioactive systems.

#### ▪ Performance

Relative to performance improvements, the facility developed a routine Be sampling program and a sampling schedule for glove box internals. An additional 180 electronic dosimeters with low-energy photon response capabilities were purchased to improve dose monitoring and estimating. Numerous improvements were made in radiological and industrial hygiene workplace monitoring, including collecting shallow and deep dose rates and quantifying contamination levels with ion chambers when levels exceed the upper range of contamination friskers. A smaller powered air purifying respirator (PAPR) was introduced to the facility to mitigate observed challenges with wearing PAPRs in congested work environments.

The facility established a radiological air quality board to display trending information and increased instrument inventories to accommodate additional radiological and industrial hygiene workplace monitoring. Radiological Control and Engineering developed the relationship between radiological engineers and the facility ventilation engineer to ensure adequacy of applied ventilation as an engineered control and

PFP converted RMA/RMC to high contamination and airborne radioactivity areas, HCA and ARA respectively, based on a historical review of contamination spreads and the planned scope of work for these high-hazard areas.

## 5.2 WORK MANAGEMENT PROGRAM ACTIONS

The CHPRC Work Management process has undergone numerous changes during this contract with focus on improving aspects applicable to all of the ISMS Core Functions. In summary, the criteria for developing scope information in a planned work document has been relocated from the guidance document, PRC-GD-WKM-12116, into PRC-PRO-WKM-12115, *Work Management*, and the recent major revision to the program included additional details to support effective work scope content in planned work documents. Related program updates have also focused on improvements to the hazard analysis process including clearer distinction of requirements to incorporate effective controls for all types of hazards including radiological. The effective incorporation of the controls is achieved through updated Subject Matter Expert (SME) expectations regarding additional focus on reviewing the controls as they reside in the planned work instructions, not just in the context of the supporting analysis documentation. This is further enhanced by the addition of the Responsible Manager (RM) position whose responsibilities include ensuring the appropriate SMEs are supporting the planning process as well as owning the work document from "cradle to grave".

The improvements in the process for development and implementation of hazard controls directly influence the effectiveness of the controls supporting the expectation that they are task-specific while minimizing the application of generic controls that were historically prevalent in planned work documents. This effort enhanced the pre-job briefings with appropriate focus on task-specific controls as well as supporting effective execution of the controls in the field. Lastly, the feedback process has been updated to simplify how the feedback is gathered and documented which directly supports the successful use of feedback information on the execution of future activities that have similar hazards and/or scope.

## 6.0 PROBLEM ANALYSIS

Initial discussions with management and discussions with team members concluded the focus areas necessary to evaluate the problem statement would encompass the 12 findings and the four Observations provided in S-11-SED-CHPRC-PFP-002 and Conduct of Operations Issues identified in CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions*, and CR-2011-1810, *Common Cause(s) of Work Control and Conduct of Operations Issues*.

The team reviewed each of the findings and those CRs documenting the issues and events germane to the findings. The team evaluated the causal factors and preventive actions for each CR. Figure 1 is provided to illustrate the relationship of each CR to CR-2011-2196.

Due to limited "run time" of those actions completed, the evaluation results also rely on information derived from interview results.

The team interviewed the PFP RadCon Program Manager, Radiological Engineers/Radiological Work Planners, Radiological Control Supervisors, Radiological Control Technicians, Fieldwork Supervisors, Work Planners and Nuclear Chemical Operators to assess the efficacy of the recent PFP and RadCon program improvement



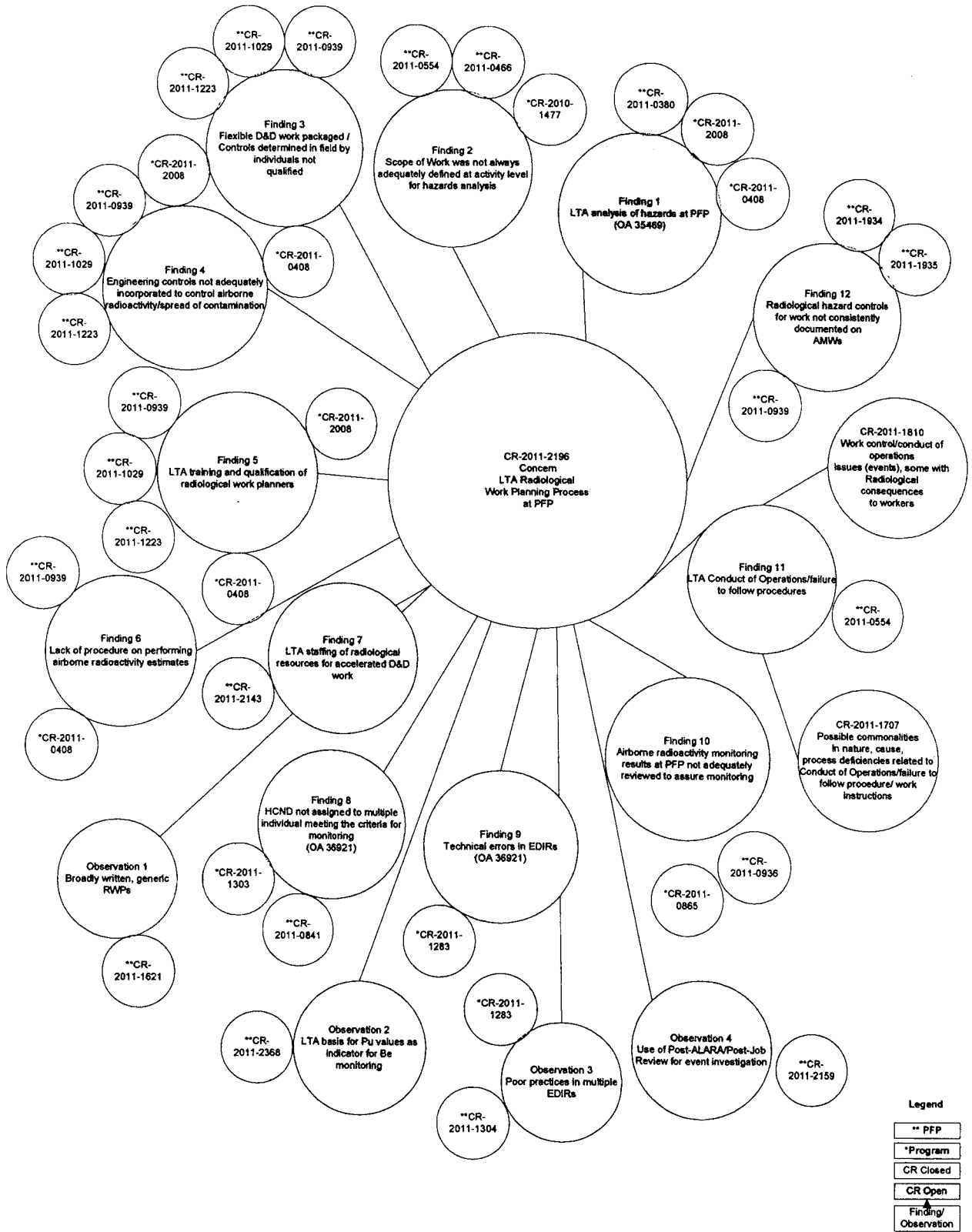
initiatives. The evaluation results were supported through selected interviews using Lines of Inquiry (LOI) (Attachment 6). Results of those interviews indicate mixed results. Although workers realize the improvement initiatives and actions have had limited "run time", interviewees reported opportunity for improvement is needed in the following areas:

- Organizational efficiencies
- Resource allocation
- Work planning interfaces
- Clarity of Roles and Responsibilities
- Implementation of management expectations relative to RadCon planning
- Supervisory presence in the field

These results are consistent with CHPRC surveillance (SHS&Q-2011-SURV-10682) that evaluated the progress of the radiological control improvement initiative at PFP.

Additional opportunities for improvement are anticipated as information continues to become available resultant of continuous improvement processes, oversight and effectiveness review activities.

#### **Figure 1. CR Interrelationship Diagram**



## 6.1 Barrier Analysis

A Barrier Analysis was performed to evaluate the use and effectiveness of barriers. The Barrier Analysis focused on identifying failed or missing barriers that could or should have prevented or mitigated the condition(s) culminating in the issues related to the Concern. The analysis considered physical and non-physical barriers. Barriers determined to be partially effective or ineffective are presented in Table 1. These barriers were suspected as causal factors and further evaluated during completion of the "WHY" analysis (see section below). A complete list of barriers and the evaluation is provided in Attachment 8

The Barrier Analysis identified the following less-than-effective barriers as causal factors. Each barrier and the causal relationship are summarized:

**Table 1: Less-than-effective Barriers**

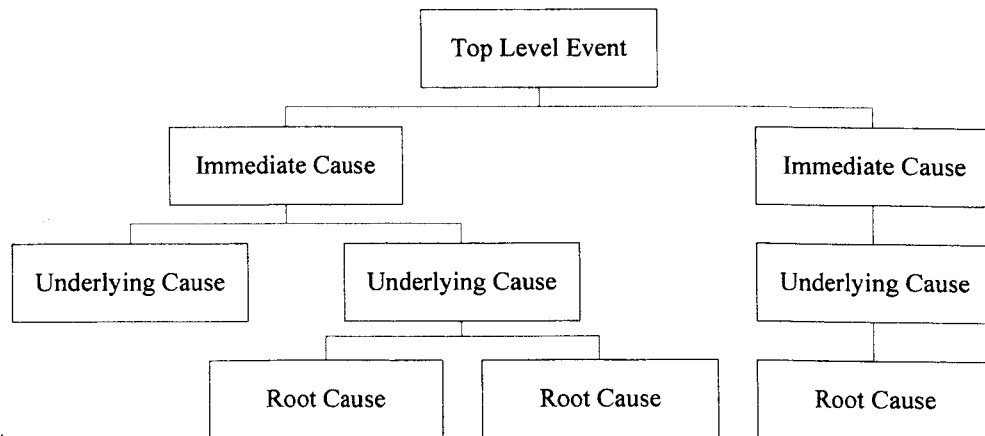
Barrier	Remarks
PFP Work Documents/Work Packages	Deficient work packages enabled an environment where decisions on Rad control were made in the field. Enabled decisions on how to do work in the field.
Radiological Work Permit (RWP) Development	Issues with voids - Limiting Rad conditions - No action limit or void limit - Over generalization - Too much work scope. Insufficient level of detail in Rad hazards analysis process, including RWPs (Ref. S-11-SED-CHPRC-PFP-002-O01) to ensure controls were task specific.
Radiological Work Permit (RWP) Implementation	Over generalization enabled inconsistent deployment of RWPs. Insufficient level of detail in Rad hazards analysis process, including RWPs (Ref. S-11-SED-CHPRC-PFP-002-O01) to ensure controls were task specific.
Procedure PRC-PRO-12115 <i>Work Management</i>	12115 LTA - Work control program requirements did not emphasize expectations for SME review of activity level work. Continued improvement June 2011. Updated expectations on SME involvement.
Procedures PRC-PRO-RP-40109, <i>Radiological Work Planning</i> , PRC-PRO-RP-40108 CANCELLED	Actual controls being determined in the field by individuals not qualified in radiological hazards analysis. Continued improvement March 2011. Effective hazard controls (Radiological) captured.
ALARA Management worksheet (AMW)	AMWs lacked hazard analysis and controls. Training course 022801 focused on completion of AMW not hazard analysis/control.
Completed Decision Making Packet (CDMP-0011)	Although example air calculations were provided, they were not focused on task specific hazards analysis. Inadequate program oversight of airborne analysis.
Procedure PRC-PRO-RP-40031, <i>Workplace Air Monitoring Program</i>	Trending – process trigger was an order magnitude higher than necessary Worker - not aware assigned trending duties.
Procedure FSP-PFP-5-8,14.18, <i>Trending Air Sample Data</i>	Trending – process trigger was an order magnitude higher than necessary Worker - not aware assigned trending duties.
Self Assessments	Multiple assessments performed, not focused on hazard analysis/control.
Management Assessments	Multiple assessments performed, not focused on hazard analysis/control.

Barrier	Remarks
Independent Assessments	Corrective actions did not prevent recurrence.
Process for performing Airborne Radioactivity Calculations for hazard analysis in work planning	No process for performing Airborne Radioactivity Calculations for hazard analysis in work planning process. Did not perform airborne radioactive analysis
Corrective Action Program / Trending	Limited use by workforce and/or ineffective response.
Containments	Inconsistent use. Engineering controls were not adequately incorporated to control airborne radioactivity and spread of contamination for some work activities, resulting in high airborne radioactivity, low-level intakes, and spreads of contamination. Engineering staff were not always adequately engaged in the radiological engineering of the work
Confinement	Inconsistent use, and in some cases, inappropriate use of Engineering controls, in the form of confinement, were not adequately incorporated to control airborne radioactivity and spread of contamination for some work activities, resulting in high airborne radioactivity, low-level intakes, and spreads of contamination. Engineering staff were not always adequately engaged in the radiological engineering of the work
Senior Supervisory Oversight (SSO)	More work performance than work compliance focused.
Management Oversight Program (MOP)	More work performance than work compliance focused.
Fieldwork Supervisor (FWS)	Receptive to allowed level of latitude. Actual controls being determined in the field by individuals not qualified in radiological hazards analysis. Work package change process not always followed, which would have required engaging engineering and other SMEs.
Radiological Control Supervisor (RCS)	Insufficient field presence of RCS complicated by manning levels. Enabled actual controls being determined in the field by individuals not qualified in radiological hazards analysis.
D&D Managers	Focused on completion of work. Did not consistently demonstrate balance between work completion and safe execution. Management oversight expectations not consistently implemented.
Radiological Staffing	Untimely replacement of departed staff - Availability of Rad Engineers was restricted nationwide due to ARRA demand.
Program Oversight	Insufficient use - focused on mentoring and assistance with little documentation.
Training - 022801	Training (Hazards Analysis) course determined to be deficient - course 022801 focused on completion of AMW not hazard analysis/control.
Historical Expertise	Over-reliance on historical expertise and experience with control of Radiological hazards. Historical hazard analysis process did not adjust with changing hazard level associated with D&D. Management relied on historical training needs analysis.
Tech Doc FSP-PFP-IP-003	Document not used as informational source
Radiological Control Technician (RCT)	Occasionally supportive of the allowed level of latitude – Ratio of Senior to Junior RCTs created skills mix weaknesses and need for additional consideration to balance work assignments based on hazard level and associated risk.

