

"Designated Original"

**Confirmatory Action Letter – CAL-4-07-004**



*A subsidiary of Pinnacle West Capital Corporation*

Palo Verde Nuclear  
Generating Station

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102-05837-RKE/DCM/REB/CJS  
March 31, 2008

Mr. E. E. Collins Jr.  
Regional Administrator, Region IV  
U.S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, TX 76011-4005

- References:
- 1) Revised Confirmatory Action Letter CAL-4-07-004 dated February 15, 2008, from Elmo E. Collins, Region IV NRC, to Randall K. Edington (ADAMS ML080460653)
  - 2) Arizona Public Service Company (APS) letter number 102-05789, dated December 31, 2007, Response to NRC Confirmatory Action Letter (CAL) Action 5: Submittal of Portions of the Modified Improvement Plan

Dear Mr. Collins:

**Subject: Palo Verde Nuclear Generating Station (PVNGS)  
Units 1, 2, and 3  
Docket Nos. STN 50-528/529/530  
Response to NRC Confirmatory Action Letter (CAL)-4-07-004,  
List of Specific Tasks, Due Dates, Measures and Metrics**

This letter responds to the revised CAL-4-07-004 (Reference 1), which requested that APS submit to the NRC a list of the specific tasks, including due dates, associated with the action plans and strategies for each of the twelve CAL key performance areas. This submittal also includes a description of measures and metrics for each PVNGS Site Integrated Improvement Plan (SIIP) Action Plan to aid in monitoring performance improvement, as requested.

Attachment 1 to this letter is the updated SIIP, which reflects ongoing APS enhancements, including the establishment of performance measures and metrics for each of the Action Plans. The revised SIIP contains key improvement actions that APS is taking to address the

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causes of the decline in performance at PVNGS. The SIIP actions are a subset of the overall Site Integrated Business Plan (SIBP).

The revised CAL identified those Action Plans and strategies from the SIIP that the NRC has determined are necessary to address performance issues. For each of the identified strategies, Attachment 1 provides the specific SIIP task numbers that implement that strategy. APS considers these tasks to be regulatory commitments. Attachments 2 through 13 provide a detailed listing of the specific tasks and due dates for each of the 12 key performance areas identified in the revised CAL. Additional information has, in some cases, been provided in the task list in order for the committed actions to be understood in context. This clarifying material, as well as any other actions to which these tasks may refer, are not part of the regulatory commitment.

The due dates noted in Attachments 2 through 13 are the dates by which APS intends to implement each task. Subsequent to implementation, these tasks will be subject to review by a Closure Review Board to confirm that they have been properly completed. These tasks will be ready for inspection upon completion of the Closure Review Board for each task.

As required in the CAL, APS will notify the NRC when APS has satisfactorily completed or demonstrated substantial and sustainable improvement in each of the twelve key performance areas itemized in the CAL. Substantial and sustainable performance improvement will be indicated by (1) progress in implementing the tasks in that area, and (2) positive performance results as indicated by the collective trend of metrics and other effectiveness reviews.

A number of actions and issues addressed in CAL-4-07-004 and in this response have been the subject of previous plans and correspondence between APS and the NRC. Please note that the actions, metrics, and effectiveness reviews described in this response supersede and replace previous plans and commitments. In particular, these actions, metrics and effectiveness reviews supersede and replace previously submitted plans and correspondence describing actions to address the Recirculation Actuation Signal (RAS) and K-1 Relay issues.

Performance measures and metrics have been developed for each of the fifteen SIIP Action Plans. These measures and metrics consist of (1) quantitative metrics and (2) effectiveness reviews. The metrics and effectiveness reviews (typically some form of audit or assessment) for each SIIP Action Plan are identified in Attachment 1. Descriptions of each of the quantitative metrics are presented in Attachment 14.

The SIIP is not a static document. As implementation proceeds, APS will adjust specific actions, timetables, performance measures and metrics as warranted by circumstances or

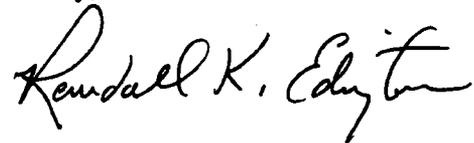
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effectiveness reviews, and will keep the NRC informed during periodic updates as requested in the CAL.

Our goal is to achieve substantial near-term improvement and to institutionalize the changes we make so that this performance improvement is sustained. Through the SIIP and SIBP, we will return PVNGS to excellent performance in support of our mission to safely and efficiently generate electricity for the long term.

If you have any questions, please contact me or Dwight Mims, Vice President Regulatory Affairs and Plant Improvement, at (623) 393-5403.

Sincerely,



- Attachment 1** Palo Verde Nuclear Generating Station Site Integrated Improvement Plan, Revision 1
- Attachment 2** Key Performance Area 1 -- Recirculation Actuation Signal (RAS) Actions - Listing of Specific Tasks and Due Dates (Covers 10 Focus Areas)
- Attachment 3** Key Performance Area 2 -- Unit 3 Emergency Diesel Generator (EDG) K-1 Relay Actions - Listing of Specific Tasks and Due Dates
- Attachment 4** Key Performance Area 3 -- Problem Identification and Resolution (PI&R) Actions - Listing of Specific Tasks and Due Dates
- Attachment 5** Key Performance Area 4 -- Human Performance Actions - Listing of Specific Tasks and Due Dates
- Attachment 6** Key Performance Area 5 -- Engineering Programs Actions - Listing of Specific Tasks and Due Dates
- Attachment 7** Key Performance Area 6 -- Quality of Equipment Evaluations Actions - Listing of Specific Tasks and Due Dates
- Attachment 8** Key Performance Area 7 -- Safety Culture Assessment Actions - Listing of Specific Tasks and Due Dates
- Attachment 9** Key Performance Area 8 -- Standards and Expectations for Performance and Accountability Actions - Listing of Specific Tasks and Due Dates
- Attachment 10** Key Performance Area 9 -- Change Management Process Actions - Listing of Specific Tasks and Due Dates

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- Attachment 11      Key Performance Area 10 -- Emergency Preparedness Program Actions  
                                 - Listing of Specific Tasks and Due Dates
- Attachment 12      Key Performance Area 11 -- Longstanding Equipment Actions - Listing of  
                                 Specific Tasks and Due Dates
- Attachment 13      Key Performance Area 12 -- Backlog Tracking and Prioritization Actions  
                                 - Listing of Specific Tasks and Due Dates
- Attachment 14      Descriptions of Metrics

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cc:    M. T. Markley      NRC NRR Project Manager - (send electronic and paper)  
       R. I. Treadway      NRC Senior Resident Inspector for PVNGS

**Attachment 1**

**Palo Verde Nuclear Generating Station  
Site Integrated Improvement Plan  
Revision 1**

**PALO VERDE NUCLEAR GENERATING STATION  
SITE INTEGRATED IMPROVEMENT PLAN  
REVISION 1**

**1.0 PURPOSE**

The Site Integrated Improvement Plan (SIIP) contains actions to address the causes of the decline in Palo Verde Nuclear Generating Station (PVNGS) performance that impact the Reactor Safety Strategic Performance Area, including the issues that led to PVNGS being placed in the Multiple / Repetitive Degraded Cornerstone Column (Column IV) of the NRC Action Matrix (NRC Inspection Manual Chapter 0305, *Operating Reactor Assessment Program*, Exhibit 4). The SIIP also addresses the drivers of safety culture issues identified during independent safety culture assessments at PVNGS. The objective of the SIIP is to achieve substantial and sustainable improvement in performance.

The actions contained in the SIIP are a subset of the PVNGS Site Integrated Business Plan (SIBP).

**2.0 DEVELOPMENT, SCOPE, AND STRUCTURE**

The SIIP has been developed based upon a series of evaluations that APS performed to identify the fundamental problems that led to the decline in PVNGS performance and the causes of those fundamental problems. The SIIP also contains actions to address causes of the violations that led to the NRC Inspection Procedure (IP) 95001 and 95002 inspections, causes of the Human Performance (HU) and Problem Identification & Resolution (PI&R) substantive cross-cutting issues, and the drivers of the safety culture issues that were identified in the 2007 independent safety culture assessments conducted by Synergy, Inc. and an Independent Safety Culture Performance Evaluation Team composed of outside industry experts.

The assessments, reviews and causal analyses upon which the SIIP actions are based were performed under the auspices of the PVNGS Improved Performance and Cultural Transformation (ImPACT) Team and the PVNGS Corrective Action Program (CAP). They included:

- A systematic review of site performance issues (dating back a minimum of 6 years in most areas).
- A collective evaluation of those site performance issues, resulting in the identification of twelve fundamental overall problems that had contributed to the decline in performance.
- Causal analyses and/or reviews to identify the reasons for those fundamental overall problems.
- Performance of independent assessments that examined the PVNGS safety culture. These assessments included a survey and follow-up interviews of site personnel, as well as an evaluation of safety culture performance by a team of

outside industry experts. Stream analyses were performed to identify the drivers of safety culture issues identified by these assessments.

- Reviews and causal analyses of the Emergency Diesel Generator K-1 relay and Recirculation Actuation Signal (RAS) conditions, including reviews of actions taken in response to those conditions.
- Reviews and causal analyses of the issues associated with the HU and PI&R substantive cross-cutting areas.

In a few cases where other assessments, reviews, and causal analyses had been recently performed and were determined to be acceptable, the ImpACT Team relied upon those results to understand the nature and causes of problems and to serve as bases for development of corrective actions.

These reviews and analyses resulted in the development of fifteen (15) Action Plans grouped into five (5) Improvement Areas. These Action Plans are designed to address the results of the causal analyses and assessments. The 15 Action Plans and their associated Improvement Areas are:

IMPROVEMENT AREAS	ACTION PLANS
Operations	<ul style="list-style-type: none"> <li>• Operational Focus (including Operations Fundamentals and Operability Determinations)</li> <li>• Equipment Reliability</li> </ul>
Engineering	<ul style="list-style-type: none"> <li>• Engineering Technical Rigor</li> <li>• Design Control/Configuration Management</li> <li>• Engineering Programs (including Maintenance Rule, Equipment Qualification, and Fire Protection)</li> </ul>
Site Programs and Processes	<ul style="list-style-type: none"> <li>• Performance Improvement (including Corrective Action Program, Operating Experience, and Self Assessment / Benchmarking)</li> <li>• Managing Plant Workloads</li> <li>• Emergency Preparedness</li> <li>• Programs, Procedures and Work Instructions</li> </ul>
Organization and Human Performance	<ul style="list-style-type: none"> <li>• Organizational Effectiveness</li> <li>• Human Performance/Industrial Safety</li> <li>• Safety Culture</li> <li>• Training and Qualification</li> </ul>
EDG K-1 Relay and RAS	<ul style="list-style-type: none"> <li>• Emergency Diesel Generator K-1 Relay Event [Inspection Procedure (IP) 95001]</li> <li>• Recirculation Actuation Signal Event (IP 95002)</li> </ul>

The 15 Action Plans are presented in Section 6.0.

### **3.0 SELECTION OF ACTIONS TO BE INCLUDED IN THE SIIP**

The actions to address the causes and drivers of the problems in the areas identified above have been included in the PVNGS SIBP along with many other actions to improve PVNGS performance and support the mission to safely and efficiently generate electricity for the long term. APS has established an Implementation and Monitoring Team to oversee the SIBP and SIIP. To select items for inclusion in the SIIP, line management and Implementation and Monitoring Team members (including ImPACT Team members familiar with the causal analysis and other reviews performed by ImPACT) performed reviews to ensure that the SIIP contained actions to address the causes and/or drivers of the identified problems and to confirm that those actions are likely to address those causes and drivers successfully. In particular, within each SIIP Action Plan, the following types of actions have been included:

- Actions designed to prevent recurrence of root causes of issues for which a root cause analysis was performed
- Actions designed to address drivers of issues for which stream analyses were performed

These types of actions form the backbone of the SIIP. Because these actions include the actions to prevent recurrence of root causes and actions to address drivers, there is confidence they will result in substantial and sustainable performance improvement.

In addition, during reviews of the SIIP by PVNGS management, there were instances in which management chose to modify or supplement these actions with additional actions designed to address the identified problems and their causes. The selection of these additional actions was based upon consideration of the following factors:

- Is the action likely to result in significant improvement in performance in the area being addressed?
- Is the action needed to promptly address an area in which no corrective action to prevent recurrence (CAPR) is scheduled to be completed in the near term?
- Is the action needed to address issues identified during the NRC IP 95003 inspection?
- Is the action necessary to address important operability, reliability, or safety issues?
- Given available resources and time, is the action achievable?
- Is the action defined with sufficient clarity such that implementation can be verified, measured and monitored?
- Will the action result in improvement within a reasonable time (1-2 years or sooner) commensurate with the level of need for immediate improvement?
- Collectively, do the selected actions address the causes of problems in the area and appear likely, if implemented, to result in substantial and sustainable performance in that area?
- Collectively, can all of the selected actions be accomplished in a quality manner as described and scheduled?

In cases where an action to prevent recurrence resulting from a root cause analysis was modified, the change was reviewed by the PVNGS Corrective Action Review Board (CARB) pursuant to CAP requirements to ensure the revised actions appropriately addressed the identified causes.

#### **4.0 IMPLEMENTATION, TRACKING, AND CLOSURE OF SIIP ACTIONS**

Closure of SIIP actions is subject to the requirements of a formal procedure, 01DP-0AC06, *Site Integrated Business Plan (SIBP) / Site Integrated Improvement Plan (SIIP) Process*. Pursuant to this procedure:

- Closure of actions requires the sign off of the responsible leader.
- Closure is supported by a formal closure package providing evidence of the completion of the action.
- Closure packages are reviewed and maintained by the Implementation and Monitoring Team (IMT). The IMT provides feedback to the organization on the quality of the closure packages in order to raise standards in the corrective action program.
- Each action has been entered into the PVNGS CAP, and must meet the closure requirements of that program.
- Action closures are reviewed by a Closure Review Board that includes members of PVNGS management independent of the management responsible for implementation of the action.

These controls provide confidence that SIIP actions will be rigorously implemented.

Completion status of SIIP actions will be tracked and reported to PVNGS senior management on a periodic basis (approximately monthly).

#### **5.0 EFFECTIVENESS REVIEW OF SIIP AREAS**

Effectiveness of the SIIP will be monitored by several means, including:

- Effectiveness measures and performance metrics for each SIIP Improvement Area
- Planned internal effectiveness reviews or self-assessments for each SIIP Improvement Area
- Periodic review of progress and effectiveness by the Implementation and Monitoring Team
- Periodic review of progress and effectiveness by PVNGS senior management
- Independent surveys or assessments (including an independent safety culture survey and performance evaluation)

The specific methods to be used for monitoring the effectiveness in achieving improvement in each SIIP area are presented in Section 6.0. The set of metrics for each SIIP Action Plan has been established and is reflected in the Action Plans.

## **6.0 ACTION PLANS**

For each Action Plan presented below, the following information is provided: (1) a problem statement describing the overall problem being addressed and its primary causes and/or drivers; (2) an Action Plan Strategy describing the actions being taken to address the problem and its primary causes and/or drivers; (3) the effectiveness reviews and metrics for each plan. Detailed implementing steps for actions contained in these Action Plans have been developed and are included in the SIBP. Cross-references to the appropriate SIBP/SIIP sections are provided.

**SIIP ACTION PLAN - 1**  
**Operational Focus**  
 Executive Sponsor: Bob Bement

**Action Plan Strategy**

**Problem Statement**

Palo Verde lacked an operationally focused organization. As a result, long standing issues had been tolerated while reliable plant operation, the operability of systems important to safety, and nuclear safety had been challenged.

Additionally, control room personnel have not consistently demonstrated the level of formality and rigor associated with the levels of professionalism expected of personnel in command and control of a nuclear power plant.

Furthermore, the operability assessment process has not been consistently applied to ensure timely, complete and properly prioritized evaluation of potentially degraded or non-conforming conditions.

**Primary Causes**

Senior management failed to establish and enforce appropriate expectations for maintaining an operationally focused organization led by operations.

1. Develop and implement the Leadership/Management Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5)
2. Create a site-wide awareness/focus on the plant and corresponding safety aspects by setting the expectation to open initial daily meetings with discussions on plant status and correlating safety aspects. (SIBP/SIIP 4.4.11)
3. Complete an aggregate review of installed temporary mods, degraded-nonconforming work orders, control room deficiencies, installed jumpers, operability determinations, number of work orders on safety systems, longstanding permits, and operator-work-arounds that have been proceduralized to determine overall impact to operational nuclear safety of the plant. (SIBP/SIIP 4.1.G.1 through 4.1.G.3)
4. Identify and review for aggregate impact, imbedded operator-work-arounds and burdens that challenge nuclear safety and institutionalize the process. (SIBP/SIIP 4.1.G.10 and 4.1.G.11)
5. Establish a site-wide emphasis and alignment on core mission and on core fundamental focus areas including: Safely and efficiently generate electricity for the long term, and core fundamental focus areas of Plant Equipment, People, Corrective Action Program, Safety, and Knowledge/Training. (SIBP/SIIP 7.1.B.10)
6. Develop and implement leadership training to address key nuclear fundamentals and improve overall leadership. (SIBP/SIIP 2.4.A.8)
7. Develop and implement a site-wide communication and meeting strategy to address site alignment, operational focus, and site-wide penetration of messages (SIBP/SIIP 7.1.B.1 and 7.1.B.5).
8. Identify key Operations department attributes and behaviors of an operationally focused organization from INPO 01-002, Conduct of Operations and incorporate them into procedures and training. (SIBP/SIIP 4.1.G.4, 4.1.G.5, and 4.1.G.6)
9. Develop and implement a Palo Verde specific power plant fundamentals course for site staff. (SIBP/SIIP 5.1.A.1 through 5.1.A.3)
10. Develop and implement a strategy to expand operational knowledge and experience across the organization. (SIBP/SIIP 2.4.C.6)
11. Develop and implement plans and training to ensure that Operations management defines, communicates, and reinforces Operations Fundamentals such as high professional standards, control board monitoring, communications, and ownership of equipment problems. (SIBP/SIIP 6.11.1 and 6.11.2)
12. Ensure potentially degraded or non-conforming conditions receive a timely, thorough and appropriately prioritized Operability Determination and provide training for key operations and engineering personnel. (SIBP/SIIP 4.1.F.9 through 4.1.F.27, and 4.1.F.34)



**Effectiveness Reviews / Metrics**

- Operational Focus Indicator
- Operator Work Arounds Indicator
- Operator Burdens Indicator
- Lit Annunciators Indicator
- Control Room Discrepancy Logs Indicator
- Long-term Tag Outs Indicator
- Fire System Component Condition Records Indicator
- Temporary Modifications Indicator
- Unplanned Entries into Limiting Conditions of Operation Indicator
- Site Corrective Maintenance Indicator
- Site Elective Maintenance Indicator
- Site Chemistry Effectiveness Indicator
- Forced Loss Rate Indicator
- Unplanned Power Change (NRC Indicator)
- Unplanned Power Change (PVNGS Site Indicator)
- Operability Determination Quality Indicator
- Engineering Systems Health Report Total Color Progress Indicator
- Site Plant Performance Index (Annualized)
- Quarterly Reviews by a Management Review Challenge Team (SIBP/SIIP 4.1.H.1 thru 4.1.H.8 and 4.1.F.28)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 2**  
**Equipment Reliability**  
 Executive Sponsor: Bob Bement

**Action Plan Strategy**

**Problem Statement**

Critical equipment has not operated properly on demand and has not performed reliably through the operating cycle.

**Primary Causes**

Lack of ownership, accountability, and visibility resulted in the station being ineffective at implementing the Reliability Centered Maintenance (RCM) project within established targets.

The station does not have a site wide long range process to prioritize, budget, and integrate individual system long-term reliability plans for system and component health.

The equipment root cause process does not consistently require consideration of actions to minimize recurrence for ERCFA 1 equipment failure evaluations

1. Revise and implement the plan to complete the Reliability Centered Maintenance (RCM) project. (SIBP/SIIP 1.2.C.11 and 1.2.C.12)
2. Develop and implement a Long Range Planning process which includes major repetitive activities, major modifications, major maintenance activities, appropriate approval processes, and process metrics to measure its health. (SIBP/SIIP 19.1.1.c, 19.1.1.f, 19.1.1.h, and 19.1.14)
3. Revise the Equipment Root Cause of Failure Analysis (ERCFA) program to require that ERCFA level 1 evaluations include consideration and documentation of corrective actions to minimize the likelihood of recurrence including revisions to the PM Program. (SIBP/SIIP 1.2.D.2, 1.2.D.3, and 1.2.D.4)
4. Transition the System Team Steering Committee to a Plant Health Committee and revise the charter to be consistent with industry guidance and to reinforce rigor and ownership in eliminating equipment reliability challenges . (SIBP/SIIP 1.2.F.10, 1.3.A.2, and 1.3.A.3)
5. Develop and implement the Leadership/Management Model and the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)
6. Implement a minor modifications process to better address small equipment challenges. (SIBP/SIIP 1.4.2 and 1.4.6)
7. Establish a site Top 10 process for identifying and prioritizing equipment issues and address specific long-standing issues associated with known equipment deficiencies. (SIBP/SIIP 1.2.A.3, 11.3.1 through 11.3.7, and 11.3.15)



**Effectiveness Reviews / Metrics**

- Operational Focus Indicator
- Operator Work Arounds Indicator
- Operator Burdens Indicator
- Lit Annunciators Indicator
- Control Room Discrepancy Logs Indicator
- Long-term Tag Outs Indicator
- Fire System Component Condition Records Indicator
- Temporary Modifications Indicator
- Unplanned Entries into Limiting Conditions of Operation Indicator
- Site Corrective Maintenance Indicator
- Site Elective Maintenance Indicator
- Site Chemistry Effectiveness Indicator
- Forced Loss Rate Indicator
- Unplanned Power Change (NRC Indicator)
- Unplanned Power Change (PVNGS Site Indicator)
- Engineering Systems Health Report Total Color Progress Indicator
- Engineering Program Health Report Total Color Progress Indicator
- Quarterly reviews by a Management Review Challenge Team. (SIBP/SIIP 1.5.1 thru 1.5.8)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 3**  
**Engineering Technical Rigor**  
 Executive Sponsor: John Hesser

**Action Plan Strategy**

**Problem Statement**

Inconsistencies in some design output documentation, important operability determinations input, and engineering assumptions made during critical evaluations and resolution of key issues created challenges to reliable plant operations and meeting regulatory requirements.

**Primary Causes**

Engineering leadership has not maintained accountability for enforcement of engineering fundamentals and human performance standards.

Training has not been used effectively to improve engineering performance.

Lack of engineering work management (prioritization/due dates) and resource allocation (concurrent duties, responsibilities and loss of expertise) has affected quality of products.

1. Develop and implement the Leadership/Management Model and the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)
2. Develop and train on a Conduct of Engineering procedure. The procedure should include engineering principles and standards. Incorporate a requirement into the engineering Training Program Description (TPD) to train on the Conduct of Engineering procedure in initial training and continuing training. (SIBP/SIIP 11.1.6 and 11.8.30)
3. Implement an Engineering Operations Support team with a charter for Operations interface and support on the Operability Determination process. (SIBP/SIIP 4.1.G.16)
4. Develop and incorporate Operability Determination training into initial and continuing engineering training. (SIBP/SIIP 5.1.E.3 and 5.1.E.4)
5. Establish a process to ensure technical information used for key operations, maintenance and regulatory activities contains appropriate engineering review and approval requirements. (SIBP/SIIP 4.1.F.31, 4.1.F.32, 4.1.F.33, 11.4.15)
6. Develop and provide training for problem solving and decision making techniques. (SIBP/SIIP 11.8.20 and 11.8.21)
7. Establish an Engineering Leader Observation Program that is incorporated within the site observation program as a tool for monitoring and adjusting engineering products, practices and human performance standards and tools. (SIBP/SIIP 11.4.1)
8. Provide training for use of Engineering Department Guide EDG-01 Engineering Human Performance Tools and EDG-02 Engineering Human Performance Tools for Technical Task Risk/Rigor. (SIBP/SIIP 11.4.9)
9. Establish metrics for Engineering Human Performance. (SIBP/SIIP 11.4.10)
10. Implement an Engineering work management and scheduling department and issue for use initial base load work schedules for Design, System, & Maintenance Engineering Department. (SIBP/SIIP 11.9.A.1 and 11.9.A.8)
11. Develop a procedure that describes the purpose, conduct, membership, criteria and requirements for using an Engineering Quality Product Review Board. (SIBP/SIIP 11.4.17)
12. Establish an Engineering Training group and align it within the Engineering Performance Improvement Department to provide focus on the engineering training program. (SIBP/SIIP 11.10.3)
13. Review selected equipment causal analyses and PMs outside their grace period between January 1, 2002 and December 31, 2007 that could potentially affect plant safety to ensure that those determinations were appropriate from a safety perspective. (SIBP/SIIP 3.2.9.a and 3.2.9.b)



**Effectiveness Reviews / Metrics**

- Engineering Work Product Quality Indicator
- Operability Determination Quality Indicator
- Quarterly Reviews by a Management Review Challenge Team (SIBP/SIIP 11.11.1 thru 11.11.8)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 4**  
**Design Control / Configuration Management**  
 Executive Sponsor: John Hesser

**Action Plan Strategy**

**Problem Statement**

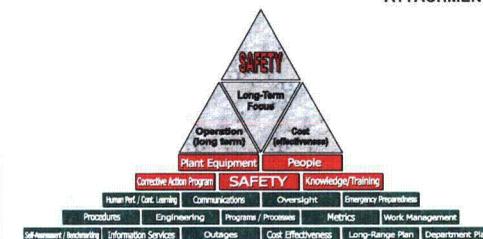
Weaknesses in the Design Control & Configuration Management processes and their implementation have resulted in some errors in design output documents, plant procedures and inappropriate operating conditions. This is demonstrated by latent design issues that challenge operability, plant configuration change weaknesses, long standing temporary mods, and inadequate design products.

**Primary Causes**

Engineering has not taken full ownership and accountability as the design authority.

1. Develop and implement the Leadership/Management Model and the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)
2. Improve configuration change processes, including control of temporary changes and train personnel on the improved processes. (SIBP/SIIP 11.7.1, and 11.7.4 through 11.7.6)
3. Inventory engineering backlogs, complete significance reviews, and develop work-off plans. (SIBP/SIIP 11.9.A.4 through 11.9.A.6 and 11.9.A.18)
4. Communicate and train the concept that Engineering is the "Design Authority" for the site. (SIBP/SIIP 7.1.C.6, 11.7.18, and 11.7.19)
5. Implement the CDBR for high risk/low margin components in accordance with the project schedule. (SIBP/SIIP 11.6.1.a, 11.6.1.b, 11.6.1.c, 11.6.7, and 11.6.13)
6. Inventory, plan, and work off backlogs of temporary changes and degraded conditions. (SIBP/SIIP 4.1.G.1 through 4.1.G.3, 11.3.11, and 11.3.14)

NOTE: For additional actions to address Engineering product quality see SIIP ACTION PLAN 3 – Engineering Technical Rigor



**Effectiveness Reviews / Metrics**

- Quality of the Resolution of Component Design Basis Review (CDBR) Related Actions Indicator
- Component Design Basis Review (CDBR) Project Schedule Adherence Indicator
- Engineering Condition Report Disposition Request/Condition Report Action Item (CRDR/CRAI) Reduction Indicator
- Temporary Modifications Indicator
- Engineering Work Product Quality Indicator
- Quarterly reviews by a Management Review Challenge Team. (SIBP/SIIP 11.13.1 thru 11.13.8)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

## SIIP ACTION PLAN - 5 Engineering Programs

Executive Sponsor: John Hesser

### Action Plan Strategy

#### Problem Statement

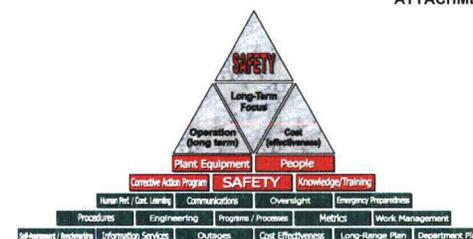
Engineering Programs are not consistently aligned with industry standards and practices or other work processes. Resources are not adequate to meet both emerging daily priorities and address long-term programmatic issues. Learning opportunities have been missed as self assessment, benchmarking, corrective action and operating experience has not been fully utilized to improve Engineering Programs.

#### Primary Causes

Engineering leadership was not focused on Engineering fundamentals and did not place adequate oversight and ownership on Engineering Programs.

Organizational structure and resource allocation were not adequate to ensure long-term success of Engineering Programs.

1. As an interim measure to determine full extent of condition, Engineering is to evaluate what existing programs need to be immediately assessed or assessed near term and complete the assessments. (SIBP/SIIP 1.2.E.21, 1.2.E.22, and 1.2.E.35)
2. Establish owners for each one of the Engineering Programs, issue roles and responsibilities, and ensure they are trained on expectations and standards. (SIBP/SIIP 1.2.E.1, 1.2.E.14, and 11.10.4)
3. Develop and implement the Leadership/Management Model and Leadership Training from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.4.A.8)
4. Create and implement an Engineering work management and scheduling department and issue initial base-load schedule to ensure appropriate allocation of resources. (SIBP/SIIP 11.9.A.1 and 11.9.A.14)
5. Engineering Management will ensure a "rollup" of the Engineering Program Performance Indicators is presented for the first three quarters of 2008 at the quarterly Management Review Meeting. (SIBP/SIIP 1.2.E.7)
6. Revise the engineering program health reporting procedure (73DP-0AP05) to address self-assessment expectations, revise metrics using industry input, establish MRM program health indicator rollup presentations, require that program documents are maintained current, and to use change management when modifying engineering programs. (SIBP/SIIP 1.2.E.8, 1.2.E.13, and 1.2.E.16)
7. Realign engineering to consolidate system engineer responsibilities for the Maintenance Rule Program and establish a section leader responsible for management oversight of the program. Complete a self-assessment of the Maintenance Rule Program using external expertise. (SIBP/SIIP 1.2.E.24 and 1.2.E.27)
8. Complete corrective actions from the evaluation of the U3R13 transient combustible material procedure violations. Complete benchmarking of transient combustible material processes and organizational structures for Fire Protection program implementation. (SIBP/SIIP 1.2.E.29, 1.2.E.30, and 1.2.E.32)
9. Enter actions from the 2007 Equipment Qualification Program Self-Assessment into the corrective action program and benchmark the Equipment Qualification Program using the INPO Engineering Program Guide (EPG-02). (SIBP/SIIP 1.2.E.28 and 1.2.E.31)
10. Based on industry best practices, identify if there are other engineering processes that should be managed as an Engineering Program. (SIBP/SIIP 1.2.E.15)



#### Effectiveness Reviews / Metrics

- Engineering Program Health Report Total Color Progress Indicator
- Forced Loss Rate Indicator
- Unplanned Entries into Limiting Conditions of Operations Indicator
- Chemistry Effectiveness Indicator
- Unplanned Power Change (NRC Indicator)
- Unplanned Power Change (PVNGS Site Indicator)
- Quarterly reviews by a Management Review Challenge Team. (SIBP/SIIP 11.12.1 thru 11.12.8)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 6**  
**Performance Improvement Part 1 - CAP**  
 Executive Sponsor: Dwight Mims

**Action Plan Strategy**

**Problem Statement**

PVNGS continues to demonstrate weaknesses in the effective implementation of the station Corrective Action Program (CAP). CRDR quality is at an unacceptably low level.