Barrier	Remarks
Nuclear Chemical Operator (NCO)	Receptive to allowed level of latitude
Engineers	Insufficient transfer of system configuration and knowledge on occasion during work planning process. Project Engineering staff were not always adequately engaged in the radiological engineering of the work.
Rad Engineers/Radiological Planner	Insufficient hazard analysis and controls on multiple occasions. Management relying on SME (experience and education). RadCon Engineering misconception on ventilation specifics (i.e., Point source vs. facility).
Skills Mix	Inadequate skills-mix for Rad Engineers - project did not manage skills mix beyond education/experience requirements for radiological engineers/radiological planners.
Organizational Structure	Project and Program managers did not successfully collaborate to ensure program requirements and expectations were implemented. Positional authority from the program was ineffective.
Change Management Process	Change in work scope from operations to D&D – Historical standard operating practice did not adjust with changing hazard levels associated with D&D.

### 6.2 "Why" Analysis

The RCE team performed a "Why" Analysis (Attachment 9). As exemplified below, the problem statement represents the top level event. Other causal factors and salient elements of the surveillance finding statements were evaluated as the immediate causal factors. The immediate causes were then evaluated to determine the underlying causal factors contributing cause or root cause. A list of the immediate and underlying causal factors identified is provided in Attachment 5.



## 7.0 ROOT AND CONTRIBUTING CAUSES

The following root cause (RC) and contributing causes (CCs) were identified through investigation and analysis of the problem statement, the immediate causes and their underlying causal factors.

**RC-01:** CHPRC and PFP did not effectively manage change associated with the PFP shift to Demolition and Deconstruction (D&D) work scope and the increase in scope made possible by ARRA funding. (A4B1C04, ISMS CF-1 and CF-5)

Collectively, a preponderance of the underlying causal factors contributing to the aggregate of immediate causal factors associated with the Concern contain or conclude in elements representative of ineffective change management. Inadequacies in Conduct of Operations, radiological controls, and oversight deficiencies at the management and program level exacerbated the condition.

**CC-01:** The PFP and radiological control (RadCon) organization and Project RadCon organizational structure was ineffective to assure implementation of an effective RadCon program. (A4B1C02, A4B1C03, A4B1C04, ISMS CF-4)

RC-01 was exacerbated by deficiencies in Management's ability to cause programmatic expectations to adequately flow down to implementing work process documents and to the workers who perform the work. Project and Program managers did not successfully collaborate to ensure program requirements and expectations were implemented. Positional authority from the program was ineffective.

**CC-02:** PFP Conduct of Operations culture was less than adequate. (A4B1C01, ISMS CF-4)

RC-01 was exacerbated by Conduct of Operations deficiencies at the project and company level. Since contract award and through early 2011 several CHPRC issues and events were related to deficiencies in radiological work execution. Between March 29, 2011 and May 24, 2011, PFP noted a number of events that indicated that a potential negative trend existed related to procedure compliance. This prompted initiation of CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions*. An RCE team was chartered to determine if common causes or underlying issues existed for the recent events.

CHPRC has experienced a number of work control and conduct of operation issues in recent years. The actions to address these issues and the collective causes have not fully prevented recurrence. Recent work control and Conduct of Operations issues (events), some with radiological consequences to workers have occurred, as CHPRC continues to implement comprehensive work control and Conduct of Operations corrective actions to effect a cultural change (improvement) within the CHPRC work force. CHPRC initiated CR-2011-1810 to document this issue.

## 8.0 EXTENT OF CONDITION

The root and contributing causes identified relative to the overall concern (Section 6.0) are believed to be transportable throughout CHPRC projects. Therefore, the proposed

actions and any actions not previously completed need to be evaluated and implemented at the company level.

## 9.0 ACTIONS

The RCE team identified actions to address RC-01, CC-01 and CC-02. No Remedial Actions were identified and five Preventive Actions (PAs) are necessary to address the Root Cause and Contributing Causes (beyond those actions taken for the individual events). One final action is not corrective but is to determine the effectiveness of the Corrective Action Plan (CAP).

Additionally, it was noted that the Integrated Corrective Action Plan (ICAP) is designed to address programmatic and cultural shortcomings related to work management. The ICAP corrective actions are complete and have been implemented across CHPRC. Those actions address the issues management issues identified during this analysis.

The following preventive actions were developed to prevent the recurrence of this event and focuses on impacts to the RadCon Organizational Structure and CHPRC Change Management.

The following five PAs address the Root and Contributing Causes.

**PA-01:** Develop a change management process according to PRC-PRO-MS-589 for radiological control managers.

The process will be founded on industry standards and focus on changes impacting radiological control personnel, processes, and performance.

Fundamental elements should include:

- Assessment of risk and complexity
- Validation of the need for change
- Development of a Change Management Plan
- Implementation of the change
- Post implementation effectiveness review

The process will interface with the existing CHPRC Risk Management procedure (PRC-PRO-PC-40079) to ensure that radiological control change management evaluations are considered for impacts to existing assumptions and evaluations relative to mitigating project technical, cost, and schedule risks throughout the life of the project.

- **PA-02:** Centralize the RadCon program. Realign accountability lines from Project Line management to the Radiological Control program to enhance collaboration and balancing of requirements and production goals and to promote consistency across project lines.
  - **PA-03:** Perform an assessment to determine training needs related to PA-01. Develop new, or incorporate into existing training, the results of the assessment. When complete, administer the necessary training.
  - **PA-04:** Perform a Common Cause analysis of Work Control and Conduct of Operations Issues across CHPRC.

CHPRC has experienced a number of work control and conduct of operation issues in recent years. The actions to address these issues and the collective causes have not fully prevented recurrence. CHPRC initiated CR-2011-1810 to document this issue.

- **PA-05:** Implement the preventive actions identified by the causal analysis performed in response to CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions*. Refer to Attachment 2 (Finding 11 Portion)

Between 3/29/2011 and 5/24/2011, PFP noted a number of events which indicated that a potential negative trend existed related to procedure compliance. This prompted initiation of CR-2011-1707, *Potential Trend Related to Failure to Follow Procedure/Work Instructions*. A Root Cause Evaluation (RCE) Team was chartered to determine if common causes or underlying issues existed for the recent events.

Note: PA-04 and PA-05 address the conduct of operations issues identified at PFP and leverage improvement in this element throughout CHPRC respectively.

## 10.0 EFFECTIVENESS REVIEW CRITERIA

The following are criteria to be evaluated in determining the effectiveness of the preventive actions in precluding or mitigating the effects of root cause:

- The effects of impending changes are anticipated and managed such that trust in the organization is maintained and program/project performance is not negatively impacted. Managers regularly communicate to the workforce important decisions and their bases.
- The Change Management process is utilized. Results indicate that changes to requirements, programs, processes, procedures, organizations, and work conditions are thoroughly evaluated and accepted by affected personnel. Affected employees possess a comprehensive working knowledge of the new requirements, expectation and/or processes. Workers understand their roles and responsibilities.
- Both project and program radiological control personnel demonstrate a collaborative and effective regard for compliantly completing work and Line management customers recognize "healthy tension" with RadCon.
- Management Observation Program and Work Site Assessment identify a reduction in the overall rate of PFP events related to not following the procedure/work instructions.
- Management Observation Program and Work Site Assessment activities identify a reduction in the overall rate of events related to PFP Radiological work planning process issues. The CHPRC RadCon program is effectively implemented at PFP and balance of projects.



## 11.0 LESSONS LEARNED

### 12.0 ISSUE/ACTION MATRICES

Three Causal Reconciliation Matrices are provided:

CR-2011-2196 Causal Reconciliation Matrix (Attachment 1)

CR-2011-1707 Causal Reconciliation Matrix (Attachment 2)

Issues Analysis Action Matrix for the specific Findings and Observations requiring RL closure, (Attachment 3).

Disposition of actions and closure will be performed in accordance with PRC-PRO-QA-052, *Issues Management*. The information and dates associated with action planning, responsible party assignment and completion are tracked in the Condition and Reporting Resolution System (CRRS). The Extent of Condition is detailed in Section 8 of this report.

Current CR review and closure verification information may be retrieved at:

[https://xiprod.ri.gov/businessobjects/enterprise115/InfoView/scripts/documentXML.aspx?token=&cmdP1=untitled\\*310502530\\*0\\*\\*\\*&cmd=askView&cmdBlock=all&cmdP2=](https://xiprod.ri.gov/businessobjects/enterprise115/InfoView/scripts/documentXML.aspx?token=&cmdP1=untitled*310502530*0***&cmd=askView&cmdBlock=all&cmdP2=)

### 13.0 CAUSE EVALUATION TEAM

Responsible Manager(s):	T.E. Bratvold/C.K. Bean
Team Lead:	M.J. Berkenbile
Team Members:	K.R. Escujuri P.A. Pechin T.D. Jarecki
Subject Matter Participants:	L. S. Nye K.O. Gramstad S.A. Woollums S.J. Gray

## ATTACHMENT 1: CAUSAL RECONCILIATION MATRIX (CR-2011-2196)

Applicable Cause(s)	Action	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Expected Results	Effectiveness Review Criteria
RC-01	PA-01	<p>Develop a change management process according to PRC-PRO-MS-589 for radiological control managers.</p> <p>The process will be founded on industry standards and focus on changes impacting radiological control personnel, processes, and performance.</p> <p>Fundamental elements should include:</p> <ul style="list-style-type: none"> <li>• Assessment of risk and complexity</li> <li>• Validation of the need for change</li> <li>• Development of a Change Management Plan</li> <li>• Implementation of the change</li> <li>• Post implementation effectiveness review</li> </ul> <p>The process will interface with the existing CHPRC Risk Management procedure (PRC-PRO-PC-40079) to ensure that radiological control change management evaluations are considered for impacts to existing assumptions and evaluations relative to mitigating project technical, cost, and schedule risks throughout the life of the project.</p>	Copy of new process/procedure.	12/31/2011	TE Bratvoid	The effects of impending changes are anticipated/ managed such that performance is positively impacted.	Perform a work Site Assessment of procedure implementation and effectiveness six months after the effective/issue date.
CC-01	PA-02	Centralize the RadCon program. Realign accountability lines from Project Line management to the Radiological Control program to enhance collaboration and balancing of requirements and production goals and to promote consistency across project lines.	Copy of radiological protection organizational chart reflecting a centralized organizational structure.	11/30/2011	TL Vaughn	<p>The CHPRC RadCon Program effectively implemented at PFP and balance of projects</p> <p>Both project and program radiological control personnel demonstrate collaborative and effective regard for compliantly completing work and Line management customers recognize "healthy tension" with RadCon.</p>	Work Site Assessment of radiological control performance and customer relations.

Applicable Cause(s)	Action	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Expected Results	Effectiveness Review Criteria
CC-01	PA-03	Perform a needs analysis to determine training needs related to PA-01 according to PRC-PRO-TQ-40165. Based on needs analysis, develop new, or incorporate into existing training, the results of the needs analysis. When complete, administer the training to the highest ranking radiological control manager/director in each project and the program.	Copy of training needs analysis; Copy of training material; Copy of training rosters for the highest ranking radiological control manager/director in each project and the program.	1/31/2012	TE Bratvoid	The organization understands and provides the requisite training needed to educate and inform affected employees of the new requirements.  Affected employees possess a comprehensive working knowledge of the new requirements, expectation and/or processes. Workers understand their roles and responsibilities.	Perform a work Site Assessment of procedure/training implementation and effectiveness six months after the effective/issue date.
CC-02	PA-04	Perform a Common Cause analysis of Work Control and Conduct of Operations Issues across CHPRC.	Copy of the common cause analysis and identification of any additional corrective actions resulting from analysis.	09/30/2011	GM Grant	Perform a common cause analysis using a team approach to review/evaluate recent operational events to determine commonalities/common causes related to work control implementation at CHPRC. The evaluation will include comparing/aligning the results of this evaluation against on-going corrective actions (i.e., Integrated Corrective Action Plan (ICAP), and occurrence reporting) to determine if any new causes or performance trends are developing and/or if additional evaluation and corrective actions are necessary.	Common cause analysis is complete and analysis identifies that existing corrective actions are appropriate or additional corrective actions are identified and loaded into CRRS.
CC-02	PA-05	Refer to Attachment 2 (Finding 11 Portion)					

## ATTACHMENT 2: CAUSE / ACTION RECONCILIATION MATRIX (CR-2011-1707) EXCERPT

Action #	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Applicable Causes	Cause Codes	Expected Results	Effectiveness Review Criteria
PA 1	Develop a new PFP procedure to require: 1) During the Pre-Job briefing Field Work Supervisor (FWSs) shall read aloud the words of the tasks expected to be performed during the day's activities. 2) FWSs shall conduct an interactive pre-job briefing with the work team on the written work steps to be performed for each work evolution. This includes specific questioning on the tasks to be performed. 3) Pre-job attendees sign the CHPRC Pre-Job Briefing Checklist after the FWS has asked if the work team clearly understands their job responsibilities and are qualified for the work assigned. Signature on this form acknowledges that the workers understand the work tasks as they are written. 4) FWSs shall be able to declare which work step they are working at any given time.	Provide a closure statement describing what action was taken with a copy of the new or revised procedure as objective evidence.	9/16/2011	Bernie Lueck	RC-01	A4B1C01	This is expected to define a clear set of standards and methods for ensuring that work teams are aware of the words as they are written and to be performed.	N/A.  Addition of a requirement to an administrative procedure cannot be evaluated for effectiveness without the follow-on training and consistent emphasis in the field. See Effectiveness Criteria for PAs 2, 3, 6 and 7.
PA 2	PFP Vice President to conduct a documented briefing of expectations for Directors, Managers and FWSs to reiterate the requirement to perform work within defined controls. The briefing will include the following: <ul style="list-style-type: none"><li>• New requirements for compliance with written instructions (see PA1).</li><li>• Definition of verbatim compliance.</li><li>• Expectations for Workability Walkdowns.</li><li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li><li>• Review of stop work responsibility.</li><li>• Expectation to share the briefing with PFP personnel.</li></ul>	Provide a closure statement describing what a citation was taken with a copy of documented discussion material, identification of individuals requiring the briefing and evidence of completion. (Completion Roster or Attendance Roster) as objective evidence.	9/7/2011	Jerry Long	RC-01	A4B1C01	This is expected to provide accountability for personnel to understand the requirement to perform work within defined controls.	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that work teams understand the expectation to perform work as written or stop work.