**Primary Causes**

The primary cause is inadequate personnel and organizational accountability. In addition contributing causes included: insufficient change management, weak CAP procedures, ineffective CAP program oversight, ineffective communication of standards and expectations, ineffective performance indicators, and inadequate training and qualifications.

1. Develop and communicate Corrective Action Program (CAP) fundamentals for station personnel and for managers and supervisors. (SIBP/SIIP 3.3.3.j)
2. Increase visibility of CAP indicators and reinforce CAP behaviors through management alignment and review meetings. (SIBP/SIIP 3.2.7.i through 3.2.7.p)
3. Develop a process to conduct crosscutting reviews during Management Review Meetings (MRM). (SIBP/SIIP 8.4.4)
4. Incorporate performance objectives for CAP timeliness and quality into the Performance Management Plans (PMPs) for each position. (SIBP/SIIP 3.5.3.f)
5. Develop and implement the Leadership/Management Model and the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)
6. Improve quality and consistency of root and apparent cause evaluations. (SIBP/SIIP 3.2.5, 3.3.2, and 3.3.3.b)
7. Establish a process to provide training to Performance Advocates on their responsibility for quality program implementation. (SIBP/SIIP 3.3.3.d)
8. Develop and implement qualification requirements for ARRC and CARB members. (SIBP/SIIP 3.3.3.b and 3.3.3.c)
9. Complete a job qualification and training for root cause investigators and investigation directors. (SIBP/SIIP 3.3.1.b, 3.3.1.c, and 3.3.2.c)
10. Implement process changes to include reinstatement of the adverse evaluation, improvement of CAP governing procedures, and improvement of trending processes. (SIBP/SIIP 3.4.7.a through 3.4.7.k, 3.4.2.b, 3.4.9.d, and 3.4.10.a through 3.4.10.j)
11. Institutionalize the use of a formal Change Management Process. (SIBP/SIIP 6.10.1)



**Effectiveness Reviews / Metrics**

- Condition Report Disposition Request (CRDR) Inventory Indicator
- Corrective Action Program (CAP) Quality Index
- Condition Report Disposition Request (CRDR) Evaluation Age Indicator
- Average Age of Open Corrective Actions to Prevent Recurrence Indicator
- Quarterly reviews by a Management Review Challenge Team. (SIBP/SIIP 3.5.5 thru 3.5.12)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 6**  
**Performance Improvement Part 2 – OE & SA/BM**  
 Executive Sponsor: Dwight Mims

**Action Plan Strategy**

**Problem Statement**

Operating Experience (OE) - Lessons learned from important industry and internal operating experience have not been put into practice.

In addition, the Self Assessment and Benchmarking Program (SA/BM) is ineffective in identifying and resolving performance gaps

**Primary Causes**

The station has not embraced Operating Experience as a learning tool and lessons learned. The degree of management oversight and engagement was not adequate. Periodic verification and validation of operating experience evaluation results has not been performed. The process for periodic effectiveness reviews has not been adequate. Key attributes and behaviors, integral to a successful operating experience program, were not evident in the current program or implementation.

The value of the Self Assessment process has not been firmly anchored and management has not provided adequate program oversight and ownership. Self-assessments were not consistently intrusive. Benchmarking was infrequent, lacked a disciplined approach to planning, and was not constructively used for station-wide improvement. Station management has not demonstrated adequate leadership to ensure the PVNGS program aligns with station standards, industry standards, and was effectively supported and implemented. Program oversight and ownership was not well established.

033108 Arizona Public Service

1. Revise 65DP-0QQ01, Industry Operating Experience Review, to include conduct of operating experience elements from INPO 05-05 and 97-011, including in the procedure, roles, responsibilities, and ownership expectations. (SIBP/SIIP 6.7.1)
2. Develop and implement an operating experience screening committee, include criteria, charter, roles/responsibilities for cross-disciplinary review of in-coming (external) operating experience. (SIBP/SIIP 6.7.16)
3. Evaluate the SOER select listing from INPO and re-evaluate the analysis and corrective actions taken by the station. (SIBP/SIIP 6.7.17, 6.7.29 and 6.7.30)
4. Develop a process to add OE to work packages. (SIBP/SIIP 6.7.11)
5. Implement more usable OE search engine(s). (SIBP/SIIP 6.7.12)
6. Develop and implement controls to ensure corrective actions implemented into procedures, processes, and training to address high-tier OE are not inadvertently deleted. (SIBP/SIIP 6.7.6)
7. Evaluate and implement a robust self assessment and benchmarking process program aligned with industry best practices. (SIBP/SIIP 15.1.2, 15.1.7, 15.1.10, and 15.2.1)
8. Conduct station quality review boards for reviewing and approving self assessment and benchmarking reports. (SIBP/SIIP 15.1.9)
9. Implement self assessment team leader and sponsor training prior to conduct of cross-functional, mid-cycle, or comprehensive assessments. (SIBP/SIIP 15.1.6)
10. Implement a process to schedule overall station self assessments by department. (SIBP/SIIP 15.1.16)



**Effectiveness Reviews / Metrics**

- Timeliness of Operating Experience Screening Indicator
- Quarterly reviews of Operating Experience by a Management Review Challenge Team. (SIBP/SIIP 6.7.20 thru 6.7.27)
- Quarterly reviews of SA/BM by a Management Review Challenge Team. (SIBP/SIIP 15.1.17 thru 15.1.24)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

Palo Verde Nuclear Generating Station

## SIIP ACTION PLAN - 7

### Managing Plant Workload

Executive Sponsor: Bob Bement

#### Action Plan Strategy

#### Problem Statement

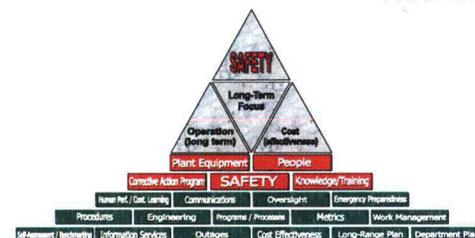
Effective work management is an organizational process whereby individuals clearly understand and follow roles in order to ensure work is planned and scheduled in accordance with established plans, schedules and procedures to ensure the right work is performed on the right equipment at the right time in order to improve plant safety, reliability and performance. Contrary to this, the processes and procedures for Work Management and Outage Management have not been effectively implemented at PVNGS in order to improve and maintain station equipment reliability.

#### Primary Causes

Site organizations have isolated themselves from the industry and themselves, resulting in a lack of alignment on the Work Management process. Department Managers have different perspectives on how Work Management should be supported or improved.

Site personnel across the organization and up the management chain do not value the work management process due to little understanding about how the Work Management process is supposed to work.

1. Revise procedure 51DP-90M03, Site Scheduling, to incorporate industry best practices based upon industry benchmarking and INPO AP-928 including roles and responsibilities and conduct of meeting expectations. (SIBP/SIIP 14.4.16)
2. Revise procedure 51DP-90M09, Outage Planning and Execution, to incorporate industry best practices based upon industry benchmarking and INPO 06-008 including roles and responsibilities and conduct of meeting expectations. (SIBP/SIIP 17.3.17)
3. Develop a plan to implement INPO style High Performance Team Building Training in the Work Management Area. (SIBP/SIIP 14.4.10)
4. Develop a charter and standard agenda for each T- minus scheduling meeting. (SIBP/SIIP 14.4.13)
5. Conduct Engineering work management and periodic alignment meetings with Operations, Maintenance, Work Management & Engineering. (SIBP/SIIP 11.9.A.9 and 11.9.A.10)
6. Improve Maintenance and Operations support of schedule development including appropriate metrics to monitor performance. (SIBP/SIIP 14.1.8, 14.5.2, and 14.5.3)
7. Complete an assessment of the current tools and processes for online and outage risk management against industry best practices to identify improvement opportunities. (SIBP/SIIP 14.1.15)
8. Identify PVNGS work tracking system backlogs. Screen and perform significance reviews of items contained in the work tracking systems. (SIBP/SIIP 14.2.21, 14.2.22, and 14.2.23)



#### Effectiveness Reviews / Metrics

- Operational Focus Indicator
- Online Schedule Adherence Indicator
- Online Scope Stability T-5 thru T-1 Indicator
- Site Corrective Maintenance Indicator
- Site Elective Maintenance Indicator
- Total/Adverse Procedure Change Inventory Indicator
- Engineering Condition Report Disposition Request/Condition Report Action Item (CRDR/CRAI) Reduction Indicator
- Condition Report Disposition Request (CRDR) Inventory Indicator
- Quarterly reviews by a Management Review Challenge Team. (SIBP/SIIP 14.2.11 thru 14.2.18)
- Assess Readiness for 2R14 and 1R14. (SIBP/SIIP 17.3.18)
- 2008 Mid-cycle Assessment. (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 8**  
**Emergency Preparedness**  
 Executive Sponsor: Dwight Mims

**Action Plan Strategy**

**Problem Statement**

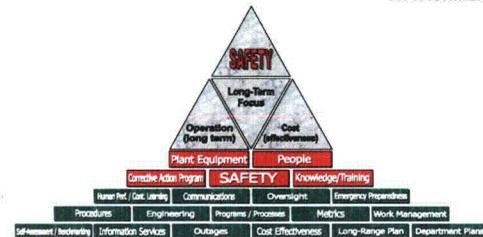
Weaknesses in the Emergency Preparedness (EP) Program ownership and program implementation exist. Numerous deficiencies have been identified showing an adverse trend in the timely and accurate emergency plan notifications, classifications, and Protective Action Recommendations

**Primary Causes**

With respect to Emergency Preparedness, leaders have not established, communicated, and reinforced high expectations for performance and held individuals accountable to those standards. Shortfalls in meeting expectations are sometimes not evaluated, understood and promptly addressed.

Emergency Preparedness Drill/Exercise Performance is in the 4th Quartile due to training designed to meet requirements vice operational excellence.

1. Revise policy guidance on Emergency Planning to incorporate revised roles and responsibilities. (SIBP/SIIP 9.1.A.1 and 9.1.A.5)
2. Develop and implement the Leadership/Management Model and the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)
3. Emergency Planning to institute alignment meetings between Emergency Response Organization's Emergency Coordinators (EC) and Emergency Operations Directors (EOD). (SIBP/SIIP 9.1.A.22)
4. Enhance the training program and conduct training for EC's and EOD's on EAL's. (SIBP/SIIP 9.2.A.15, 9.2.A.16, and 9.2.A.22)
5. Create an EP Training Review Group as well as the appropriate number of Training Advisory Committees and control EP training similar to accredited training programs. (SIBP/SIIP 9.2.A.23, 9.2.A.31 and 9.1.A.33)
6. Develop and implement a strategy (posters, lanyard cards, etc) to communicate Emergency Planning Program elements to the line organization. (SIBP/SIIP 9.1.A.6 and 9.1.A.21)
7. Revise EOD Performance Management Plans to include an expectation that they are responsible for their team's performance commencing 2008. (SIBP/SIIP 9.1.A.4)
8. Develop and implement a multi-discipline E-Plan Steering Committee that will provide oversight of the Emergency Preparedness program. (SIBP/SIIP 9.1.A.24)
9. Revise 21SP-0SK11 to address implementation of EALs 7-1, 7-2, and 7-3 and provide applicable training. (SIBP/SIIP 9.5.5 and 9.5.6)
10. Implement Emergency Response Organization weekly turnover meetings. (SIBP/SIIP 9.1.A.11 and 9.1.B.9)
11. Develop a plan for implementation of NEI 99-01 Rev.5 for EAL upgrade and present to Senior Management. (SIBP/SIIP 9.5.1 and 9.5.2)



**Effectiveness Reviews / Metrics**

- Emergency Response Organization (ERO) Drill/Exercise Performance (NRC Indicator)
- Emergency Response Organization (ERO) Drill/Exercise Performance (PVNGS Site Indicator)
- Emergency Drill Participation (NRC Indicator)
- Alert and Notification System (NRC Indicator)
- Quarterly Reviews by Management Challenge Review Team (SIBP/SIIP 9.6.1 thru 9.6.8)

**SIIP ACTION PLAN - 9**  
**Programs / Procedures / Work Instructions**  
 Executive Sponsor: Dwight Mims

**Action Plan Strategy**

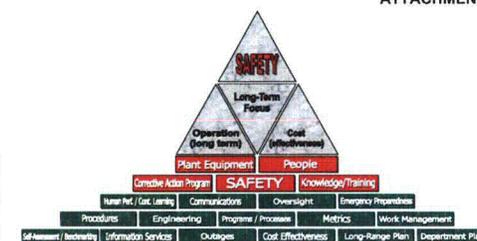
**Problem Statement**

Palo Verde Nuclear Station, procedure, and policy guidance deficiencies have continued to result in ineffective program implementation and have contributed to procedure adherence problems. Previous attempts to resolve issues associated with programs, procedures and processes have not been successful in elimination of the overall issue.

**Primary Causes**

Inadequate procedure program / process controls have contributed to procedure quality issues.

1. Develop and implement the Leadership/Management Model and the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)
2. Establish an administrative review committee for management of program, procedure and process priorities. (SIBP/SIIP 12.2.2)
3. Establish a Site Work Management System (SWMS) users board for review and prioritization of software change requests. (SIBP/SIIP 16.2.A.1)
4. Re-establish a procedures administrative control program and develop upper tier documents for implementation of vital processes and controls for procedural hierarchy. (SIBP/SIIP 12.2.8)
5. Identify major programs and processes vital to ensuring performance at PVNGS is maintained. (SIBP/SIIP 12.2.7)
6. Revise procedure 01DP-0AP01, Procedure Process, to improve usability. (SIBP/SIIP 10.2.7)
7. Complete Process mapping for development of a PV process inventory infrastructure. (SIBP/SIIP 12.3.2 and 12.3.3)
8. Develop CAP and Work Management process simplification improvement plans. (SIBP/SIIP 12.4.4, 12.4.5 and 12.4.6)
9. Reduce the number of procedure writer's guides to enhance procedure consistency. (SIBP/SIIP 10.2.8)
10. Identify and develop SWMS usability improvements. (SIBP/SIIP 16.2.A.4.b and 16.2.A.4.c)
11. Establish an organizational structure to focus on control and improvement of site processes with particular focus on CAP and Work Management. (SIBP/SIIP 4.4.20)



**Effectiveness Reviews / Metrics**

- Total/Adverse Procedure Change Inventory Indicator
- Quarterly Reviews by Management Challenge Review Team (SIBP/SIIP 12.3.10 thru 12.3.17)
- Conduct an effectiveness review of the Administrative Review Committee (SIBP/SIIP 12.2.3)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

## SIIP ACTION PLAN - 10

### Organizational Effectiveness

Executive Sponsor: Bob Bement

#### Action Plan Strategy

#### Current State

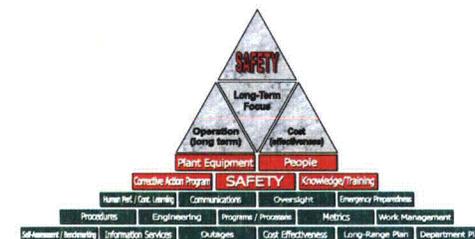
Site efforts to internalize nuclear fundamentals have not been effective and have not improved station performance. Shortcomings in nuclear fundamentals continue to exist, are tolerated by the Palo Verde organization, and sometimes challenge long term safe and reliable operation.

#### Primary Causes

Leaders have not established, communicated, and reinforced high standards and expectations for performance and held individuals accountable to those standards. Shortfalls in meeting expectations are sometimes not evaluated, understood and promptly addressed.

Responsibility, accountability, and authority for nuclear safety are not well defined, clearly understood, and effectively implemented. Some leaders are not leading advocates of nuclear safety and do not demonstrate their commitment both in word and deed. Individual behaviors that demonstrate nuclear safety principles are not consistently applied to daily activities.

1. Develop and implement a Management Review Meeting (MRM) process for Performance Indicators (PI) to include cross cutting reviews, deep dives, and an accountability process for improving performance. (SIBP/SIIP 8.4.1, 8.4.4, 8.4.5, 8.4.6, and 8.4.15)
2. Create a site-wide awareness/focus on the plant and corresponding safety aspects by setting the expectation to open initial daily meetings with discussions on plant status and correlating safety aspects. (SIBP/SIIP 4.4.11)
3. Develop and implement a site-wide leadership/management model to establish standards of performance to be used as a basis for improving individual behaviors and station performance. (SIBP/SIIP 2.1.D.5)
4. Develop and implement a site-wide accountability model. (SIBP/SIIP 2.1.D.6)
5. Develop and implement a site-wide communication and meeting strategy to address site alignment, operational focus, and site-wide penetration of messages. (SIBP/SIIP 7.1.B.1 and 7.1.B.5)
6. Develop and implement leadership training to address key nuclear fundamentals and improve overall leadership training. (SIBP/SIIP 2.2.E.1.b and 2.4.A.8)
7. Develop and implement leader evaluations and a management succession plan to assure qualified and competent leadership for the long term. (SIBP/SIIP 2.3.C.1.a and 2.4.B.4)
8. Improve the quality and assure the effectiveness of the employee Performance Management Process. (SIBP/SIIP 2.3.A.3, 2.3.A.4, 2.3.A.8 and 2.3.A.9)
9. Implement a Safety Culture Team and a Recovery Team (Implementation and Monitoring Team) to assure continued focus on improving PVNGS performance. (SIBP/SIIP 4.4.10 and 8.10.1)
10. Institutionalize the use of a formal Change Management Process. (SIBP/SIIP 6.10.1)



#### Effectiveness Reviews / Metrics

- Operational Focus Indicator
- Site Plant Performance Index (Annualized)
- Site Clock Reset Indicator
- Consequential Human Error Rate Indicator
- Site Chemistry Effectiveness Indicator
- Forced Loss Rate Indicator
- Engineering Systems Health Report Total Color Progress Indicator
- Engineering Program Health Report Total Color Progress Indicator
- Condition Report Disposition Request (CRDR) Inventory Indicator
- Corrective Action Program (CAP) Quality Index
- APS/PVNGS Industrial Safety Accident Rate (ISAR) Indicator
- Non-Utility Industrial Safety Accident Rate (ISAR) Indicator
- Quarterly reviews by a Management Review Challenge Team. (SIBP/SIIP 2.6.1 thru 2.6.8)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)
- 2008 Safety Culture Assessment (SIBP/SIIP 4.4.8.b)

**SIIP ACTION PLAN - 11**  
**Human Performance / Industrial Safety – Part 1 HU**  
 Executive Sponsor: Dwight Mims / Bob Bement

**Action Plan Strategy**

**Problem Statement**

Human Performance (HU) - Palo Verde has experienced an increase in human performance errors over the last four years. Corrective actions have not addressed effectively the cross-cutting issues involving failing to implement standards and fundamentals, reinforcing behaviors, use of error-prevention tools, and changing behaviors. These problems were identified across several cornerstones and involved multiple groups within the PV organization.

**Primary Causes**

Human Performance - The Palo Verde organization does not demonstrate ownership and leadership of the human performance culture.

In addition, a common cause analysis concluded that the leading causes of the department clock reset issues were worker behaviors, organizational factors, and job site conditions.

1. Revise and implement standards and expectations, including HU fundamentals. (SIBP/SIIP 6.1.1 thru 6.1.3, 6.1.6, and 6.1.11)
2. Implement Observation Program, analyze data quarterly to determine areas for improvement, and identify corrective actions. (SIBP/SIIP 6.2.1.a, 6.5.2.a through 6.5.2.k)
3. Establish the advocate's role in trending process and provide them training on how to analyze potential adverse trends. (SIBP/SIIP 6.3.2)
4. Develop/implement graded approach for HU tools for leaders and include in the Standards and Expectations Preventing Events Handbook. (SIBP/SIIP 6.1.4.a)
5. Complete human performance tools training utilizing HU simulators and dynamic learning tools. (SIBP/SIIP 6.4.1)
6. Develop and implement training for coach-the-coach, including situations awareness, observations, and how to provide feedback skills. (SIBP/SIIP 6.2.4.b and 6.4.4.b)
7. Develop and implement the Accountability Model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.6)
8. Develop Integrated Issues Identification Team (IIIT) to be used in conjunction with coach-the-coach program. IIIT should include cross-functional members, a charter, observation training, field time (physical walk downs), identification of issues. (SIBP/SIIP 6.2.10)
9. Inventory existing mock-up's and develop a strategy to use mock-ups for human performance training focused on behaviors in the field. (SIBP/SIIP 6.2.11)



**Effectiveness Reviews / Metrics**

- Site Clock Reset Indicator
- Consequential Human Error Rate Indicator
- Quarterly reviews by Management Challenge Review Team (SIBP/SIIP 6.9.5 thru 6.9.12)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)
- Integrated Human Performance Self Assessment (SIBP/SIIP 6.9.1)

**SIIP ACTION PLAN - 11**  
**Human Performance / Industrial Safety – Part 2 IS**  
 Executive Sponsor: Dwight Mims / Bob Bement

**Action Plan Strategy**

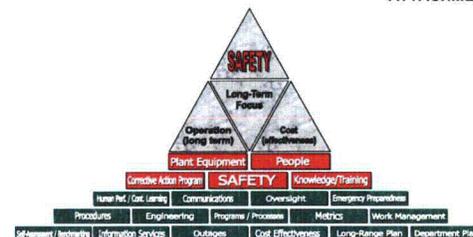
**Problem Statement**

Industrial Safety (IS) - The station has exhibited poor implementation practices and weakness in correcting deficient conditions in the area of Industrial Safety that resulted in unacceptable Industrial Safety performance

**Primary Causes**

Industrial Safety has not been a high priority for all Station personnel due to lack of organizational alignment and accountability.

1. Evaluate and determine the staffing, structure, roles, responsibilities and qualifications of the Palo Verde Safety Department, including establishment of rotational safety department personnel positions. (SIBP/SIIP 4.2.3)
2. Develop and implement an Industrial Safety observation program consisting of a core group of individuals for the purpose of providing a catalyst for Industrial Safety culture change. (SIBP/SIIP 4.2.20)
3. Develop and provide formal behavioral based safety observation techniques training for the PV Leadership Team (SIBP/SIIP 4.2.21)
4. Develop and put into practice a reporting mechanism that is capable of capturing the various industrial safety-related items in SWMS and establish performance indicator(s). (SIBP/SIIP 4.2.22)
5. Develop and implement a Palo Verde accountability and leadership/management model from the Organizational Effectiveness Root Cause. (SIBP/SIIP 2.1.D.5 and 2.1.D.6)



**Effectiveness Reviews / Metrics**

- APS/PVNGS Industrial Safety Accident Rate (ISAR) Indicator
- Non-Utility Industrial Safety Accident Rate (ISAR) Indicator
- Industrial Safety Work Orders and Average Age Indicator
- Quarterly reviews by Management Challenge Review Team (SIBP/SIIP 4.5.1 thru 4.5.8)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

## SIIP ACTION PLAN - 12 Safety Culture

Executive Sponsor: Dwight Mims

### Action Plan Strategy

#### Problem Statement

Results of independent safety culture surveys, interviews and assessment determined that Palo Verde has several areas for improvement regarding safety culture. Performance in this area has declined since a similar survey effort and action plan was implemented in 2005.

#### Primary Causes

Drivers resulting from Safety Culture streaming analysis include:

- Individual Accountability and Ownership
- Clarity and Communication of Overall Priorities and Strategy
- Quality of Leadership and Management
- Receptivity to Employee Input
- Change Management
- Site Programs and Processes

1. Develop and implement the Leadership/Management Model and the Accountability Model to reinforce site standards and expectations. (SIBP/SIIP 2.1.D.5, 2.1.D.6, and 4.4.14)
2. Develop and implement a Management Review Meeting (MRM) process for Performance Indicators (PI) to include cross cutting reviews, deep dives, and an accountability process for improving performance. (SIBP/SIIP 8.4.1 and 8.4.4)
3. Create a site-wide awareness of safety culture by setting the expectation to open initial daily meetings with discussions on plant status and corresponding nuclear, radiological, industrial, and cultural safety aspects. (SIBP/SIIP 4.4.11)
4. Establish a Safety Culture Team to better focus the site on safety culture and implement a more formal process for periodic evaluation of PVNGS Safety Culture and SCWE. (SIIP 4.4.16 and 4.4.10)
5. Develop and implement a site-wide communication and meeting strategy to address site alignment, operational focus, site-wide penetration of messages and to communicate Corrective Action Program (CAP) and Work Management (WM) improvements. (SIBP/SIIP 7.1.B.1, 7.1.B.5, and 7.1.C.7)
6. Educate employees on behaviors which support a strong Safety Culture via small group meetings. (SIBP/SIIP 4.4.4)
7. Develop and implement leadership training on nuclear fundamentals, including: Nuclear Safety, Safety Culture, SCWE, Operations Focus, and CAP. Establish and implement competencies (including Nuclear Safety, Safety Culture, and SCWE behaviors) for key positions and implement a formal Management Succession Plan. (SIBP/SIIP 2.3.C.1.a, 2.4.A.8, 2.4.B.4, and 4.4.17)
8. Implement specific action plans, including targeted staffing strategies, for each Safety Culture priority group and follow up with other site groups to assure they address safety culture weaknesses in their areas. (SIBP/SIIP 2.2.B.1 through 2.2.B.5, 2.2.B.8, 4.4.35, 4.4.36, and 20.2 through 20.14)
9. Establish a formal process for use of a change management tool and communicate to site personnel the requirements for use of the tool. (SIBP/SIIP 4.4.18, 6.10.1, and 6.10.5)
10. Perform evaluation of weaknesses and complexity in site processes, procedures, programs, and work instructions, and establish an organizational structure to focus on control and improvement of site processes with particular focus on CAP and Work Management. (SIBP/SIIP 4.4.19, 4.4.20, and 4.4.32)



#### Effectiveness Reviews / Metrics

- Operational Focus Index
- Corrective Action Program (CAP) Quality Index
- Condition Report Disposition Request (CRDR) Evaluation Age Indicator
- Operability Determination Quality Indicator
- Online Schedule Adherence Indicator
- Interim effectiveness reviews of Priority Groups
- 2008 Safety Culture Assessment (SIBP/SIIP 4.4.8.b)

## SIIP ACTION PLAN - 13

### Training and Qualification

Executive Sponsor: Bob Bement

#### Action Plan Strategy

#### Problem Statement

The line and training organizations have not sufficiently engaged each other to improve the station's performance and fundamental knowledge deficiencies. Additionally, a learning organizational culture has not been embraced.

#### Primary Causes

Training was not recognized or valued as a key strategic tool for performance improvement.

Training management did not have the organizational presence to effectively reinforce station training culture.

The tools and guidance for gathering and analyzing plant performance data were insufficient to determine performance gaps and identify appropriate training solutions.

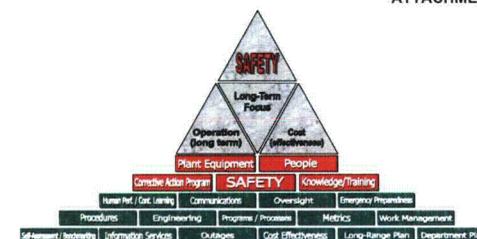
Station management did not value self assessments as a tool to improve performance.

Nuclear Training staff lacked knowledge and/or skill to develop specific training intervention problem statements and metrics.

The site wide policy for performing self assessment is not an effective tool for identifying the site strategy or requirement for self assessments including comprehensive self assessments.

NOTE: These actions are to address the training program issues. Specific knowledge deficiencies are addressed in their respective SIIP Action Plans.

1. Train line managers associated with accredited programs on the importance and value of using training as a strategic tool for improving performance. (SIBP/SIIP 5.3.A.6)
2. Senior management established knowledge and training as one of five permanent building blocks within the site integrated improvement plan. (SIBP/SIIP 7.1.B.10)
3. Establish guidance for and training on analysis of performance data such as field observations, corrective actions, human performance clock resets and line performance indicators for possible training solutions. (SIBP/SIIP 5.3.A.7 and 5.3.A.8)
4. Provide Nuclear Training Department instructors and leaders continuing training on methods to determine and develop specific metrics and problem statements. (SIBP/SIIP 5.3.C.7)
5. Enhance the existing guidelines on self assessment to establish a more comprehensive template for conducting accredited training program self assessments. (SIBP/SIIP 5.3.D.2 and 5.3.D.6)
6. Operations to establish individual Shift Manager biennial professional development plans for each shift manager using the ACAD 97-004 as a guide. (SIBP/SIIP 5.3.A.14)
7. Implement orientation to key training oversight committee members on their roles and responsibilities. (SIBP/SIIP 5.3.C.10)



#### Effectiveness Reviews / Metrics

- Emergency Response Organization (ERO) Drill/Exercise Performance (NRC Indicator)
- Emergency Response Organization (ERO) Drill/Exercise Performance (PVNGS Site Indicator)
- Corrective Action Program (CAP) Quality Index
- Site Clock Reset Indicator
- Consequential Human Error Rate Indicator
- Quarterly Reviews by a Management Review Challenge Team (SIBP/SIIP 5.3.D.7 thru 5.3.D.14)
- 2008 Mid-cycle Assessment (SIBP/SIIP 2.6.9)

**SIIP ACTION PLAN - 14**  
**EDG K-1 RELAY EVENT**  
 Executive Sponsor: John Hesser

**Action Plan Strategy**

**Problem Statement**

Unit 3 emergency diesel generator (DG) "A" K1 contactor latched closed during the September 4, 2006 shutdown, however, the normally open direct current (DC) coil switch contact did not close as expected. This caused DG A to be incapable of performing its design function. The condition was not identified until September 22, 2006; therefore, DG 3A had been out of service for 18 days. This contactor had only been in service since July 26, 2006, having replaced a contactor that had failed with the same symptoms.

- 05000530/2006-12-01: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to establish appropriate instructions for performing corrective maintenance activities on an emergency diesel generator K-1 relay.
- 05000530/2006-12-02: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Actions," for the failure to identify and correct the cause of erratic emergency diesel generator K-1 relay operation prior to installation of the relay on July 26, 2006

**Primary Causes**

(Failure Mechanism): Insufficient contact compression introduced by stack-up of tolerances and a bent metal actuator arm permitted inconsistent electrical operation of the DC coil switch, normally open contact of the K1 contactor.

The K1 contactor was treated as a single reliable replaceable component; therefore, subcomponents of the K1 contactor mechanics were not fully understood. This lack of understanding, produced ineffective preventive maintenance (PM) tasks for the emergency diesel generator field flash and de-excitation circuit.

Inadequate management expectation for use of a systematic problem solving methodology: (1) no clear site-wide expectation of a common process to be used when equipment fails; (2) the requirement to consider all possible failure modes and document refuting evidence is not sufficiently clear in ERCFA procedure 70DP-0EE01; (3) troubleshooting game plans do not require multiple failure mode strategy and they tend to direct the action toward pre-determined probable causes; and (4) the correct failure modes were not identified in recent equipment problem solving efforts, such as the K1 relay.

1. Straightened metal actuator arm in the Unit 3 Diesel Generator (DG) (A) K1 relay to restore sufficient contact compression. Inspected and straightened 5 other DG's K-1 relay actuator arms as necessary. (SIBP/SIIP 3.6.49)
2. Updated vendor tech manual and Model Work Scope Library (WSL) revised to ensure proper contactor set-up and DC coil switch cleaning instructions are provided. (SIBP/SIIP 3.6.5, 3.6.47 and 3.6.48)
3. Reviewed Preventive Maintenance (PM) templates for the Diesel Generator (DG) System to ensure that identified single point vulnerabilities are effectively managed. (SIBP/SIIP 3.6.57)
4. Reviewed similar relays in other safety related systems for extent of cause. (SIBP/SIIP 3.6.59 through 3.6.65)
5. Implement 01DP-9ZZ01, Systematic Troubleshooting, as the Palo Verde troubleshooting and problem solving process and provide training to selected Operations, Maintenance, and Engineering personnel. (SIBP/SIIP 3.6.55, 3.6.72 and 11.8.21)
6. Develop and provide training to ERCFA qualified personnel on failure modes considerations, use of OE, and accountability to assure quality investigations. (SIBP/SIIP 3.6.7)
7. Replace the K1 relays in the EDG control cabinets XJDGA(B)B02 for all six onsite Class 1E EDGs. Implement mod in all three units. (SIBP/SIIP 3.6.11)



**Effectiveness Reviews / Metrics**

- Effectiveness Review of Corrective Actions to Prevent Recurrence (CAPRs) (SIBP/SIIP 3.6.79)

**SIIP Action Plan - 15**  
**RAS Event**  
**Executive Sponsor: John Hesser**

**Action Plan Strategy**

**Problem Statement**

A lack of some specific provisions in the design and licensing bases, ineffective questioning attitude and technical rigor in reviewing design documents and inadequate communications of design and licensing information to the appropriate groups resulted in a failure to fill and maintain full ECCS suction lines from the Recirculation Actuation Sump.

**Primary Causes**

Lack of Specific Provisions in the Design and Licensing Basis. The design and licensing basis documents did not contain explicit statements requiring the ECCS suction lines to be filled. The reasons for not explicitly stating these requirements was not positively ascertained.

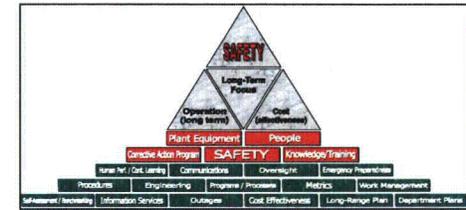
Ineffective Questioning Attitude and Technical Rigor of individuals. Some PVNGS personnel had a narrow focus and an incorrect mindset (i.e., incorrect belief in self-venting theory) in reviewing information provided in various design documents that indicated the need to keep the ECCS suction line filled. There was a general ineffective use of a QV&V process.

Inadequate Communication of Design Information. The need to keep the ECCS suction lines filled was identified but not appropriately communicated. Follow-through for ensuring start-up procedures contained provisions for filling and venting the system was inadequate.

This SIIP Action Plan contains actions, metrics, and effectiveness reviews to address each of the 10 Focus Areas associated with the RAS event, including Focus Area Plans for:

- Focus Area 1 - Procedures Did Not Contain Necessary Requirements
- Focus Area 2 - Lack of Specific Provisions in the Licensing and Design Basis
- Focus Area 3 - Part 1 - Lack of Questioning Attitude and Technical Rigor of Individuals  
 - Part 2 - Lack of Questioning Attitude and Technical Rigor of Individuals - Operability Determinations
- Focus Area 4 - Inadequate Communication of Design Information
- Focus Area 5 - Inadequate Problem Identification and Resolution
- Focus Area 6 - Limited or Weak Operating Experience Program
- Focus Area 7 - Limited Experience and Training
- Focus Area 8 - Limited Resources
- Focus Area 9 - Limited Nuclear Assurance Department Oversight
- Focus Area 10 - Limited Procedural Guidance (DBM Writer's Guide)

These Focus Area Plans are presented on the following pages.



**Effectiveness Reviews/Metrics**

► Measures and metrics for monitoring performance improvement in each Focus Area are identified in each Focus Area Plan.

**SIIP Action Plan 15 - RAS Focus Area 1  
Procedures Did Not Contain Necessary Requirements**

**Problem Statement**

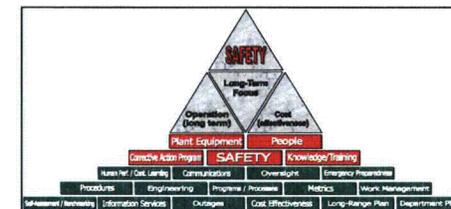
The design intent that the suction line be filled with water was not translated into start-up procedures, surveillance procedures, and operating procedures. [As a consequence, the suction line was not kept full of water]

**Action Plan Strategy**

1. Revised procedure "Recovery from Shutdown Cooling to Normal Operating Lineup," 40OP-9SI02, to fill the RAS penetrations with borated water by keeping the sump full. (Completed during the investigation)
2. Modifications have been completed to assure that vent and drain placement supports keeping the line filled. (SIBP/SIIP 3.7.3.p and 3.7.3.d)
3. Developed test instruction "Containment Recirculation Sump Isolation Valve Leak Testing," 73TI-9ZZ21, to leak-test the inboard RAS penetration CIV using air prior to filling with borated water. Incorporated requirement to perform this leak test into procedure "Recovery from Shutdown Cooling to Normal Operating Lineup," 40OP-9SI02. (SIBP/SIIP 3.7.2.e)
4. Revised surveillance test procedure "RAS Line Fill Check," 40ST-9SI04 to verify the RAS penetrations are full of water on a monthly basis once the vent and drain modifications are completed. (SIBP/SIIP 3.7.2.b and 3.7.2.c)
5. Revised surveillance test procedure 40ST-9SI04 to include time criteria for evaluating the amount of air escaping the vent valve and reordering the venting steps to eliminate one possible path for drawing air into the piping on the vent. (SIBP/SIIP 3.7.2.g)
6. Complete Engineering Study 13-MS-A102 to determine venting duration and tolerable void size criteria for surveillance test procedure 40ST-9SI04 that will ensure no adverse impact to pump operation. (SIBP/SIIP 3.7.2.j)
7. Revise surveillance test procedure 40ST-9SI04 to align the procedure acceptance criteria and contingency actions with the results of Engineering Study 13-MS-A102. Also revise the procedure for estimating void size. (SIBP/SIIP 3.7.2.k)

**Primary Causes**

Direct Cause 1 - The design intent that the suction line be filled with water was not translated into start-up procedures, surveillance procedures, and operating procedures.



**Effectiveness Reviews/Metrics**

- ▶ Perform a Focus Area Owner review of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.2.a)

## SIIP Action Plan 15 - RAS Focus Area 2 Lack of Specific Provisions in the Licensing and Design Basis

### Action Plan Strategy

#### Problem Statement

Licensing and Design Basis Information was incomplete and inaccurate, particularly with Architect Engineer (AE) to NSSS provider interface documentation.

#### Primary Causes

Root Cause 1 - The design and licensing basis documents did not contain explicit statements requiring the ECCS suction lines to be filled. The reasons for not explicitly stating these requirements was not positively ascertained.

Root Cause 4 - Personnel missed opportunities to identify the unanalyzed condition involving the unfilled suction lines because the design basis documents did not contain an explicit statement that required the lines to be filled.

Contributing Cause 1 - The design of the ECCS suction lines at PVNGS was different than the design at other CE plants, but the PVNGS design did not account for the significance of those differences.

Contributing Cause 7 - By design, the "100% validation" of the DBMs was comprehensive and focused on validation of the information in the DBMs but was not 100%.

1. Fixed the original condition:

- The Safety Injection (SI) Design Basis Manual (DBM) has been revised to document the requirement to fill ECCS suction lines (Completed during the investigation)
- Revised UFSAR Section 6.3.2.6 to add a new paragraph to indicate the need to have the ECCS lines (including the suction lines) filled to ensure proper operation of the CS and HPSI pumps. Evaluations have been performed to determine the need for revisions to other affected sections of the UFSAR and other affected licensing documents. (SIBP/SIIP 3.7.3.k and 3.7.3.l)
- The Technical Requirements Manual has been revised to include a requirement to periodically verify that the ECCS sump suction lines are filled (SIBP/SIIP 3.7.3.m and 3.7.3.l)
- After RAS specific design and licensing requirements were changed to make ECCS suction line fill requirements clear, modifications have been completed to assure that vent and drain placement supports keeping the line filled. (SIBP/SIIP 3.7.3.p and 3.7.3.d)

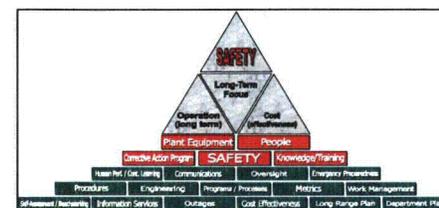
2. Identify and resolve limitations of Design Basis Manuals:

- Communicated to engineering personnel regarding DBM limitations (Interim Action) (SIBP/SIIP 3.7.3.q)
- Revised initial Engineering Tech Staff training to address limitations of DBMs (SIBP/SIIP 3.7.3.o, 3.7.5.gg and 3.7.8.j)
- Add note on DBM cover page on limitations of DBMs and direction to refer to source documents (SIBP/SIIP 3.7.3.h and 3.7.11.a)
- Update the DBM Writer's Guide to provide guidance on addressing interface requirements and Operating Experience reviews. (SIBP/SIIP 3.7.3.w)

3. Identify and resolve latent design and licensing basis issues:

- Complete Component Design Bases Review (CDBR) for high risk components (SIBP/SIIP 11.6.1.a, 11.6.1.b, 11.6.1.c and 11.6.13)
- Revise DBMs based upon CDBR results. (SIBP/SIIP 3.7.3.x and 3.7.3.y)

Note: In addition to actions shown, Focus Area 4 contains actions for extent of condition reviews related to pre-startup Independent Design Reviews. These reviews were performed to assure that the results of the Independent Design Reviews were incorporated into design and licensing documents and plant procedures.



#### Effectiveness Reviews/Metrics

- ▶ Quality of the Resolution of CDBR Related Actions Indicator
- ▶ CDBR Project Schedule Adherence Indicator
- ▶ Perform Focus Area Owner reviews of the CDBR project. (SIBP/SIIP 3.7.3.aa and 3.7.3.bb)
- ▶ An end of project effectiveness review for the CDBR Project is planned. (SIBP/SIIP 3.7.5.d/11.6.12)

## SIIP Action Plan 15 - RAS Focus Area 3 - Part 1 Lack of Questioning Attitude and Technical Rigor of Individuals

### Problem Statement

Ineffective use of error prevention tools and management oversight is illustrated by errors related to technical rigor, questioning attitude, and decision making tools.

### Primary Causes

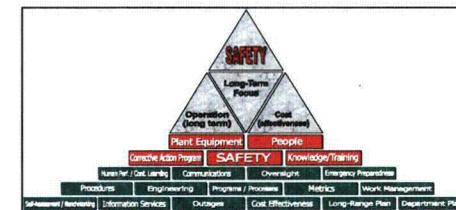
Root Cause 2 - Some PVNGS personnel had a narrow focus and an incorrect mindset (i.e., incorrect belief in self-venting theory) in reviewing information provided in various design documents that indicated the need to keep the ECCS suction lines filled. There was a general ineffective use of a QV&V process.

Root Cause 5 - Some PVNGS personnel had a narrow focus and an incorrect mindset (i.e., incorrect belief in self-venting theory) in reviewing various documents and information related to the ECCS suction lines. There was general ineffective use of a QV&V process.

Root Cause 8 - As a result of inadequate technical reviews, PVNGS personnel overlooked information regarding the need to fill the ECCS suction lines or did not review identified issues that could have led to identification of the unanalyzed condition involving the suction lines.

### Action Plan Strategy

1. Defined and established site standards for questioning attitude and technical rigor and incorporated in Revision 3 of the Site Standards and Expectations document. (SIBP/SIIP 6.1.7, 6.1.8 and 3.7.4.gg)
2. Implement training on questioning attitude and technical rigor, including a systematic approach to decision making and add to employee indoctrination training program. (SIBP/SIIP 6.4.6 and 6.4.7)
3. Established the Engineering Department Guidelines which include human performance tools relating to questioning attitude and technical rigor. (SIBP/SIIP 3.7.5.mm)
4. Develop and implement training on the Engineering Department Guidelines. (SIBP/SIIP 1.2.E.19)
5. Established formal Engineering Principles and Expectations including expectations for technical rigor, verification of assumptions, and alertness to situations that could impact compliance with design and licensing basis. (SIBP/SIIP 11.1.1)
6. Provided classroom training on Engineering Principles and Expectations. (SIBP/SIIP 11.1.2)
7. Incorporate Engineering Department Guidelines and Principles and Expectations into the Conduct of Engineering procedure. (SIBP/SIIP 11.8.30)
8. Implement an engineering leader observation and observation analysis and trending program. (SIBP/SIIP 11.4.1)
9. Implement an Engineering Product Quality Review Board including grading, feedback and metrics. (SIBP/SIIP 11.4.17)
10. Implemented the plant walkdown procedure and provided training on the procedure and use of questioning attitude during walkdowns. (SIBP/SIIP 3.7.4.l, 3.7.4.m, 3.7.4.n and 3.7.4.q)
11. Strengthened the use of technical reviews of high tier Operating Experience. (see also RAS Focus Area 6). (SIBP/SIIP 3.7.4.f)



### Effectiveness Reviews/Metrics

- ▶ Engineering Work Product Quality Indicator
- ▶ Perform Focus Area Owner reviews of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.4.u and 3.7.4.v)

## SIIP Action Plan 15 - RAS Focus Area 3 - Part 2 Lack of Questioning Attitude and Technical Rigor of Individuals - Operability Determinations

### Action Plan Strategy

1. Interim actions:
  - Assigned a dedicated advisor to drive rigor and consistency in Operability Determinations (OD) (SIBP/SIIP 4.1.F.9)
  - Instituted Plant Manager Daily Challenge Board review of Immediate Operability Determinations (IOD) and Prompt Operability Determinations (POD) (SIBP/SIIP 4.1.F.22)
  - Issued revised expectations for system engineering for monitoring and trending system performance. (SIBP/SIIP 1.2.F.1)
2. Training and qualification of personnel on the OD and Functional Assessment process:
  - Develop OD process lesson plan and incorporate into initial License Training that uses actual events for exercises (SIBP/SIIP 4.1.F.16)
  - Provide OD training to Engineering FIN (E-FIN) and SROs/STAs on OD changes, the standard for technical rigor including critical thinking, and the use of design basis information in support of PODs (SIBP/SIIP 4.1.F.21)
  - Establish a formal qualification requirement and dedicated E-FIN for POD preparation (SIBP/SIIP 4.1.F.23 and 4.1.F.19)
  - All SROs/STAs will be trained in the IOD process. (SIBP/SIIP 4.1.F.14)
3. Improved entry into the OD process:
  - OD procedure changed to require a documented Operability/Functionality Assessment for any PVAR on T.S. or T.S. support SSCs (SIBP/SIIP 4.1.F.10)
4. Improvements in OD process:
  - Revised OD procedure to support PVAR process (SIBP/SIIP 3.7.4.i)
  - Added an IOD checklist to OD procedure to aid SROs (SIBP/SIIP 4.1.F.11)
  - Revised OD Procedure to have Operations make an initial extent of condition determination or coordinate with appropriate departments to obtain the information (SIBP/SIIP 4.1.F.12)
  - Revised OD procedure to include the requirements for "Engineering Technical Rigor" (SIBP/SIIP 4.1.F.32)
  - Revised OD procedure to document any unverified assumptions and require a corrective action to validate the assumptions. (SIBP/SIIP 4.1.F.18)
5. Improved OD metrics and OD review processes:
  - Developed OD quality improvement plan & metrics (SIBP/SIIP 4.1.F.30)
  - Established updated metrics for OD performance. (SIBP/SIIP 4.1.F.27)
6. Improve site's sensitivity to Nuclear Safety and Operability through Spray Pond training, OD training, trending improvements, and daily plant status and safety meetings. (SIBP/SIIP 11.8.22, 4.4.1, 4.4.11, and 1.2.F.4)
7. Review PODs approved prior to April 1, 2008 and currently in effect, and initiate necessary corrective actions to bring those determinations into compliance with current standards. (SIBP/SIIP 4.1.F.33)

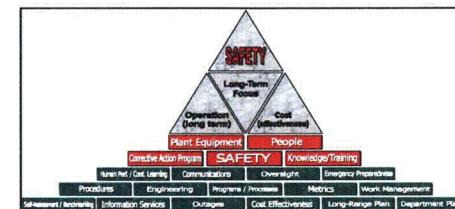
### Problem Statement

Inadequate implementation of the operability determination process has led to issues with identification of issues requiring IODs/PODs and the quality of IODs/PODs.

### Drivers

(CRDR 3130598 Common Cause Analysis)

- 1: Management and ownership of OD process is lacking across organizational boundaries, with no clear leadership for the process. In addition, at times, entry into performance of ODs is being driven by the NRC or other outside organization, instead of by PVNGS.
- 2: Knowledge weakness exist across organizational boundaries, including operations, engineering, maintenance, chemistry, work control, and within the management team. This is demonstrated by a clear lack of understanding potential impacts to operability with other systems and/or process and when to implement the OD process.
- 3: OD program is incomplete to support the process. It does not adequately incorporate questioning attitude and QV&V behaviors. It does not require a documented assessment of minor conditions adverse to quality related to TS or TS support SSCs. Links to CAP to ensure extent of condition is determined did not exist and were sometimes missed.
- 4: Metrics, indicators, and the trending programs are inadequate to properly identify potential operability impacts issues in a timely manner. Furthermore, due to lack of management oversight and ownership, indicators are not being used to drive and identify performance improvement opportunities.



### Effectiveness Reviews/Metrics

- ▶ OD Quality Indicator
- ▶ Perform Focus Area Owner reviews of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.4.y and 3.7.4.z)

## SIIP Action Plan 15 - RAS Focus Area 4 Inadequate Communication of Design Information

### Action Plan Strategy

#### Problem Statement

Inadequate internal and external communications resulted in incomplete technical information provided from engineering or vendors to functional groups.

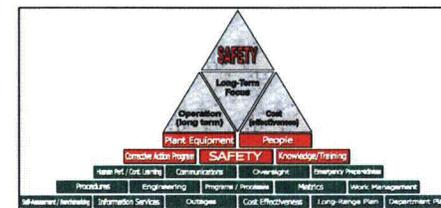
#### Primary Causes

Root Cause 3 - The need to keep the ECCS suction lines filled was identified but not appropriately communicated. Follow-through for ensuring start-up procedures contained provisions for filling and venting the system was inadequate.

Root Cause 6 - The need to keep the ECCS suction lines filled was identified but not appropriately communicated.

1. Establish a process to formally provide technical information by the engineering staff. This process will apply to key operation, maintenance and regulatory activities and shall not circumvent the Corrective Action Program (e.g., CRDRs, DFOWs). The process will contain appropriate engineering review and approval requirements based on type of request. (SIBP/SIIP 3.7.5.hh and 11.4.15)
2. Expectations regarding communication of technical information were communicated to personnel through guidelines, expectations documents, and briefings:
  - A RAS event case study was developed and provided to engineering, operations, nuclear assurance, and regulatory affairs personnel regarding the need for proper communication of information. Use of this case study has been embedded into pre-job briefs for self-assessments, significant investigations, and high-tier operating experience reviews. (SIBP/SIIP 3.7.5.dd and 3.7.7.b).
  - Human performance tools, including tools to ensure strong communication of technical information, were included in new Engineering Department Guidelines and the Conduct of Engineering procedure. (SIBP/SIIP 3.7.5.mm and 11.8.30)
3. Established additional procedural guidance for addressing vendor correspondence to assure that appropriate, cognizant personnel determine distribution of this correspondence. (SIBP/SIIP 3.7.5.kk)
4. Reviewed the nine Independent Design Reviews (IDRs) performed prior to plant startup to ensure that design intent has been incorporated into the design and licensing bases. (SIBP/SIIP 3.7.5.e, 3.7.5.f, 3.7.5.g, 3.7.5.i, 3.7.5.l, 3.7.5.v, 3.7.5.p, 3.7.5.q, 3.7.5.u, 3.7.5.r, 3.7.5.s, 3.7.5.t, 3.7.5.nn, 3.7.5.a, 3.7.3.a, 3.7.5.m, 3.7.5.n, 3.7.5.o and 3.7.5.oo)
5. Strengthen the engineering to operations interface by providing the Operability Determinations Discovery Evaluation Checklist to assist in identifying degraded/nonconforming conditions requiring immediate control room contact. (SIBP/SIIP 3.7.5.k)
6. Develop and conduct training of engineering (non-administrative) personnel on the station vendor documentation procedure. (SIBP/SIIP 3.7.5.ll)

NOTE: Other actions to identify potential, latent issues resulting from inadequate communication of design information are described in Focus Area 2 (i.e., CDBR).



#### Effectiveness Reviews/Metrics

- ▶ Operability Determination Quality Indicator
- ▶ Engineering Work Product Quality Indicator
- ▶ Perform Focus Area Owner reviews of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.5.c and 3.7.5.jj)

## SIIP Action Plan 15 - RAS Focus Area 5 Inadequate Problem Identification and Resolution

### Action Plan Strategy

#### Problem Statement

Inadequate implementation of the Corrective Action Program (CAP) resulted in inconsistent problem identification, narrowly focused evaluations, and ineffective and untimely issue resolution.

Note: Multiple processes/programs could be used to document questions and provide guidance outside the CAP. Problem identification and resolution has not always been fully effective.

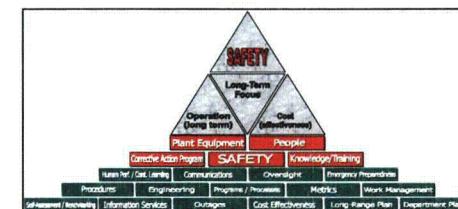
#### Primary Causes

Root Cause 7 - Issues related to the acceptability of the unfilled ECCS suction lines were not documented on CRDRs due to unclear procedural guidance.

**Background:** Some of the failures to document the voided suction pipe issue occurred in the late 1980s and early 1990s. Between that time and the time the issue was again identified in 2004, two changes were made to ensure that issues are reviewed under the Corrective Action Program (CAP): (a) In 1994, 90AC-01P04, "Condition Reporting," was issued, which expanded the use of Condition Reports/Disposition Requests (CRDRs) to include requests for technical clarifications and evaluations previously captured under the Engineering Evaluation Request (EER) process; and (b) In 1997, the Instruction Change Request (ICR) process was discontinued as a process for requesting information and instead CRDRs are generated and controlled through the Site Work Management System (SWMS). In addition, in December 2006, the Palo Verde Action Request (PVAR) was implemented as a "single entry" form for documentation of any issue. This change ensures that issues are not missed due to the use of multiple forms/processes for documenting issues. Communications and training were provided to site personnel on use of the PVAR to document issues.

#### Additional Actions:

1. Reviewed PVNGS programs and processes to identify processes outside the CAP that may be used for identification of items needing corrective action. As necessary, revise processes to ensure that any items needing corrective action are addressed through the CAP. (SIBP/SIIP 3.4.4.c)
2. Established the Action Request Review Committee (ARRC) to review PVARs and ensure that condition statements, risk assessments, and prioritizations are appropriate. Established qualification requirements based upon NRC and INPO guidance for ARRC members. (SIBP/SIIP 3.2.1.d and 3.3.3.b)
3. Established the Condition Review Group (CRG) to ensure participation and buy-in of responsible management in the disposition of PVARs and definition of corrective actions. (SIBP/SIIP 3.2.4)
4. Required Corrective Action Review Board (CARB) review of root and apparent cause evaluations under the CAP and provision for feedback from CARB reviews to applicable leaders and trending of CARB review results. Develop and implement job familiarization requirements for CARB members, including appropriate training on cause evaluation and the CAP. (SIBP/SIIP 3.2.3, 3.2.5.f and 3.3.3.c)
5. Provided additional and ongoing training and familiarization regarding the PVAR process and CAP fundamentals to PVNGS personnel. (SIBP/SIIP 3.3.3.i and 3.3.3.j)



#### Effectiveness Reviews/Metrics

- ▶ CAP Quality Index Indicator
- ▶ Perform a Focus Area Owner review of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.6.d)

## SIIP Action Plan 15 - RAS Focus Area 6 Limited or Weak Operating Experience Program

### Action Plan Strategy

1. Operating experience (OE) usage has been/is being integrated into station work documents, procedures, and expectations to ensure day-to-day usage:
  - Process to be developed to add OE to work packages (SIBP/SIIP 6.7.11)
  - Streamlined RAS event case study and embedded in pre-job briefs for self-assessment, significant CRDR, and high-tier OE evaluations (SIBP/SIIP 3.7.3.j)
  - Developed and institutionalized the OE books emphasizing OE use (SIBP/SIIP 6.7.13 and 6.1.15)
  - Briefing of selected leaders on the use of OE in day-to-day activities, program changes, roles and responsibilities. (SIBP/SIIP 3.7.7.p and 3.7.7.q)
2. Train personnel on use of Operating Experience search tools:
  - Develop a database for the retrieval and knowledge management of operating experience and train target population on its use (SIBP/SIIP 6.7.10)
  - Identify and train operating experience points of contact in departments and pertinent Performance Improvement staff members on the use of external INPO website (SIBP/SIIP 6.7.5)
  - Train significant and ACE CRDR evaluators on OE use and evaluation methods. (SIBP/SIIP 6.7.8)
3. Reviewed a 95/95 sample of past high-tier OE to identify any potential operability concerns that were not appropriately addressed. (SIBP/SIIP 3.7.7.i)
4. Operating Experience Process Improvements:
  - Modify the process of reviewing high-tier OE to require independent or backend review, a checklist to assure broad analysis, roles and responsibilities, and other process improvements (SIBP/SIIP 3.7.4.f, 3.7.7.c, 3.7.4.g, 3.7.7.f, 3.7.7.l, 3.7.7.o, 6.7.16 and 6.7.1)
  - Performance Improvement Department will perform or coordinate review of all high-tier OE (SIBP/SIIP 3.7.7.d)
  - Methods and controls to be developed to assure procedure changes made as a result of OE reviews cannot be eliminated without appropriate review (SIBP/SIIP 6.7.6)
  - Evaluated and implemented improved metrics for station OE Program. (SIBP/SIIP 6.7.7)
5. Review active SOERs for adequate disposition and sustainability of actions. (SIBP/SIIP 6.7.17)
6. Trained selected Engineering, Operations, Regulatory Affairs and Nuclear Assurance personnel on RAS event and importance of fully addressing high-tier OE. (SIBP/SIIP 3.7.5.dd)
7. Validated Nuclear Regulatory Affairs Procedure technical rigor requirements for incoming NRC documents. (SIBP/SIIP 3.7.4.h and 3.7.7.k)
8. Sampled past OE Digests (previously titled Tracking Trends) and Topical Reports for adequate evaluation. (SIBP/SIIP 3.7.7.g)

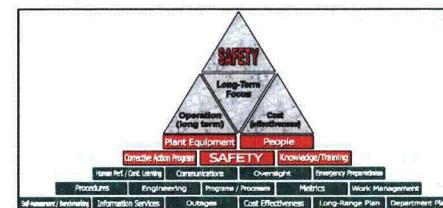
### Problem Statement

PVNGS did not effectively use Operating Experience to enhance safety.

### Primary Causes

Root Cause 9 - The PVNGS Operating Experience Program did not require reviews of some types of operating experience reports related to the ECCS suction lines.

Contributing Cause 4 - The Operating Experience Program had little guidance applicable to the review of the IOE reports related to the ECCS suction lines and gave low priority to the reviews, resulting in a narrow focus to the reviews and a lack of review by the Nuclear Assurance Department.



### Effectiveness Reviews/Metrics

- ▶ Timeliness of Operating Experience Screening Indicator
- ▶ Quarterly reviews of OE by Management Review Challenge Team. (SIBP/SIIP 6.7.20 thru 6.7.27)

## SIIP Action Plan 15 - RAS Focus Area 7 Limited Experience and Training

### Action Plan Strategy

#### Problem Statement

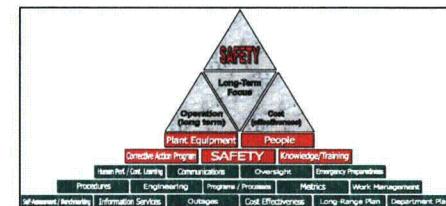
Gaps in engineering technical knowledge assessment, design basis, and SSC knowledge contributed to incorrect technical decisions and errors in design information.

#### Primary Causes

Contributing Cause 2 - PVNGS personnel with responsibility for start-up did not have adequate system design or licensing basis training or experience to be able to detect the need for filling of the suction lines.

Contributing Cause 5 - PVNGS personnel with responsibility for the SI System had limited training and experience to be able to detect the need for filling the suction lines.

1. For System Engineers, developed a design and licensing bases knowledge assessment and turnover process for assigned systems. Completed incumbent analysis of system engineers per the system engineering handbook work authorization checklist and identified gaps in knowledge. (SIBP/SIIP 3.7.8.h and 3.7.8.i)
2. Perform remediation of system engineering derived from incumbent analysis gaps. (SIBP/SIIP 3.7.8.i and 3.7.8.b)
3. Developed and implemented a procedure to identify design and licensing basis knowledge gaps among incumbent engineering personnel. (SIBP/SIIP 3.7.8.m, 3.7.8.n and 3.7.8.o)
4. For Design and Component engineers, perform incumbent analyses to identify training and knowledge weaknesses. (SIBP/SIIP 11.8.8 and 11.8.7)
5. Perform remediation for design and component engineering derived from incumbent analysis gaps. (SIBP/SIIP 3.7.8.v, 3.7.8.c and 3.7.8.d)
6. Develop and implement Computer Based Training for methods and critical aspects of understanding of the design and licensing bases of interfacing systems. (SIBP/SIIP 3.7.8.u, 3.7.8.w, 3.7.8.x and 3.7.8.y)
7. Develop and implement improved initial training for engineering personnel on design and licensing basis. (SIBP/SIIP 11.8.4)



#### Effectiveness Reviews/Metrics

- ▶ Engineering Product Quality Indicator
- ▶ Operability Determination Quality Indicator
- ▶ Perform Focus Area Owner reviews of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.8.aa and 3.7.8.bb)

**SIIP Action Plan 15 - RAS Focus Area 8  
Limited Resources**

**Problem Statement**

High workloads and conflicting priorities contributed to engineers not raising issues beyond what they were specifically assigned.

**Action Plan Strategy**

1. Engineering defined the roles and responsibilities of each engineering group to improve focus of activities. (SIBP/SIIP 3.7.9.h)
2. Engineering developed a long range staffing plan that included analysis of retirement projections and yearly analysis for hiring through the Legacy Program. (SIBP/SIIP 3.7.9.i)
3. Issued for use initial baseload work schedules for Design, Systems, and Component Engineering Departments. (SIBP/SIIP 11.9.A.8)
4. Establish and conduct periodic Engineering work management meetings, between Engineering Leaders and their staffs, to review work prioritization, resource allocation, and schedule dates for assigned work activities. (SIBP/SIIP 11.9.A.9)

**Primary Causes**

Contributing Cause 3 - During start-up, the Safety Injection engineers were under a high workload and had multiple tasks to perform, which deterred them from raising questions on issues not directly related to resolving the specific issues assigned to them.

Contributing Cause 6 - System engineers have been under a high workload and had multiple tasks to perform, which deterred them from raising questions on issues not directly related to resolving the specific issues assigned to him. Reviews of IOE reports are generally narrowly focused and limited to addressing the specific issue raised in the report.