Action #	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Applicable Causes	Cause Codes	Expected Results	Effectiveness Review Criteria
PA 3	<p>PFPP Vice President to conduct a documented briefing of expectations for personnel performing MOPs to reiterate the purpose and requirements of the program. This includes, but is not limited to SSOs. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1).</li> <li>• Purpose of the MOP/SSO program is to identify weaknesses and opportunities for improvement. Additionally, SSOs provide immediate feedback and mentoring to FWSs and work teams.</li> <li>• The importance of maintaining independence.</li> <li>• Expectations for Workability Walkdowns.</li> <li>• Review of requirements for review of written instructions prior to performance of work in the facility.</li> <li>• Definition of verbatim compliance.</li> <li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li> <li>• Review of stop work responsibility.</li> </ul>	<p>Provide a closure statement describing what action was taken with a copy of documented discussion material, identification of individuals requiring the briefing and evidence of completion. (Completion Roster or Attendance Roster) as objective evidence.</p>	9/7/2011	Jerry Long	RC-01	A4B1C01	<p>This is expected to provide accountability for personnel to understand the requirement to perform work within defined controls.</p>	<p>Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that personnel conducting MOPs understand the program requirements as well as their role in assessment/oversight and providing feedback (related to the briefed topics).</p>
PA 4	<p>Revise PFP SSO procedure, FSP-PFP-5-8, 2.6 to:</p> <ul style="list-style-type: none"> <li>• Identify FWS past work performance (e.g., failure to perform work per procedure/work instruction) as a factor to be considered when determining whether continuous SSO coverage is required.</li> <li>• Require that the specific work package steps that will be worked during the observation are documented in the SSO record to ensure the observer understands the steps to be worked.</li> </ul>	<p>Provide a closure statement describing what action was taken with a copy of the SSO procedure as evidence.</p>	8/31/2011	Terry Hunter	RC-01	A4B1C01	<p>Require an ongoing review of FWS performance and will implement SSO continuous coverage if warranted.</p> <p>AND</p> <p>Ensure the SSO observer understands the steps to be worked.</p>	<p>Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that work teams understand the expectation to perform work as written or stop work.</p> <p>AND</p> <p>Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that personnel conducting MOPs understand the program requirements as well as their role in assessment/oversight and providing feedback (related to the briefed topics).</p>

Action #	Action Statement	Closure Requirements	Expected Completion Date	Responsible	Applicable Causes	Cause Codes	Expected Results	Effectiveness Review Criteria
PA 5	Perform a Training Needs Analysis (TNA) related to Actions 1, 2 and 3.	Provide a closure statement describing what action was taken with copy of the TNA Report as objective evidence.	10/12/2011	Dave Riddle	CC-01	A4B1C06	Determine the appropriate target audience, delivery method, and location for PFP specific training regarding new requirements defined in Action 1.	N/A.  Conduct of a TNA cannot be evaluated for effectiveness without the follow-on training and consistent emphasis in the field. See Effectiveness Criteria for PAs 2, 3, 7 and 8.
PA 6	Develop new, or incorporate into existing training, the results of the Training Needs Analysis conducted in Action 5.	Provide a closure statement describing what action was taken with copy of the new or revised training materials and evidence that Project Management is aware that the training is available (e.g. email), as objective evidence.	11/2/2011	Dave Riddle	CC-01	A4B1C06	Adequate training content to provide tools for procedure compliance.	N/A.  Conduct of training cannot be evaluated for effectiveness without the consistent emphasis in the field. See Effectiveness Criteria for PAs 2, 3, 7 and 8.
PA 7	Conduct the first session of the new or revised training developed in Action 6.	Provide a closure statement describing what action was taken with documentation (e.g. training roster.) as objective evidence.	12/7/2011	Jerry Long	RC-01 CC-01	A4B1C01 A4B1C06	Institutionalize training for employees on the new requirements defined in Action 1.	N/A.  Conduct of training cannot be evaluated for effectiveness without the consistent emphasis in the field. See Effectiveness Criteria for PAs 2, 3, 7 and 8.
PA 8	Institute the conduct of a quarterly workshop for FWSs to discuss challenges encountered in the field. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.	Provide a closure statement describing what action was taken with a copy of the meeting attendance roster for the first workshop and a proposed schedule for FY 2012 as objective evidence.	10/12/2011	Bob Leonard	RC-01 CC-01	A4B1C01 A4B1C06	Provide ongoing and repeated reinforcement of the standards and expectations for procedure compliance, as well as provide a forum for Supervisors to discuss challenges encountered in the field and Managers to provide mentoring and guidance on issues which have not been dealt with on a day-to-day basis	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that work teams understand the expectation to perform work as written or stop work.
PA 9	Institute the conduct of a quarterly workshop for those who perform Senior Supervisory Oversight (SSOs) to discuss challenges encountered in the field and techniques for providing feedback to work teams. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.	Provide a closure statement describing what action was taken with a copy of the meeting attendance roster for the first workshop and a proposed schedule for FY 2012 as objective evidence.	10/12/2011	Mark Wright	RC-01 CC-01	A4B1C01 A4B1C06	Provide ongoing and repeated reinforcement of the standards and expectations for procedure compliance, as well as provide a forum for SSOs to discuss challenges encountered in the field and Conduct of Operations personnel to provide mentoring and guidance on areas of focus and techniques for providing feedback to work teams.	Review of MOPs conducted between 9/7/2011 and 12/31/2011 showing 90% or greater demonstration that personnel conducting MOPs understand the program requirements as well as their role in assessment/oversight and providing feedback (related to the briefed topics).

## ATTACHMENT 3: ISSUES ANALYSIS ACTION MATRIX

S-11-SED-CHPRC-PFP-002 Surveillance Ref	Resultant CR(s) (* indicates Process/Program Action)	Date Identified	Cause Codes	Corrective Action(s)	Closure Requirements	Action Owner	Action Status/Due Date
S-11-SED-CHPRC-PFP-002-F01: Less than adequate analysis of hazards has occurred at PFP resulting in airborne radioactivity above the protection factor of the respiratory protection worn and multiple events involving spread of contamination. Investigation revealed a programmatic deficiency in hazards analysis existed	CR-2011-0380	1/27/2011	A5B2C08 - Incomplete / situation not considered. A3B2C05 - Situation incorrectly identified or represented resulting in wrong rule used	Develop and implement a Technical Evaluation which establishes the expectation to calculate the airborne estimates unmitigated and applies a consistent methodology of hazard controls to mitigate the hazards.	Copy of issued Technical Evaluation.	CK Bean	Complete 6/09/2011
	CR-2011-2008-	6/22/2011	AGB1C03 - Training Deficiency, No Training Provided, Work incorrectly considered 'skill of the craft'	CA1) Develop radiological hazard analysis and appropriate controls training for qualified Radiological Work Planners. a. Training must address how to appropriately determine hazards before mitigation; b. address the use of ventilation and associated calculations; c. address the use and types of containments; and d. address proper use and documentation of the results.  CA2) Ensure Waste and Fuels workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.  CA3) Ensure D&D workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.  CA4) Ensure Soil and Ground Water workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.  CA5) Ensure assigned PFP workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1.	Copy of training material.  Copy of training rosters for qualified radiological work planners.	KW McLain	Due: 11/11/2011
	CR-2011-0408-	2/1/2011	A3B3C01 - Attention was given to wrong issues	CA1) Develop a tool for performing airborne radioactivity estimates based on the guidance in PRC-0904-CDMP-0011.  CA2) Provide the tool for performing airborne	Copy of revised procedure PRC-PRO-PP-40109 showing overt requirement to perform airborne calculations as part of the radiological work planning process.	KW McLain	Complete 7/05/2011

<p><b>S-11-SED-CHPRC-PFP-002-F02:</b> Scope of Work was not always adequately defined at the activity level for hazards analysis, resulting in less than adequate radiological controls identification and implementation.</p>	<p>CR-2010-1477</p>	<p>05/22/2010</p>	<p>A4B1C01 - Management policy/guidance/expectations not well defined, understood or enforced  A4B5C09 - Change-related documents not developed or revised</p>	<p>This Significant CR included a 21 action CAP which included revision to, and associated training on, the new work control program within CHPRC. This was implemented across the company on 06/20/2011.  Revised PRC-PRO-WKM-12115, associated training, and Guide.</p>	<p>radioactivity estimates in the Radiological Work Planning procedure(s).</p>	<p>Copy of new airborne estimating tool.  Copy of Revised work planning procedure (PRC-PRO-WKM-12115), associated Guide (PRC-GD-WKM-12116), and training completion rosters for affected individuals.</p>	<p>Complete 06/20/2011</p>	<p>JC Hoffman</p>
<p><b>S-11-SED-CHPRC-PFP-002-F03:</b> The "flexible" Decontamination and Demolition (D&amp;D) work packages resulted in "flexible" radiological controls in the work packages, which resulted in the actual controls being determined in the field by individuals not qualified in radiological hazards analysis resulting in inadequate hazards controls. Roles and responsibilities for determining radiological controls were not clearly defined.</p>	<p>CR-2011-0466</p>	<p>1/28/2011</p>	<p>A3B2C04 - Previous success in use of rule reinforced continued use of rule  A4B3C11 - Inadequate work package preparation A3B2C04 - Previous success in use of rule reinforced continued use of rule</p>	<p>Communicate to FWGs the need to verify the size of items they are planning to dispose of in a 55 gallon drum.  Perform a walk down of work packages that have a similar waste stream to work package 22-10-03925 to verify that the proper planning/controls are in place.</p>	<p>Closure statement that field work supervisors were directed to verify size of items prior to attempting to place into waste drums.</p>	<p>Complete 4/14/2011</p>	<p>BC Leonard</p>	
<p><b>S-11-SED-CHPRC-PFP-002-F04:</b> The "flexible" Decontamination and Demolition (D&amp;D) work packages resulted in "flexible" radiological controls in the work packages, which resulted in the actual controls being determined in the field by individuals not qualified in radiological hazards analysis resulting in inadequate hazards controls. Roles and responsibilities for determining radiological controls were not clearly defined.</p>	<p>CR-2011-0554</p>	<p>2/15/2011</p>	<p>A4B1C02 - Job performance standards not adequately defined A4B1C07 - Responsibility of personnel not well-defined or accountable</p>	<p>CA1) Issue RadCon Technical Evaluation (TE) regarding Radiological Engineering Methods at PFP. TE should include benchmarking with other DOE contractors for consistency of approach and rigor.  CA2) Provide Briefing to PFP Radiological Engineering and Health Physicist staff on the Technical Evaluation for radiological engineering at PFP.  CA3) Evaluate a representative sampling of medium and high hazard work packages, using the attached checklist (reviewform.docx), at all projects other than PFP to verify adequacy of controls relative to the associated hazard  CA4) Issue formal expectations to Radiological Engineering and Industrial Hygienists relative to the selection of containment as the first choice of hazard controls for breaching radioactive systems.  CA5) Establish radiological air quality information board that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Closure statement indicating that a walk down of work packages with a similar waste stream was performed and that reviewed packages were verified to have appropriate controls</p>	<p>Complete 5/18/2011</p>	<p>BC Leonard</p>	
<p><b>S-11-SED-CHPRC-PFP-002-F05:</b> Engineering controls were not adequately incorporated to control airborne radioactivity and spread of contamination for some high airborne activities, resulting in high airborne radioactivity and spreads of contamination. Engineering staff were not always adequately engaged in the radiological engineering of the work.</p>	<p>CR-2011-0939</p>	<p>3/16/2011</p>	<p>Copy of issued Technical Evaluation.  Copy of briefing provided to PFP radiological work planners.  Copy of attendance rosters for PFP radiological work planners.  Copy of the extent of condition review performed at WFMP, D&amp;D, S&amp;GW.  Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls.</p>	<p>Closure statement indicating that radiological air quality information board has been established at PFP that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>Copy of issued Technical Evaluation.  Copy of briefing provided to PFP radiological work planners.  Copy of attendance rosters for PFP radiological work planners.  Copy of the extent of condition review performed at WFMP, D&amp;D, S&amp;GW.  Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls.</p>	<p>Complete 6/17/2011</p>	<p>CK Bean</p>	



radiological hazards analysis.	CR-2011-1029	3/24/2011	A5B2C08 - Incomplete/situation not covered	Revise RWP's and BWP's to consistently include High Contamination Area (HCA) postings/controls for entries based on work scope and location to ensure compliant postings and controls are deployed for work.	Closure statement indicating RMA/RMC lines have been posted as HCA/ARA and associated RWPS and BWPs revised accordingly	CK Bean	Complete 7/12/2011
	CR-2011-1223	4/6/2011	A5B2C08 - Incomplete/situation not covered	CA1) Revise work package 2Z-10-2068 to include the utilization of a down drafter, surveys and fixatives, during cutting activities of the glovebox. CA2) Evaluate the AMW to address higher contamination levels for 242-Z. Incorporate necessary changes in work package 2Z-10-2068.	Copy of revised work package 2Z-10-2068. Copy of revised AMW for package 2Z-10-2068.	RL Garcia	Complete 5/6/2011
	CR-2011-0408	2/1/2011	A3B3C01 - Attention was given to wrong issues	CA1) Develop a tool for performing airborne radioactivity estimates based on the guidance in PRC-0904-COMP-0011. CA2) Provide the tool for performing airborne radioactivity estimates in the Radiological Work Planning procedure(s).	Copy of revised procedure PRC-PRO-RP-40109 showing overt requirement to perform airborne calculations as part of the radiological work planning process. Copy of new airborne estimating tool.	KW McLain	Complete 7/05/2011
	CR-2011-2008	6/22/2011	A6B1C03 - Training Deficiency, No Training Provided, Work incorrectly considered 'skill of the craft'	CA1) Develop radiological hazard analysis and appropriate controls training for qualified Radiological Work Planners. a. Training must address how to appropriately determine hazards before mitigation; b. address the use of ventilation and associated calculations; c. address the use and types of containments; and d. address proper use and documentation of the results. CA2) Ensure Waste and Fuels workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1. CA3) Ensure D&D workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1. CA4) Ensure Soil and Ground Water workers who are qualified as Radiological Work Planners attend training for radiological hazard analysis and appropriate controls developed in action 1. CA5) Ensure assigned PEP workers who are qualified as Radiological Work Planners attend	Copy of training material. Copy of training rosters for qualified radiological work planners	KW McLain	Due: 11/11/2011