- ▶ Engineering CRDR/CRAI Backlog Indicator
- ▶ Perform a Focus Area Owner review of corrective action effectiveness in this Focus Area. (SIBP/SIIP 3.7.9.j and 3.7.9.k)

**SIIP Action Plan 15 - RAS Focus Area 9  
Limited Nuclear Assurance Department Oversight**

**Problem Statement**

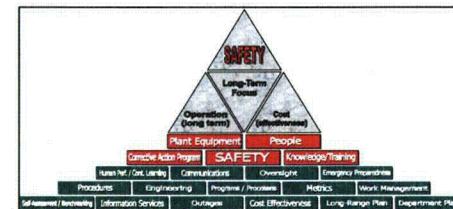
NAD Oversight activities were not effective in helping the station identify and respond to problems.

**Primary Causes**

Contributing Cause 9 - NAD has not had a systematic approach for assessing safety significant or high risk technical specification or design configuration issues.

**Action Plan Strategy**

1. The auditing procedure, 60DP-0QQ19, was revised to include the following to ensure that pertinent technical specifications and design configuration issues are reviewed during audits:
  - Ensured that audit scopes include provisions for an in-depth review of LCO-related Technical Specifications, as appropriate to the area being audited, and that audit teams include personnel (auditors or technical specialists) with the appropriate engineering or operational expertise (SIBP/SIIP 3.7.10.a)
  - Required that the underlying issues surrounding the RAS event are discussed in audit pre-job briefings (SIBP/SIIP 3.7.10.b)
  - Developed checklists for use in evaluating the adequacy of technical products. (SIBP/SIIP 3.7.10.c)
  
2. Developed and implemented a process to ensure that NAD evaluations are based upon a broad set of inputs, including: plant operating characteristics, NRC issuances, industry advisories, Licensee Event Reports, and other sources of plant design and operating experience information, including plants of similar design, which may indicate areas for improving plant safety. (SIBP/SIIP 3.7.10.g and 3.7.10.i)
  
3. Conducted a detailed stand-down with all Lead Auditors to discuss and reinforce expectations for the conduct of audits and the subsequent reporting of results. (Interim Actions) (SIBP/SIIP 3.7.10.d and 3.7.10.f)



**Effectiveness Reviews/Metrics**

- Using the NIEP assessment, determine the effectiveness of the Nuclear Assurance Department in helping the station identify and respond to safety significant problems. This review will include a review of findings in the Escalation, Audit, and Evaluation process areas. (SIBP/SIIP 8.5.13)

## SIIP Action Plan 15 - RAS Focus Area 10 Limited Procedural Guidance (DBM Writer's Guide)

### Action Plan Strategy

1. Identify and resolve limitations of Design Basis Manuals (DBM):
  - Communicated to engineering personnel regarding DBM limitations (Interim Action) (SIBP/SIIP 3.7.3.q, 3.7.8.k, 3.7.11.b)
  - Revised initial Engineering Tech Staff training to address limitations of DBMs (SIBP/SIIP 3.7.3.o, 3.7.5.gg, 3.7.8.j)
  - Add note on DBM cover page on limitations of DBMs and direction to refer to source documents (SIBP/SIIP 3.7.3.h, 3.7.11.a)
  - Update the DBM Writer's Guide to provide guidance on addressing interface requirements and Operating Experience reviews. (SIBP/SIIP 3.7.3.w)
  
2. Revised the design and technical document control procedure to require personnel changing, or adding a reference to a DBM to thoroughly review the reference document. (SIBP/SIIP 11.6.11)
  
3. Conducted additional reviews of UFSAR to review effectiveness of CESSAR information incorporation project. (SIBP/SIIP 3.7.11.e)
  
4. Identify and resolve latent design and licensing basis issues:
  - Complete Component Design Bases Review for High Risk components (SIBP/SIIP 11.6.1.b, 11.6.1.a, 11.6.1.c and 11.6.13).
  - Revise DBMs based upon results. (SIBP/SIIP 3.7.3.x and 3.7.3.y)

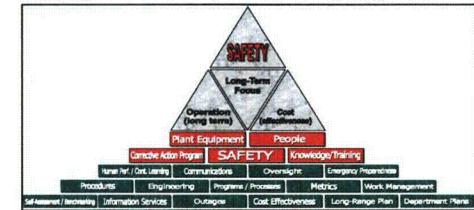
Note: In addition to actions shown, Focus Area 4 contains actions for extent of condition reviews related to pre-startup Independent Design Reviews. These reviews were to assure that the Independent Design Reviews were incorporated into design and licensing documents and plant procedures.

### Problem Statement

Design and Licensing bases project guides did not contain necessary requirements/ guidance on application of source document control.

### Primary Causes

Contributing Cause 8 - The DBM Writer's Guide (Procedure 83DP-4CC02) lacked detailed guidance on how to review source documents during preparation of the DBMs (e.g., there was no requirement to review the entire source documents).



### Effectiveness Reviews/Metrics

- ▶ Quality of the Resolution of CDBR Related Actions Indicator
- ▶ CDBR Project Schedule Adherence Indicator
- ▶ Perform Focus Area Owner reviews of the CDBR project. (SIBP/SIIP 3.7.11.c and 3.7.11.d)

## **Attachment 2**

### **Key Performance Area 1**

#### **Recirculation Actuation Signal (RAS) Actions**

##### **Listing of Specific Tasks and Due Dates**

## Attachment 2

### Key Performance Area 1

#### Recirculation Actuation Signal (RAS) Actions Listing of Specific Tasks and Due Dates

To address root and contributing causes identified in your evaluations in response to the Yellow finding associated with the voided containment sump suction piping for all three units. PVNGS will implement the following:

##### **SIIP Action Plan 15, "RAS [Recirculation Actuation Signal] Event," Focus Areas 1 through 10**

The following RAS Focus Area Task Lists present the specific tasks and due dates for the Strategies in each Focus Area Plan. The Task Lists also present additional tasks within each Focus Area that are not associated with a specific Strategy. These additional tasks are listed as "Other Focus Area Tasks" at the end of each Task List.

#### **Focus Area 1 – Procedures Did Not Contain Necessary Requirements**

- Strategy 1 - Revised procedure "Recovery from Shutdown Cooling to Normal Operating Lineup," 40OP-9SI02, to fill the RAS penetrations with borated water by keeping the sump full.
  - The above action was completed during the investigation.
- Strategy 2 - Modifications have been completed to assure that vent and drain placement supports keeping the line filled. (SIBP/SIIP 3.7.3.p and 3.7.3.d)
  - Implement Design Modification Work Order (DMWO) # 2760330 to implement the ECCS Suction Piping Modification in Unit 1. This installation of this modification will add additional venting, draining and filling connections on the sections of SI piping between the inboard and outboard containment isolation butterfly valves. It will also replace the existing carbon steel parts on the inboard butterfly valves JSIAUV0673 and JSIBUV0675 with stainless steel parts. [Action to add additional venting, draining and filling connections is complete. The remaining action is not being relied upon for resolution of the pipe void issue.] (3.7.3.p) Due: Complete
  - Implement Design Modification Work Order (DMWO) # 2760330 to implement the ECCS Suction Piping Modification in Unit 2. This installation of this modification will add additional venting, draining and filling connections on the sections of SI piping between the inboard and outboard containment isolation butterfly valves. It will also replace the existing carbon steel parts on the inboard

butterfly valves JSIAUV0673 and JSIBUV0675 with stainless steel parts. [Action to add additional venting, draining and filling connections is complete. The remaining action is not being relied upon for resolution of the pipe void issue.] (3.7.3.d) Due Date: 05/31/2008

- DMWO 2739742 was completed for Unit 3 to add additional venting, draining, and filling connections on the ECCS suction piping. [Action completed during investigation]
- Strategy 3 - Developed test instruction "Containment Recirculation Sump Isolation Valve Leak Testing," 73TI-9ZZ21, to leak-test the inboard RAS penetration CIV using air prior to filling with borated water. Incorporated requirement to perform this leak test into procedure "Recovery from Shutdown Cooling to Normal Operating Lineup", 40OP-9SI02. (SIBP/SIIP 3.7.2.e)
  - Revise 40OP-9SI02 to add the requirement to perform 73TI-9ZZ21 prior to filling the sump suction lines to assure JSIAUV0673 and JSIBUV0675 are leak tight for units that have completed the vent and drain modification. (3.7.2.e) Due: Complete
- Strategy 4 - Revised surveillance test procedure "RAS Line Fill Check," 40ST-9SI04, to verify the RAS penetrations are full of water on a monthly basis once the vent and drain modifications are completed. (SIBP/SIIP 3.7.2.b and 3.7.2.c)
  - Revise 40ST-9SI04 for Unit 1 after implementation of DMWO 2760330 to verify that the ECCS sump lines remain filled. (3.7.2.b) Due: Complete
  - Revise 40ST-9SI04 for Unit 2 after implementation of DMWO 2760330 to verify that the ECCS sump lines remain filled. (3.7.2.c) Due: Complete
  - Revise 40ST-9SI04 for Unit 3 after implementation of modification to install fill and vent lines. [Completed during the investigation]
- Strategy 5 - Revised surveillance test procedure 40ST-9SI04 to include time criteria for evaluating the amount of air escaping the vent valve and reordering the venting steps to eliminate one possible path for drawing air into the piping on the vent. (SIBP/SIIP 3.7.2.g)
  - Revise 40ST-9SI04 to include time criteria for evaluating length of void escaping the vent valve and reordering the venting steps to eliminate one possible path for drawing air into the piping on the vent. (3.7.2.g) Due: Complete
- Strategy 6 - Complete engineering study 13-MS-A102 to determine venting duration and tolerable void size criteria for surveillance test procedure 40ST-9SI04 that will ensure no adverse impact to pump operation. (SIBP/SIIP 3.7.2.j)
  - Complete study 13-MS-A102 to determine venting duration and tolerable void size criteria for surveillance test procedure 40ST-9SI04 that will ensure no adverse impact to pump operation. (3.7.2.j) Due: 04/03/2008

- Strategy 7 - Revise surveillance test procedure 40ST-9SI04 to align the procedure acceptance criteria and contingency actions with the results of Engineering Study 13-MS-A102. Also revise the procedure for estimating void size. (SIBP/SIIP 3.7.2.k)
  - Revise surveillance test procedure 40ST-9SI04 to align the procedure acceptance criteria and contingency actions with the results of Engineering study 13-MS-A102. Also delete step 10.2.2 directing the STA to estimate the void size based on RWT level change. Determine or recommend Operations training to effectively implement this procedure change. Ensure new CRAI to training is initiated by parent CRDR owner. (3.7.2.k) Due: 04/16/2008
- Other Focus Area 1 Tasks:
  - Revise appendices A and B of procedure 40ST-9SI04 to require that the inner piping exposed by removing the pipe cap after the fill and vent be inspected to determine if water is still actively flowing after 30 seconds. If water is observed after 30 seconds, then the fill and drain valves are to be checked for full closure and the penetration fill and vents re-performed. Also, similarly revise as applicable, other procedures that fill and vent the ECCS RAS lines. (3.7.2.f) Due: Complete
  - Develop a new SI venting strategy based on feedback and lessons learned from benchmarking activities. (3.7.2.h) Due: Complete
  - While performing 40ST-9SI04 (STWO 2877128) on the "B" RAS fill check, the operator noticed approximately 30 seconds of intermittent bubbling air through SIB-VA28. It is suspected that the RD drain arrangement not being able to accept much flow limited the fill of the normally dry fill / drain header. [Evaluation of issue identified in April 2006 resulted in direct revision of procedure 40ST-9SI04 and 40OP-9SI04 to assure the line used to fill the RAS piping is full of water before beginning the RAS fill.] (3.7.2.i) Due: Complete

## **Focus Area 2 – Lack of Specific Provisions in the Licensing and Design Basis**

- Strategy 1 - Fixed the original condition:
  - The Safety Injection (SI) Design Basis Manual (DBM) has been revised to document the requirement to fill ECCS suction lines.
    - The above action was completed during the investigation
  - Revised UFSAR Section 6.3.2.6 to add a new paragraph to indicate the need to have the ECCS lines (including the suction lines) filled to ensure proper operation of the CS and HPSI pumps. Evaluations have been performed to determine the need for revisions to other affected sections of the UFSAR and other affected licensing documents. (SIBP/SIIP 3.7.3.k and 3.7.3.l)

- Revise UFSAR section 6.3.2.6 to change reference to Safety Injection piping to ECCS piping and add new paragraph to indicate need to have ECCS lines filled to insure proper operation of the CS and HPSI pumps. Evaluate the need for revisions to other affected sections of the UFSAR and other affected licensing documents. (3.7.3.k) Due: Complete
- Licensing to process TRM change, LDCR 05-R002, and UFSAR change, LDCR 05-F017 in accordance with procedure 93DP-0LC03 with a due date of August 30 [2005]... The proposed TRM change will add a new TRM surveillance requirement TSR 3.5.202.4 to verify that the containment sump safety injection recirculation piping is full of water every 31 days. The proposed UFSAR change will add clarification to the UFSAR 6.3.2.6 description that the suction and discharge SI piping will be maintained filled with water, and that it will be done in accordance with Technical Specification and TRM surveillance requirements. (3.7.3.l) Due: Complete
- The Technical Requirements Manual has been revised to include a requirement to periodically verify that the ECCS sump suction lines are filled. (SIBP/SIIP 3.7.3.m and 3.7.3.l)
  - Revise the Technical Requirement Manual to include requirement to periodically verify that the ECCS sump lines are filled. (3.7.3.m) Due: Complete
  - Licensing to process TRM change, LDCR 05-R002, and UFSAR change, LDCR 05-F017 in accordance with procedure 93DP-0LC03 with a due date of August 30 [2005]...The proposed TRM change will add a new TRM surveillance requirement TSR 3.5.202.4 to verify that the containment sump safety injection recirculation piping is full of water every 31 days. The proposed UFSAR change will add clarification to the UFSAR 6.3.2.6 description that the suction and discharge SI piping will be maintained filled with water, and that it will be done in accordance with Technical Specification and TRM surveillance requirements. (3.7.3.l) Due: Complete
- After RAS specific design and licensing requirements were changed to make ECCS suction line fill requirements clear, modifications have been completed to assure that vent and drain placement supports keeping the line filled. (SIBP/SIIP 3.7.3.p and 3.7.3.d)
  - Implement Design Modification Work Order (DMWO) # 2760330 to implement the ECCS Suction Piping Modification in Unit 1. This installation of this modification will add additional venting, draining and filling connections on the sections of SI piping between the inboard and outboard containment isolation butterfly valves. It will also replace the existing carbon steel parts on the inboard butterfly valves JSIAUV0673 and JSIBUV0675 with stainless steel parts. [Action to add additional venting, draining and filling connections is complete. The remaining action

is not being relied upon for resolution of the pipe void issue.] (3.7.3.p)  
Due: Complete

- Implement Design Modification Work Order (DMWO) # 2760330 to implement the ECCS Suction Piping Modification in Unit 2. This installation of this modification will add additional venting, draining and filling connections on the sections of SI piping between the inboard and outboard containment isolation butterfly valves. It will also replace the existing carbon steel parts on the inboard butterfly valves JSIAUV0673 and JSIBUV0675 with stainless steel parts. [Action to add additional venting, draining and filling connections is complete. The remaining action is not being relied upon for resolution of the pipe void issue.] (3.7.3.d)  
Due Date: 05/31/2008
  - DMWO 2739742 was completed for Unit 3 to add additional venting, draining, and filling connections on the ECCS suction piping. [Action completed during investigation]
- Strategy 2 - Identify and resolve limitations of Design Basis Manuals:
- Communicated to engineering personnel regarding DBM limitations (interim action) (SIBP/SIIP 3.7.3.q)
    - Engineering to communicate to all potential DBM users, on the possible limitations of the DBMs and measures to effectively use the DBMs. Accuracy of the DBMs may not be 100%; there may be errors of omission (primarily unincorporated EDCs, and other possible omissions) and possibly inaccurate content. Users should QV&V the information with other resources when possible. Users should also understand the context of set point information; the differences between safety limits, operational bands, instrument inaccuracies, etc. (3.7.3.q) Due: Complete
  - Revised initial Engineering Tech Staff training to address limitations of DBMs (SIBP/SIIP 3.7.3.o, 3.7.5.gg, and 3.7.8.j)
    - Revise NGT-91 to communicate the DBM usage limitations to future engineering staff. This CRAI is also related to CRAI 2825641. (3.7.3.o, 3.7.5.gg, 3.7.8.j) Due: Complete
  - Add note on DBM cover page on limitations of DBMs and direction to refer to source documents. (SIBP/SIIP 3.7.3.h and 3.7.11.a)
    - Add a standard note to the cover page of each design bases manual to require personnel to refer to source documents when developing engineering work products or performing quality activities. (3.7.3.h and 3.7.11.a) Due: 05/22/2008
  - Update the DBM Writer's Guide to provide guidance on addressing interface requirements and Operating Experience reviews. (SIBP/SIIP 3.7.3.w)

- Update 83DP-4CC02, Design Basis Manual Finalization, (developed for the original design basis program) to provide guidance for the inclusion of the interface requirements and method of compliance, the high risk component listing, and an enhanced Industry Operating Experience (IOE) section. The IOE section will include the topic and the Palo Verde response. The guidance will address the following items for the systems with applicable NSSS to BOP design interface requirements:
  - a. Identify and discuss the applicable NSSS to BOP design interface requirements and the associated interface compliance evaluations.
  - b. Establish the system and component related performance interface requirements (e.g., supply x gpm); the required performance parameter shall be identified for each system operating scenario (e.g., large break LOCA, small break LOCA, main steam line break, etc.).
  - c. Document the APS design calculations that demonstrate compliance with the interface requirement and the NSSS Supplier calculations identified that establish the analytical basis for the NSSS to BOP design interface requirements.  
(3.7.3.w) Due: 07/25/2008
- Strategy 3 - Identify and resolve latent design and licensing basis issues:
  - Complete Component Design Bases Review (CDBR) for High Risk components (SIBP/SIIP 11.6.1.a, 11.6.1.b, 11.6.1.c and 11.6.13)
    - Complete CDBR on High Risk components in the Diesel Generator system. (11.6.1.a) Due: 10/24/2008
    - Complete CDBR on High Risk components in the Auxiliary Feedwater system. (11.6.1.b) Due: 10/24/2008
    - Complete CDBR on High Risk components in the Safety Injection system. (11.6.1.c) Due: 09/26/2008
    - Complete Component Design Basis Review Project per project schedule. (11.6.13) Due: 12/13/2010
  - Revise DBMs based upon CDBR results. (SIBP/SIIP 3.7.3.x and 3.7.3.y)
    - Revise the Design Basis Manuals for systems containing high risk components to incorporate the changes outlined in the revised Design Basis Manual Writer's Guide and other changes that were identified during the project (refer to CRAI 3069703). (3.7.3.x) Due: 11/18/2011
    - Create a new Topical Design Basis Manual (DBM) for systems that have NSSS design interface requirements and do not have a system DBM. (3.7.3.y) Due: 11/18/2011

- Other Focus Area 2 Tasks:
  - Finalize overall (3 year) scope of CDBR High Risk, low margin components by both a qualitative & quantitative PRA/analysis. (11.6.7) Due: Complete

### **Focus Area 3, Part 1 - Lack of Questioning Attitude and Technical Rigor of Individuals**

- Strategy 1 - Define and establish site standards for questioning attitude and technical rigor and incorporate in Revision 3 of the Site Standards and Expectations document. (SIBP/SIIP 6.1.7, 6.1.8 and 3.7.4.gg)
  - Develop and define what questioning attitude and technical rigor are for the site. This should be based on benchmarking INPO, the NRC, and other utilities. Update policy/procedure as appropriate. Present benchmarking results and recommendation to the senior leadership team. Evaluate station procedure and program that will require revision based on benchmarking effort. (6.1.7 and 6.1.8) Due: Complete
  - Establish/re-establish the expectations for a questioning attitude and technical rigor. Set expectations for questioning attitude and technical rigor, how to model, reinforce, and observed during observation/coaching. (Replaces CRAI 2825480 which an effectiveness review determined was ineffective) (3.7.4.gg) Due: 05/15/2008
- Strategy 2 - Implement training on questioning attitude and technical rigor, including a systematic approach to decision making and add to employee indoctrination training program. (SIBP/SIIP 6.4.6 and 6.4.7)
  - Develop a training program based on the definition from the benchmarking for questioning attitude and technical rigor results and include a systematic approach to decision making.... (6.4.6) Due: Complete
  - Present "questioning attitude and technical rigor" training concept to the Training Oversight Committee (TOC) prior to 05/01/08 to obtain concurrence on concept, population to receive the training, schedule for development and implementation (to include a "pilot" with comment incorporation) of the training. Initiate additional actions following TOC review to track the training development, pilot presentation, and presentation due dates for the remaining populations to receive the training. Implementation of this training for key groups identified by the TOC, such as Operations, Engineering, and site leadership, shall be no later than 08/15/08. ( 6.4.7) Due: 05/30/2008
- Strategy 3 - Established the Engineering Department Guidelines which include human performance tools relating to questioning attitude and technical rigor. (SIBP/SIIP 3.7.5.mm)

- Develop and implement a plan for improving qualification, validation & verification (QV&V) of engineering products. [The only element of this action being relied upon to address RAS issues is the development of the engineering human performance tools (Engineering Department Guidelines)] (3.7.5.mm) Due: Complete
- Strategy 4 - Develop and implement training on the Engineering Department Guidelines. (SIBP/SIIP 1.2.E.19)
  - Design and develop training for use of Engineering Department Guide EDG-01 - Engineering Human Performance Tools and EDG-02 - Engineering Human Performance Tools for Technical Task Risk/Rigor. The training should cover use of EDG-01 and EDG-02 on a graded approach based on risk significance of task. Suggest training as described in December 2005 INPO Engineering Digest featured topic "Engineering Human Performance." Incorporate initial training and continuing training into the Engineering Training Program Description. (1.2.E.19) Due: 06/30/2008
- Strategy 5 - Established formal Engineering Principles and Expectations including expectations for technical rigor, verification of assumptions, and alertness to situations that could impact compliance with design and licensing basis. (SIBP/SIIP 11.1.1)
  - Develop Engineering Principles and Expectations handbook. (11.1.1) Due: Complete
- Strategy 6 - Provided classroom training on Engineering Principles and Expectations. (SIBP/SIIP 11.1.2)
  - Distribute Engineering Principles and Expectations to Engineering via Focus Communication Groups. (11.1.2) Due: Complete
- Strategy 7 - Incorporated Engineering Department Guidelines and Principles and Expectations into the Conduct of Engineering procedure. (SIBP/SIIP 11.8.30)
  - Develop a Conduct of Engineering procedure. The procedure should include engineering principles and standards. Incorporate a requirement into the Engineering TPD to train on the Conduct of Engineering procedure in initial training and continuing training. (11.8.30) Due: Complete
- Strategy 8 - Implement an engineering leader observation and observation analysis and trending program. (SIBP/SIIP 11.4.1)
  - Establish an Engineering Leader Observation Program that is incorporated within the site observation program as a tool for monitoring and adjusting engineering products, practices and human performance standards and tools. (11.4.1) Due: 06/28/2008
- Strategy 9 - Implement an Engineering Product Quality Review Board including grading, feedback and metrics. (SIBP/SIIP 11.4.17)

- Develop a procedure that describes the purpose, conduct, membership, criteria and requirements for using an Engineering Quality Product Review Board. The procedure shall include a requirement to have: Engineering Quality Product Review Board feedback on products reviewed [and] metrics to monitor and trend performance. (11.4.17) Due: 06/28/2008
- Strategy 10 - Implemented the plant walkdown procedure and provided training on the procedure and use of questioning attitude during walkdowns. (SIBP/SIIP 3.7.4.l, 3.7.4.m, 3.7.4.n, and 3.7.4.q)
  - Create "stand-alone" Plant Walkdown procedure to incorporate Safety System Walkdowns using the 12 week schedule (see STA Shift Conduct Procedure, 79DP-9ZZ02). Add instructions to identify personnel safety issues, transient material/transient combustible issues and other common walkdown area's of interest. Ensure weekly schedule times are coordinated with Maintenance and Engineering. Add FIN support to the walkdown team. (3.7.4.l) Due: Complete
  - Develop and administer a practical demonstration of Plant Walkdowns to the Auxiliary Operators. (3.7.4.m) Due: Complete
  - Provide Plant Walkdown Training/Briefing to Licensed Operators, STA, Engineering Staff and NAD. (3.7.4.n) Due: Complete
  - Provide Plant Walkdown training for AO's using the NRC Plant Walkdown Guide as a reference. Provide the developed material to STA's to use as a briefing for the STA Group and Engineering. (3.7.4.q) Due: Complete
- Strategy 11 - Strengthened the use of technical reviews of high tier Operating Experience. (SIBP/SIIP 3.7.4.f) (see also RAS Focus Area 6)
  - Revise the IOE Program (65DP-0QQ01) to require performance of an independent or back-end technical review of all high-tiered IOE evaluations (for evaluations performed by other than a team or with multiple technical reviews). (3.7.4.f) Due: Complete
- Other Focus Area 3, Part 1 Tasks:
  - Evaluate what programs or processes will be included in a rollup program to determine current status of human performance. Examples include; self-assessment, corrective action program, observation data, trending data, operating experience, off-site audits or assessments, etc. Develop a process for gathering and analyzing data that will be included in the PI rollup program. Use RAPID (change management) as part of the development of the PI rollup program. Provide guidelines for department PI rollup to determine individual trends, both in the improving or declining performance. New PI's will be added to the line organizations indicators, where performance issues are identified. (6.6.1.a) Due: 02/15/2009
  - Evaluate current DME indicator/metrics and provide recommendation for changes based on industry benchmarking (see CRAI 3020641) for questioning attitude, technical rigor, and decision making errors. (6.1.9) Due: 04/15/2008

- 40DP-9ZZ03 [Weekly Material Condition Inspection of Safety Significant Equipment] Appendix C will be changed to designate the required participants. 40DP-9ZZ03 guidance will be changed to require full complement of participants or re-schedule the inspection and write a PVAR. (3.7.4.x) Due: 06/06/2008
- A lesson plan will be developed and incorporated into Initial Non-License Training that uses actual events for exercises with emphasis on the importance of Area Rounds and field observations as input to the control room determination of degraded safety systems. (4.1.F.17) Due: 09/30/2008

### **Focus Area 3, Part 2 – Lack of Questioning Attitude and Technical Rigor of Individuals – Operability Determinations**

- Strategy 1 - Interim actions:
  - Assigned a dedicated advisor to drive rigor and consistency in Operability Determinations (OD) (SIBP/SIIP 4.1.F.9)
    - As an interim action to drive consistency during the implementation and training phase of this plan, Operations will dedicate a current or previously licensed SRO (and provide an alternate), to the Corrective Action Program/ Operability Determination Process (CAP-OD SRO). This SRO will have in depth knowledge of Procedure 40DP-9OP26, Operability Determination and Functional Assessment, and NRC RIS 2005-20. The position will be staffed during normal dayshift hours. This position will be staffed until the 40DP-9OP26 changes and IOD training is complete. (4.1.F.9) Due: Complete
  - Instituted Plant Manager Daily Challenge Board review of Immediate Operability Determinations (IOD) and Prompt Operability Determinations (POD) (SIBP/SIIP 4.1.F.22)
    - As an interim action, establish a daily challenge board, sponsored by the Plant Manager, for IODs and PODs generated in the previous 24 hours/weekend/holiday. A PVAR will be generated and feedback provided to the Shift Manager and engineering FIN for any identified deficiencies. This will continue until training required by this plan is complete as described in CRAIs 3105761 and 3109581. (4.1.F.22) Due: Complete
  - Issued revised expectations for system engineering for monitoring and trending system performance. (SIBP/SIIP 1.2.F.1)
    - Issue revised expectations for system engineering for monitoring and trending system performance. (1.2.F.1) Due: Complete
- Strategy 2 - Training and qualification of personnel on the OD and Functional Assessment process:

- Develop OD process lesson plan and incorporate into initial License Training that uses actual events for exercises. (SIBP/SIIP 4.1.F.16)
  - An Operability Determination process lesson plan will be developed and incorporated into initial License Training that uses actual events for exercises. (4.1.F.16) Due: 09/30/2008
- Provide OD training to Engineering FIN (E-FIN) and SROs/STAs on OD changes, the standard for technical rigor including critical thinking, and the use of design basis information in support of PODs. (SIBP/SIIP 4.1.F.21)
  - Provide OD training to engineering FIN team and SRO's/STAs on OD related procedure changes, the standard for technical rigor including critical thinking, and the use of design basis information in support of PODs. (4.1.F.21) Due: 09/30/2008
- Establish a formal qualification requirement and dedicated E-FIN for POD preparation. (SIBP/SIIP 4.1.F.23 and 4.1.F.19)
  - Establish a formal qualification requirement for POD preparation and incorporate into the ETP. (4.1.F.23) Due: 09/30/2008
  - Establish dedicated Engineering Support (E-FIN) for the preparation of PODs. (4.1.F.19) Due: Complete
- All SROs/STAs will be trained in the IOD process (SIBP/SIIP 4.1.F.14)
  - All SRO's / STA's will be trained on the IOD process and the recent changes to 40DP-9OP26. (4.1.F.14) Due: 06/30/2008
- Strategy 3 - Improved entry into the OD process:
  - OD procedure changed to require a documented Operability/Functionality Assessment for any PVAR on T.S. or T.S. support SSCs (SIBP/SIIP 4.1.F.10)
    - 40DP-9OP26 will be changed to require a documented Operability / Functionality Assessment for any PVAR on T.S. or T.S. support SSC's. (4.1.F.10) Due: Complete
- Strategy 4 - Improvements in OD process:
  - Revised OD procedure to support PVAR process (SIBP/SIIP 3.7.4.i)
    - Implement changes to 40DP-9OP26 [Operability Determination and Functional Assessment] to support the new AR [PVAR] process for CRDRs/WOs. (3.7.4.i) Due: Complete
  - Added an IOD checklist to OD procedure to aid SROs (SIBP/SIIP 4.1.F.11)

- A checklist will be developed and included in 40DP-9OP26 to aid the SRO in making the Immediate Operability Determination. (4.1.F.11) Due: Complete
- Revised OD Procedure to have Operations make an initial extent of condition determination or coordinate with appropriate departments to obtain the information (SIBP/SIIP 4.1.F.12)
  - Revise 40DP-9OP26 to have Operations make the initial extent of condition determination. If information is required from other organizations, Operations will communicate to the appropriate department the need and time frame that the information is needed and enter the action in the CAP. (4.1.F.12) Due: Complete
- Revised OD procedure to include the requirements for "Engineering Technical Rigor" (SIBP/SIIP 4.1.F.32)
  - Revise POD procedure (40DP-9OP26) to include the requirements stated in Task 1 above. (Reference SIIP Action Plan 3, "Engineering Technical Rigor," Strategy 5). (4.1.F.32) Due: Complete
- Revised OD procedure to document any unverified assumptions and require a corrective action to validate the assumptions (SIBP/SIIP 4.1.F.18)
  - Revise the OD procedure to require documentation of any unverified assumptions and require a corrective action item to validate the assumptions when not able to be validated at the time of the POD. (4.1.F.18) Due: Complete
- Strategy 5 - Improved OD metrics and OD review processes:
  - Developed OD quality improvement plan & metrics (SIBP/SIIP 4.1.F.30)
    - Develop operability determination improvement plan and metrics that more accurately measure the quality of ODs. (4.1.F.30) Due: Complete
  - Established updated metrics for OD performance (SIBP/SIIP 4.1.F.27)
    - Establish appropriate metrics to monitor Operability Determination performance. (4.1.F.27) Due: Complete
- Strategy 6 - Improve site's sensitivity to Nuclear Safety and Operability through Spray Pond training, OD training, trending improvements, and daily plant status and safety meetings. (SIBP/SIIP 11.8.22, 4.4.1, 4.4.11 and 1.2.F.4)
  - Implement the site training on the case study develop for the Essential Spray Pond CRAI 2937340. (11.8.22) Due: Complete
  - Integrate Safety discussions in the context of Plant Status during meetings (Nuclear, Industrial, Radiological and Safety Culture). (4.4.1) Due: Complete

- Create a site-wide awareness/focus on the plant and corresponding safety aspects by setting the expectation to open initial daily meetings with discussions on plant status and correlating safety aspects. Subsequent meetings begin with a discussion on any changes to plant status or safety aspects (i.e., nuclear, industrial, radiological and safety culture). (4.4.11) Due: Complete
  - Revise system engineering handbook to include the expectations identified in task 1.2.F.3 (e.g., trending and monitoring). (1.2.F.4) Due: 04/30/2008
- Strategy 7 - Review PODs approved prior to April 1, 2008 and currently in effect, and initiate necessary corrective actions to bring those determinations into compliance with current standards. (SIBP/SIIP 4.1.F.33)
  - Review PODs approved prior to April 1, 2008 and currently in effect and initiate necessary corrective actions to bring those determinations into compliance with current standards. (Reference SIIP Action Plan 3, "Engineering Technical Rigor," Strategy 5). (4.1.F.33) Due: 07/01/2008
- Other Focus Area 3, Part 2 Tasks:
  - Perform a "Needs Analysis" using the Systematic Approach to Training (SAT) process to determine the training needs for engineering FIN for POD preparation. Develop the lesson plan for this task. (4.1.F.20) Due: 06/30/2008
  - Established a daily challenge board, as an interim action, sponsored by the Plant Manager, for IODs and PODs generated in the previous 24 hours/weekend/holiday. This action is requesting NAD to perform periodic observations of the challenge board. (4.1.F.34) Due: 05/23/2008

#### **Focus Area 4 – Inadequate Communication of Design Information**

- Strategy 1 - Establish a process to formally provide technical information by the engineering staff. This process will apply to key operation, maintenance and regulatory activities and shall not circumvent the Corrective Action Program (e. g. CRDRs, DFWOs). The process will contain appropriate engineering review and approval requirements based on type of request. (SIBP/SIIP 3.7.5.hh and 11.4.15)
  - Establish a process to formally provide technical information by the engineering staff. This process should be used in lieu of white papers, emails or verbal responses when the information provided by engineering is used for key operation, maintenance and regulatory activities. This process shall not circumvent the Corrective Action Program (e. g. CRDRs, DFWOs). The process should contain the appropriate engineering review and approval requirements based on type of request. (3.7.5.hh and 11.4.15) Due: 09/30/2008
- Strategy 2 - Expectations regarding communication of technical information were communicated to personnel through guidelines, expectations documents, and briefings:



3.7.5.q, 3.7.5.ü, 3.7.5.r, 3.7.5.s, 3.7.5.t, 3.7.5.nn, 3.7.5.a, 3.7.3.a, 3.7.5.v, 3.7.5.n, 3.7.5.o and 3.7.5.oo)

- Review the Containment Systems, IDR to determine if any other design requirement was not incorporated in design documents. (3.7.5.e) Due: Complete
- Review the Auxiliary Feedwater System IDR to determine if any other design requirement was not incorporated in design documents. (3.7.5.f) Due: Complete
- Review the Alternating Current Power Systems IDR to determine if any other design requirement was not incorporated in design documents. (3.7.5.g) Due: Complete
- Review the Results of the IDR reviews to determine if further reviews are required. Modify the corrective actions to this CRDR as appropriate based on the results. (3.7.5.i) Due: Complete
- In response to CRDR 2726509, an extent of condition review was conducted to determine if there were other instances of design or licensing commitments being identified and discussed in one of the IDR reports that were not effectively translated into requirements in the design documents. .... The purpose of this CRDR is to document the results of the review of the [following systems: Auxiliary Feedwater (3.7.5.l); Auxiliary Systems (3.7.5.v); Containment Systems (3.7.5.p); AC Power Distribution (3.7.5.q); DC Power Distribution (3.7.5.u); Balance of Plant I&C (3.7.5.r); Equipment Qualification (3.7.5.s); Fire Protection (3.7.5.t); CE Control System (3.7.5.nn)] Due: Complete
- Track to completion Open CE control system IDR items, noted on spreadsheet attached to this CRDR 2825473. (except for item one to be handled on another CRAI) (3.7.5.a) Due: Complete
- APS was unable to locate a copy of Volume II of the CE control system IDR from the NRC's public document room. This level 4 CRAI has been initiated to track the need for further evaluation of CE control system IDR volume II based on the completed results of the other IDR reviews (refer to CRDRs 2825464, 2824066, 2824714, 2824198, 2824214, 2824241, 2825472, 2825202, 2825460, 2825372, 2825474 and 2825475). To date no known Potential Significance items have been identified by these evaluations. [This action documents the review of CE Control System IDR Volume II] (3.7.3.a) Due: Complete
- ...The purpose of this CRDR is to document a discrepancy identified during the review of the Auxiliary Systems IDR... the IDR text states that the EW to NC crosstie to supply cooling water from EW to the Nuclear Cooling Water Heat Exchanger is classified as Seismic Category I. Contrary to this, the EW P&ID, drawing 01/02/03-M-EWP-001 shows the EW cross-tie to supply cooling water to the NC priority loads through valve EWUV145/6 and from the NC priority loads through valves EWUV65/66 classified as Seismic Category 2... (3.7.5.m) Due: Complete

- The purpose of this CRDR is to document a discrepancy identified during the review of the Auxiliary Systems IDR... the IDR lists several EW heat loads and the post accident peak EW temperature. These heat loads and the post accident peak EW temperature differ slightly from those currently stated in the DBM and the design calculations...(3.7.5.n) Due: Complete
- ...The purpose of this CRDR is to document a potential discrepancy that was identified during the review of the Containment Systems IDR...the IDR has a statement regarding Regulatory Guide 1.7 compliance that states Palo Verde is in compliance with the requirement that the purge or ventilation system filter will be Seismic Category I. It is not clear if this commitment/requirement should be applied to the containment access purge filter MCPJ02... (3.7.5.o) Due: Complete
- The existing calculation 01ECPK0207 DC Battery Sizing and Minimum Voltage Calculation has analyzed class 1E battery capacity for 2 hours during station blackout event and referenced Reg. Guide 1.155 Station Blackout. However, review of Reg. Guide 1.155 did not find any 2 hour capacity requirement for the class 1E battery during station blackout event. A brief research indicated that the previous calculations 13ECPK202 and 13ECPK161 (SBY 01,02,03ECPK207) had considered 2 hour battery capacity requirement during SBO with reference of Reg. Guide 1.155. [This CRDR resolved an issue identified under CRDR 2824066 as part of the IDR extent of condition review] (3.7.5.oo) Due: Complete
- Strategy 5 - Strengthen engineering to operations interface by providing the Operability Determinations Discovery Evaluation Checklist to assist in identifying degraded/nonconforming conditions requiring immediate control room contact. (SIBP/SIIP 3.7.5.k)
  - Improve engineering involvement in the Operability Determination (OD) process by:
    - Revising the OD Procedure to address RIS 2005-20.
    - Developing guidance for Engineering personnel on when to communicate potential nonconforming and degraded conditions to Operations, the type of information to be provided to Operations to support immediate operability determinations, the type of information to provide in engineering evaluations to support prompt ODs (e.g., focus on whether the structure, system, or component (SSC) can perform its specified safety function). This guidance will include a checklist to guide engineering personnel through a process to provide input to ODs. [The only facet of this action being relied upon to address RAS issues is the creation of the Discovery Checklist] (3.7.5.k) Due: Complete
- Strategy 6 - Develop and conduct training of engineering (non-administrative) personnel on the station vendor documentation procedure. (SIBP/SIIP 3.7.5.ii)
  - Include within 2nd Quarter 2008 Engineering Quarterly Events, Generic Topic Training instruction on the process used to receive vendor documentation. The instruction should include expectations for personnel who receive vendor

documentation, outside of the formal process, to ensure that potentially impacted groups receive the information. (ref. CRAI 2903206) ( 3.7.5.ii) Due: 07/16/2008

o Other Focus Area 4 Tasks:

- Re-review the PVNGS response to Information Notice 88-23 Supplement 5. Consideration should be given to modify the response since the Safety Injection Tanks were the origin of the gas which caused the Turkey Point event and Safety Injection Tanks are components also at PVNGS. (3.7.5.h) Due: Complete
- Cover lessons learned from technical communications trends during engineering events training: technical justifications are not used to bypass the OD process and judgment/justifications are recognized by engineering/operations and prompt operability determinations are performed. [Short-term check and adjust action. Not intended for sustainability] (3.7.5.z) Due: Complete
- Actions completed for impact review program improvement have not identified a means of tracking or sampling the impact reviews get to all of the correct groups and that the review is accurate. Determine action plan to improve this aspect of impact review. Generate any required corrective action documents needed to implement action plan.... (3.7.5.aa) Due: Complete
- CDBR Item. As of 05/11/2007; 26 out of 178 PVARs/CRDRs are in the area of Procedure Quality. CDBR has identified procedural inadequacies that are inconsistent with design assumptions. Evaluation needs to be performed to determine the apparent cause for so many issues in this area. (3.7.5.ii) Due: Complete
- Develop and implement interim communications from the PVNGS VP of Engineering that Prompt Operability Determinations (PODs) prepared subsequent to April 1, 2008 may not be based upon informal information. In addition, those PODs may not be based upon previous PODs or CRDRs prepared before April 1, 2008 without Engineering review and approval. (4.1.F.31) Due: Complete
- Develop Checklists for high-tiered OE evaluations (SOER, SEN, SER, IN, etc.) for use during disposition and analysis. This should include guidance for expansive OE review so that personnel do not focus only on the particular conditions identified in the OE report. In addition revise Self-Assessments and Significant CRDR evaluations to include evaluation and emphasize of using high-tiered OE. (3.7.7.c) Due: Complete

## **Focus Area 5 – Inadequate Problem Identification and Resolution**

- o Strategy 1 - Reviewed PVNGS programs and processes to identify processes outside the CAP that may be used for identification of items needing corrective action. As necessary, revise processes to ensure that any items needing corrective action are addressed through the CAP. (SIBP/SIIP 3.4.4.c)

- Review other departmental programs/processes used in implementing UFSAR programs to identify potential corrective action processes outside the formal CAP. (3.4.4.c) Due: Complete
- Strategy 2 - Established the Action Request Review Committee (ARRC) to review PVARs and ensure that condition statements, risk assessments, and prioritizations are appropriate. Established qualification requirements based upon NRC and INPO guidance for ARRC members. (SIBP/SIIP 3.2.1.d and 3.3.3.b)
  - Establish the ARRC. Implement an Action Request Review Committee (ARRC) to improve condition statement, risk assessment, and prioritization. Implement the new ARRC. (3.2.1.d) Due: Complete
  - Develop and implement qualification requirements for members of the ARRC. These requirements should include the review of the following, as a minimum:
    - Review of INPO guidance for performance improvement and human performance
    - Review of NRC Inspection criteria related to Problem Identification and Resolution
    - Review of PVNGS CAP Procedures and Process Guidance, with an emphasis on classification and evaluation level of effort. (3.3.3.b) Due: Complete
- Strategy 3 - Established the Condition Review Group (CRG) to ensure participation and buy-in of responsible management in the disposition of PVARs and definition of corrective actions. (SIBP/SIIP 3.2.4)
  - Evaluate the establishment of a Condition Review Group (CRG). Present results of evaluation to Senior management and incorporate actions resulting from Senior management meeting into this building block initiative, as necessary. (3.2.4) Due: Complete
- Strategy 4 - Required Corrective Action Review Board (CARB) review of root and apparent cause evaluations under the CAP and provision for feedback from CARB reviews to applicable leaders and trending of CARB review results. Develop and implement job familiarization requirements for CARB members, including appropriate training on cause evaluation and the CAP. (SIBP/SIIP 3.2.3, 3.2.5.f and 3.3.3.c)
  - Require CARB to review root cause and apparent cause evaluations and provide performance feedback (immediate to applicable leader and site via trending) for continuous learning to station staff and leadership and review backlog of apparent cause evaluations completed after May 1, 2007 and determine whether CARB review is warranted. (3.2.3) Due: Complete
  - Implement a process for periodic review of CARB scorecard results and provision of roll-up score card results to the management team, training department, Performance Improvement Department (PID), root and apparent cause investigators, oversight groups, and Advocates. (3.2.5.f) Due: Complete

- Develop and implement a "Job Familiarization Guidance document" for members of the CARB. These requirements should include the following, as a minimum:
      - INPO guidance for performance improvement and human performance
      - NRC Inspection criteria related to Problem Identification and Resolution
      - Training on Root Cause and ACE Evaluation tools and techniques
      - PVNGS CAP Procedures and Process Guidance
 (3.3.3.c) Due: Complete
  - Strategy 5 - Provided additional and ongoing training and familiarization regarding the PVAR process and CAP fundamentals to PVNGS personnel. (SIBP/SIIP 3.3.3.i and 3.3.3.j)
    - Revise the station access training materials based on the information and direction as a result of task 3.3.3.h. Implement the revised training to ensure that station personnel receive the training through Site Access Training. (3.3.3.i) Due: Complete
    - Develop and communicate CAP Fundamentals for Station Personnel and for Managers and Supervisors. (3.3.3.j) Due: Complete
  - Other Focus Area 5 Tasks:
    - Provide ability to anonymously initiate a PVAR. Reference CRDRs 3022621 and 3015865. (3.4.1) Due: Complete
    - (Interim Action) Commence review of 100% of closed CRDRs on a month to month basis using the existing CRDR closure quality review criteria, including Significant, ERCFA2, ERCFA1, Apparent Cause, and Adverse. Document the reviews and populate performance indicators. Perform CRDR reject activities as required by Condition Reporting. To be discontinued when performance indicators indicate sustained acceptable performance. (3.3.12) Due: Complete
    - Re-incorporate the "adverse" evaluation process into 90DP-0IP10. (3.4.2.b) Due: Complete

## **Focus Area 6 – Limited or Weak Operating Experience Program**

- Strategy 1 - Operating experience (OE) usage has been/is being integrated into station work documents, procedures, and expectations to ensure day-to-day usage:
  - Process to be developed to add OE to work packages. (SIBP/SIIP 6.7.11)
    - Planning Department Leader will develop process which will add operating experience to work packages. (6.7.11) Due: 08/10/2008
  - Streamlined RAS event case study and embedded in pre-job briefs for self-assessment, significant CRDR, and high-tier OE evaluations. (SIBP/SIIP 3.7.7.b)

- Performance Improvement Department (PID) will streamline the case study for RAS and initiate the expectations that it's use during prejob briefings for self-assessments, significant investigations, and high-tiered operating experience evaluations. (3.7.7.b) Due: 07/30/2008
- Developed and institutionalized the OE books emphasizing OE use. (SIBP/SIIP 6.7.13 and 6.1.15)
  - Operating Experience Outage books developed and published prior to each refueling outage, outlining internal and external Operating Experience and the behaviors to prevent occurrence. (6.7.13) Due: Complete
  - Evaluate and implement a method to institutionalize outage preparation for HU/CL and IS activities, to include programs and tools such as team PRIDE, and operating experience booklets. (6.1.15) Due: Complete
- Briefing of selected leaders on the use of OE in day-to-day activities, program changes, roles and responsibilities. (SIBP/SIIP 3.7.7.p and 3.7.7.q)
  - Develop and provide briefing to selected leaders for communication of procedure 65DP-0QQ01 program definition, responsibilities and process flow. (3.7.7.p) Due: 05/13/2008
  - Develop and provide briefing to selected leaders for communication of expectations and guidance to effectively use OE in day-to-day activities for the prevention and mitigation of events. Reference other CRAIs as appropriate for individual actions previously identified for use of OE: CRAIs 2988507 (use of OE in Operability Determinations), 3104862 (development of a desktop guide for OE tools), 2922028 (OE usage during CDBR reviews), 2938870 (Use of OE during Shop Meetings and Safety Meetings), 2938874 (Outage OE books), and 2941720 (Use of OE during work planning). (3.7.7.q) Due: 08/13/2008
- Strategy 2 - Train personnel on use of Operating Experience search tools:
  - Develop a database for the retrieval and knowledge management of operating experience and train target population on its use. (SIBP/SIIP 6.7.10)
    - Develop a database for the retrieval and knowledge management of operating experience. Identify target population and train on how to use the database efficiently. Include a shortcut to current Kiosk menu for retrievability. (6.7.10) Due: 12/28/2008
  - Identify and train operating experience points of contact in departments and pertinent Performance Improvement staff members on the use of external INPO website. (SIBP/SIIP 6.7.5)
    - Train and identify operating experience points of contact in departments and pertinent PIT staff members on the use of external INPO website.

This website provides the user with access to OE on an as-needed basis, which negates the need for current mechanical distribution process.  
(6.7.5) Due: 12/14/2008

- Train significant and ACE CRDR evaluators on OE use and evaluation methods. (SIBP/SIIP 6.7.8)
  - Develop and implement training for investigators of significant events and apparent cause evaluation on use/evaluation methods associated with operating experience. (6.7.8) Due: Complete
- Strategy 3 - Reviewed a 95/95 sample of past high-tier OE to identify any potential operability concerns that were not appropriately addressed. (SIBP/SIIP 3.7.7.i)
  - Perform an assessment of the technical adequacy of past high-tiered IOE evaluations. Criteria should be judged on whether any deficient IOE evaluation impacted any SSC Technical Specification OPERABILITY or safety related function (i.e., caused an SSC to be INOPERABLE or resulted in a reportable condition). Review IOEs at least since 1985; provide a technical resolution if necessary; include a random (95/95) sample of high risk systems, but biased to not include any IOEs that are human performance issues exclusively (e.g., System Status Control SOER 98-01); should be performed by technical experts but not any who have previously worked on the issue here at PVNGS (use outside expertise if necessary); include SOER 97-1, SEN 243, IN 88-23, and GL 97-04 / IN 96-55. If the reviews do not meet the above criteria, then expand the sample size. (3.7.7.i) Due: Complete
- Strategy 4 – Operating Experience Process Improvements:
  - Modify the process of reviewing high-tier OE to require independent or backend review, a checklist to assure broad analysis, roles and responsibilities, and other process improvements. (SIBP/SIIP 3.7.4.f, 3.7.7.c, 3.7.4.g, 3.7.7.f, 3.7.7.i, 3.7.7.o, 6.7.16, and 6.7.1)
    - Revise the IOE Program (65DP-0QQ01) to require performance of an independent or back-end technical review of all high-tiered IOE evaluations (for evaluations performed by other than a team or with multiple technical reviews). (3.7.4.f) Due: Complete
    - Develop Checklists for high-tiered OE evaluations (SOER, SEN, SER, IN, etc.) for use during disposition and analysis. This should include guidance for expansive OE review so that personnel do not focus only on the particular conditions identified in the OE report. In addition revise Self-Assessments and Significant CRDR evaluations [guidance or procedures] to include evaluation and emphasize using high-tiered OE. (3.7.7.c) Due: Complete
    - Engineering will apply an independent verification process for the technical quality of high-tiered IOE evaluations for use by all of Engineering (e.g., similar to the modification process or calculation

process). This is only necessary if the IOE evaluation is not performed by a multi-disciplined team. (3.7.4.g and 3.7.7.f) Due: Complete

- Revise the IOE Program (65DP-0QQ01) to provide guidance for ensuring that IOE reviews broadly consider related conditions that could have similar consequences. The problem associated with this action is from some IOE evaluations having narrow focus, i.e., those that zeroed in on the narrow focused questions and not on the broader focused issues or questions of the IOEs. (3.7.7.l) Due: Complete
- Establish a method of checks and balances that verify IOE high-tiered documents are appropriately processed per program requirements (65DP-0QQ01). (3.7.7.o) Due: Complete
- Develop and implement an operating experience screening committee, include criteria, charter, roles / responsibilities for cross-disciplinary review of in-coming (external) operating experience. (6.7.16) Due: 04/18/2008
- Revise 65DP-0QQ01 to include conduct of operating experience elements from INPO 05-05 and 97-011, including in the procedure, roles, responsibilities, and ownership expectations. (6.7.1) Due: Complete
- Performance Improvement Department (PID) will perform or coordinate review of all high tier OE. (SIBP/SIIP 3.7.7.d)
  - The Performance Improvement Dept. will either perform or coordinate all reviews on High-Tiered IOE CRDR evaluations in accordance with the requirements of 65DP-0QQ01 (Industry Operating Experience Review). This includes reviewing the adequacy of scope and rigor as documented within the completed IOE Checklists (Appendix D). This CRAI can be closed once this review process is established. (3.7.7.d) Due: Complete
- Methods and controls to be developed to assure procedure changes made as a result of OE reviews cannot be eliminated without appropriate review. (SIBP/SIIP 6.7.6)
  - Develop/implement methods and controls to ensure that corrective actions taken to address high-tier operating experience (as defined by the 65DP-0QQ01 procedure) are not eliminated without appropriate review. (6.7.6) Due: 08/13/2008
- Evaluated and implemented improved metrics for station OE Program. (SIBP/SIIP 6.7.7)
  - Evaluate and implement metrics/indicators to include station performance on and overall health of the Operating Experience program. (6.7.7) Due: Complete

- Strategy 5 - Review active SOERs for adequate disposition and sustainability of actions. (SIBP/SIIP 6.7.17)
  - Evaluate the SOER listing from INPO and re-evaluate the analysis and corrective actions taken by the station in response to implementing the recommendations. Develop additional actions, if determine previous actions were inadequate or inappropriate, to resolve and ensure that recommendations are properly disposition for the long-term. (6.7.17) Due: 10/15/2008
  
- Strategy 6 - Trained selected Engineering, Operations, Regulatory Affairs and Nuclear Assurance personnel on RAS event and importance of fully addressing high-tier OE. (SIBP/SIIP 3.7.5.dd)
  - Training will be provided to the Palo Verde organization: "RAS event case study." Training will develop the ECCS Sump event as a case study emphasizing how the design configuration escaped detection for over 20 years during various missed opportunities due to ineffective questioning attitude and technical rigor, incorrect mindsets, and tunnel vision. This case study will be presented to non-admin PVNGS personnel, in Operations, Engineering, NFM, OCS Engineering, (Engineering Tech Staff), Regulatory Affairs, and Nuclear Assurance. Include the following in the training (specific issues from the event):
    - That if a technical question cannot be answered with "qualified", "validated", AND "verified", information in a timely manner, then the issue needs to be elevated to the next level of supervision. The amount of QV&V applied, should be commensurate with the potential safety significance of the issue.
    - Individuals will be trained on the importance of ensuring that all issues identified in high-tiered OE reports (per 65DP-0QQ01) and CRDRs (per 90DP-0IP10) are fully addressed, e.g., avoid narrow focus approaches, think in broader terms.
 (3.7.5.dd) Due: Complete
  
- Strategy 7 - Validated Nuclear Regulatory Affairs Procedure technical rigor requirements for incoming NRC documents. (SIBP/SIIP 3.7.4.h and 3.7.7.k)
  - Review the guidance in 93DP-0LC05 (Regulatory Interaction & Correspondence Control) to ensure that adequate technical reviews are performed for responses to Generic Letters, Bulletins and other NRC correspondence. (3.7.4.h and 3.7.7.k) Due: Complete
  
- Strategy 8 - Sampled past OE Digests (previously Tracking Trends) and Topical Reports for adequate evaluation. (SIBP/SIIP 3.7.7.g)
  - A sample of past [Tracking Trends] documents and Topical Reports will be reviewed to determine whether PVNGS should take additional actions to address the conditions identified in the reports. A collective evaluation will be performed of the results of the review to determine whether the sample size should be expanded. (Tracking Trends started in 2002.) (3.7.7.g) Due: Complete

## Focus Area 7 – Limited Experience and Training

- Strategy 1 - For System Engineers, developed a design and licensing bases knowledge assessment and turnover process for assigned systems. Completed incumbent analysis of system engineers per the system engineering handbook work authorization checklist and identified gaps in knowledge. (SIBP/SIIP 3.7.8.h and 3.7.8.i)
  - System Engineering will develop an appropriate system turnover process to include accomplishment of the necessary technical and administrative material prior to turnover. This turnover process will assure engineers review specific system technical and operational information (high risk significant systems first). This includes specific design and licensing requirements (e.g., information from the Technical Specifications, UFSAR, DBM, STM, etc.). The process should be structured to suit both current needs (experienced engineers) and for future needs (inexperienced engineers) and should include provisions for the Legacy Project. (3.7.8.h) Due: Complete
  - Revise the SE Handbook to include the SE Work Authorization Checklist. (3.7.8.i) Due: Complete
- Strategy 2 - Perform remediation of system engineering derived from incumbent analysis gaps. (SIBP/SIIP 3.7.8.i and 3.7.8.b)
  - Review completed System Engineer Incumbent and Section Leader analysis. Develop plan for remediation for areas identified by Jan 30th, 2007 with completion of remediation by June 30th, 2007. (3.7.8.i) Due: Complete
  - Complete remediation in areas identified from incumbent and section leader analysis performed under CRAI 2950481 [that were completed] by June 30th, 2007 (3.7.8.b) Due: 06/01/2008
- Strategy 3 - Developed and implemented a procedure to identify design and licensing basis knowledge gaps among incumbent engineering personnel. (SIBP/SIIP 3.7.8.m, 3.7.8.n, and 3.7.8.o)
  - Based on the review of action taken by System Engineering to address the issues identified CRAI 2825660, it was determined that a similar initiative should be implemented in the Design and Maintenance Engineering departments therefore, a CRAI has been initiated for each Department: Design Engineering I&C/Electrical, Design Engineering Mechanical and Maintenance Engineering to develop and implement a work assignment checklist, similar to System Engineering, for the Engineers assigned to that section. The work assignment checklists most likely will revolve around Topical areas instead of system areas. [Electrical/I&C Design Engineering] (3.7.8.m) Due: Complete
  - Based on the review of action taken by System Engineering to address the issues identified CRAI 2825660, it was determined that a similar initiative should be implemented in the Design and Maintenance Engineering departments therefore, a CRAI has been initiated for each Department: Design Engineering



- Each System Engineer will complete the CBT course ECT01 – Impact of Supporting Systems. [System Engineering Mechanical NSSS] (3.7.8.w) Due: Complete
- Each System Engineer will complete the CBT course ECT01 – Impact of Supporting Systems. [System Engineering Mechanical BOP] (3.7.8.x) Due: Complete
- Each System Engineer will complete the CBT course ECT01 – Impact of Supporting Systems. [System Engineering Electrical and I&C] (3.7.8.y) Due: Complete
- Strategy 7 - Develop and implement improved initial training for engineering personnel on design and licensing basis. (SIBP/SIIP 11.8.4)
  - Conduct needs analysis with engineering management to determine the frequency and content of design and licensing basis training for specific engineering positions. This analysis will also determine the content and method for initial training. (11.8.4) Due: Complete

## **Focus Area 8 – Limited Resources**

- Strategy 1 - Engineering defined the roles and responsibilities of each engineering group to improve focus of activities. (SIBP/SIIP 3.7.9.h)
  - Engineering will define the roles, responsibilities, and expectations of the various departments of the Engineering Organization to Palo Verde. Consider incorporating related INPO guidance. (Note in discussions with investigation team the intent of looking at INPO guide is to capture items to add to roles, responsibilities, and expectations write-up). (3.7.9.h) Due: Complete
- Strategy 2 - Engineering developed a long range staffing plan that included analysis of retirement projections and yearly analysis for hiring through the Legacy Program. (SIBP/SIIP 3.7.9.i)
  - Develop a long-term plan (pursuant to the Legacy Program) for personnel hiring and development to address expected workforce retirements. (3.7.9.i) Due: Complete
- Strategy 3 - Issued for use initial baseload work schedules for Design, Systems, and Component Engineering Departments. (SIBP/SIIP 11.9.A.8)
  - Issue for use initial base load work schedules for Design, System, & Maintenance Engineering Department. (11.9.A.8) Due: Complete
- Strategy 4 - Establish and conduct periodic Engineering work management meetings, between Engineering Leaders and their staffs, to review work prioritization, resource allocation, and schedule dates for assigned work activities. (SIBP/SIIP 11.9.A.9)

- Establish and conduct periodic Engineering work management meetings, between Engineering Leaders and their staff, to review work prioritization, resource allocation, and schedule dates for assigned work activities and incorporate results into the engineering schedule. (11.9.A.9) Due: 04/15/2008
- Other Focus Area 8 Tasks:
  - Monitor performance indicators applicable to the backlog of undispositioned DFs, EDCs and CRDR evaluations assigned to Nuclear Engineering. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied. CRAI 2856973 is being used as an Effectiveness Review related to Engineering Staffing. (3.7.9.a) Due: Complete
  - Assigning the responsibility for performance of modifications to contractors while maintaining a core of experienced design engineers to maintain oversight of the technical adequacy of the work products of the contractors. (3.7.9.c) Due: Complete
  - Develop a Conduct of Engineering procedure. The procedure should include engineering principles and standards. Incorporate a requirement into the Engineering TPD to train on the Conduct of Engineering procedure in initial training and continuing training. (11.8.30) Due: Complete
  - Issue revised expectations for system engineering for monitoring and trending system performance. (1.2.F.1) Due: Complete
  - Revise system eng. handbook to include the expectations identified in task 1.2.F.3 (e.g., trending and monitoring). (1.2.F.4) Due: 04/30/2008
  - Validate/Resolve or delete general Engineering Product Review Board comments on emergent issues impacting preventive activities. Collect data through interviews to determine work or functions not getting done by the various engineering groups. Include potential safety significance and whether any items are not captured in the station corrective action system. (3.7.9.e) Due: Complete