<p><b>S-11-SED-CHPRC-PFP-002-F06:</b> PFP did not have a procedure on how to perform airborne radioactivity estimates for hazards analysis and work planning. The CHPRC technical basis document for workplace air monitoring did not address estimating airborne radioactivity levels for hazard analysis and work planning.</p>	<p>CR-2011-0408-</p>	<p>2/1/2011</p>	<p>A3B3C01 - Attention was given to wrong issues</p>	<p>training for radiological hazard analysis and appropriate controls developed in action 1. CA1) Develop a tool for performing airborne radioactivity estimates based on the guidance in PRC-0904-CDMP-0011. CA2) Provide the tool for performing airborne radioactivity estimates in the Radiological Work Planning procedure(s).</p>	<p>KW McLain</p>	<p>Complete 7/05/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F07:</b> The contractor's radiological staffing resources were less than adequate to accommodate personnel losses and planned accelerated decontamination and demolition work.</p>	<p>CR-2011-0939</p>	<p>3/16/2011</p>	<p>A4B1C02 - Job performance standards not adequately defined. A4B1C07 - Responsibility of personnel not well-defined or accountable</p>	<p>CA1) Issue RadCon Technical Evaluation (TE) regarding Radiological Engineering Methods at PFP. TE should include benchmarking with other DOE contractors for consistency of approach and rigor. CA2) Provide Briefing to PFP Radiological Engineering and Health Physicist staff on the Technical Evaluation for radiological engineering at PFP. CA3) Evaluate a representative sampling of medium and high hazard work packages using the attached checklist (reviewform.docx) at all projects other than PFP to verify adequacy of controls relative to the associated hazard CA4) Issue formal expectations to Radiological Engineering and Industrial Hygienists relative to the selection of containment as the first choice of hazard controls for breaching radioactive systems CA5) Establish radiological air quality information board that presents results of Quarterly Tracking &amp; Trending analysis to project personnel.</p>	<p>CK Bean</p>	<p>Complete 6/17/2011</p>
<p><b>S-11-SED-CHPRC-PFP-002-F07:</b> The contractor's radiological staffing resources were less than adequate to accommodate personnel losses and planned accelerated decontamination and demolition work.</p>	<p>CR-2011-1243</p>	<p>4/7/2011</p>	<p>A4B2C02 - Insufficient supervisory resources to provide necessary supervision</p>	<p>CA1) Procure or reallocate Radiological Engineers to be available for A.HAs.  In addition to the additional radiological engineers, 3 additional RadCon supervisors were assigned to PFP.</p>	<p>CK Bean</p>	<p>Complete 5/06/2011</p>

S-11-SED-CHPRC-PFP-002-F08: The Hanford Combination Neutron Dosimeter (HCND) was not assigned to multiple individuals that met the criteria for monitoring as specified in the Hanford technical basis document. The CHPRC procedure did not fully incorporate monitoring criteria from the Hanford External Dosimetry Technical Basis Manual.	CR-2011-1303-  CR-2011-0841	4/19/2011  3/8/2011	A5B3C07 - Facts wrong/requirements not correct  A5B3C01 - Lack of written communication  A4B1C01 - Management policy guidance/expectations not well-defined, understood or enforced	Incorporate monitoring criteria from the Hanford External Dosimetry Technical Basis Manual in procedure PRC-PRO-RP-379.  CA1) Document review of CY10 dose reports relative to dosimeter type and exchange frequency, including evaluation of annual neutron exposures exceeding 80 mrem in 2010, determine if HCND was assigned. Based on CY11 0099 estimates, evaluate potential for workers to exceed 100 mrem neutrons in FY11 and ensure HCNDs are assigned appropriately. Also document exchange frequency against CY10 dose reports, PRC-379 exchange criteria, and CY11 dose projections. Identify any changes made based on this evaluation.  CA2) Evaluate PFP dosimetrist evaluation (CA-1) and provide direction regarding type and frequency change direction.	Copy of revised procedure PRC-PRO-RP-379.  Copy of evaluation.  Closure statement indicating action taken regarding type and frequency of TLD use at PFP	KW McLain  TE Bratbold	Due: 9/30/2011  Complete 4/27/2011
S-11-SED-CHPRC-PFP-002-F09: Technical errors were identified in five out of nineteen External Dosimetry Investigation Reports (EDIRs)	CR-2011-1283-	4/18/2011	A6B1C01 - Decision not to train A4B3C01 - Insufficient time for worker to prepare task A5B3C01 - Lack of written communication A4B3C04 - Too few workers assigned to task	CA1) Revise the procedure to provide clarity for required documentation for the investigation package, require the projects to submit the EDIR within 14 days, and require a peer review of all the EDIR at the project level.  CA2) Develop process overview material and implement a briefing for everyone that has to complete or review the EDIRs.  CA3) Provide additional instruction on how to fill out the EDIRs on the Hanford Site Forms.  CA4) Correct the EDIRs that were identified by DOE in the OA (five EDIRs) and the EDIRs that were identified during the EOC (13 EDIRs).	Copy of revised procedure PRC-PRO-RP-40068.  Copy of briefing materials for personnel completing EDIRs.  Copy of briefing rosters for personnel performing EDIRs.  Copy of EDIR instruction sheet associated.  Closure statement that EDIRs have been corrected, reviewed, and forwarded to PNNL for records retention.	KW McLain	Due: 9/30/2011
S-11-SED-CHPRC-PFP-002-F10: Airborne radioactivity monitoring results at PFP were not adequately reviewed to ensure individuals likely to receive a committed effective dose of 0.1 rem or more from all occupational radionuclide intakes in a year were appropriately monitored through the internal dosimetry program.	CR-2011-0865-	3/7/2011	A4B1C02 - Job performance standards not adequately defined  A4B1C01 - Management policy guidance/expectations not well-defined, understood or enforced	CA1) Revise FSP PFP 5-8, Procedure 14.18 to ensure tracking/trending of routine air sampling is done to the 2% DAC criteria and includes criteria to perform investigations when above the criteria  CA2) Revise PRC-PRO-RP-40031 to ensure tracking and trending of routine air sampling is done to the 2% DAC criteria.	Copy of revised procedure FSP-PFP-5-8, Procedure 14.18.  Copy of revised procedure PRC-PRO-RP-40031	KW McLain	Complete 5/10/2011

<p>S-11-SED-CHPRC-PPF-002-F11: Less than adequate conduct of operations was observed. Failures to follow procedures contributed to generation of airborne radioactivity and low level uptakes.</p>	<p>CR-2011-0936</p>	<p>3/7/2011</p>	<p>A4B2C02 - Insufficient supervisory resources to provide necessary supervision -A4B1C04 - Management follow-up or monitoring of activities did not identify problems - A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable - A4B2C01 - Too many administrative duties assigned to immediate supervisor</p>	<p>CA1) Provide formal management expectations for health physicist/radiological engineering staff serving as PFP project points of contact for functional elements of the RadCon Program.  CA2) Complete/document review of radiological work permits to determine additional RWPs (Z-889 already revised based immediate corrective actions) that should require bioassay for personnel working in contaminated areas (i.e. potential to exceed 100 mrem/year outside of a posted airborne radioactivity area based on air sample tracking/trending).  CA3) Generate tracking and trending charts for the rolling year ending March 2011.  CA4) Evaluate trending data to determine potential for an individual to receive 100mrem in the last year without being included in the bioassay program.</p>	<p>Copy of issued management expectations to health physicist/radiological engineering staff serving as PFP project points of contact for functional elements of the RadCon Program.  Copy of review of RWPs relative to bioassay requirements and potential to exceed 100 mrem per year outside of a posted ARA.  Copy of tracking and trending charts for March 2010 through March 2011  Copy of exposure evaluation relative to potential to exceed 100 mrem per year without being included in the bioassay program.</p>	<p>CK Bean</p>	<p>Complete 5/22/2011</p>
	<p>CR-2011-0554</p>	<p>2/15/2011</p>	<p>A4B3C11 - Inadequate work package preparation A3B2C04 - Previous success in use of rule reinforced continued use of rule</p>	<p>Perform a walk down of work packages that have a similar waste stream to work package Z2-10-03925 to verify that the proper planning/controls are in place.</p>	<p>Closure statement indicating that a walk down of work packages with a similar waste stream was performed and that reviewed packages were verified to have appropriate controls.</p>	<p>BC Leonard</p>	<p>Complete 5/18/2011</p>
	<p>CR-2011-1810</p>	<p>05/31/2011</p>	<p>TBD</p>	<p>Perform a common cause analysis using a team approach to review/evaluate recent operational events to determine commonalities/common causes related to work control implementation at CHPRC. The evaluation will include comparing/aligning the results of this evaluation against on-going corrective actions (i.e., Integrated Corrective Action Plan (ICAP), and occurrence reporting) to determine if any new causes or performance trends are developing and/or if additional evaluation and corrective actions are necessary.</p>	<p>Copy of common cause analysis report.</p>	<p>GM Grant</p>	<p>Due 09/30/2011</p>

CR-2011-1707	5/24/2011	A4B1C01 - Management policy guidance/expectations not well-defined, understood or enforced A4B1C06 - Previous industry or in-house experiences was not effectively used to prevent recurrence A4B1C09 - Corrective action for previously identified problem or event was not adequate to prevent recurrence A3B2C02 - Signs to stop were ignored and step performed incorrectly	<p><b>PA1:</b> Develop a new PFP procedure to require:</p> <ol style="list-style-type: none"> <li>1) During the Pre-Job briefing Field Work Supervisor (FWS) shall read aloud the words of the tasks expected to be performed during the day's activities.</li> <li>2) FWSs shall conduct an interactive pre-job briefing with the work team on the written work steps to be performed for each work evolution. This includes specific questioning on the tasks to be performed.</li> <li>3) Pre-job attendees sign the CHPRC Pre-Job Briefing Checklist after the FWS has asked if the work team clearly understands their job responsibilities and are qualified for the work assigned. Signature on this form acknowledges that the workers understand the work tasks as they are written.</li> <li>4) FWSs shall be able to declare which work step they are working at any given time.</li> </ol> <p><b>PA2:</b> PFP Vice President to conduct a documented briefing of expectations for Directors, Managers and FWSs to reiterate the requirement to perform work within defined controls. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1).</li> <li>• Definition of verbal compliance</li> <li>• Expectations for Workability Walkdowns</li> <li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have been appropriate.</li> <li>• Review of stop work responsibility</li> <li>• Expectation to share the briefing with PFP personnel.</li> </ul> <p><b>PA3:</b> PFP Vice President to conduct a documented briefing of expectations for personnel performing MOJs to reiterate the purpose and requirements of the program. This includes, but is not limited to SSOs. The briefing will include the following:</p> <ul style="list-style-type: none"> <li>• New requirements for compliance with written instructions (see PA1).</li> <li>• Purpose of the MOP/SSO program is to identify weaknesses and opportunities for improvement. Additionally, SSOs provide immediate feedback and mentoring to FWSs and work teams.</li> <li>• The importance of maintaining independence</li> <li>• Expectations for Workability Walkdowns</li> <li>• Review of requirements for review of written instructions prior to performance of work in the facility.</li> <li>• Definition of verbal compliance.</li> <li>• Review of similar events at PFP including a discussion of why the actions taken violated requirements and what actions would have</li> </ul>	<p>PA-01 Copy of new/revised procedure promulgating PA-01 action items.</p> <p>PA-02 Copy of briefing material.</p> <p>PA-03 Copy of attendance briefing attendance rosters.</p> <p>PA-04 Copy of revised SSO procedure FSP-PFP-3-6, 2.6.</p> <p>PA-05 Copy of training needs analysis (TNA).</p> <p>PA-06 Copy of the new or revised training materials and evidence that Project Management is aware that the training is available (e.g. email) as objective evidence.</p> <p>PA-07 Copy of training/attendance roster.</p> <p>PA-08 Copy of attendance roster from the first Quarterly workshop for FWSs and a proposed schedule for FY 2012 as objective evidence.</p> <p>PA-09 Copy of attendance roster from the first Quarterly workshop for SSOs and a proposed schedule for FY 2012 as objective evidence.</p> <p>WSA - Provide a statement describing the results of the WSA with a copy of the WSA as evidence.</p> <p>Effectiveness Review- Provide a closure statement describing the results of the effectiveness review with a copy of the effectiveness review as objective evidence.</p>	TC Otten	Due 12/07/2011
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		<ul style="list-style-type: none"> <li>• been appropriate. Review of stop work responsibility.</li> <li>• <b>PA4:</b> Revise PFP SSO procedure, FSP.PFP-5-8, 2.6 (b).</li> <li>• Identify FWS past work performance (e.g., failure to perform work per procedure/work instruction) as a factor to be considered when determining whether continuous SSO coverage is required.</li> <li>• Require that the specific work package steps that will be worked during the observation are documented in the SSO record to ensure the observer understands the steps to be worked.</li> <li>• <b>PAS:</b> Perform a Training Needs Analysis (TNA) related to Actions 1, 2 and 3.</li> <li>• <b>PA6:</b> Develop new, or incorporate into existing training, the results of the Training Needs Analysis conducted in Action 5.</li> <li>• <b>PA7:</b> Conduct the first session of the new or revised training developed in Action 6.</li> <li>• <b>PA8:</b> Institute the conduct of a quarterly workshop for FWSs to discuss challenges encountered in the field. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.</li> <li>• <b>PA9:</b> Institute the conduct of a quarterly workshop for those who perform Senior Supervisory Oversight (SSOs) to discuss challenges encountered in the field and techniques for providing feedback to work teams. A topic of the first workshop conducted shall be procedure compliance and the new requirements defined in Action 1.</li> </ul>		
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S-11-SED-CHPRC-PFP-002-F12: Required radiological hazard controls for work were not consistently documented on the AMW as specified by the form's instructions.	CR-2011-0939	3/16/2011	A4B1C02 - Job performance standards not adequately defined A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable	CA1) Issue RadCon Technical Evaluation (TE) regarding Radiological Engineering Methods at PFP. TE should include benchmarking with other DOE contractors for consistency of approach and rigor.  CA2) Provide Briefing to PFP Radiological Engineering and Health Physicist staff on the Technical Evaluation for radiological engineering at PFP.  CA3) Evaluate a representative sampling of medium and high hazard work packages, using the attached checklist (reviewform.docx), at all projects other than PFP to verify adequacy of controls relative to the associated hazard.  CA4) Issue formal expectations to Radiological Engineering and Industrial Hygienists relative to the selection of controls as the first choice of hazard controls for breaching radioactive systems.  CA5) Establish radiological air quality information board that presents results of Quarterly Tracking & Trending analysis to project personnel	Copy of Issued Technical Evaluation.  Copy of briefing provided to PFP radiological work planners.  Copy of attendance rosters for PFP radiological work planners.  Copy of the extent of condition review performed at WFMP, D&D, S&GW.  Copy of issued formal expectations to PFP radiological work planners and industrial hygienists regarding use of engineered controls.  Closure statement indicating that radiological air quality information board has been established at PFP that presents results of Quarterly Tracking & Trending analysis to project personnel.	CK Bean	Complete 6/17/2011
S-11-SED-CHPRC-PFP-002-O01: Job Specific RWPs, were written broadly and generically to cover multiple work packages	CR-2011-1934	6/16/2011	A4B3C09 - Work planning not coordinated with all departments involved in task	Review draft work packages to ensure that radiological mitigative actions have been consistently incorporated into both work documents and AMW.	Copy of review.	B Oldfield	Due: 8/12/2011
S-11-SED-CHPRC-PFP-002-O01: Job Specific RWPs, were written broadly and generically to cover multiple work packages	CR-2011-1935	6/16/2011	A4B3C09 - Work planning not coordinated with all departments involved in task	Review draft work packages to ensure that radiological mitigative actions have been consistently incorporated into both work documents and AMW. The review should include assuming that all appropriate radiological mitigative actions are documented in the AMW and are incorporated into the technical work documents.	Copy of review.	B Oldfield	Due: 8/12/2011
S-11-SED-CHPRC-PFP-002-O01: Job Specific RWPs, were written broadly and generically to cover multiple work packages	CR-2011-1621	5/16/2011	A5B2C05 - Ambiguous instructions/requirements	Revise RWPs described in the MOP associated with this CR (see PFPWPMP/Results.pdf).	Listing of RWPs revised and associated changes made.	CK Bean	Due: 8/12/2011
S-11-SED-CHPRC-PFP-002-O02: The facility's technical basis for use of plutonium values as an indicator of when to perform beryllium monitoring did not identify and evaluate plutonium-beryllium	CR-2011-2368	7/7/2011	A5B2C03 - Data/computations wrong/incomplete	Revise beryllium hazards assessment/technical basis to document alpha be expected ratio associated with PuBe source spill.	Copy of revised beryllium hazards assessment.	CK Bean	09/30/2011