## Focus Area 9 - Limited Nuclear Assurance Department Oversight

- Strategy 1 - The auditing procedure, 60DP-0QQ19, was revised to include the following to ensure that pertinent technical specifications and design configuration issues are reviewed during audits:
  - Ensured that audit scopes include provisions for an in-depth review of LCO-related Technical Specifications, as appropriate to the area being audited, and that audit teams include personnel (auditors or technical specialists with the appropriate engineering or operational expertise. (SIBP/SIIP 3.7.10.a)
    - Revise procedure 60DP-0QQ19 (Internal Audits) [to ensure] that during planning for Nuclear Assurance audits, the audit scopes should include provisions for an in-depth review of LCO-related Technical Specifications, as appropriate to the area being audited. The intent of this in-depth review is to verify the technical specification and related surveillance requirement acceptance criteria are consistent with supporting design and licensing documents. Audits that perform these in-depth reviews should include personnel (auditors or technical specialists) with the appropriate engineering or operational expertise. The overall intent is to perform an in-depth review of all safety-significant Technical Specifications over time during the course of audit performance. During planning for the required biennial Technical Specification audits, the scope of the in-depth reviews performed in other audits shall be used to focus the technical specification audit on selected Technical Specifications which have not had an in-depth review. (3.7.10.a) Due: Complete
  - Required that the underlying issues surrounding the RAS event are discussed in audit pre-job briefings. (SIBP/SIIP 3.7.10.b)
    - NAD should incorporate the streamlined case study from Performance Improvement Department (PID) CRAI 2825482 RAS Case Study and initiate the expectation that it be used during pre-job briefs for audits. Emphasis should be placed on ensuring the proper communications are made of pertinent information (including design information) to responsible organizations. (3.7.10.b) Due: Complete
  - Developed checklists for use in evaluating the adequacy of technical products. (SIBP/SIIP 3.7.10.c)
    - NAD should coordinate with Performance Improvement Department (PID) and incorporate the appropriate information from the checklists developed by Performance Improvement Department (PID) in CRAI 2825483 into audit checklists. See CRAI 2825483 for guidance to be included. These checklists define attributes to be examined during reviews of technical products to determine their adequacy. (3.7.10.c) Due: Complete
- Strategy 2 - Developed and implemented a process to ensure that NAD evaluations are based upon a broad set of inputs, including: plant operating characteristics, NRC issuances, industry advisories, Licensee Event Reports, and other sources of plant

design and operating experience information, including plants of similar design, which may indicate areas for improving plant safety. (SIBP/SIIP 3.7.10.g and 3.7.10.i)

- Determine and implement a process to review from a broad, composite method "plant operating characteristics, NRC issuances, industry advisories, Licensee Event Reports, and other sources of plant design and operating experience information, including plants of similar design, which may indicate areas for improving plant safety." Also determine the method to document these reviews. (3.7.10.g) Due: Complete
- Coordinate this action with CRDR 2820745 which will focus on improving the Independent Safety Reviews. Develop methodology to conduct fewer and more in-depth assessments. The purpose of this action is for the NAD leaders to select specific, high impact activities during the weekly work planning meeting to perform in depth ER's on. (3.7.10.i) Due: Complete
- Strategy 3 - Conducted a detailed stand-down with all Lead Auditors to discuss and reinforce expectations for the conduct of audits and the subsequent reporting of results (interim actions). (SIBP/SIIP 3.7.10.d and 3.7.10.f)
  - Using the Sequence of Events table provided in the evaluation of significant CRDR 2833743 as talking points, conduct a detailed stand-down with all Lead Auditors to discuss and reinforce expectations for the conduct of audits and the subsequent reporting of results. At a minimum, the Director of NAD needs to communicate his expectations regarding the importance of:
    - a. clearly identifying and developing issues/deficiencies,
    - b. leaving emotions and personal opinions out of conclusions,
    - c. clearly stating/wording conclusions based on supporting facts, and
    - d. not putting a positive spin on conclusions because of peer or management pressure, i.e., tell it like it is.(3.7.10.d) Due: Complete
  - Implement post audit conference with each ATL for audits conducted in the 1st quarter to determine if there are any areas where management did not provide the necessary level of support. Implement actions to address any concerns. (3.7.10.f) Due: Complete
- Other Focus Area 9 Tasks:
  - Revise Procedure 60DP-0QQ17 [Conduct of Nuclear Assurance Evaluations] to add instructions for the UFSAR 13.4.4.1 [Independent Safety] reviews based on the prior CRAIs results [Implement CRAI 2833209]. (3.7.10.h) Due: Complete
  - Nuclear Assurance to pilot a NAD Product Review Board, utilizing independent technical expertise, to ensure desired improvements is being achieved. (3.7.10.o) Due: Complete

## Focus Area 10 – Limited Procedural Guidance (DBM Writers Guide)

- Strategy 1 - Identify and resolve limitations of Design Basis Manuals (DBM):
  - Communicated to engineering personnel regarding DBM limitations (interim action) (SIBP/SIIP 3.7.3.q, 3.7.8.k and 3.7.11.b)
    - Engineering to communicate to all potential DBM users, on the possible limitations of the DBMs and measures to effectively use the DBMs. Accuracy of the DBMs may not be 100%; there may be errors of omission (primarily unincorporated EDCs, and other possible omissions) and possibly inaccurate content. Users should QV&V the information with other resources when possible. (3.7.3.q, 3.7.8.k and 3.7.11.b) Due: Complete
  - Revised initial Engineering Tech Staff training to address limitations of DBMs (SIBP/SIIP 3.7.3.o)
    - Revise NGT-91 to communicate the DBM usage limitations to future engineering staff. This CRAI is also related to CRAI 2825641. (3.7.3.o) Due: Complete
  - Add note on DBM cover page on limitations of DBMs and direction to refer to source documents (SIBP/SIIP 3.7.3.h and 3.7.11.a)
    - Add a standard note to the cover page of each design bases manual to require personnel to refer to source documents when developing engineering work products or performing quality activities. (3.7.3.h and 3.7.11.a) Due: 05/22/2008
  - Update the DBM Writer's Guide to provide guidance on addressing interface requirements and Operating Experience reviews (SIBP/SIIP 3.7.3.w)
    - Update 83DP-4CC02, Design Basis Manual Finalization, (developed for the original design basis program) to provide guidance for the inclusion of the interface requirements and method of compliance, the high risk component listing, and an enhanced Industry Operating Experience (IOE) section. The IOE section will include the topic and the Palo Verde response. The guidance will address the following items for the systems with applicable NSSS to BOP design interface requirements:
      - a. Identify and discuss the applicable NSSS to BOP design interface requirements and the associated interface compliance evaluations.
      - b. Establish the system and component related performance interface requirements (e.g., supply x gpm); the required performance parameter shall be identified for each system operating scenario (e.g., large break LOCA, small break LOCA, main steam line break, etc.).

- c. Document the APS design calculations that demonstrate compliance with the interface requirement and the NSSS Supplier calculations identified that establish the analytical basis for the NSSS to BOP design interface requirements. (3.7.3.w)  
Due: 07/25/2008
- o Strategy 2 - Revised the design and technical document control procedure to require personnel changing, or adding a reference to a DBM to thoroughly review the reference document. (SIBP/SIIP 11.6.11)
  - Engineering to revise the 81DP-0CC05 (Design and Technical Document Control) and 81TD-0EE10 (Plant Design and Modification) as appropriate to specify for any changes to the DBMs, any new reference or source documents used for the revision or changes needs to be reviewed in its entirety for pertinent information and not just using abbreviated summary information. This is to preclude using the reference or source documents out-of-context and missing pertinent information. (11.6.11) Due: Complete
- o Strategy 3 - Conducted additional reviews of UFSAR to review effectiveness of CESSAR information incorporation project. (SIBP/SIIP 3.7.11.e)
  - Conduct additional UFSAR reviews using the identified scope. [CESSAR to UFSAR Conversion Project] The reviews should be documented similar to the matrix model concept and criteria from Attachment 2 of CRDR 2726509. See also CRAI 2830487 which contains the matrices for the original systems picked during 2726509. This effort may be modified to integrate with other site reviews. (3.7.11.e) Due: Complete
- o Strategy 4 - Identify and resolve latent design and licensing basis issues:
  - Complete Component Design Bases Review for High Risk components (SIBP/SIIP 11.6.7, 11.6.1.a, 11.6.1.b, 11.6.1.c and 11.6.13)
    - Finalize overall (3 year) scope of CDBR High Risk, low margin components by both a qualitative & quantitative PRA/analysis. (11.6.7) Due: Complete
    - Complete CDBR on High Risk components in the Diesel Generator system. (11.6.1.a) Due: 10/24/2008
    - Complete CDBR on High Risk Components in the Auxiliary Feedwater system. (11.6.1.b) Due: 10/24/2008
    - Complete CDBR on High Risk Components in the Safety Injection system. (11.6.1.c) Due: 09/26/2008
    - Complete Component Design Basis Review Project per project schedule. (11.6.13) Due: 12/31/2010
  - Revise DBMs based upon results. (SIBP/SIIP 3.7.3.x and 3.7.3.y)

- Revise the Design Basis Manuals for systems containing high risk components to incorporate the changes outlined in the revised Design Basis Manual Writer's Guide and other changes that were identified during the project (refer to CRAI 3069703). (3.7.3.x) Due: 11/18/2011
- Create a new Topical Design Basis Manual (DBM) for systems that have NSSS design interface requirements and do not have a system DBM. (3.7.3.y) Due: 11/18/2011

**Attachment 3**

**Key Performance Area 2**

**Unit 3 Emergency Diesel Generator (EDG) K-1 Relay Actions**

**Listing of Specific Tasks and Due Dates**

## Attachment 3

### Key Performance Area 2

#### Unit 3 Emergency Diesel Generator (EDG) K-1 Relay Actions Listing of Specific Tasks and Due Dates

To address root and contributing causes identified in your evaluations in response to the White finding associated with the Unit 3 Train A EDG electrical relay failures. PVNGS will implement the following:

##### SIIP Action Plan 14, "EDG K-1 Relay Event," Strategies 1 through 7

- Strategy 1 - Straightened metal actuator arm in the Unit 3 DG (A) K1 relay to restore sufficient contact compression. Inspected and straightened 5 other DG's K-1 relay actuator arms as necessary. (SIBP/SIIP 3.6.49)
  - ERCFA [Equipment Root Cause Failure Analysis] root cause investigation Report (CRDR 2926830) has identified:

Straightened metal actuator arm in K1 relay to restore sufficient contact compression. (For DG-3A under work order 2926829 and other DG's under work orders 2919670, 2919671, 2919672, 2919666 and 2919673).

The above action was completed as part of ERCFA investigation. This CRAI provides documentation of closure in accordance with 01DP-0AC06. (3.6.49)  
Due: Complete
- Strategy 2 - Updated vendor tech manual and Model Work Scope Library (WSL) revised to ensure proper contactor set-up and DC coil switch cleaning instructions are provided. (SIBP/SIIP 3.6.5, 3.6.47 and 3.6.48)
  - Revise WSL 243880 (or create a new task specifically for the DG FF/K1 contactors) to provide instructions for how to remove/clean the auxiliary contacts, verifying as found/as left contact resistance values for the main/auxiliary contacts, verify proper switching of the main/auxiliary contacts and the need to perform functional testing if components on the FF contactor are removed for any reason. (3.6.5) Due: Complete
  - ERCFA root cause investigation (CRDR 2926830) has identified:
    - "Model Work Scope Library (WSL) 2960093 created to ensure proper contactor set-up and DC coil switch cleaning instructions are provided." The above action was completed as part of ERCFA investigation. This CRAI provides documentation of closure in accordance with 01DP-0AC06. (3.6.47) Due: Complete
  - ERCFA root cause investigation (CRDR 2926830) has identified:
    - "Vendor Technical Manual VTD-P-292-00004 for DG cabinet updated with Engineering Design Change (EDC) 2007-00048 "

(Additional information: This EDC 2007-00048 added additional information for the purpose of providing better detail for the inspection of the K1 DC Coil auxiliary contact module.)

The above action was completed as part of ERCFA investigation. This CRAI provides documentation of closure in accordance with 01DP-0AC06. (3.6.48) Due: Complete

- Strategy 3 - Reviewed PM templates for the DG [Diesel Generator] System to ensure that identified single point vulnerabilities are effectively managed. (SIBP/SIIP 3.6.57)

- Ensure Reliability Centered Maintenance (RCM) templates effectively manage identified single point vulnerabilities (SPVs) on the diesel generator (DG) system. Specifically, determine if maintenance tasks are effective in ensuring DG reliability or if DG modifications are needed. (3.6.57) Due: Complete

- Strategy 4 - Reviewed similar relays in other safety related systems for extent of cause. (SIBP/SIIP 3.6.59 through 3.6.65)

- Identify and classify the components in the PB [Class 1E 4.16KV Power] system designated to have moving parts which break or make contacts and/or physical adjustments which control the actuation of the device. See table in CRAI 3014243 for initial evaluation of components in the PB system.

Determine if the moving part affects the safety function of the device. If the safety function of the device is not affected or there are no adjustments or measurements possible then no further investigation is required.

Evaluate current Palo Verde documentation to determine if dimensional criteria are given for the components. If criteria is given, determine if this criteria verified during PM tasks via WSL documentation.

If dimensional criteria are not found, the vendor will be contacted to attempt to establish this criterion. (3.6.59) Due: Complete

- Identify and classify the components in the PG [Class 1E 480V Power Switchgear] system designated to have moving parts which break or make contacts and/or physical adjustments which control the actuation of the device. See table in CRAI 3014243 for initial evaluation of components in the PG system.

Determine if the moving part affects the safety function of the device. If the safety function of the device is not affected or there are no adjustments or measurements possible then no further investigation is required.

Evaluate current Palo Verde documentation to determine if dimensional criteria are given for the components. If criteria is given, determine if this criteria verified during PM tasks via WSL documentation.

If dimensional criteria are not found, the vendor will be contacted to attempt to establish this criterion. (3.6.60) Due: Complete

- Identify and classify the components in the PH [Class 1E 480V Power MCC] system designated to have moving parts which break or make contacts and/or physical adjustments which control the actuation of the device. See table in CRAI 3014243 for initial evaluation of components in the PH system.

Determine if the moving part affects the safety function of the device. If the safety function of the device is not affected or there are no adjustments or measurements possible then no further investigation is required.

Evaluate current Palo Verde documentation to determine if dimensional criteria are given for the components. If criteria is given, determine if this criteria verified during PM tasks via WSL documentation.

If dimensional criteria are not found, the vendor will be contacted to attempt to establish this criterion. (3.6.61) Due: Complete

- Identify and classify the components in the PK [Class 1E 125V DC Power] system designated to have moving parts which break or make contacts and/or physical adjustments which control the actuation of the device. See table in CRAI 3014243 for initial evaluation of components in the PK system.

Determine if the moving part affects the safety function of the device. If the safety function of the device is not affected or there are no adjustments or measurements possible then no further investigation is required.

Evaluate current Palo Verde documentation to determine if dimensional criteria are given for the components. If criteria is given, determine if this criteria verified during PM tasks via WSL documentation.

If dimensional criteria are not found, the vendor will be contacted to attempt to establish this criterion. (3.6.62) Due: Complete

- Identify and classify the components in the DG [Diesel Generator] system designated to have moving parts which break or make contacts and/or physical adjustments which control the actuation of the device. See table in CRAI 3014243 for initial evaluation of components in the DG system.

Determine if the moving part affects the safety function of the device. If the safety function of the device is not affected or there are no adjustments or measurements possible then no further investigation is required.

Evaluate current Palo Verde documentation to determine if dimensional criteria are given for the components. If criteria is given, determine if this criteria verified during PM tasks via WSL documentation.

If dimensional criteria are not found, the vendor will be contacted to attempt to establish this criterion. (3.6.63) Due: Complete

- Identify and classify the components in the AF [Auxiliary Feedwater] system designated to have moving parts which break or make contacts and/or physical adjustments which control the actuation of the device. See table in CRAI 3014243 for initial evaluation of components in the AF system.

Determine if the moving part affects the safety function of the device. If the safety function of the device is not affected or there are no adjustments or measurements possible then no further investigation is required.

Evaluate current Palo Verde documentation to determine if dimensional criteria are given for the components. If criteria is given, determine if this criteria verified during PM tasks via WSL documentation.

If dimensional criteria are not found, the vendor will be contacted to attempt to establish this criterion. (3.6.64) Due: Complete



- DMWO 3089358-K1 Relays replacement in the EDG control Cabinet XJDGA(B)B02 (x=1,2&3) for all six Class 1E EDG's. Implement mod in all three units and close DMWO paperwork (U1- DIWO 3126811, 3126813), (U2- DIWO 3126815, 3126816), (U3 - DIWO 3126817, 3126818) (3.6.11) Due: 06/30/2009

**Attachment 4**

**Key Performance Area 3**

**Problem Identification and Resolution (PI&R) Actions**

**Listing of Specific Tasks and Due Dates**

## Attachment 4

### Key Performance Area 3

#### Problem Identification and Resolution (PI&R) Actions Listing of Specific Tasks and Due Dates

To address problem identification and resolution issues, PVNGS will implement the following:

##### **SIIP Action Plan 3, "Engineering Technical Rigor," Strategies 3 and 4**

- Strategy 3 - Implement an Engineering Operations Support team with a charter for Operations interface and support on the Operability Determination process. (SIBP/SIIP 4.1.G.16)
  - Implement an Engineering Operations Support (EOS) team with a charter for Operations interface and support on the operability determination process. The charter will include the Engineering function to support assessment of CAP conditions routed through Operations for functionality assessment and potential impact on operability. (Note: This action is complete and was given an 11/30/2007 due date in the SIBP to submit a closure package) (4.1.G.16) Due: Complete
- Strategy 4 - Develop and incorporate Operability Determination training into initial and continuing engineering training. (SIBP/SIIP 5.1.E.3 and 5.1.E.4)
  - Incorporate Operability Determination in Engineering Continuing Training program requirements. (5.1.E.3) Due: Complete
  - Develop and incorporate initial training on Operability Determinations into ETP. Revise the ETP Plan, as needed. (5.1.E.4) Due: 05/31/2008

##### **SIIP Action Plan 6, "Performance Improvement," Part 1, Strategies 4, 6 (Tasks 3.2.5 and 3.3.2), and 10**

- Strategy 4 - Incorporate performance objectives for CAP timeliness and quality into the Performance Management Plans (PMPs) for each position. (SIBP/SIIP 3.5.3.f)
  - Root Cause CRDR 3015327 actions - monitoring for performance. (Major Task)
    - Based on the metrics and standards developed from the Business Plan as directed by CRAI 3037445, develop performance objectives for:
      - 1) Evaluation timeliness and quality
      - 2) Closure timeliness and qualityIncorporated these performance objectives into the PMP for each position. The Corrective action Department will provide the criteria to be incorporated into the PMP from task 3.5.3.d (CRAI 3037445). (3.5.3.f) Due: 06/15/2008
- Strategy 6 - Improve quality and consistency of root and apparent cause evaluations. (SIBP/SIIP 3.2.5 and 3.3.2)





- Phase 4 -- Implement an interactive automated trending program to facilitate identification of developing trends at both the line and site levels. [continuous learning organization] Present to senior management. (Incorporate into Information Services Building Block) (3.4.7.j) Due: 09/19/2009
- Provide training to and engage advocates in the trending process. Evidence of completion will be demonstrated by:
  1. Completing briefing during weekly advocate meeting (attach attendance sheet and topic summary) and
  2. Advocate input to the trend report (develop new section for advocate input) (3.4.7.k) Due: Complete
- Reinststitute the "adverse evaluation." (Major Task)
  - Re-incorporate the "adverse" evaluation process into 90DP-0IP10. (Reference task # 3.4.10.g) (3.4.2.b) Due: Complete
- Review and implement, as appropriate, previously identified process improvements. (Major Task)
  - Improve CAP-related procedures by developing separate procedures for root cause, apparent cause, and common cause analyses. (3.4.9.d) Due: 07/31/2008
- Root Cause CRDR 3015327 actions for process improvements. (Major Task)
  - Revise the CARB Charter and CAP Procedures to require CARB review of closeout actions and documentation for Priority 2 corrective actions. (3.4.10.a) Due: Complete
  - Provide dedicated resources to support ARRC PVAR review and classification activities and ensure that the ARRC is their primary job function. (3.4.10.b) Due: Complete
  - Revise procedure 01DP-0AP12, Palo Verde Action Request Processing, to ensure that Substantive Cross-Cutting Issues identified in NRC Reports and Confirmatory Action Letters are classified as "Significant." (3.4.10.c) Due: Complete
  - Develop and establish procedural Advocate duties and responsibilities to support the Site Integrated Business Plan. Reference CAP Building Block - task 3.2.2.b. (3.4.10.d) Due: Complete
  - Incorporate SMART (SPECIFIC, MEASURABLE, ACHIEVABLE, RELEVANT, TIMELY) Corrective Action development criteria into procedure 90DP-0IP10, Condition Reporting, and into the PVNGS Root Cause Evaluation Manual. (3.4.10.e) Due: Complete
  - Revise the Root Cause Evaluation Manual for Significant CRDR's, based on benchmarking of the industry. The revision should include the following, as a minimum:
    - Update to reflect the PVAR Process
    - SMART Corrective Action Criteria
    - Organizational and Programmatic Assessment Tools

(3.4.10.f) Due: 07/31/2008

- Develop and implement in station CAP procedures an evaluation category for “simple evaluations” that do not require the level of rigor of an ACE but will ensure that minor issues are evaluated and CA’s are determined using a logical and consistent method. (Reference task 3.4.2.b) (3.4.10.g) Due: Complete
- Revise 90DP-0IP10, to require that procedure changes implemented as CAPR’s for significant adverse conditions be annotated. (3.4.10.h) Due: Complete
- Incorporate ACE Qualification requirements into Training Program Description to ensure that ACE evaluations are only assigned to personnel who are qualified. (3.4.10.i) Due: 07/31/2008
- Proceduralize the Station Quality Issues (SQI) reporting mechanism and ensure that it contains a graded, pre-determined sequence of actions for escalation if quality issues are not being resolved by the organization. (3.4.10.j) Due: Complete

**SIIP Action Plan 6, “Performance Improvement,” Part 2, Strategies 2, 4, 6, 7 and 8**

- Strategy 2 - Develop and implement an operating experience screening committee, include criteria, charter, roles/responsibilities for cross-disciplinary review of in-coming (external) operating experience. (SIBP/SIIP 6.7.16)
  - Develop and implement an operating experience screening committee, include criteria, charter, roles / responsibilities for cross-disciplinary review of in-coming (external) operating experience. (6.7.16) Due: 04/18/2008
- Strategy 4 - Develop a process to add OE to work packages. (SIBP/SIIP 6.7.11)
  - Planning Department Leader will develop process which will add operating experience to work packages. (6.7.11) Due: 08/10/2008
- Strategy 6 - Develop and implement controls to ensure corrective actions implemented into procedures, processes, and training to address high-tier OE are not inadvertently deleted. (SIBP/SIIP 6.7.6)
  - Develop/implement method and controls to ensure operating experience, particularly high-tier operating experience as defined by 65DP-0QQ01 procedure, so that corrective actions incorporated into other procedures, processes and training can not be eliminated. (6.7.6) Due: 09/19/2008
- Strategy 7 - Evaluate and implement a robust self assessment and benchmarking process program aligned with industry best practices. (SIBP/SIIP 15.1.2, 15.1.7, 15.1.10, and 15.2.1)
  - Transition current station policy for self-assessment to a station procedure and enhance to include, at a minimum:
    - training requirements for team leaders and team members

- guidance regarding when to enter the self-assessment process, such as declining trends, upcoming assessment/audits, etc.- instructions for conducting self-assessments
- station quality review board, including charter and checklist
- planning and scheduling self-assessments. (15.1.2) Due: Complete
- Develop a process to identify and schedule overall station self-assessments, by department. The process will include submittal of self-assessment plan by department, integration of the plans into a tracking tool, annual review and approval of the station integrated self-assessment plan/schedule. (15.1.7) Due: Complete
- Develop and implement station metrics/indicators associated with self-assessments. Base the indicators on benchmarking activity for industry best practices. (15.1.10) Due: Complete
- Develop guidelines which delineate station benchmarking expectations to include the following actions: (Major Task)
  - Requirements for participation in benchmarking activities including but not limited to: Teleconferences, trips to other utilities, participation in industry committees, INPO, assist and evaluation teams, WANO, and attendance in industry conferences. (15.2.1.a) Due: 05/15/2008
  - Trip report guidance, including lessons learned and recommendations for incorporation of good practices into SWMS. (15.2.1.b) Due: Complete
  - Identify metrics to track benchmarking activities by department and by employee. Provide input to (Performance Improvement Department (PID) for incorporation into the site procedure, as necessary, under task 15.2.2. (15.2.1.c) Due: Complete
  - Identify a process to schedule/track employee participation in INPO/WANO activities by department. Provide input to Performance Improvement Department (Performance Improvement Department (PID)) for incorporation into the site procedure, as necessary, under SIBP task 15.2.2. (15.2.1.d) Due: Complete
- Strategy 8 - Conduct station quality review boards for reviewing and approving self assessment and benchmarking reports. (SIBP/SIIP 15.1.9)
  - Conduct station quality review board for reviewing and approving self-assessment plans and completed reports, as part of the approval process, including a charter, with a minimum outline of roles and responsibilities, type of self-assessment to be approved, quality check, schedule, and review of self-assessment metrics/indicators. Upon completion/approval of the station quality review board, results will be communicated to the station via various methods, examples; leaders digest, HU/IS awareness newsletters, PV Online, etc. (15.1.9) Due: 06/10/2008

**Attachment 5**

**Key Performance Area 4**

**Human Performance Actions**

**Listing of Specific Tasks and Due Dates**

## Attachment 5

### Key Performance Area 4

#### Human Performance Actions Listing of Specific Tasks and Due Dates

To address human performance issues, PVNGS will implement the following:

##### **SIIP Action Plan 9, "Programs/Procedures/Work Instructions," Strategies 4, 5, 7, and 10**

- Strategy 4 – Re-establish a procedures administrative control program and develop upper tier documents for implementation of vital processes and controls for procedural hierarchy. (SIBP/SIIP 12.2.8)
  - Develop and implement upper tier documents to define major processes identified through benchmarking and process mapping (CRAI 3062736). The process documents shall establish management controls necessary to ensure quality procedures are developed and used to support activities at PVNGS. The key elements should include a defined Nuclear Procedures Hierarchy, program sponsorship, and controls consistent with each procedure's safety significance. (reference CRAI 3028938, CRDR 3015926; CRAI 3063627, CRDR 3079100) (12.2.8) Due: 12/15/2008
- Strategy 5 – Identify major programs and processes vital to ensuring performance at PVNGS is maintained. (SIBP/SIIP 12.2.7)
  - Identify the major programs/processes at PVNGS. (Reference CRAI 3028938, CRDR 3015926) (12.2.7) Due: 04/15/2008
- Strategy 7 – Complete Process mapping for development of a PV process inventory infrastructure. (SIBP/SIIP 12.3.2 and 12.3.3)
  - Using a top down approach, create a high level integrated process map of Palo Verde's major processes per the Program Simplification process mapping methodology. (12.3.2) Due: 06/30/2008
  - Based on the results of the high level process mapping sessions and benchmarking conducted in tasks 12.3.1 and 12.3.2, develop Palo Verde's process inventory infrastructure including process owners. (12.3.3) Due: 08/28/2008
- Strategy 10 – Identify and develop SWMS usability improvements. (SIBP/SIIP 16.2.A.4.b and 16.2.A.4.c)
  - Support the ImpACT process improvement efforts by implementing business defined usability improvements and the overall user interface upgrade for SWMS. This requires migration from Oracle 6i client server forms/reports to Oracle 10G web forms/reports. (Major Task)

- Present the proposed plan to provide SWMS usability improvement to Senior Management for review and approval. (16.2.A.4.b) Due: Complete
- Establish funding and schedule SWMS usability improvements for implementation. (16.2.A.4.c) Due: 06/30/2008

**SIIP Action Plan 11, “Human Performance/Industrial Safety,” Part 1, Strategies 1, 2, 6, and 8.**

- Strategy 1 – Revise and implement standards and expectations, including HU fundamentals. (SIBP/SIIP 6.1.1 through 6.1.3, 6.1.6, and 6.1.11)
  - Update Standards and Expectations Preventing Events to include leadership fundamentals, which should include questioning attitude, technical rigor and decision making process. (Major Task)
    - Revised policy for human performance program for inclusion of leadership fundamentals. (6.1.1.a) Due: 11/01/2008
    - Incorporate leadership fundamentals into the HR Performance Management Process (PMP) for enhancing behaviors associated with shift manager, department leaders, section/team leaders and above. (6.1.1.b) Due: 01/09/2009
    - Conduct effectiveness review or self-assessment on the implementation of the standards/expectations for leadership fundamentals. (6.1.1.c) Due: 07/15/2009
  - Update Standards and Expectations Preventing Events to include engineering fundamentals, which should include questioning attitude, technical rigor and decision making process. (Major Task)
    - Revise policy for human performance program for inclusion of engineering fundamentals. (6.1.2.a) Due: 06/30/2008
    - Incorporate Engineering principles and expectations (ref. 11.1) into conduct of Engineering procedure for enhancing engineering staff and leaders behavior. (6.1.2.b) Due: 06/30/2008
  - Develop and implement graded approach to HU error-prevention tools for engineering, which should include questioning attitude, technical rigor and decision making process. (Major Task)
    - Identify station procedures that contain direction for use of HU tools associated with engineering tools and revise as appropriate. Obtain additional resources from engineering as team members and align with resources from performance improvement human performance group. (Reference Engineering Building Block – initiative 11.4) (6.1.3.a) Due: 04/15/2008
    - Identify revised stations standard for graded approach to engineering error prevention tools. (6.1.3.b) Due: 04/15/2008
    - Conduct effectiveness review or self-assessment on the implementation of the engineering human performance tools, standard/expectations for

engineering, and engineering fundamentals observations. (6.1.3.c) Due: 04/15/2009

- Review HU program to include appendix on risk assessment process. Develop additional actions, if appropriate, for implementation and inclusion into other station programs/processes. (6.1.6) Due: 11/15/2008
- Revise and implement standards and expectations, including fundamentals and graded approach to HU tools. (6.1.11) Due: Complete
- Strategy 2 – Implement Observation Program, analyze data quarterly to determine areas for improvement, and identify corrective actions. (SIBP/SIIP 6.2.1.a, 6.5.2.a through 6.5.2.k)
  - Implement Management Observation Program. (Major Task)
    - Implement Observation Program for the station. (6.2.1.a) Due: Complete
  - Conduct quarterly analysis from data demonstrating declining performance associated with site and department indicators, corrective action data, and observation data. Analysis will be conducted with the corrective action program elements, such as apparent cause analysis, root cause investigations, common cause analysis and stream analysis. Individual action for each quarter, 2007-2009, will be generated. (Major Task)
    - Second quarter 2007, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.a) Due: Complete
    - Third quarter 2007, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.b) Due: Complete
    - Fourth quarter 2007, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.c) Due: Complete
    - First quarter 2008, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.d) Due: 04/25/2008
    - Second quarter 2008, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.e) Due: 07/25/2008
    - Third quarter 2008, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.f) Due: 10/25/2008

- Fourth quarter 2008, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.g) Due: 01/25/2009
  - First quarter 2009, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.h) Due: 04/25/2009
  - Second quarter 2009, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.i) Due: 07/25/2009
  - Third quarter 2009, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.j) Due: 10/25/2009
  - Fourth quarter 2009, review and determine if additional analysis is required for declining human performance, including organizational and programmatic trends. Generate and document PVAR/CRDR for trends. (6.5.2.k) Due: 01/25/2010
- Strategy 6 – Develop and implement training for coach-the-coach, including situations awareness, observations, and how to provide feedback skills. (SIBP/SIIP 6.2.4.b and 6.4.4.b)
    - Develop and implement “Coach the Coach” training. (Major Task)
      - Present "Coach the Coach" training concept to the Training Review Group (TRG) prior to 5/1/08 to obtain concurrence on concept, population to receive the training, schedule for development and implementation (to include a "pilot" with comment incorporation) of the training. Define additional actions following TRG review to track the training development, pilot presentation, and presentation due dates for the remaining populations to receive the training on or prior to 5/30/08. (6.2.4.b) Due: 05/30/2008
    - Develop and implement instructor training for reinforcement of human performance and industrial safety behaviors during classroom, lab, simulator, etc. This should include the core and leadership fundamentals, individual department fundamentals attributes and the role of training instructors when changing behaviors. (Major Task)
      - Implement training with training instructors, including some type of hands-on activity to reinforce the HU and IS behaviors. (6.4.4.b) Due: Complete
  - Strategy 8 – Develop Integrated Issues Identification Team (IIIT) to be used in conjunction with coach-the-coach program. IIIT should include cross-functional members, a charter, observation training, field time (physical walk downs), identification of issues. (SIBP/SIIP 6.2.10)
    - Develop Integrated Issues Identification Team (IIIT) to be used in conjunction with coach-the-coach program. IIIT should include a charter, observation

training, field time (physical walk downs), identification of issues, and cross-functional members. Develop additional actions for implementation, as appropriate during the development of the process/team. (6.2.10) Due: 11/15/2008