<p>S-11-SED-CHPRC-PFF-002-003: Poor practices were identified in multiple EDIRs reviewed.</p>	<p>CR-2011-1283</p>	<p>4/18/2011</p>	<p>A6B1C01 - Decision not to train A4B3C01 - Insufficient time for worker to prepare task A5B3C01 - Lack of written communication A4B3C04 - Too few workers assigned to task</p>	<p>CA1) Revise the procedure to provide clarity for required documentation for the investigation package, require the projects to submit the EDIR within 14 days, and require a peer review of all the EDIR that the project level. CA2) Develop process overview material and implement a briefing for everyone that has to complete or review the EDIRs. CA3) Provide additional instruction on how to fill out the EDIRs on the Hanford Site Forms. CA4) Correct the EDIRs that were identified by DOE in the OA (five EDIRs) and the EDIRs that were identified during the EOC (13 EDIRs).</p>	<p>Copy of revised procedure PRC-PRO-RP-40068. Copy of briefing materials for personnel completing EDIRs. Copy of briefing rosters for personnel performing EDIRs. Copy of EDIR instruction sheet associated. Closure statement that EDIRs have been corrected, reviewed, and forwarded to PNNL for records retention.</p>	<p>Due: 9/30/2011</p>
<p>CR-2011-1304</p>	<p>4/19/2011</p>	<p>A4B3C05 - Insufficient number of trained or experienced workers assigned to task A4B3C02 - Insufficient time allotted for task A4B4C07 - Too many concurrent tasks assigned to worker</p>	<p>Correct the EDIRs from 2010 with identified errors which result in a change to the recorded dose and submit to PNNL.</p>	<p>Closure statement that EDIRs have been corrected, reviewed, and forwarded to PNNL for records retention.</p>	<p>Complete 6/20/2011</p>	



**ATTACHMENT 4: LISTING OF CONDITION REPORTS REVIEWED**

CR Number	Title	CR Status	Date Identified
CR-2011-0086	Immediate corrective actions not sufficient to prevent recurrence of event	Complete	1/12/11
CR-2011-0380	No airborne radioactivity estimate conducted to establish Room 172 airborne controls	Complete	1/27/11
CR-2011-0466	Work planning did not adequately identify size considerations for waste disposal	Complete	1/28/11
CR-2011-0408	Opportunity for improvement in radiological work planning procedures	Complete	2/1/11
CR-2011-0554	Non compliance with work scope definitions	Complete	2/15/11
CR-2011-0865	Incomplete direction for air sample tracking and trending in procedures FSP-PFP-5-8, 14.18 and PRC-PRO-RP-40031	Complete	3/7/11
CR-2011-0936	Formal tracking and trending of fixed-head air sample & continuous air monitor results not performed	Complete	3/7/11
CR-2011-0841	Annual review of PFP dosimeter type and exchange frequency	Complete	3/8/11
CR-2011-0843	Evaluation of neutron to gamma ratios at PFP	Complete	3/8/11
CR-2011-0939	Radiological work planning and control weaknesses	Complete	3/16/11
CR-2011-1029	PFP discoveries of HCA conditions in CAs	Complete	3/24/11
CR-2011-1176	Contamination in rooms 230-C and/or 235-B led to positive nasal	Analysis	3/28/11
CR-2011-1223	High air samples during supplied air activities in 242-Z	Complete	4/6/11
CR-2011-1224	Contamination in Room 263 duct level	Complete	4/6/11
CR-2011-1243	Radiological engineer not available for AJHA	Complete	4/7/11
CR-2011-1283	Errors identified in external EDIRs	Analysis	4/18/11
CR-2011-1303	Individuals not appropriately monitored IAW Hanford external dosimetry technical basis	Analysis	4/19/11
CR-2011-1304	Poor practices identified during reviews of EDIRs	Complete	4/19/11
CR-2011-1621	MOP results for PFP RWP review	Analysis	5/16/11
CR-2011-1707	Potential trend related to failure to follow procedure/work instructions	Analysis	5/24/11

CR Number	Title	CR Status	Date Identified
CR-2011-1810	Common Cause(s) of Work Control and Conduct of Operations Issues	Analysis	5/31/2011
CR-2011-1932	Work Package Reviews	Analysis	6/16/11
CR-2011-1934	Work controls in use that are not reflected in AMW	Analysis	6/16/11
CR-2011-1935	Work controls not implemented in work package as required	Analysis	6/16/11
CR-2011-2008	Opportunities to improve radiological work planning	Analysis	6/22/11
CR-2011-2015	RadCon self-identification of weaknesses	Analysis	6/22/11
CR-2011-2159	Post job ALARA review was not sufficient to fully identify and correct all radiological and industrial hygiene deficiencies	Analysis	6/24/11
CR-2011-2196	Radiological work planning process at PFP was less than adequate	Analysis	7/12/11
CR-2011-2310	PRC-PRO-RP-40109 does not address all radiological work	Analysis	7/22/2011
CR-2009-0316	The PFP Closure and D&D Infrastructure Project's execution of change management needs improvement.	Closed	3/5/2009
CR-2011-2398	Additional Improvements Needed in Implementation of PFP RadCon Improvement Initiative.	Assignment	8/2/2011

## **ATTACHMENT 5: IMMEDIATE AND UNDERLYING CAUSAL FACTORS**

The following immediate and underlying causal factors were identified through investigation and analysis of the issue:

- **Less than adequate analysis of hazards**
  - Insufficient number of radiological engineers. Nationwide, the number of radiological engineers was restricted due to ARRA-related work demands.
  - Inadequate skills mix in the labor pool of radiological engineers principally due to the shortage of radiological engineers and deficiencies in the CHPRC training. This condition was exacerbated by the fact that CHPRC did not recognize the need to adjust training to compensate for skills mix because of a reliance on the historical training needs analysis.
- **The scope of work was not always defined at the activity level**
  - Work planning teams did not adequately evaluate the details necessary to perform the work. SME involvement was found to be less than adequate due to deficiencies in CHPRC work management program requirements.
- **D&D work packages were prepared with flexible plans and flexible controls**
  - This was a common historical approach to radiological hazard controls at PFP that did not adjust with the shift to D&D work primarily due to insufficient level of detail in the radiological hazards analysis process to ensure controls were task specific and appropriate for the higher hazard level of D&D activities.
  - Flexible packages also enabled decisions on how to do work in the field and actual controls being determined in the field by individuals not qualified in radiological hazards analysis rather than through proper work planning. Due to an historical success on lower level hazard activities, some PFP supervisors accepted the belief that this degree of flexibility equated to operational efficiency through timely completion of work.
  - RadCon program management expectations were not clearly defined in process and through training.
- **Work was performed outside scope of the work packages**
  - Ineffective communication of CHPRC management expectations resulted in some workers not recognizing what constituted scope change leading to a failure to follow the work package change process that required engaging Systems Engineering. Recent work control and Conduct of Operations issues (events), some with radiological consequences to workers, have occurred as CHPRC continues to implement comprehensive work control and Conduct of Operations corrective actions to effect a cultural change (improvement) within the CHPRC work force.
- **Training and qualification of radiological work planners was found to be less than adequate**

- A reliance on historical training needs analysis and SME experience and education led to inadequacies in SME performance. Training course materials were tailored to the expert-based system of SME reliance rather than formal instruction on the task of hazards analysis and control.
- **PFP did not have a procedure on how to perform airborne radioactivity estimates for hazards analysis and work planning**
  - Inadequate oversight of airborne analysis, reliance on SME (experience and education), and a failure to establish RadCon program management expectations for airborne analysis, including training and procedures were identified as contributing causal factors.
  - The CHPRC technical basis document for workplace air monitoring did not address estimating airborne radioactivity levels for hazard analysis and work planning. The process required estimating airborne radioactivity levels but did not provide specific methodologies for how to perform these estimates, relying on education and experience for this effort. This resulted in continued use of historical standard operating practices for "estimating" air quality which did not adjust with changing hazard levels associated with D&D
- **Engineering controls (containments/ confinements) were not adequately incorporated to control airborne radioactivity and spread of contamination for some work activities.**
  - RadCon Program management expectations were not clearly defined in process requirements resulting in an insufficient level of detail in radiological hazards analysis process, including RWPs to ensure controls were task specific. This condition led enabled continuance of historical control sets that did not adjust with changing hazard levels associated with D&D.
  - The absence of specific direction/training on application of ventilation as an engineered control created lack of awareness of the scope of facility expertise among radiological engineers and a general misconception on ventilation specifics (i.e., point source vs. facility) within RadCon Engineering. As a result, PFP project engineering staff was not always adequately engaged in the radiological engineering of the work. RadCon Program management expectations were not clearly communicated and not understood by the workers. As a result, workers did not follow work package change process which would have required engaging engineering to assist.
  - There were an insufficient number of radiological engineers available due to ARRA demands and the demands associated with allocation of CHPRC radiological engineers across projects. This condition was exacerbated by the reliance on historical training needs analysis and SME experience and education which led to inadequacies in training course material and the training and qualification of radiological work planners due to CHPRC reliance on SME experience and education.
- **Radiological staffing resources were less than adequate to accommodate personnel losses and planned accelerated decontamination and demolition work.**
  - CHPRC did not recognize need to establish / build resources.

- There was a belief there were no additional CHPRC resources that could be utilized without negative impact to other CHPRC projects.
- Availability of SMEs was restricted nationwide.
- **Failure to follow procedures and inconsistent AMW documentation of required radiological hazard controls for work.**
  - Since contract award and through early 2011 several CHPRC issues and events were related to deficiencies in radiological work execution. Between 3/29/2011 and 5/24/2011, PFP noted a number of events which indicated that a potential negative trend existed related to procedure compliance. This prompted initiation of CR-2011-1707, Potential Trend Related to Failure to Follow Procedure/Work Instructions. A Root Cause Evaluation (RCE) Team was chartered to determine if common causes or underlying issues existed for the recent events. Initial conclusions indicate the following root and contributing causal factors:
    - ✓ PFP Conduct of Operations issues were evident due to a lack of consistently applied and reinforced standards for procedure/work instruction compliance in the field
    - ✓ Training had not fostered rigorous Conduct of Operations behaviors related to procedure/work instruction compliance in the field.
    - ✓ Previous actions to prevent procedure compliance issues had not been effective
- **The PFP facility's technical basis for use of plutonium values as an indicator of when to perform beryllium monitoring did not identify and evaluate plutonium-beryllium sources, as a potential source of beryllium in the facility.**
  - Industrial Hygiene (IH) did not evaluate sufficient historical documents (e.g., FSP-PFP-IP-003) to recognize the potential hazards from the Pu/Be spill relative to the technical basis document correlating alpha contamination to Be content for Rocky Flats ash. This document was available but not applied to work planning. As such, IH did not analyze the alpha : Be rates associated with the Pu/Be source spill. The condition was exacerbated by the absence of or inclusive Beryllium hazards assessment at the facility level.

## **ATTACHMENT 6: LINES OF INQUIRY**

### Problem Statement

Work activities at PFP related to the Radiological work planning process resulted in airborne radioactivity levels that exceeded the maximum protection factor of the type of respiratory protection used, multiple intakes of plutonium, and spreads of contamination.

### Program RadCon Manager LOIs

- 1) In the recent RL Surveillance, it was noted that PFP did not have a procedure or process to estimate airborne radioactivity. It was also noted that the technical basis at the company level did not address estimating airborne radioactivity levels for hazards analysis and work planning. What changes have been made, or are necessary, from your perspective to correct this problem and are it limited to PFP?
- 2) The RL surveillance also stated that the External Dosimetry Procedure did not fully incorporate the Hanford Technical Basis, stating that a HCND should be issued for personnel who routinely have neutron dose reported on an HSD. What's your position on this?
- 3) The RL Surveillance also identified technical errors and poor practices on number of EDIRs. How did this happen and what has been done to improve performance?
- 4) The RL surveillance identified that PFP work place air monitoring results were not adequately performed to ensure individuals likely to receive a CED of 100 mrem in a year were appropriately monitored through the internal dosimetry program. What changes have been made, or are necessary, from your perspective to correct this problem and are it limited to PFP?
- 5) The RL Surveillance claimed inadequate training is provided for hazards analysis and control development. What changes have been made, or are necessary, from your perspective to correct this problem?

### Radiological Engineers/Radiological Work Planner LOIs

- 1) How long have you been assigned to PFP?
- 2) At what point do you typically become involved in the Work Planning process for a new, or revision to an existing, work package or procedure?
- 3) How does that involvement start (i.e., who makes first contact with you regarding the need for support on new or revised work documents)?
- 4) What does "Scope of Work" mean to you and where is the scope of work defined for a given work document?
- 5) When do you interface with Engineering during your work planning efforts? How do you determine if you need their support? What Engineers do you typically work with while planning work?

- 6) When do you perform an estimate of airborne radioactivity and what guidance/document do you use to assist in that process?
  - If interviewee has been at PFP for more than 4 months, ask them if this is different today than it used to be and why?
- 7) What is the purpose of the RWP? Do you write RWPs? Do you approve RWPs?
- 8) What is the purpose of the AMW? What information do you capture in an AMW?
- 9) When do you deploy engineered controls? What are the most common ones you use?
- 10) When do you prescribe protective equipment? How do you determine if it will be sufficient?
- 11) Who determines radiological hazard controls? What happens if your customer does not believe your selected controls are necessary or appropriate?
- 12) How do you determine what information from an AMW belongs in the RWP or the work document?
- 13) How do you know if your prescribed controls are effective?
- 14) Do you perceive any barriers that prevent/interfere with your ability to perform your job?
- 15) From your perspective- What aspects of the process need to be improved? What would you do to improve them?
- 16) What aspects of the process are working well? Are the good things part of the procedure, or ad hoc?

#### Radiological Control Supervisors LOIs

- 1) How long have you been assigned to PFP?
- 2) What is your involvement in the Work Planning process for a new, or revision to an existing, work package or procedure?
- 3) Describe your involvement with overseeing the execution of field work and ensuring the radiological controls are incorporated and adequate for the work being performed.
- 4) What does "Scope of Work" mean to you and where is the scope of work defined for a given work document?
- 5) Who determines radiological hazard controls? What are your actions, if any, when radiological controls prove ineffective?
- 6) How specific are the radiological controls in work documents? Are you familiar with the radiological hazard controls being used?
  - If interviewee has been at PFP for more than 4 months, ask them if this is different today than it used to be and why?

- 7) Do you make radiological hazard control decisions? (If yes, have you completed the training and qualification card for planning of radiological work?)
- 8) What is the expectation when work instructions cannot be followed as written and is this expectation understood by the worker?
- 9) What is the purpose of the RWP? Do you write RWP's? Do you approve RWP's?
- 10) Do you perceive any barriers that prevent/interfere with your ability to perform your job?
- 11) From your perspective- What aspects of the process need to be improved? What would you do to improve them?
- 12) What aspects of the process are working well? Are the good things part of the procedure, or ad hoc?

#### Radiological Control Technician LOIs

- 1) How long have you been assigned to PFP?
- 2) At what point do you typically become involved in the Work Planning process for a new, or revision to an existing, work package or procedure?
- 3) What level of involvement do you have in the initial planning of work or changes to existing instructions?
- 4) What does "Scope of Work" mean to you and where is the scope of work defined for a given work document?
- 5) What takes place when the work instructions do not align with the needed actions in the field?
- 6) Who determines radiological hazard controls? What happens if you do not believe the selected controls are necessary or appropriate?
- 7) Who is responsible for ensuring hazard controls are being properly applied? What action is taken when they are not?
- 8) How specific are the work instructions and radiological hazard controls in work documents?
  - If interviewee has been at PFP for more than 4 months, ask them if this is different today than it used to be and why?
- 9) How do you proceed if you disagree with a hazard control or believe its application is not adequate?
10. Do you have the training or qualifications necessary to perform assigned work tasks or follow the procedures/instructions?  
  
(If yes, what training is that?)



11. Are work instructions written such that you recognize when field conditions are outside the planned scope?
12. What is the management expectation when work instructions cannot be followed as written?
13. What is the process when in the field it is identified that the work can be performed differently than what the work instructions direct?
- 14) From your perspective- What aspects of the process need to be improved? What would you do to improve them?
- 15) What aspects of the process are working well? Are the good things part of the procedure, or ad hoc?

#### Field Work Supervisor LOIs

- 1) How long have you been assigned to PFP?
- 2) At what point do you typically become involved in the Work Planning process for a new, or revision to an existing, work package or procedure?
- 3) How does that involvement start (i.e., who makes first contact with you regarding the need for support on new or revised work documents)?
- 4) What does "Scope of Work" mean to you and where is the scope of work defined for a given work document? How do you know when you are outside of it?
- 5) Who decides what SMEs are required for work document development?
- 6) Who determines radiological hazard controls? What happens if you do not believe the selected controls are necessary or appropriate?
- 7) What do you view your role to be in the work planning process? What do you believe is not your role?
- 8) How specific are the radiological controls in work documents?
  - If interviewee has been at PFP for more than 4 months, ask them if this is different today than it used to be and why?
- 9) What is a Post-Job ALARA Review for? How about a Critique? How do you decide which type of meeting to hold following an issue in the field?
- 10) If you believe a hazard control is not necessary or appropriate during a job, how do you proceed?
- 11) From your perspective- What aspects of the process need to be improved? What would you do to improve them?
- 12) What aspects of the process are working well? Are the good things part of the procedure, or ad hoc?

Nuclear Chemical Operator (NCO) LOIs

- 1) How long have you been assigned to PFP?
- 2) At what point do you typically become involved in the Work Planning process for a new, or revision to an existing, work package or procedure?
- 3) What level of involvement do you have in the initial planning of work or changes to existing instructions?
- 4) What does "Scope of Work" mean to you and where is the scope of work defined for a given work document?
- 5) What takes place when the work instructions do not align with the needed actions in the field?
- 6) Who determines radiological hazard controls? What happens if you do not believe the selected controls are necessary or appropriate?
- 7) How specific are the work instructions? How specific should the work instructions be? How much flexibility is needed in work instructions?
- 8) How specific are the radiological controls in work documents?
  - If interviewee has been at PFP for more than 4 months, ask them if this is different today than it used to be and why?
- 10) If you believe a hazard control is not necessary or appropriate during a job, how do you proceed?
11. Do you have the training or qualifications necessary to perform assigned work tasks or follow the procedures/instructions?  
  
(If yes, what training have you completed for this?)
12. Are work instructions written such that you recognize when field conditions are outside the planned scope?
13. What is the management expectation when work instructions cannot be followed as written?
14. What do you do when it is identified in the field that the work can be performed differently than what the work instructions direct?
- 15) From your perspective- What aspects of the process need to be improved? What would you do to improve them?
- 16) What aspects of the process are working well? Are the good things part of the procedure, or ad hoc?

### Work Planner LOIs

- 1) How long have you been assigned to PFP?
- 2) At what point do you typically become involved in the Work Planning process for a new, or revision to an existing, work package, work instruction or work procedure?
- 3) In your role as a Planner, how does your involvement start (i.e., who makes first contact with you regarding the need for support on new or revised work documents)?
  - What SMEs are contacted to initiate work planning?
- 4) What does "Scope of Work" mean to you and where is the scope of work defined for a given work document?
- 5) When do you interface with Engineering during your work planning efforts? How do you determine if you need their support? Does the level of support provided meet your needs? What Engineers do you typically work with while planning work?
- 6) Who determines radiological hazard controls? Are the controls used always necessary or appropriate? What do you do if you do not believe a hazard control is needed?
- 7) How do you determine what information from an AMW belongs in the work document?
- 8) What do you view your role to be in the work planning process? What do you believe is not your role?
- 9) From your perspective- What aspects of the planning process need to be improved? What would you do to improve them?
- 10) What aspects of the planning process are working well? Are the good things part of the procedure, or ad hoc?
- 11) How specific are the radiological controls in work documents?
  - How are things different today and why?
- 12) Are you involved in Post-Job Reviews and Critiques associated with a work document that you supported? What is the difference between these two types of meetings?
- 13) What prompts you to involve an SME for changes to existing approved planned work?

## ATTACHMENT 7: CAUSE EVALUATION CHARTER

**CH2MHILL**  
Plateau Remediation Company

## INTEROFFICE MEMORANDUM

11-SHS&amp;Q-003

**Date:** July 20, 2011

**To:** M. J. Berkenbile, H8-22

**From:** T. L. Vaughn, Vice-President of Safety, Health, Security & Quality  
D. C. Del Vecchio, Vice President of PFP Closure Project

**Subject:** ROOT CAUSE EVALUATION TEAM CHARTER: CONDITION REPORT  
CR-2011-2196

**Purpose**

The purpose of this memorandum is to direct you, as Root Cause Evaluation Team Leader, to perform a root cause evaluation of the condition described in Condition Report (CR) CR-2011-2196, *The Radiological Work Planning Process at PFP*.

**Problem Statement**

Work activities at PFP related to the Radiological work planning process resulted in airborne radioactivity levels that exceeded the maximum protection factor of the type of respiratory protection used, multiple uptakes of plutonium, and spreads of contamination.

**Background**

On July 7, 2011 CHPRC received RL, Surveillance Report S-11-SED-CHPRC-PFP-002 (11-SED-0124, 1103433A). The Surveillance identified one concern, 12 findings and four observations. The Concern (S-11-SED-CHPRC-PFP-002-C01) documented in CR-2011-2196, was screened as "Significant" on July 12, 2011.

**Expectations**

The evaluation will be performed in accordance with procedure PRC-PRO-QA-052, *Issues Management*, (latest). The team will deliver a report documenting the evaluation to the PFP and SHS&Q Vice Presidents. The report will be considered complete upon our approval and review by the Executive Safety Review Board (ESRB). The evaluation will be performed in an expeditious manner with a target completion date no later than August 4, 2011. The target completion date shall in no way compromise the quality and thoroughness of the evaluation. The conduct of the evaluation shall be given the highest priority by team members and by all the personnel from whom the team needs support. The team is expected to provide near full-time attention to this evaluation, until complete.

**Root Cause Evaluation Team**

Responsible Manager (Project)	Curtis Bean
Responsible Manager (Program)	Tom Bratvold
Cause Evaluation Team Leader	Mike Berkenbile
Cause Evaluation Team Members	Kori Escujuri Theodore Jarecki Patty Pechin

## ATTACHMENT 8: BARRIER ANALYSIS

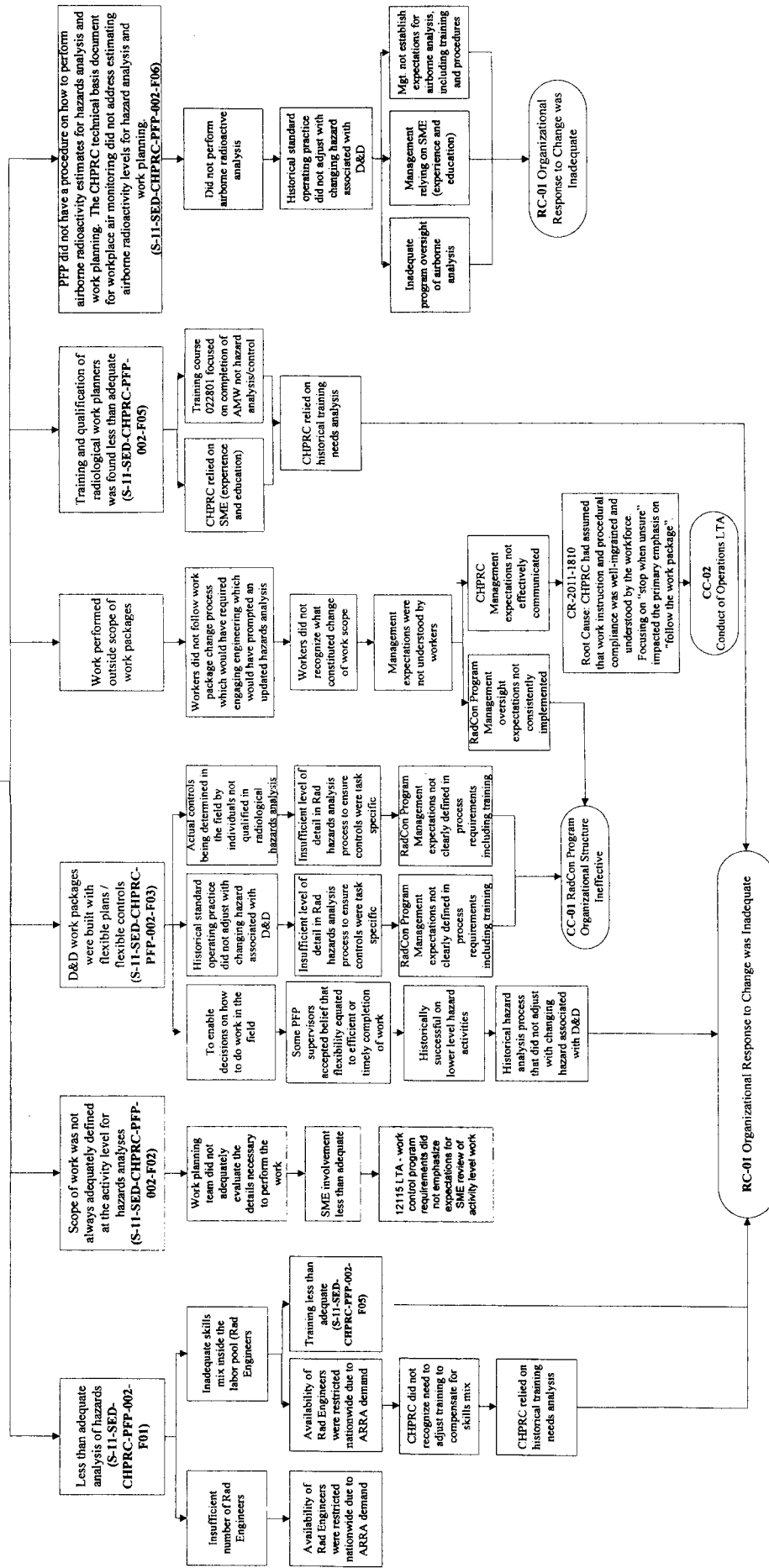
Hazard	Barrier	Target	Used	Effective	Causal
Hazards not controlled	Work Documents/Work Packages	Workers / Work Performance	Yes	Partial - enabling environment where decisions on RadCon were made in the field -	YES
Worker protection	RWP - Implementation	Workers	Yes	Partially - over generalization enables inconsistent deployment	YES
Ineffective work documentation	Procedure PRC-PRO-12115, Work Management	RMs / Planners	Yes	Partial - Work control program requirements did not emphasize expectations for SME review of activity level work. continued improvement June 2011. Updated expectations on SME involvement	YES
Ineffective work documentation	Procedure PRC-PRO-RP-40108, (CANCELLED) PRC-PRO-RP-40109, Radiological Work Planning	Workers / Work Performance	Yes	Partial - Actual controls being determined in the field by individuals not qualified in radiological hazard analysis. Continued improvement March 2011. Effective hazard controls (Radiological) captured	YES
Ineffective hazard analysis and control	ALARA Management Worksheet (AMW)	Work Package	Yes	No - lacked hazard analysis and controls; training course 022801 focused on completion of AMW, not hazard analysis/control	YES
Ineffective hazard analysis and control	RWP - Development	AMW	Yes	Partial - issues with voids - limiting Rad conditions - no action limit or void limit - over generalization - too much work scope	YES
Ineffective air monitoring	Completed Decision Making Packet (CDMP-0011)	Workers	PF-P-No	No - Although example air calculations were provided, they were not focused on task specific hazards analysis. Inadequate program oversight of airborne analysis.	YES
Intake	Procedure PRC-PRO-RP-40031, Workpiece Air Monitoring Program	Workers	PF-P-No	No - Trending - process trigger was an order magnitude higher than necessary - Worker not aware needed to be done	NO
Intake	Procedure FSP-PFP-5-8, 14, 18, Trending Air Sample Data	Workers	PF-P-No	No - Trending - process trigger was an order magnitude higher than necessary - Worker not aware needed to be done	NO
Work compliance / work performance - LTA	Self Assessment	Work compliance / work performance	Yes	No - Multiple assessments performed, not focused on hazard analysis/control.	YES
Work compliance / work performance	Management Assessment	Work compliance / work performance	Yes	No - Multiple assessments performed, not focused on hazard analysis/control.	YES
Work compliance / work performance	Independent Assessment	Work compliance / work performance	Partially	Partial - Corrective actions did not prevent recurrence	YES
Intake	Process for performing Air Borne Radioactivity Calculations for hazard analysis in work planning	Workers	Missing	No - No process for performing Air Borne Radioactivity Calculations for hazard analysis in work planning process. Did not perform air borne radioactive analysis.	YES
Issues not identified	Corrective Action Program / Trending	Work compliance / work performance	No	No - Limited use and/or ineffective response	NO
Minimizing Intake	CAMs	Workers	Yes	Yes - dependent on airflow and placement	NO
Minimizing Intake	Fixed Head Air Samplers	Workers	Yes	Yes	NO