### **SIIP Action Plan 13, "Training and Qualification," Strategy 3**

- Strategy 3 – Establish guidance for and training on analysis of performance data such as field observations, corrective actions, human performance clock resets and line performance indicators for possible training solutions. (SIBP/SIIP 5.3.A.7 and 5.3.A.8)
  - Establish guidance for analysis of performance data such as field observations, corrective actions, human performance clock resets and line performance indicators for possible training solutions. (5.3.A.7) Due: Complete
  - Provide training on established guidance for analysis of performance data such as field observations, corrective actions, human performance clock resets and line performance indicators for possible training solutions. (5.3.A.8) Due: Complete

**Attachment 6**

**Key Performance Area 5**

**Engineering Programs Actions**

**Listing of Specific Tasks and Due Dates**

## **Attachment 6**

### **Key Performance Area 5**

#### **Engineering Programs Actions Listing of Specific Tasks and Due Dates**

To address problems with the implementation of engineering programs, PVNGS will implement the following:

##### **SIIP Action Plan 2, "Equipment Reliability," Strategies 2, 3, and 6**

- Strategy 2 - Develop and implement a Long Range Planning process which includes major repetitive activities, major modifications, major maintenance activities, appropriate approval processes, and process metrics to measure its health. (SIBP/SIIP 19.1.1.c, 19.1.1.f, 19.1.1.h, and 19.1.14)
  - Implement short-term actions for the establishment of a site-wide long-range plan including: (Major Task)
    - Coordinate with feeder organizations and obtain input on items which should be considered for the long-range plan including major repetitive activities, major modifications, major maintenance activities (outage and on-line). (19.1.1.c) Due: Complete
    - Develop and implement a process for review and approval of items to be included into the long-range plan. Establish a long-range plan committee. The process should include a means to visibly display items which have been proposed for addition to the long-range plan, items which have received preliminary approval pending completion of estimating process, and items which have been formally approved and added to the plan, including resource and costing approval. (19.1.1.f) Due: Complete
    - Develop metrics used to monitor the long-range planning process. (19.1.1.h) Due: 06/27/2008
  - Conduct a focused assessment of the short-term actions implemented in steps task 19.1.1.a-g, and incorporate learnings. Assess the long-range plan to ensure it includes major repetitive activities, major modifications, and major maintenance activities identified by the Plant Health Committee for improving system and component health and these activities are integrated with other major site activities. (19.1.14) Due: 12/19/2008
- Strategy 3 - Revise the Equipment Root Cause of Failure Analysis (ERCFA) program to require that ERCFA level 1 evaluations include consideration and documentation of corrective actions to minimize the likelihood of recurrence including revisions to the PM Program. (SIBP/SIIP 1.2.D.2, 1.2.D.3, and 1.2.D.4)
  - Revise the ERCFA program to require that ERCFA level 1 evaluations include consideration and documentation of corrective actions to minimize the likelihood of recurrence. (1.2.D.2) Due: Complete

- Notify or brief personnel performing ERCFA I evaluations on Corrective Action to Prevent Recurrence (CAPR-04 - CRAI 3065256) and Corrective Action (CA-10 - CRAI 3065259) from the root cause investigation. ERCFA I evaluations will require documentation of the consideration of actions to minimize the likelihood of recurrence. The ERCFA program owner will provide oversight to ensure that ERCFA I evaluations contain this documentation until the ERCFA program/procedure is revised. This is an interim action taken prior to ERCFA program revision. (1.2.D.3) Due: Complete
- Revise the ERCFA program to require that equipment failure analysis will consider the PM program as a barrier to failure. Evaluations shall determine if changes to the PM program are needed, i.e. revision to the PM template scope of tasks or their interval, and document the determination. (1.2.D.4) Due: Complete
- Strategy 6 - Implement a minor modifications process to better address small equipment challenges. (SIBP/SIIP 1.4.2 and 1.4.6)
  - Implement a minor modifications process procedure. (1.4.2) Due: Complete
  - Dedicate resources to implement the minor mods process. (1.4.6) Due: Complete

### **SIIP Action Plan 3, "Engineering Technical Rigor," Strategies 2, 7, 10, and 11**

- Strategy 2 - Develop and train on a Conduct of Engineering procedure. The procedure should include engineering principles and standards. Incorporate a requirement into the engineering Training Program Description (TPD) to train on the Conduct of Engineering procedure in initial training and continuing training. (SIBP/SIIP 11.1.6 and 11.8.30)
  - Identify the target population and provide training on the Conduct of Engineering procedure developed under SIBP task 11.8.30 (CRAI 3065735) to the engineering staff and implement the procedure. (11.1.6) Due: 06/30/2008
  - Develop a Conduct of Engineering procedure. The procedure should include engineering principles and standards. Incorporate a requirement into the Engineering TPD to train on the Conduct of Engineering procedure in initial training and continuing training. (11.8.30) Due: Complete
- Strategy 7 - Establish an Engineering Leader Observation Program that is incorporated within the site observation program as a tool for monitoring and adjusting engineering products, practices and human performance standards and tools. (SIBP/SIIP 11.4.1)
  - Establish an Engineering Leader Observation Program that is incorporated within the site observation program as a tool for monitoring and adjusting engineering products, practices, and human performance standards and tools. (Reference Human Performance Building Block - initiative 6.2) (11.4.1) Due: 06/28/2008
- Strategy 10 - Implement an Engineering work management and scheduling department and issue for use initial base load work schedules for Design, System, & Maintenance Engineering Department. (SIBP/SIIP 11.9.A.1 and 11.9.A.8)

- Implement an Engineering work management and scheduling department. (11.9.A.1) Due: Complete
- Issue for use initial base load work schedules for Design, System, & Maintenance Engineering Department. (11.9.A.8) Due: Complete
- Strategy 11 - Develop a procedure that describes the purpose, conduct, membership, criteria and requirements for using an Engineering Quality Product Review Board.(SIBP/SIIP 11.4.17)
  - Develop a procedure that describes the purpose, conduct, membership, criteria and requirements for using an Engineering Quality Product Review Board. The procedure shall include a requirement to have:
    - Engineering Quality Product Review Board feedback on products reviewed.
    - Metrics to monitor and trend performance. (11.4.17) Due: 06/28/2008

#### **SIIP Action Plan 4 “Design Control/Configuration Management” Strategies 2 and 5**

- Strategy 2 - Improve configuration change processes, including control of temporary changes and train personnel on the improved processes. (SIBP/SIIP 11.7.1, and 11.7.4 through 11.7.6)
  - Revise 01DP-0CC01 to implement the INPO AP-929 model as well as use EPRI based guidance to give simplified configuration change options. (11.7.1) Due: Complete
  - Coordinate with training and maintenance to identify target population within maintenance department on configuration change process. Perform training for identified Maintenance department personnel, as needed. Incorporate into initial and continuing Maintenance training programs as necessary. (11.7.4) Due: 08/29/2008
  - Coordinate with training and Operations to identify target population within Operations department on configuration change process. Perform training for identified Operations department personnel, as needed. Incorporate into initial and continuing Operations training programs as necessary. (11.7.5) Due: 08/29/2008
  - Coordinate with training and Work Controls to identify target population within Work Controls department on configuration change process. Perform training for identified Work Control department personnel, as needed. Incorporate into initial and continuing Work Control (Work Management) training programs as necessary. (11.7.6) Due: 08/29/2008
- Strategy 5 - Implement the CDBR for high risk/low margin components in accordance with the project schedule. (SIBP/SIIP 11.6.1.a, 11.6.1.b, 11.6.1.c, 11.6.7, and 11.6.13)
  - Complete CDBR on High Risk, Low Margin Components in Safety Injection, Diesel Generator, and Auxiliary Feedwater systems. (Major Task)

- Complete CDBR on High Risk components in the Diesel Generator system. (11.6.1.a) Due: 10/24/2008
- Complete CDBR on High Risk Components in the Auxiliary Feedwater system. (11.6.1.b) Due: 10/24/2008
- Complete CDBR on High Risk Components in the Safety Injection system. (11.6.1.c) Due: 09/26/2008
- Finalize overall (3 year) scope of CDBR High Risk, low margin components by both a qualitative & quantitative PRA/analysis. (11.6.7) Due: Complete
- Complete Component Design Basis Review Project per project schedule (reference task 11.6.7). (11.6.13) Due: 12/31/2010

### **SIIP Action Plan 5, "Engineering Programs," Strategies 1 and 6 through 10**

- Strategy 1 - As an interim measure to determine full extent of condition, Engineering is to evaluate what existing programs need to be immediately assessed or assessed near term and complete the assessments. (SIBP/SIIP 1.2.E.21, 1.2.E.22, and 1.2.E.35)
  - As an interim measure to determine full extent of condition, Engineering is to evaluate what existing programs need to be immediately assessed or assessed near term; this evaluation should take into consideration programs that have high risk impact to the plant, potential regulatory risk, and/or programs with temporary or short term ownership. Initiate actions as necessary to implement program assessment commensurate with safety significance. (1.2.E.21) Due: Complete
  - Perform self assessments on all Engineering Programs based on the schedule and criteria identified in the SIBP: #15.1.7 and developed as part of the interim action for CRAI 3065077. (1.2.E.22) Due: 08/20/2010
  - Ensure CRAIs are in place and linked to CRDR 3048870 for each program owner to complete self-assessments using Policy Guide 120 based on the ranking and recommended schedule developed in CRAI 3065077. Specify that each self-assessment will have external expertise on the self-assessment team.
 

It is recommended that the six programs ranked 21 and above be completed as a priority before the end of the second quarter 2008. The 7 programs ranked between 8 and 21 should be completed by the end of 2008. The remaining four programs should be completed in 2009. Reference CRAI 3065077 for details. (1.2.E.35) Due: Complete
- Strategy 6 - Revise the Engineering Program Health Reporting procedure (73DP-0AP05) to address self-assessment expectations, revise metrics using industry input, establish MRM program health indicator rollup presentations, require that program documents are maintained current, and to use change management when modifying engineering programs. (SIBP/SIIP 1.2.E.8, 1.2.E.13, and 1.2.E.16)
  - Revise procedure 73DP-0AP05, Engineering Programs and Health Reporting, to establish oversight of Engineering Program Health utilizing the MRM. Procedure revision will include in the responsibilities section the requirement for the Engineering Department Leader Technical Services (section 2.2) to provide this presentation. (1.2.E.8) Due: Complete



- Complete benchmarking of the Equipment Qualification Program to the INPO Program Guide (EPG-02) and enter an action plan in the corrective action program to address identified improvements. (1.2.E.31) Due: Complete
- Strategy 10 - Based on industry best practices, identify if there are other engineering processes that should be managed as an Engineering Program. (SIBP/SIIP 1.2.E.15)
  - Perform a review of the definitions and scope of what is considered an Engineering Program at other stations. Based on the review and management input, adjust the scope of Engineering activities managed as an Engineering Program in 73DP-0AP05. (1.2.E.15) Due: 06/27/2008

## **Attachment 7**

### **Key Performance Area 6**

#### **Quality of Equipment Evaluations Actions**

##### **Listing of Specific Tasks and Due Dates**

## **Attachment 7**

### **Key Performance Area 6**

#### **Quality of Equipment Evaluations Actions Listing of Specific Tasks and Due Dates**

To mitigate the potential for previous decisions to affect the quality of current evaluations associated with significant equipment problems, PVNGS will implement the following:

##### **SIIP Action Plan 3, "Engineering Technical Rigor," Strategies 5 and 13**

- Strategy 5 – Establish a process to ensure technical information used for key operations, maintenance and regulatory activities contains appropriate engineering review and approval requirements. (SIBP/SIIP 4.1.F.31, 4.1.F.32, 4.1.F.33, and 11.4.15)
  - Develop and implement interim communications from the PVNGS VP of Engineering that Prompt Operability Determinations (PODs) prepared subsequent to April 1, 2008 may not be based upon informal information. In addition, those PODs may not be based upon previous PODs or CRDRs prepared before April 1, 2008 without Engineering review and approval. (4.1.F.31) Due: Complete
  - Revise POD procedure (40DP-90P26) to include the requirements stated in Task 4.1.F.31, above. (4.1.F.32) Due: Complete
  - Review PODs approved prior to April 1, 2008 and currently in effect and initiate necessary corrective actions to bring those determinations into compliance with current standards. (4.1.F.33) Due: 07/01/2008
  - Establish a process to formally provide technical information by the engineering staff. This process should be used in lieu of white papers, emails or verbal responses when the information provided by engineering is used for key operations, maintenance and regulatory activities. This process shall not circumvent the Corrective Action Program (e.g., CRDRs, DFWOs). The process should contain the appropriate engineering review and approval requirements based on type of request. (11.4.15) Due: 09/30/2008
- Strategy 13 – Review selected equipment causal analyses and PMs outside their grace period between January 1, 2002 and December 31, 2007 that could potentially affect plant safety to ensure that those determinations were appropriate from a safety perspective. (SIBP/SIIP 3.2.9.a and 3.2.9.b)
  - Develop and implement plan for review of selected documents reflecting decision-making between January 1, 2002 and December 31, 2007 to confirm that items potentially affecting plant safety were dispositioned consistent with

results that would be achieved under current standards. This plan will include the following categories of determinations: (Major Task)

- Equipment failure causal evaluations performed via CRDRs (excluding “adverse” and “review” CRDRs). The reviews will be performed on the risk significant safety systems. The plan will include review of equipment-related causes, extent of condition, extent of cause (where applicable), and corrective actions. (3.2.9.a) Due: 07/15/2008
  
- Preventive maintenance items currently planned to be performed past their due date plus grace period. The reviews will be performed on the risk significant safety systems. (3.2.9.b) Due: 07/15/2008

### **SIIP Action Plan 6, “Performance Improvement,” Part 2, Strategy 3**

- Strategy 3 - Review and validate site actions taken for high tier INPO/NRC OE. (SIBP/SIIP 6.7.17, 6.7.29 and 6.7.30)
  - Evaluate the SOER listing from INPO (see below) and re-evaluate the analysis and corrective actions taken by the station in response to implementing the recommendations. Develop additional actions, if determine previous actions were inadequate or inappropriate, to resolve and ensure that recommendations are properly disposition for the long-term. [See SWMS for detailed list] (6.7.17) Due: 10/15/2008
  - Perform validation and effectiveness reviews of INPO designated “select” Significant Operating Event Reports (SOERs). Update master SOER spread sheet to document site actions taken for each recommendation to each SOER. (6.7.29) Due: 06/30/2008
  - Develop plan, based on gaps identified in Task 6.7.29, to validate and perform effectiveness reviews on other past high tier OE received from INPO/NRC to include NRC Information Notices and Generic Letters (IN, IEN, GL), INPO Significant Event Notifications (SEN), INPO Significant Event Response (SER), INPO Significant Operating Event Reports (SOERs) not designated “select”, and INPO Topical Reports (TR). (6.7.30) Due: 08/31/2008

**Attachment 8**

**Key Performance Area 7**

**Safety Culture Assessment Actions**

**Listing of Specific Tasks and Due Dates**

## Attachment 8

### Key Performance Area 7

#### Safety Culture Assessment Actions Listing of Specific Tasks and Due Dates

To address the issues identified during your 2007 independent safety culture assessment, PVNGS will implement the following:

##### **SIIP Action Plan 12, "Safety Culture, Strategies 4, 7, 8, 10 and Effectiveness Review Task 4.4.8.b.**

- Strategy 4 - Establish a Safety Culture Team to better focus the site on safety culture and implement a more formal process for periodic evaluation of PVNGS Safety Culture and SCWE. (SIBP/SIIP 4.4.16 and 4.4.10)
  - Establish and implement a more formal process for periodic evaluation of PV safety culture and SCWE by the SC team, HR, Legal, Reg Affairs and mechanisms for reporting results to Senior Mgmt and taking responsive actions. (4.4.16) Due: Complete
  - Establish a specific Safety Culture organization to better focus the site on Safety Culture. The organization should help facilitate the development of improvement actions for Safety Culture issues, and assist in the tracking, closure and follow-up assessment of those issues. (4.4.10) Due: Complete
- Strategy 7 – Develop and implement leadership training on nuclear fundamentals, including: Nuclear Safety, Safety Culture, SCWE, Operations Focus, Safety Culture, and SCWE behaviors for key positions and implement a formal Management Succession Plan. (SIBP/SIIP 2.3.C.1.a, 2.4.A.8, 2.4.B.4, and 4.4.17)
  - Evaluate current leaders, or update recent evaluations, to ensure leaders possess the necessary skills, abilities and behaviors for effective leadership. Establish and implement a process to rate each Palo Verde leader's effectiveness. Define each leader's strengths and areas for improvement. Develop plans for each leader that include expectations for improvement, advancement, or corrective action and include in leader PMPs. The process will include as a minimum the following actions (CA-10 thru 14)  
Evaluations/screening should include director level positions down to first line leaders, assessing areas for improvement and incorporating actions to improve supervisory effectiveness into each individual's Performance Management Plan (PMP). The results of the evaluations are to be used to adjust organization positions, target leaders for succession planning, and address and behavior issues. The evaluation must consider the following:
    - Whether the leader has the skill set and ability to continue in their current position.

- If leaders are identified who lack the necessary skills, consider reassignment or remediation.
- Identify leaders who are chosen to remain in leadership positions and provide training/coaching to develop the necessary skills. (Major Task)
- Establish attributes/competencies for key positions, at a minimum department leaders and above, to include Nuclear Safety, Safety Culture, and SCWE Behaviors. (2.3.C.1.a) Due: Complete
- Develop and implement leadership training to address the following nuclear fundamentals:
  - Nuclear Safety/Safety Culture/Safety Conscious Work Environment
  - Operational Focus
  - Corrective Action Program
  - Core mission and fundamental focus areas
  - Risk awareness/risk significance
  - Accountability
  - Professionalism

Senior Management and Director level leaders should be involved in providing key aspects of this training, as appropriate. Emphasis should be on first line and middle management with each session consisting of diverse mix of leaders (i.e., multi-discipline, multi-organization). (2.4.A.8) Due: 06/30/2008
- Develop and implement a formal Management Succession Plan and associated policy. Include the following elements:
  - PVNGS nuclear leadership standards as identified in the management model
  - Leadership skill set specific to Operational Focus
  - Leadership development plan to support the model
  - Plan to ensure future leaders have fundamental plant knowledge
  - Rotation of selected Operations leaders to other organizations
  - Establish attributes/competencies for key positions, at a minimum department leaders and above
  - Development of compensatory actions for identified gaps to attributes/competencies for key positions
  - Plan should cover a minimum of five years
  - Provide periodic follow-up

(2.4.B.4) Due: 12/17/2008
- Verify that the competencies in 2.3.C.1.a address Nuclear Safety, Safety Culture, and SCWE behaviors. (4.4.17) Due: Complete
- Strategy 8 - Implement specific action plans, including targeted staffing strategies, for each Safety Culture priority group and follow up with other site groups to assure they address safety culture weaknesses in their areas. (SIBP/SIIP 2.2.B.1 through 2.2.B.5, 2.2.B.8, 4.4.35, 4.4.36, and 20.2 through 20.14)
  - Develop a targeted staffing strategy for Operations detailing types of hires, how and where to find and attract needed talent. (2.2.B.1) Due: Complete
  - Develop a targeted staffing strategy for Engineering detailing types of hires, how and where to find and attract needed talent. (2.2.B.2) Due: Complete
  - Develop a targeted staffing strategy for Maintenance detailing types of hires, how and where to find and attract needed talent. (2.2.B.3) Due: Complete

- Develop a targeted staffing strategy for RP/Chemistry detailing types of hires, how and where to find and attract needed talent. (2.2.B.4) Due: Complete
- Develop a targeted staffing strategy for other positions as required detailing types of hires, how and where to find and attract needed talent. (2.2.B.5) Due: Complete
- Develop a (longer-term) targeted staffing strategy for Operations / Engineering / Maintenance / RP / Chemistry and other groups detailing types of hires, how and where to find and attract needed talent. (2.2.B.8) Due: 12/15/2008
- Provide the Safety Culture Driver action plan and the individual departmental Synergy banner report to the applicable Department Leader and above with instructions on completing a discussion with their staffs on Safety Culture. The intent of this discussion is to provide a progress report to frontline on Safety Culture actions, assess the current status of their organization relative to the concerns their frontline had raised, and identify any additional concerns that may require follow-up. The Safety Culture Team will provide a template to use to report out the results of the review. Each department leader or above will present their findings to their Vice President and provide a copy of the report to the Safety Culture Team by April 15th, 2008. (4.4.35) Due: Complete

[Note: Task 4.4.35 provided the information to the applicable leaders to complete the discussion with their staffs. This task is completed as noted above. CRAI'S were issued for each applicable leader with a due date of 4/15/08 to report back on the results. The Safety Culture Team, in Task 4.4.36, will review the findings, determine appropriate adjustments and issue a consolidated report.]

- Obtain feedback from each department that the activity in CRAI 3106479 was completed and what, if any additional actions are required to address concerns within their organization. Review the findings and determine if there are any adjustments that need to be made to the Drivers Action Plan or if additional Priority Groups need to be considered. Assure that any additional actions have been entered into CAP. Consolidate the input into a report and attach to this action to support closure. (4.4.36) Due: 04/30/2008
- Complete the Safety Culture Improvement Plan.  
This CRAI is for: 12. Planning (Maintenance) (20.2.1) Due: 05/15/2008
- Description: Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:
  - 1) An improving trend to the issues contained in this Plan.
  - 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
  - 3) An effectiveness review by the Safety Culture Team.
 This CRAI is for: 12. Planning (Maintenance) (20.2.2) Due: 02/28/2009
- Complete the Safety Culture Improvement Plan.  
This CRAI is for: 9. Finance and Community (20.3.1) Due: 09/30/2008
- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 9. Finance and Community (20.3.2) Due: 02/28/2009

- Complete the Chemistry Safety Culture Improvement Plan for Chemistry (CRAI 3068556). (20.4.1) Due: 08/01/2008
- Close the Chemistry Safety Culture Improvement Plan (CRAI 3068556) based on results of the department's Site Wide Fall 2008 Safety Culture Assessment showing an improving trend to the issues contained in the plan and the department no longer being identified as a Priority Group and completion of an effectiveness review by the Safety Culture Team. (20.4.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: 4. Maintenance Services (20.5.1) Due: 06/30/2008

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 4. Maintenance Services (20.5.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: 7. Training (20.6.1) Due: 05/30/2008

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 7. Training (20.6.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: 8. Operations (20.7.1) Due: 08/28/2008

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 8. Operations (20.7.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: 13. Project Engineering (20.8.1) Due: 12/26/2008

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 13. Project Engineering (20.8.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: 1. RP Operations (20.9.1) Due: 09/30/2008

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 1. RP Operations (20.9.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: 5. Security (20.10.1) Due: Complete

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: 5. Security (20.10.2) Due: 02/28/2009

- Complete the Safety Culture Improvement Plan.

This CRAI is for: Work Management (20.11.1) Due: 08/01/2008

- Close the Plan based on the results of the Department's Site Wide Fall 2008 Safety Culture Assessment showing:

- 1) An improving trend to the issues contained in this Plan.
- 2) The Department is no longer identified as a Priority Group based on the results of the Site Wide Fall 2008 Safety Culture Assessment.
- 3) An effectiveness review by the Safety Culture Team.

This CRAI is for: Work Management (20.11.2) Due: 02/28/2009



- The Apparent Cause Evaluation on Programmatic Weaknesses in PV Programs, Procedures, and Processes - ImPACT FOP 11 and Safety Culture, CRDR 3079100, and its identified corrective [action plan] will include evaluation and action to: ensure appropriate interdisciplinary input and review, review of products and processes to ensure their technical adequacy and to place priority on improvements to the Corrective Action Program and Work Management. (4.4.32)  
Due: Complete
- Effectiveness Review - Complete 2008 Safety Culture Assessment. (4.4.8.b) Due: 11/30/2008

**Attachment 9**

**Key Performance Area 8**

**Standards and Expectations for Performance and Accountability  
Actions**

**Listing of Specific Tasks and Due Dates**

## **Attachment 9**

### **Key Performance Area 8**

#### **Standards and Expectations for Performance and Accountability Actions Listing of Specific Tasks and Due Dates**

To address problems associated with standards and expectations for performance and holding individuals accountable for nuclear safety, PVNGS will implement the following:

##### **SIIP Action Plan 1, "Operational Focus," Strategies 4, 8, 11 and 12**

- Strategy 4 - Identify and review for aggregate impact, imbedded operator-work-arounds and burdens that challenge nuclear safety and institutionalize the process. (SIBP/SIIP 4.1.G.10 and 4.1.G.11)
  - Identify and review for aggregate impact, imbedded operator work arounds and burdens that challenge nuclear safety. Initiate corrective action documents as necessary. (4.1.G.10) Due: Complete
  - Proceduralize periodic aggregate impact reviews for operator work arounds and burdens. (4.1.G.11) Due: Complete
- Strategy 8 - Identify key Operations department attributes and behaviors of an operationally focused organization from INPO 01-002, Conduct of Operations and incorporate them into procedures and training. (SIBP/SIIP 4.1.G.4, 4.1.G.5, and 4.1.G.6)
  - Review INPO 01-002, Conduct of Operations to identify key operations department attributes and behaviors of an operationally focused organization. (4.1.G.4) Due: Complete
  - Incorporate key operations department attributes and behaviors of an operationally focused organization identified in task 4.1.G.4 (CRAI 3064339) into procedures. (4.1.G.5) Due: 05/30/2008
  - Develop Operational Focus training module. Perform a Needs Analysis using the Systematic Approach to Training (SAT) process to determine the training required for establishment of an operationally focused organization. Incorporate into initial and continuing training for licensed operator, non-licensed operator, shift manager, shift technical advisor training programs as well as maintenance, engineering, radiation protection, and chemistry training programs. (Major Task)
    - Operations (licensed operator, non-licensed operator, Shift Manager, and Shift Technical Advisor) (4.1.G.6.a) Due: 06/30/2008
    - Maintenance (4.1.G.6.b) Due: 06/30/2008
    - Engineering (4.1.G.6.c) Due: 06/30/2008

- Radiation Protection (4.1.G.6.d) Due: 06/30/2008
- Chemistry (4.1.G.6.e) Due: 06/30/2008
- Strategy 11 - Develop and implement plans and training to ensure that Operations management defines, communicates, and reinforces Operations Fundamentals such as high professional standards, control board monitoring, communications, and ownership of equipment problems. (SIBP/SIIP 6.11.1 and 6.11.2)
  - To raise standards for operations professionalism and leadership we will perform the following actions. (Major Task)
    - Senior Management will communicate station expectations and industry standards for operations ownership of equipment problems at Palo Verde Station. This will be communicated at the Operations Leadership Seminar. These Seminars will be conducted with Senior Operations and Executive Management. CRAI 3101348 INPO AFI OF.1-1 (6.11.1.a) Due: Complete
    - Incorporate into initial licensed and non-licensed operator training programs the stations expectations and industry standards regarding operations ownership of equipment deficiencies. Perform needs analysis of requisite fundamentals not contained in the knowledge based initial training program. (6.11.1.b) Due: 06/30/2008
    - All available CRS's will attend the INPO Operations Supervisor Professional Development seminar in 2008. (6.11.1.c) Due: 12/31/2008
    - The Operations Director will re-define the roles and responsibilities of the operations leadership team in 40DP-9OP02 "Conduct of Operations". The objective will be to enhance the quality of the oversight, coaching and mentoring of the on shift team. (6.11.1.d) Due: 06/30/2008
  - To raise the standards for control board monitoring, communications, turnover, log keeping, alarm response, peer verification, and operator fundamentals in the control room , the following actions will be implemented: (Major Task)
    - A focused self assessment will be performed to identify the specific weaknesses in operator fundamentals. Weaknesses and areas for improvement from the assessment will be evaluated per the SAT process to determine training needs and/or interventions. (6.11.2.a) Due: Complete
    - Benchmarking will be performed to specifically address current standards for communication of control room alarms, status changes, and expected alarm announcements. (6.11.2.b) Complete
    - Based on benchmark results, ODP-01, "Operations Department Practices", and 40DP-9OP02, "Conduct of Operations", will be revised to reflect industry best practices. (6.11.2.c) Due: 04/30/2008
    - Incorporate changes in ODP-01, "Operations Department Practices", and 40DP-9OP02, "Conduct of Operations" into requal training for operators and operations training instructors. (6.11.2.d) Due: 06/30/2008
    - Develop a lesson plan that provides training communication of control room alarms and status change into initial simulator training. (6.11.2.e) Due: 06/30/2008

- The Operating Crews and operations training instructors will be trained in the changes in standards during cycle 2 of simulator training, communication of control room alarms and status changes will be simulator training and critique focus areas. (6.11.2.f) Due: 06/30/2008
  - An assessment will be performed on the operations team's execution of these performance standards in both the Simulator and on-shift. (6.11.2.g) Due: 07/31/2008
- Strategy 12 - Ensure potentially degraded or non-conforming conditions receive a timely, thorough and appropriately prioritized Operability Determination and provide training for key operations and engineering personnel. (SIBP/SIIP 4.1.F.9 through 4.1.F.27, 4.1.F.34)
- As an interim action to drive consistency during the implementation and training phase of this plan, Operations will dedicate a current or previously licensed SRO (and provide an alternate), to the Corrective Action Program/ Operability Determination Process (CAP-OD SRO). This SRO will have in depth knowledge of Procedure 40DP-9OP26, Operability Determination and Functional Assessment, and NRC RIS 2005-20. The position will be staffed during normal dayshift hours. This position will be staffed until the 40DP-9OP26 changes and IOD training is complete. (4.1.F.9) Due: Complete
  - 40DP-9OP26 will be changed to require a documented Operability / Functionality Assessment for any PVAR on T.S. or T.S. support SSC's. (4.1.F.10) Due: Complete
  - A checklist will be developed and included in 40DP-9OP26 to aid the SRO in making the Immediate Operability Determination. (4.1.F.11) Due: Complete
  - Revise 40DP-9OP26 to have Operations make the initial extent of condition determination. If information is required from other organizations, Operations will communicate to the appropriate department the need and time frame that the information is needed and enter the action in the CAP. (4.1.F.12) Due: Complete
  - All SRO's / STA's will be trained in the IOD process. (4.1.F.13) Due: 06/30/2008
  - All SRO's / STA's will be trained on the IOD process and the recent changes to 40DP-9OP26. (4.1.F.14) Due: 06/30/2008
  - Provide a briefing for ARRC and CARB on the recent changes to 40DP-9OP26. (4.1.F.15) Due: 06/30/2008
  - An Operability Determination process lesson plan will be developed and incorporated into initial License Training that uses actual events for exercises. (4.1.F.16) Due: 09/30/2008
  - A lesson plan will be developed and incorporated into Initial Non-License Training that uses actual events for exercises with emphasis on the importance of Area Rounds and field observations as input to the control room determination of degraded safety systems. (4.1.F.17) Due: 09/30/2008
  - Revise the OD procedure to require documentation of any unverified assumptions and require a corrective action item to validate the assumptions when not able to be validated at the time of the POD. (4.1.F.18) Due: Complete

- Establish dedicated Engineering Support (E-FIN) for the preparation of POD's. (4.1.F.19) Due: Complete
- Perform a "Needs Analysis" using the Systematic Approach to Training (SAT) process to determine the training needs for engineering FIN for POD preparation. Develop the lesson plan for this task. (4.1.F.20) Due: 06/30/2008
- Provide OD training to Engineering FIN team and SRO's/STAs on OD related procedure changes, the standard for technical rigor including critical thinking, and the use of design basis information in support of PODs. (4.1.F.21) Due: 09/30/2008
- As an interim action, establish a daily challenge board, sponsored by the Plant Manager, for IODs and PODs generated in the previous 24 hours/weekend/holiday. A PVAR will be generated and feedback provided to the Shift Manager and engineering FIN for any identified deficiencies. This will continue until training required by this plan is complete as described in CRAI's 3105761 and 3109581. (4.1.F.22) Due: Complete
- Establish a formal qualification requirement for POD preparation and incorporate into the ETP. (4.1.F.23) Due: 09/30/2008
- During the daily OD review process (see CRAI 3105745), the CAP-OD SRO will identify those OD's with loss of CLB design margin and/or use of compensatory measures and add those to the list of significant ODs. This will create a focused list of priority OD's that address conditions on equipment that have lost CLB design margin or depend on compensatory measures. (4.1.F.24) Due: Complete
- Revise the OD procedure to require the Operations Unit Department Leader to periodically review OD's corrective action due dates for those that involve loss of CLB design margin and/or use of compensatory measures and initiate changes to due dates as necessary based on safety significance or aggregate impacts. (4.1.F.25) Due: 06/30/2008
- Revise the Shift Manager Turnover to link the list of significant OD's to the Shift Manager Turnover. The Shift Manager Turnover will require daily review of the Significant OD list. (4.1.F.26) Due: 06/30/2008
- Establish appropriate metrics to monitor Operability Determination performance. (4.1.F.27) Due: Complete
- Established a daily challenge board, as an interim action, sponsored by the Plant Manager, for IODs and PODs generated in the previous 24 hours/weekend/holiday. This action is requesting NAD to perform periodic observations of the challenge board. (4.1.F.34) Due: 05/23/2008

### **SIIP Action Plan 6, "Performance Improvement," Part 1, Strategies 1 and 5**

- Strategy 1 - Develop and communicate Corrective Action Program (CAP) fundamentals for station personnel and for managers and supervisors. (SIBP/SIIP 3.3.3.j)
  - Implement a training program associated with the Corrective Action Program (CAP). (Major Task)

- Develop and communicate CAP Fundamentals for Station Personnel and for Managers and Supervisors. (3.3.3.j) Due: Complete
- Strategy 5 – Develop and implement the Leadership / Management Model and the Accountability Model from the Organizational Effectiveness Root Cause (SIBP/SIIP 2.1.D.5 and 2.1.D.6).