Hazard	Barrier	Target	Used	Effective	Causal
Contamination and Airborne Radioactivity	Containments	Work performance	Partially	Partial - Inconsistent use. Engineering controls were not adequately incorporated to control air borne radioactivity and spread of contamination for some work activities, resulting in high air borne radioactivity, low-level intakes, and spreads of contamination. Engineering staff were not always adequately engaged in the radiological engineering of the work.	YES
Contamination and Airborne Radioactivity	Confinement	Work performance	Partially	Partial - Inconsistent use, and in some cases, inappropriate use. Engineering controls, in the form of confinement, were not adequately incorporated to control air borne radioactivity and spread of contamination for some work activities, resulting in high air borne radioactivity, low-level intakes, and spreads of contamination. Engineering staff were not always adequately engaged in the radiological engineering of the work.	YES
Work compliance / work performance	Senior Supervisory Oversight (SSO)*	Work compliance / work performance	Yes	Partial - More work performance than work compliance focused	YES
Work compliance / work performance	Management Oversight Program (MOP)	Work compliance / work performance	Yes	Partial - More work performance than work compliance focused	YES
Work compliance / work performance	DOE/RL - SME Oversight	Work compliance / work performance	Yes	Yes - Pointing out significant concerns	NO
Work compliance / work performance	DOE/RL - FR Oversight	Work compliance / work performance	Yes	Yes - Task focused	NO
Work compliance / work performance	Defense Board - Oversight	Work compliance / work performance	Yes	Yes - Pointing out work control/Rad issues	NO
Work compliance / work performance	Fieldwork Supervisor (FWS)	Work compliance / work performance	Yes	Partial - receptive to allowed level of latitude. Actual controls being determined in the field by individuals not qualified in radiological hazard analysis. Work package change process not always followed, which would have required engaging engineering and other SMEs.	YES
Overexposure to Radiological hazards / RCT	Radiological Control Supervisor (RCS)	Effective implementation of Rad controls	Partially	Partial - Insufficient field presence of RCS complicated by manning levels. Enabled actual controls being determined in the field by individuals not qualified in radiological hazard analysis.	YES
Not completing DD scope through compliant work	D&D Managers	Superintendent and FWS	Yes	Partial - focused on completion of work. Did not consistently demonstrate balance between work and safe execution. Management oversight expectations not consistently implemented.	YES
Ineffective implementation of RadCon program	Radiological Staffing	Work compliance / work performance	Yes	No - Untimely replacement of departed staff - Availability of Rad Engineers was restricted nationwide due to ARRA demands.	YES
Ineffective implementation of RadCon program	Program Oversight	Work compliance / work performance	Partially	No - Insufficient use - focused on mentoring and assistance with little documentation	YES
Lack of Radiological hazard analysis	Training - 022801	Radiological engineers / Radiological planners	Yes	No - Training course (Hazards Analysis) determined to be deficient; focused on completion of AMW, not hazard analysis/control.	YES
Overconfidence	Historical Expertise	Work performance	Yes	No - Overreliance on historical expertise and experience with control of Radiological hazards. Historical hazard analysis process did not adjust with changing hazard level associated with D&D. Management relied on historical training needs analysis.	YES
Legacy, chemical, and Radiological hazards.	Tech Doc FSP-PFP-IP-003	Radiological and Industrial hygiene SME	No	No - Not used as an information source	YES

Hazard	Barrier	Target	Used	Effective	Causal
Radiological exposure not ALARA	Radiological Control Technician (RCT)	Workers	Yes	Partial - Occasionally supportive of the allowed level of latitude. Ratio of Senior to Junior RCTs created skills mix weaknesses and need for additional considerations to balance work assignments based on hazard level and associated risk.	YES
Work compliance / work performance	Nuclear Chemical Operator (NCO)	Work compliance / work performance	Yes	Partial - receptive to allowed level of latitude	YES
Lack of system configuration, knowledge / information	Engineers	Work document	Partially	Partial - Insufficient transfer of system configuration and knowledge on occasion during work planning process. Project Engineering staff was not always adequately engaged in the radiological engineering of the work.	YES
Ineffective Radiological controls and analysis	Rad Engineers/ Radiological Planner	AMW	Yes	Partially - Insufficient hazard analysis and controls on multiple occasions. Management relying on SME (experience and education). RadCon Engineering misconception of ventilation specifics (i.e., Point source vs. facility)	YES
Ineffective implementation of RadCon program	Skills Mix	Work compliance / work performance	No	No - Inadequate skills mix for Rad Engineers - project did not manage skills mix beyond education/experience requirements for Radiological engineers/Radiological planners - didn't manage skills mix with education/experience mix	YES
Ineffective implementation of RadCon program	Organizational Structure	Facility RadCon management	Partially	No - Project and Program managers did no successfully collaborate to ensure program requirements and expectations were implemented. Positional authority from the program was ineffective.	YES
Controls don't mature with the increase in hazard level	Change Management Process	PPF D&D	No	No - Change in work scope from operations to D&D - Historical standard operating practice did not adjust with changing hazard levels associated with D&D.	YES

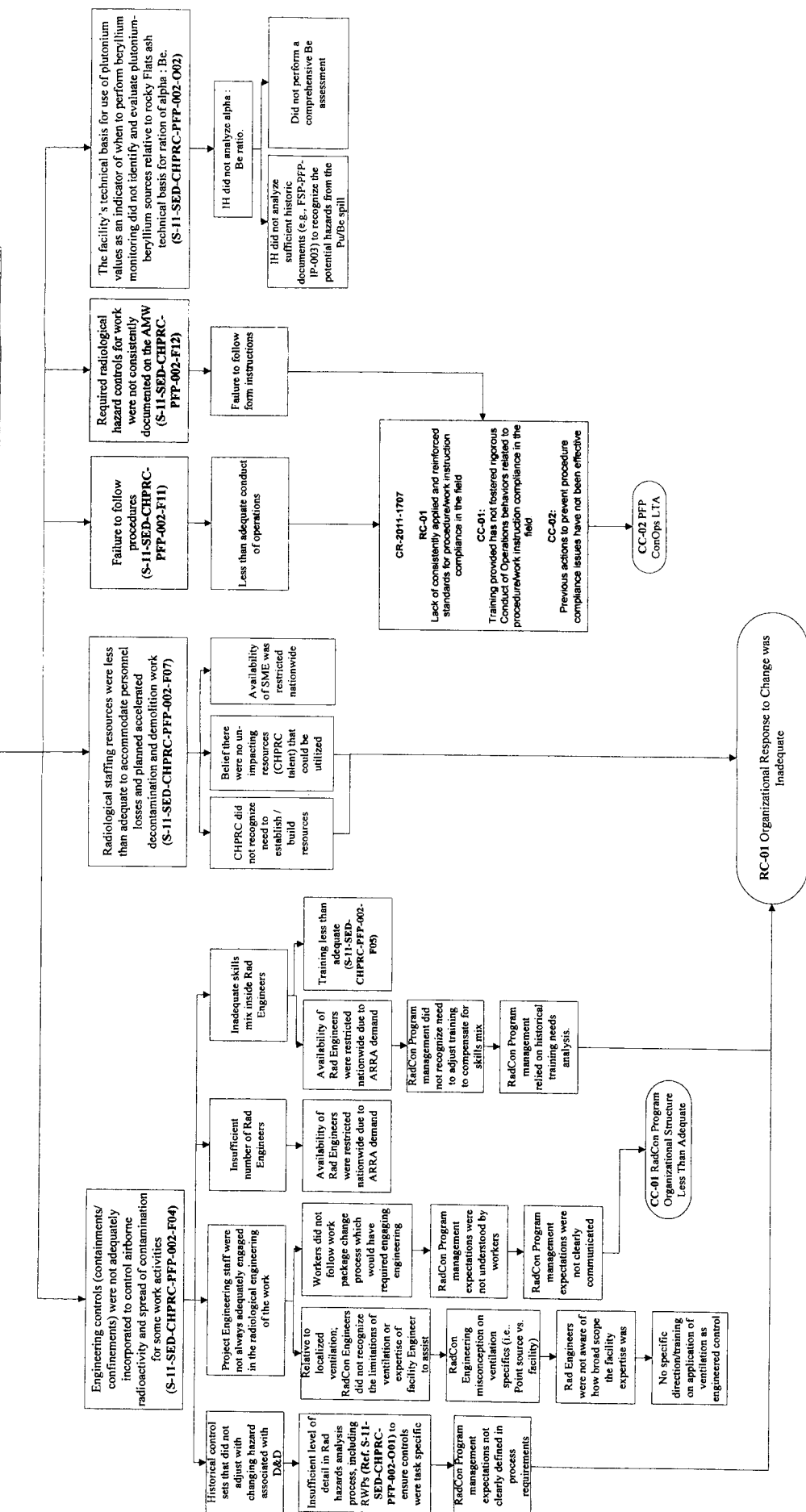
ATTACHMENT 9: WHY ANALYSIS

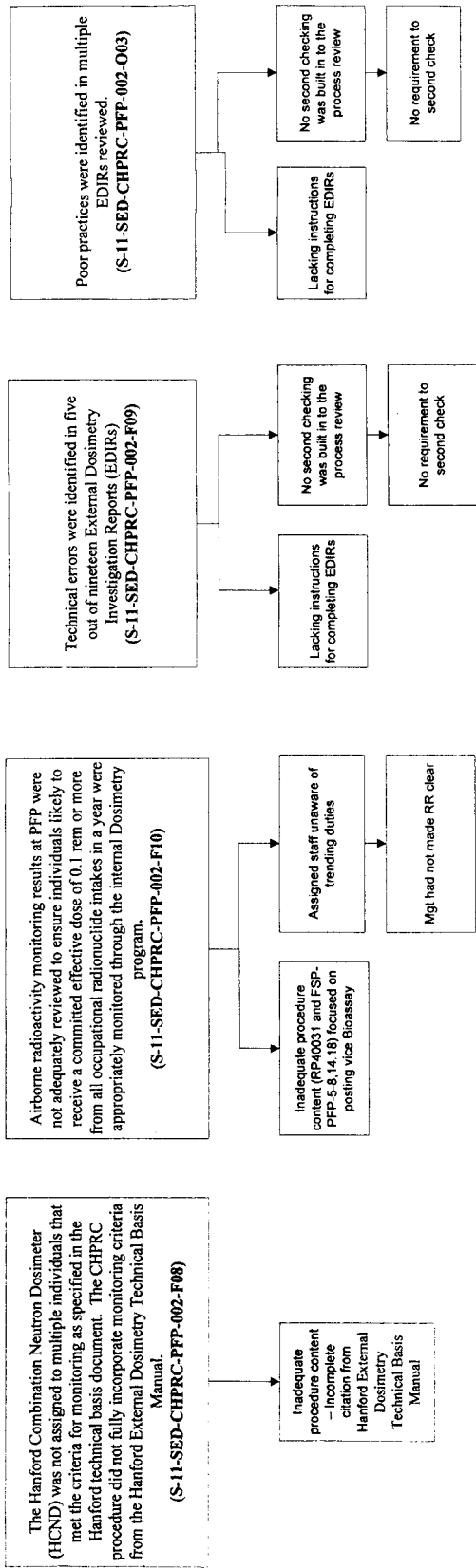
Work activities at PFP related to the Radiological work planning process resulted in airborne radioactivity levels that exceeded the maximum protection factor of the type of respiratory protection used, multiple uptakes of plutonium, and spreads of contamination. (S-11-SED-CHPRC-PFP-002-C01)





Work activities at PFP related to the Radiological work planning process resulted in airborne radioactivity levels that exceeded the maximum protection factor of the type of respiratory protection used, multiple uptakes of plutonium, and spreads of contamination. (S-11-SED-CHPRC-PFP-002-C01)