- Develop and implement a Palo Verde leadership/management model. The purpose of the leadership/management model is to establish standards of performance and use them as the basis for improving individual behaviors and station performance.

The leadership/management model should address each of the areas identified by the ImPACT team as fundamental problem areas including the Corrective Action Program, Design Control/Configuration Management, Emergency Preparedness, Engineering Programs, Engineering Technical Rigor, Equipment Reliability, Human Performance, Industrial Safety, Operational Focus, Procedures and Work Instructions, Managing of Plant Workloads and Training and Qualification. Additionally, the leadership/management model should address Nuclear Safety, Accountability, Change Management, Leadership, Operating Experience, Self Assessment/Benchmarking, and Execution and Use of the Management Model. (Major Task)

- Benchmark and develop a leadership/management model that establishes the vision, mission, values and expected behaviors for each of the problem areas identified by the ImPACT team and the additional areas as noted below. Additionally, the management model should address ownership, the Palo Verde core fundamental areas (Plant Equipment, People, Corrective Action Program, Safety, and Knowledge/Training), a mechanism for continuous monitoring and improvement, and metrics to measure effectiveness. (2.1.D.5.a) Due: 06/30/2008
- Develop training to incorporate the expected behaviors for all leaders and frontline workers to ensure personnel understand their roles and responsibilities for each of the management model areas and accountability process. (2.1.D.5.b) Due: 09/30/2008
- Provide training developed under SIBP Action 2.1.D.5.b (CRAI 3075713) to Directors and above. (2.1.D.5.c) Due: 12/15/2008
- Provide training developed under SIBP Action 2.1.D.5.b (CRAI 3075713) to Department Leaders and Managers. (2.1.D.5.d) Due: 03/30/2009
- Provide training developed under SIBP Action 2.1.D.5.b (CRAI 3075713) to Section Leaders and Team Leaders. (2.1.D.5.e) Due:09/30/2009
- Incorporate the expected behaviors from SIBP Action 2.1.D.5.b (CRAI 3075713) into individual mid-year 2009 PMPs for Department Leaders and above. (2.1.D.5.f) Due: 07/30/2009
- Incorporate the expected behaviors from SIBP Action 2.1.D.5.b (CRAI 3075713) into all individual 2010 PMPs. (2.1.D.5.g) Due: 02/15/2010

- Incorporate the expected behaviors from SIBP Action 2.1.D.5.b (CRAI 3075713) into the Observation Program/Workplace Observation tool used by the site to observe work behaviors. (2.1.D.5.h) Due: 11/30/2008
- Benchmark and develop an accountability model/accountability process.  
Note: The actions to implement the accountability model/process (i.e., training of leaders, communication to frontline, use of PMPs, and revising the Observation Program tool) are captured in the actions to develop and implement the management model. (2.1.D.6) Due: 06/30/2008

**SIIP Action Plan 10, “Organizational Effectiveness,” Strategies 1, 6 (Task 2.2.E.1.b), and 9**

- Strategy 1 - Develop and implement a Management Review Meeting (MRM) process for Performance Indicators (PI) to include cross cutting reviews, deep dives, and an accountability process for improving performance. (SIBP/SIIP 8.4.1, 8.4.4, 8.4.5, 8.4.6, and 8.4.15)
  - Implement a Management Review Meeting (MRM) process. Process should include the utilization of site/department indicators to create visible intrusive reviews of site-wide performance. Require multiple discipline/departments to participate in order to create aggregate learnings, address accountability, and improve teamwork within and between organizations. (8.4.1) Due: Complete
  - Develop a process to conduct crosscutting reviews during MRMs including corrective action program, human performance, and safety culture. (8.4.4) Due: Complete
  - Implementation of crosscutting reviews as noted in task 8.4.4 to commence second quarter 2008. (8.4.5) Due: 06/30/2008
  - Develop and implement plan for external senior industry representation on the MRMs. External senior industry leaders will periodically attend MRMs and provide feedback to ensure an external perspective is maintained, to broaden industry knowledge and provide external challenges. (8.4.6) Due: Complete
  - Develop and implement external senior industry representation on the MRMs. External senior industry leaders will periodically attend MRMs and provide feedback to ensure an external perspective is maintained, to broaden industry knowledge and provide external challenges. Note: This action was completed under CRAI 3063857. The purpose of this CRAI is to establish this as a Priority 2 action and to provide closure documentation. (8.4.15) Due: Complete
- Strategy 6 - Develop and implement leadership training to address key nuclear fundamentals and improve overall leadership training. (SIBP/SIIP 2.2.E.1.b)
  - Improve the selection and development of new leaders by completing the following five actions: (Major Task)
    - Evaluate the site portion of current initial and continuing training contained in the supervisory leadership program and provide recommendations for changes to Senior Management. The supervisory leadership training should address the following items, at a minimum:
      - Nuclear Safety/Safety Culture/Safety Conscious Work Environment

- Operational Focus
  - Corrective Action Program
  - Core mission and fundamental focus areas
  - Risk awareness/risk significance
  - Accountability
  - Professionalism
  - Key aspects from the leadership/management model and accountability model/process. (2.2.E.1.b) Due: 09/30/2008
- Strategy 9 - Implement a Safety Culture Team and a Recovery Team (Implementation and Monitoring Team) to assure continued focus on improving PVNGS performance. (SIBP/SIIP 4.4.10 and 8.10.1)
    - Establish a specific Safety Culture organization to better focus the site on Safety Culture. The organization should help facilitate the development of improvement actions for Safety Culture issues, and assist in the tracking, closure and follow-up assessment of those issues. (4.4.10) Due: Complete
    - Utilize the ImPACT team approach and establish a 'recovery team' to support and monitor the integration, implementation and closure of actions in the Site Integrated Business Plan/Site Integrated Improvement Plan. (8.10.1) Due: Complete

## **Attachment 10**

### **Key Performance Area 9**

#### **Change Management Process Actions**

#### **Listing of Specific Tasks and Due Dates**

## **Attachment 10**

### **Key Performance Area 9**

#### **Change Management Process Actions Listing of Specific Tasks and Due Dates**

To define and implement a change management process, PVNGS will implement the following:

##### **SIIP Action Plan 1, “Operational Focus,” Strategy 7**

- Strategy 7 - Develop and implement a site-wide communication and meeting strategy to address site alignment, operational focus, and site-wide penetration of messages (SIBP/SIIP 7.1.B.1 and 7.1.B.5).
  - Develop and implement a site-wide communication strategy to address site alignment, operational focus and site-wide penetration of messages. The strategy should include the following: develop a message priority and cycle time model for internal and external communications to ensure that priority messages are delivered to appropriate audiences and stakeholders for prompt dissemination and action as appropriate. This model will include identification of audiences for message type and method of conveyance. (7.1.B.1) Due: Complete
  - Develop and implement a meeting strategy to help ensure alignment throughout the organization and frontline exposure to senior leadership to include a hierarchy of current meetings, attendees, agendas, and how the meetings contribute to overall information flow. Include alignment meetings for department leaders and above, skip, all-hands and small-group meetings and 2Cs. Coordinate with People Building Block Initiative 2.3.B. (7.1.B.5) Due: Complete

##### **SIIP Action Plan 12, “Safety Culture,” Strategy 9**

- Strategy 9 - Establish a formal process for use of a change management tool and communicate to site personnel the requirements for use of the tool. (SIBP/SIIP 4.4.18, 6.10.1, and 6.10.5)
  - Verify that the formal process for Change Mgmt being established under OE CA-29, task 6.10.1 (CRAI 3076290) requires solicitation of employee input in appropriate cases. (4.4.18) Due: Complete
  - Develop and establish a formal process for use of a change management tool and communicate to site personnel the requirements for use of the tool. (6.10.1) Due: Complete
  - Working with the CNO, issue interim guidance on implementation of the Change Management process to assure that changes being implemented prior to completion of CRAI 3076290 are adequately communicated. (6.10.5) Due: Complete

**Attachment 11**

**Key Performance Area 10**

**Emergency Preparedness Program Actions**

**Listing of Specific Tasks and Due Dates**

## Attachment 11

### Key Performance Area 10

#### Emergency Preparedness Program Actions Listing of Specific Tasks and Due Dates

To address problems with the emergency preparedness program, PVNGS will implement the following:

##### **SIIP Action Plan 8, "Emergency Preparedness," Strategies 1, 3 through 9, and 11**

- Strategy 1 – Revise policy guidance on Emergency Planning to incorporate revised roles and responsibilities. (SIBP/SIIP 9.1.A.1 and 9.1.A.5)
  - Implement Policy and Policy Guide 1503-01 to require ERO Team Members to respond and fill Emergency Plan positions within required timeframes. (9.1.A.1) Due: Complete
  - Revise Policy Guide 150 Emergency Planning. (9.1.A.5) Due: Complete
- Strategy 3 – Emergency Planning to institute alignment meetings between Emergency Response Organization's Emergency Coordinators (EC) and Emergency Operations Directors (EOD). (SIBP/SIIP 9.1.A.22)
  - Emergency Planning instituted alignment meetings between ERO Team ECs and EODs.  
  
This CRAI is initiated to provide closure documentation in support of the initiative 9.1.A actions in accordance with 01DP-0AC06. (9.1.A.22) Due: Complete
- Strategy 4 – Enhance the training program and conduct training for EC's and EOD's on EAL's. (SIBP/SIIP 9.2.A.15, 9.2.A.16, and 9.2.A.22)
  - Conduct training on EALs with EC and EOD qualified individuals. Conduct training on each individual EAL in EPIP-99, Appendix A, Emergency Action Levels with EC and EOD qualified individuals. The training should include terminology, EAL Technical Basis and practice classifications. (9.2.A.15) Due: Complete
  - Ensure the initial training programs for Emergency Coordinators contains training on Emergency Action Levels and their bases. This includes the EC in the control room and the EC in the TSC. (9.2.A.16) Due: 06/15/2008
  - Ensure the continuing training programs for Emergency Coordinators contains biennial training on the Emergency Action Levels. (9.2.A.22) Due: 06/15/2008
- Strategy 5 – Create an EP Training Review Group as well as the appropriate number of Training Advisory Committees and control EP training similar to accredited training programs. (SIBP/SIIP 9.2.A.23, 9.2.A.31 and 9.1.A.33)



- After procedural revision is complete (see CRAI 3065531 – task#9.5.5), provide training on procedure changes to EC qualified personnel. (9.5.6) Due: Complete
- Strategy 11 – Develop a plan for implementation of NEI 99-01 Rev.5 for EAL upgrade and present to Senior Management. (SIBP/SIIP 9.5.1 and 9.5.2)
  - Evaluate implementation of NEI 99-01 strategy and develop recommendations for presentation to senior leadership. (9.5.1) Due: Complete
  - Present the strategy and development recommendations defined in task 9.5.1 (CRAI 3063488) to senior leadership. (9.5.2) Due: 05/30/2008

**Attachment 12**

**Key Performance Area 11**

**Longstanding Equipment Actions**

**Listing of Specific Tasks and Due Dates**

## **Attachment 12**

### **Key Performance Area 11**

#### **Longstanding Equipment Actions Listing of Specific Tasks and Due Dates**

To address the potential for latent and longstanding issues associated with equipment deficiencies (e.g., water intrusion into underground vaults, check valve degradation, and EDG fluid leaks), PVNGS will implement the following:

##### **SIIP Action Plan 2, "Equipment Reliability," Strategy 7**

- Strategy 7 – Establish a site Top 10 process for identifying and prioritizing equipment issues and address specific long-standing issues associated with known equipment deficiencies. (SIBP/SIIP 1.2.A.3, 11.3.1 through 11.3.7, and 11.3.15)
  - Develop necessary program documents to support the Top 10 Technical Issues process including site personnel roles and responsibilities. (1.2.A.3) Due: Complete
  - Develop an action plan to resolve the long-standing issues associated with the Auxiliary Feedwater Steam Admission Solenoid Valve (SG-UV-134A and SG-UV-138A). (11.3.1) Due: Complete
  - Develop an action plan to resolve the long-standing issues associated with the Unit 1 BOP/ESFAS Sequencer. (11.3.2) Due: 04/30/2008
  - Develop an action plan to resolve the long-standing issues associated with the Unit 2 Main Feedwater Pump Oil Seal. (11.3.3) Due: 04/20/2008
  - Develop an action plan to resolve the long-standing issues associated with the Secondary Chemical System Hydrazine Pumps. (11.3.4) Due: 04/30/2008
  - Develop an action plan to resolve long-standing issues associated with the SI System (RWT Air entrainment, HPSI unavailability, SI check valves). RAS issues are to be addressed separately under 95002. (11.3.5) Due: 04/30/2008
  - Develop an action plan to resolve the long-standing issues associated with the Emergency Diesel Generators (2B Fuel Strainer, Air, Oil and water Leaks, etc.). (11.3.6) Due: Complete
  - Develop an action plan to resolve the long-standing issues associated with the Spray Pond Flow. (11.3.7) Due: 04/30/2008
  - Develop an action plan to address program requirements for control of the manholes and vaults. (11.3.15) Due: 04/22/2008

## **Attachment 13**

### **Key Performance Area 12**

#### **Backlog Tracking and Prioritization Actions**

##### **Listing of Specific Tasks and Due Dates**

## Attachment 13

### Key Performance Area 12

#### Backlog Tracking and Prioritization Actions Listing of Specific Tasks and Due Dates

To address problems in backlog tracking systems and prioritization, PVNGS will implement the following:

##### **SIIP Action Plan 2, "Equipment Reliability", Strategy 1**

- Strategy 1 - Revise and implement the plan to complete the Reliability Centered Maintenance (RCM) project. (SIBP/SIIP 1.2.C.11 and 1.2.C.12)
  - Revise and implement the plan to complete the RCM project.  
Include ownership of the project and actions to prioritize and resolve existing backlog of RCM recommendations, and develop repetitive tasks from RCM templates. Develop metrics to ensure visibility to the PHC and MRM and establish periodic reviews to assure completion to project targets. Present and obtain PHC approval for plan.  
  
Complete the RCM project in accordance with the approved plan. (1.2.C.11)  
Due: 09/30/2008
  - Plant Health Committee will review and approve the revised RCM project plan and establish periodic monitoring of plan implementation to ensure ownership, visibility, and accountability. This action is CA-11 for RC-01 in the Equipment Reliability Root Cause Report. (1.2.C.12) Due: Complete

##### **SIIP Action Plan 4, "Design Control/Configuration Management," Strategies 3 and 6**

- Strategy 3 - Inventory engineering backlogs, complete significance reviews, and develop work-off plans. (SIBP/SIIP 11.9.A.4 through 11.9.A.6, and 11.9.A.18)
  - Identify/Inventory Engineering backlogs working with ImPACT team. (Major Task)
    - Mech/Civil Design (11.9.A.4.a) Due: Complete
    - Electrical/I&C Design (11.9.A.4.b) Due: Complete
    - System Eng. (11.9.A.4.c) Due: Complete
    - Maintenance Eng. (11.9.A.4.d) Due: Complete
    - Fuel Management (11.9.A.4.e) Due: Complete
    - Modifications (11.9.A.4.f) Due: Complete

- Procurement Eng. (11.9.A.4.g) Due: Complete
- Complete Significance Review of Engineering Backlog working with ImpACT team. (Major Task)
  - Mech/Civil Design (11.9.A.5.a) Due: Complete
  - Electrical/I&C Design (11.9.A.5.b) Due: Complete
  - System Eng. (11.9.A.5.c) Due: Complete
  - Maintenance Eng. (11.9.A.5.d) Due: Complete
  - Fuel Management (11.9.A.5.e) Due: Complete
  - Modifications (11.9.A.5.f) Due: Complete
  - Procurement Eng. (11.9.A.5.g) Due: Complete
- Ensure that significant latent issues identified in step 11.6.A.5 (if any) are scheduled for completion in the Site Work Management Process. ( Major Task)
  - Mech/Civil Design (11.9.A.6.a) Due: Complete
  - Electrical/I&C Design (11.9.A.6.b) Due: Complete
  - System Eng. (11.9.A.6.c) Due: Complete
  - Maintenance Eng. (11.9.A.6.d) Due: Complete
  - Fuel Management (11.9.A.6.e) Due: Complete
  - Modifications (11.9.A.6.f) Due: Complete
  - Procurement Eng. (11.9.A.6.g) Due: Complete
- Present the results and recommendations of the significance review conducted in task 11.9.A.5 of major engineering backlog categories identified in task 11.9.A.4 and contained in Table 2 of Revision 1 of the Plan for Backlog Significance Review to Senior Management. (11.9.A.18) Due: 06/13/2008
- Strategy 6 - Inventory, plan, and work off backlogs of temporary changes and degraded conditions. (SIBP/SIIP 4.1.G.1 through 4.1.G.3, 11.3.11, and 11.3.14)
  - Complete an aggregate review, utilizing a risk informed determination process such as the [other utility] process, of installed temp. mods, degraded-nonconforming work orders, CRDLs, installed jumpers, operability determinations, number of work orders on safety systems, longstanding permits, OWAs that have been proceduralized, to determine overall impact to operational nuclear safety of the plant.  
This CRAI is for Unit 1 and is related to CRAI 3064336. (4.1.G.1) Due: Complete
  - Complete an aggregate review, utilizing a risk informed determination process such as the [other utility] process, of installed temp. mods, degraded-nonconforming work orders, CRDLs, installed jumpers, operability determinations, number of work orders on safety systems, longstanding permits, OWAs that have been proceduralized, to determine overall impact to operational nuclear safety of the plant.  
This CRAI is for Unit 2 and is related to CRAI 3064337. (4.1.G.2) Due: Complete

- Complete an Aggregate Review, utilizing a risk informed determination process such as the [other utility] process of installed temp. mods, degraded-nonconforming work orders, CRDLs, installed jumpers, operability determinations, number of work orders on safety systems, longstanding permits, OWAs that have been proceduralized, to determine overall impact to operational nuclear safety of the plant.

This CRAI is for Unit 3 and is related to CRAI 3064338. (4.1.G.3) Due: Complete

- Identify and inventory the following items: 1) temporary modifications, 2) temporary jumpers (mechanical and electrical), 3) scaffolding, 4) permits, 5) imbedded Operator Work Arounds, and 6) apparent defacto changes (i.e., non-approved design or configuration changes) and provide to Engineering for input into CRAI 3064842. (11.3.11) Due: Complete
- Engineering develop metrics to facilitate and monitor burn-off of temporary installations identified in task 11.3.13. Incorporate metrics into site performance indicators. (11.3.14) Due: 12/30/2008

### **SIIP Action Plan 7, “Managing Plant Workloads,” Strategy 8**

- Strategy 8 – Identify PVNGS work tracking system backlogs. Screen and perform significance reviews of items contained in the work tracking systems. (SIBP/SIIP 14.2.21, 14.2.22, and 14.2.23)
  - Identify PVNGS work inventory tracking systems. For purposes of this review, a tracking system is defined as a system that is used by a group to track or manage an inventory of work issues. (14.2.21) Due: Complete
  - Screen the tracking systems identified in Task 14.2.21 to identify those tracking systems which are likely to contain items with the following characteristics: (a) potential for activities that are adverse to quality but are not entered into the Corrective Action Program, (b) potential for existence of latent issues affecting the performance or design capability of safety-significant Structures, Systems and Components, (c) potential impact on corrective actions to prevent recurrence, or (d) potential challenge to plant safety or operations. (14.2.22) Due: Complete
  - Perform Significance Review of the items contained in the work inventory tracking systems identified in Task 14.2.22 to identify any significant latent issues or any conditions adverse to quality and enter any such conditions identified into the PVNGS CAP. This review may rely upon sampling if large numbers of items are involved and the likelihood that they include conditions adverse to quality (CAQs) is low. (14.2.23) Due: 06/30/2008

## **Attachment 14**

### **Descriptions of Metrics**

## Attachment 14

### Descriptions of Metrics

The PVNGS Site Integrated Improvement Plan metrics are listed below, along with a brief description of each metric. The correlation of these metrics to the SIIP Action Plans is shown in Attachment 1.

Metric	Description
Status of Core Performance Indicators – Overall Indicator	Shows how many of the PVNGS core performance indicators are in the “Green,” “White,” “Yellow,” and “Red” performance bands, providing an overall indication of trends in PVNGS performance.
Operational Focus Indicator	Shows aggregate impact of various items on the operating units. Items measured include: Operator Work Arounds; Operator Burdens; Lit Annunciators; Control Room Discrepancy Log items; Long-Term Tagouts; Fire System Component Condition Records; Temporary Modifications; Unplanned Entries into Limiting Conditions of Operation; Site Corrective and Elective Maintenance.
Operator Work Arounds	Shows number of Operator Work Arounds, defined as an operator challenge resulting from equipment deficiencies that affects transient plant operations and would require operators to take compensatory actions in order to comply with an Emergency Operating Procedure or Abnormal Operating Procedure
Operator Burdens	Shows number of Operator Burdens, defined as an operator challenge resulting from equipment deficiencies that would require operators to take compensatory measures to comply with normal plant Operating Procedures.
Lit Annunciators	Shows number of Annunciator Discrepancies that involve any annunciator on a main control board that is lit and the condition is not currently under maintenance action or that will be lit for greater than 14 days while maintenance occurs.
Control Room Discrepancy Logs	Shows Control Room Discrepancy Log items (on-line only) that have been open greater than 14 days
Long-Term Tagouts	Shows Tagout Permits that have been in place for greater than 180 days.
Fire System Component Condition Reports	Shows the number of open Fire System Component Condition Reports (FSCCRs) in the power block.
Temporary Modifications	Shows the number of outstanding Temporary Modifications of any age that are not outage-related
Unplanned Entries Into Limiting Conditions of Operation	Shows the number of unplanned Limiting Condition of Operation (LCO) entries per month that would result in plant shutdown within 15 days if not resolved.

Site Corrective Maintenance	Shows number of open Corrective Maintenance (CM) items. CM items include any work on power block Structures, Systems or Components (SSCs) where the SSC has failed or is significantly degraded to the point that failure is imminent (within operating cycle or preventive maintenance interval) and no longer conforms to or is capable of providing the SSCs design function. Excludes maintenance work orders classified as outage (priority 5) or forced outage (priority 6).
Site Elective Maintenance	Shows the number of open Elective Maintenance (EM) items. EM items include any work on power block equipment in which identified potential or actual degradation is minor and does not threaten the component's design function or performance criteria.
Site Chemistry Effectiveness Indicator	Shows the effectiveness of chemistry control of various secondary and primary components as compared to industry standards. Focuses attention on a broad area of fuel and equipment reliability and corrosion mitigation.
Forced Loss Rate	Shows the rate of loss of generation as a result of total planned and unplanned power losses calculated over an 18 month period.
Unplanned Power Change (NRC Indicator)	Shows the number of unplanned power changes that are greater than 20% power per 7000 reactor critical hours.
Unplanned Power Change (PVNGS Site Indicator)	Shows the number of unplanned power changes that are greater than 20% power per 7000 reactor critical hours. This indicator is a leading indicator to monitor PVNGS performance in the NRC green band.
Operability Determination	Shows the quality of Operability Determinations (ODs). The quality is measured by the percent of ODs found acceptable as determined by the OD Quality Board.
Engineering Systems Health Report Total Color Progress	Shows how many of the PVNGS Engineering Systems are in the "Green," "White," "Yellow," and "Red" performance bands, providing an overall indication of trends in PVNGS System Health performance.
CDBR Project Schedule Adherence	Shows monthly progress of the Component Design Basis Review program to ensure the project remains on track.
Quality of the Resolution of CDBR Related Actions	Shows the effectiveness in the resolution of CDBR project-related deficiencies identified in design and licensing basis. The quality is measured by the percent of items found acceptable by third party reviews including Performance Improvement Department, Nuclear Assurance Department and the Corrective Action Review Board.
Engineering CRDR/CRAI Reduction	Shows the number of active Condition Report Disposition Requests (CRDRs) and Condition Report Action Items (CRAIs), including Significant and Adverse, assigned to Engineering for resolution.
Engineering Work Product Quality	Shows the effectiveness of engineering-related technical rigor in their products. The quality is measured by the percent of items found acceptable by third party reviews including Performance Improvement Department, Nuclear Assurance Department, the Corrective Action Review Board (CARB), and the Engineering Products Review Board (EPRB). The EPRB reviews will commence in March 2008.
Engineering Program Health Report Total Color Progress	Shows how many of the PVNGS Engineering Programs are in the "Green," "White," "Yellow," and "Red" performance bands, providing an overall indication of trends in PVNGS Engineering Program Health performance.

CRDR Inventory	Shows the total monthly inventory of Condition Report Disposition Requests (CRDRs). This indicator is a measure of CRDR inventory.
CAP Quality Index	Shows the effectiveness of Root, Apparent Cause and Adverse evaluations and Condition Report Disposition Request (CRDR) closure documents. The quality is measured by the percent of items found acceptable by third party reviews including Performance Improvement Department, Nuclear Assurance Department and the Corrective Action Review Board. The total value is weighted 50% on evaluations and 50% on CRDR closure.
CRDR Evaluation Age	Shows the average time to complete Condition Report Disposition Request (CRDR) evaluations. This indicator measures the station's timeliness in evaluating Significant, Apparent Cause and Adverse conditions.
Average Age of Open Corrective Actions to Prevent Recurrence	Shows the average age of corrective actions determined to prevent recurrence resulting from Significant cause evaluations. This indicator measures the station's timeliness in fixing Significant cause-related conditions.
Timeliness of Operating Experience Screening	Shows the timeliness in the review and evaluation of Operating Experience (OE) identified in high-tier industry OE reports. This indicator trends the percent of items reviewed in accordance with established program timelines dependent on the level of significance of the OE report.
ERO Drill/Exercise Performance (NRC Indicator)	Shows the percent of successful Classifications, Notifications and Protective Action Recommendations in emergency response- related drills and exercises as compared to the associated opportunities.
ERO Drill/Exercise Performance (PVNGS Site Indicator)	Shows the percent of successful Classifications, Notifications and Protective Action Recommendations in emergency response- related drills and exercises as compared to the associated opportunities. This indicator is a leading indicator to monitor PVNGS performance in the NRC green band.
Emergency Drill Participation (NRC Indicator)	Shows the percent of key Emergency Response personnel who have participated in emergency drills over the last eight quarters.
Alert and Notification System (NRC Indicator)	Shows the reliability of the Emergency Response-related Alert and Notification System. The reliability is measured by the percent of operable equipment over a twelve month period.
Online Schedule Adherence	Shows the percent of work activities completed on schedule. This indicator trends the monthly average of weekly work activities completed.
Online Scope Stability T-5 through T-1	Shows the percent of work in scope of a particular target week at five weeks prior to execution against the work remaining in scope the week prior to execution. This indicator trends the effectiveness in the preparation of work activities.

Total/Adverse Procedure Change Inventory	Shows the total inventory of technical procedure changes in progress as tracked by both the corrective action program (adverse) and in the ACT program (non-adverse). The indicator is a measure of the number of adverse procedure changes in working status.
Site Plant Performance Index (Annualized)	Shows the cumulative average of the three units' performance. This indicator measures site performance against a composite of industry standards including: Unit Capability Factor; Forced Loss Rate; High Pressure Safety Injection, Residual Heat Removal and Emergency Power System performance; Unplanned SCRAMS, Collective Radiation Exposure; Fuel Reliability; Chemistry Effectiveness.
Site Clock Reset	Shows the number of monthly events reaching the site threshold for significance averaged over an 18 month period. This indicator measures the site performance against a composite of standards in various areas of safety significance.
Consequential Human Error Rate	Shows the number of human performance-related errors with consequential results per month. This indicator is a measure of site behaviors associated with activities of safety significance.
APS/PVNGS Industrial Safety Accident Rate (ISAR)	Shows a twelve month rolling average of PVNGS utility employee-related injuries per 200,000 man-hours of work resulting in a lost workday, restricted duty or fatality.
Non-Utility Industrial Safety Accident Rate (ISAR)	Shows a twelve month rolling average of PVNGS non-utility employee-related injuries per 200,000 man-hours of work resulting in a lost workday, restricted duty or fatality.
Industrial Safety Work Orders and Average Age	Shows the average number of days to implement industrial safety work orders. This indicator is a measure of the timeliness in addressing industrial safety work orders over a three-month rolling average.