Apparent Cause evaluation of ancillary findings and observations

ATTACHMENT 11: PFP RADCON INTEGRATED IMPROVEMENT PLAN

ID	Task Name	Start	Finish	Resource Names
41	Draft Revised Temporary Shielding Procedure to Clarify Short-Term Use	Mon 3/27/11	Tue 3/29/11	McKamey
42	Review Draft Temporary Shielding Procedure with Sampling of End Users	Wed 3/30/11	Thu 3/31/11	McKamey
14	Develop Briefing to Clarify Expectations for Response to Exceeding RWP Void Limit	Thu 3/31/11	Mon 4/4/11	McKamey
30	Evaluate Possible Shortage of direct reading dosimetry (DRD)	Mon 3/28/11	Fri 4/8/11	McKamey
8	Review Draft Containment Procedure with multi-disciplined team	Fri 4/8/11	Mon 3/28/11	McKamey
16	Issue Shift Operating Instruction for Hazard Controls when Working Over 8 or Accessing Previously Inaccessible Areas	Mon 3/28/11	Fri 4/8/11	McKamey
34	Hire RadCon First-Line Supervisor - Bark (RCS #1)	Mon 3/28/11	Fri 4/8/11	McKamey
36	Arrange for Re-assignment of Radiological Engineer from WFPMP to PFP - Tilton (RadEng #2)	Mon 3/28/11	Fri 4/8/11	McKamey
43	Submit Draft Temporary Shielding Procedure to PFP Procedure Group	Fri 4/1/11	Mon 4/11/11	McKamey
51	Issue Shift Operating Instruction for independent review of Medium and High Hazard work packages	Mon 4/11/11	Fri 4/15/11	McKamey
26	Train PFP Insulators on MMZK	Mon 4/11/11	Fri 4/15/11	McKamey
35	Hire Health Physicist (CHIP) - Heikkala (RadEng #1)	Mon 4/11/11	Fri 4/15/11	McKamey
38	Interview WFPMP First-Line Supervisor Candidate for possible reassignment to PFP - RCS #3 (Candidate Leaving Hanford)	Mon 4/11/11	Fri 4/15/11	McKamey
27	Issue Dosimetry Change Requests (DCRs) for Affected Workers	Mon 4/11/11	Fri 4/15/11	McKamey
31	Provide Recommendation for changes in utilization methods or need for additional DRDs	Mon 4/11/11	Fri 4/15/11	McKamey
7	Incorporate Review Comments in Containment Procedure and address chemical compatibility considerations	Mon 4/11/11	Fri 4/15/11	McKamey
15	Provide RWP Void Response Briefing to 90% of PFP FWS, RCTs, and RadCon Managers	Mon 4/11/11	Fri 4/15/11	McKamey
20	Beryllium Work Permit Review by OSHA Program and completed MOP Summarizing Results	Mon 4/11/11	Fri 4/15/11	McKamey
33	Implement Radiological Survey process improvement to eliminate physical inclusion of air, lapel, and smear sample log sheets	Mon 4/11/11	Fri 4/15/11	McKamey
44	Issue Revised Temporary Shielding Procedure	Mon 4/11/11	Fri 4/15/11	McKamey
22	Develop Glove Box Sampling Schedule for Be (Be Subcommittee approving box sampling schedule)	Mon 4/11/11	Fri 4/15/11	McKamey
28	Issue Communication to PFP Project Regarding Changes to Dosimeter Type and Frequency	Mon 4/11/11	Fri 4/15/11	McKamey
37	Hire RadCon First-Line Supervisor - McClure	Mon 4/11/11	Fri 4/15/11	McKamey
49	Provide formal expectations for Radiological Engineering & Industrial Hygienists hazards analysis relative to containment and confinement	Mon 4/11/11	Fri 4/15/11	McKamey
6	Provide Example RWP Templates for improving and standardizing RWP Language and Format	Mon 4/11/11	Fri 4/15/11	McKamey
1	Draft Technical Evaluation (TE) for Radiological Engineering Methods	Mon 4/11/11	Fri 4/15/11	McKamey
9	Submit Draft Containment Procedure to PFP Procedure Group	Mon 4/11/11	Fri 4/15/11	McKamey
40	Arrange for re-assignment of Radiological Engineer from D&D to PFP - RadEng #3	Mon 4/11/11	Fri 4/15/11	McKamey
50	Provide formal expectations for health physicist/radiological engineering staff serving as PFP project points of contact for functional elements of the RadCon Program	Mon 4/11/11	Fri 4/15/11	McKamey
53	Provide formal expectations for Radiological Control Technicians regarding performance of duties, including record quality and completion	Mon 4/11/11	Fri 4/15/11	McKamey
55	Provide formal expectations for Radiological Control First-Line Managers regarding performance of duties, including time in field observing work	Mon 4/11/11	Fri 4/15/11	McKamey
56	Revised Contaminated Area Routine Task Descriptions to Require Sending Representative Swipe Samples to Count Room for Characterization Maintenance	Mon 4/11/11	Fri 4/15/11	McKamey
24	Develop Routine Be sampling program	Mon 4/11/11	Fri 4/15/11	McKamey
45	Brief RCTs on Revised Temporary Shielding Procedure (Rosters for a minimum of 90% of the RCT population)	Mon 4/11/11	Fri 4/15/11	McKamey
12	Develop Process for 5-Sided Containment Structures (Hoods) - Incorporated into RadEng Methods TE	Mon 4/11/11	Fri 4/15/11	McKamey
57	Brief RCTs on Revised Task Descriptions for Characterization Maintenance	Mon 4/11/11	Fri 4/15/11	McKamey
2	Submit TE for Internal and RadCon Program Review	Mon 4/11/11	Fri 4/15/11	McKamey
32	Implement recommendations from action 34 (i.e. order additional Low Energy EDs)	Mon 4/11/11	Fri 4/15/11	McKamey
5	Radiological Work Permit Review by RadCon Program and completed MOP of Evaluation	Mon 4/11/11	Fri 4/15/11	McKamey
3	Resolve Radiological Engineering Methods TE Comments and Issue	Mon 4/11/11	Fri 4/15/11	McKamey
13	Review Draft 5-Sided Hood Process with Engineering and RadCon	Mon 4/11/11	Fri 4/15/11	McKamey
54	Establish radiological air quality information board that presents results of Quarterly Tracking & Trending analysis to project personnel.	Mon 4/11/11	Fri 4/15/11	McKamey
21	Revised BWPs and Associated Be Hazards Assessments based on Review	Mon 4/11/11	Fri 4/15/11	McKamey
10	Issue Revised Containment Procedure	Mon 4/11/11	Fri 4/15/11	McKamey
17	Incorporate SOI into BWPs	Mon 4/11/11	Fri 4/15/11	McKamey
18	Incorporate SOI into RWP's	Mon 4/11/11	Fri 4/15/11	McKamey
39	Hire RadCon First-Line Supervisor - RCS #3	Mon 4/11/11	Fri 4/15/11	McKamey
19	Retire/Revised SOI for Hazard Controls when Working Over 8 or Accessing Previously Inaccessible Areas	Mon 4/11/11	Fri 4/15/11	McKamey
4	Train Radiological Engineers on TE	Mon 4/11/11	Fri 4/15/11	McKamey
23	Complete Be Subcommittee GB Sampling Schedule: 228C-18M, HC-1 (2228A, B, C) and Conveyor through 228C, 230A, 230B, 230C (HC-2)	Mon 4/11/11	Fri 4/15/11	McKamey
46	Review (Revise if necessary) Existing Radiological Screening Forms for Medium and High Hazard Work Packages	Mon 4/11/11	Fri 4/15/11	McKamey
47	Review Existing ALARA Management Worksheets (AMWs) for Work Packages Classified as Medium or High Hazard Following A-41	Mon 4/11/11	Fri 4/15/11	McKamey
11	Brief 90% of IH Personnel on Revised Containment Procedure	Mon 4/11/11	Fri 4/15/11	McKamey
52	Retire/Revised SOI for external package review following completion of Actions 46 and 47	Mon 4/11/11	Fri 4/15/11	McKamey
29	Implement changed dosimeter type/frequency for affected workers	Mon 4/11/11	Fri 4/15/11	McKamey
48	Configure and Post RIMARIC Lines as HCAMARA	Mon 4/11/11	Fri 4/15/11	McKamey
25	Deploy MSA MMZK Powered Air Purifying Respirator at PFP (includes training 90% of issuers, and at least 10% of the Duct level RCTs)	Mon 4/11/11	Fri 4/15/11	McKamey

External Tasks   
  External Milestone   
  Summary   
  Project Summary   
  Progress   
  Milestone   
  Task Split   
  Deadline

Project: PFP RadCon and IH (Niegrah)   
 Date: Thu 8/25/11   
 Page 1

**CHPRC CONDITION REPORT FORM**

Status: Verification

CR NUMBER: CR-2011-2368

<b>Issue Identification and Processing</b>		
<b>Initiator:</b> Woollums, Scott	<b>Initiating Document:</b> S-11-SED-CHPRC-PFP-002-002	<b>Date Identified:</b> 7/7/2011
<b>Title of Issue:</b> PFP Technical Basis for use of Plutonium Values		
<b>Description of Issue:</b> 002: The facility's technical basis for use of plutonium values as an indicator of when to perform beryllium monitoring did not identify and evaluate plutonium-beryllium sources, as a potential source of beryllium in the facility.  During review of FSP-PFP-IP-003, Radiological History of the Plutonium Finishing Plant (1954-1997), the surveillance team noted on page 20 of the report that a spread of contamination from a plutonium-beryllium source occurred in 1981 in room 236. This source of beryllium was not evaluated by the facility in the development of their beryllium monitoring program.  The additional technical staff brought into PFP had an additional benefit of supporting resolution of worker concerns in the beryllium monitoring program. When the additional source of beryllium contamination was identified by RL, the additional staff reviewed its potential impact on the PFP beryllium monitoring program.		
<b>Requirements Not Met: (Orders, Requirements, Procedures)</b>	<b>Responsible Project/Program:</b> PFP CLOSURE PROJECT	
<b>Date Submitted:</b> 7/27/2011	<b>Other Related Documents:</b>	
<b>Immediate Action(s) Taken:</b> None noted.		
<b>Recommended Corrective Actions:</b>		
<b>Initiator Comments:</b> The responsible manager is Curt Bean.		
<b>Associated Files</b> CA-1-ChangeActionee.pdf GloveboxPuNDAs.BeCalculations_9-12-2011.pdf S-11-SED-CHPRC-PFP-002.pdf TEforPuandBeTE-PFP-10-002-0.pdf		

<b>Issue Significance, Analysis, Extent of Condition, Action Assignment, and Closure</b>		
<b>Significance Level:</b> OFI	<b>Date Submitted to Responsible Manager:</b> 7/28/2011 - Bean, Curtis K	<b>Date CAP was approved by Responsible Manager/Delegate:</b> 8/11/2011 - Gibson, Shawn A
<input type="checkbox"/> ORPS	<input type="checkbox"/> Compliance Determination	<input type="checkbox"/> NTS
<b>Significant Level Justification:</b> This issue is screened as an Opportunity for Improvement (OFI).  As an OFI, the issue needs to be reviewed to determine the appropriate action (s) to be developed for improving the subject condition. This CR will track those actions to closure.  PLH		
<b>Assigned To:</b> Woollums, Scott	<b>Date Assigned:</b> 7/28/2011	
<b>Extent of Conditions:</b>		
<b>Causal Analysis Method Used:</b>	<b>Analysis Completion Date:</b> 8/11/2011	

<b>Analysis Results:</b>
<b>Trend Codes:</b> OS0701 - CBDPP - Program Management
<b>Cause Codes:</b>
<b>PAAA/851 Citations:</b>
<b>ISMS:</b>

<b>Corrective Action Items</b>	
<b>Action #:</b> 1	<b>Actionee:</b> Hess, John W
<b>Action Statement:</b> Revise beryllium hazards assessment/technical basis to document alpha:Be expected ratio associated with PuBe source spill.	<b>Due Date:</b> 9/14/2011
<b>Closure Requirements:</b> Provide a closure statement describing what was done to resolve the action. As objective evidence, provide a copy of the revised beryllium hazards assessment.	
<b>Action Taken:</b> The uploaded document "TE for Pu and Be (TE-PFP-10-002-0).pdf" contains deliberately conservative calculations of potential beryllium to plutonium ratios potentially present in PFP glovebox systems. The basis for deciding which glovebox systems at PFP potentially contain beryllium contamination is found in "OUO" HNF-21777 (contact Actionee if need to review document).  Until recently, no actual high-contamination beryllium wipe samples have been collected from PFP glovebox interiors. Analysis of these recently collected samples show that the calculated values assumed in TE-PFP-10-002-0 are conservative in all cases.  A summary of the beryllium to plutonium relations from interior glovebox sampling is contained in the uploaded document "Glovebox Pu NDA vs. Be Calculations_9-12-2011.pdf". Ratios in this document are shown in dpm alpha per 0.1 ug/100cm <sup>2</sup> . All analyzed values are greater than the dpm per surface contamination limit of 6.95E+05 dpm/0.1 ug beryllium as calculated in TE-PFP-10-002-0.  As more beryllium wipe samples collected from PFP glovebox interiors are analyzed, the beryllium to plutonium relationship calculated in TE-PFP-10-002-0 will be re-evaluated. If analysis of beryllium samples indicate TE-PFP-10-002-0 is insufficiently conservative in its assumptions, this Technical Evaluation will be reconfigured accordingly.	<b>Completed Date:</b> 9/12/2011
<b>Action Approved By:</b> Day-Phalen, Cynthia L	<b>Action Approval Date:</b> 9/13/2011

<b>Action #:</b> 2	<b>Actionee:</b> Bean, Curtis K
<b>Action Statement:</b> Review CR and determine if it is adequate/ready to submit to RL for closure verification. Contact Issues Management for any changes needed to the CR prior to closing this action.	<b>Due Date:</b> 9/27/2011
<b>Closure Requirements:</b> Closure statement in CRRS indicating results of review (i.e. CR is adequate and ready for RL closure review, or additional actions have been added to CR to address the issue). Provide objective evidence if applicable.	
<b>Action Taken:</b> The PFP Radiological, Hygiene and Safety Director reviewed this CR and determined that it is ready for RL closure review.	<b>Completed Date:</b> 9/20/2011

Action Approved By:  
Gibson, Shawn A

Action Approval  
Date:  
9/21/2011