Designated Original

A subsidiary of Pinnacle West Capital Corporation

Palo Verde Nuclear Generating Station

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102-05508-JML/SAB/RJR
June 02, 2006

Dr. B. S. Mallett
Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Dr., Suite 400
Arlington, TX 76011-4005

Dear Sir:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units: 1, 2, and 3
Docket Nos: 50-528, 50-529 and 50-530
Component Design Basis Review Plans

On March 30, 2006, Arizona Public Service Company (APS) senior management met with the NRC to present the comprehensive integrated improvement plan being implemented at PVNGS. As part of that presentation, APS provided an overview of the engineering improvement plan. The engineering improvement plan includes schedules for each action, deliverables and measures of effectiveness to demonstrate the intended result is being achieved by the actions. As with the entire integrated improvement plan, if the intended results are not being achieved, a performance monitoring feedback loop is in place to modify the actions such that the intended result is achieved. As requested, a copy of the engineering improvement plan Revision 5 is attached.

In addition, in that meeting APS presented an outline of a plan to perform a design basis review of the auxiliary feedwater system. In follow-up conversations with the NRC region staff, APS has modified this plan and is committing to perform a component design basis review for PVNGS as defined below. The purpose of the review will be to verify the design bases have been correctly implemented for highly risk-significant components and operator actions. The components and operator actions reviewed will be those with a CDF or LERF Risk Achievement Worth greater than or equal to 2.0 or a Fussell-Vesely value of greater than or equal to 0.005, using the PVNGS Internal-Events and Fire At-Power PRA Model. A qualitative assessment will be used to determine if additional components or operator actions need to be considered based on the risk during shutdown or from external events.

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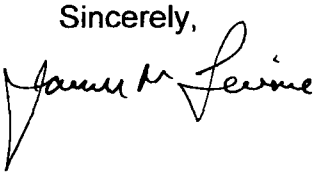
The review will verify the capability of these components to perform their intended safety functions. This evaluation will use the inspection methodologies detailed in NRC Inspection Procedure (IP) 71111.21 dated December 2, 2005. This IP will be used to develop specific review criteria and tasks to be completed including: a detailed design review, an equipment reliability review, selected system and component walkdowns, a review of operating procedures and operator actions, a review of plant modifications associated with the system/component, and operating experience reviews. In addition, interface requirements developed as part of initial design and licensing between the Nuclear Steam Supply System (NSSS) vendor and the Architect-Engineer (A-E) will be verified to be correct, complete and appropriately incorporated into the PVNGS design basis.

A detailed plan for this review is in preparation. APS will review the plan with the NRC region staff in July or August following the completion of the 95002 follow-up inspection and the Unit 1 restart. The review activities will commence in late August or September 2006. APS will implement this component design basis review in two phases. The first phase will include the highly risk-significant components and operator actions as defined above that are in the Mitigating Systems Performance Indicator systems. It is expected that at least 20 of these components and operator actions will be complete by the end of the first quarter 2007. The second phase will include the remaining highly risk-significant components and operator actions as defined above. The plan, which is estimated to take 24-48 months to complete for approximately 250 components and operator actions, will include a schedule for the completion of these activities.

APS is making a commitment in this letter to perform the aforementioned component design basis review. Should you have any questions, please contact Scott Bauer at (623) 393-5978.

Sincerely,



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Attachment- Engineering Improvement Plan, Revision 5

cc: B. S. Mallett NRC Region IV Regional Administrator
M. B. Fields NRC NRR Project Manager
G. G. Warnick NRC Senior Resident Inspector for PVNGS
Nuclear Regulatory Commission, Document Control Desk,
Washington, DC 20555-0001

Attachment- Engineering Improvement Plan, Revision 5

ENGINEERING IMPROVEMENT PLAN (EIP)

Palo Verde engineering management has analyzed inputs from the past two years to determine where improvements in engineering performance and enhancements of existing processes and programs were needed. Those inputs encompassed audit reports, self assessments, corrective action program reviews, trends seen in human performance, and inspection reports from various sources. Benchmarking revealed improvements at other stations in the use of engineering human performance tools, program health metrics, and problem solving that were included as elements of this improvement plan. This plan is targeted to improve engineering work products, reduce backlogs of routine work, improve technical rigor, support improvements in work management, and reinforce more accurate and timely engineering communications internally and externally.

ACTION PLAN OWNER: David Mauldin

1.1 Improve Engineering Leadership, Organization, and Standards

1.1.1 Action Plan Goal:

Engineering has strong leadership and is organized to focus on those engineering tasks warranting greatest attention. Engineering has sufficient personnel to accomplish its assigned tasks and has plans to address expected management and personnel retirement and turnover. Engineering has standards and expectations that include a focus on technical adequacy, prompt evaluation of the significance of adverse conditions, lasting corrective action for adverse conditions, and proactive plans to resolve equipment reliability challenges.

1.1.2 Identification Steps

1.1.2.1 Provide new leadership for Engineering, including

- Appointment of a new Director of Nuclear Engineering with strong management skills. (complete)
- Appointment of a new Director of Nuclear Fuels. (complete)
- Appointment of new department leaders for Maintenance Engineering and Engineering Programs. (complete)
- Assessment of Engineering leaders, including identification of strengths and weaknesses in satisfying engineering standards and expectations, and identification of improvement plans for any weaknesses. (complete)

Concept:
New department leaders will be needed to fill the existing open position in Maintenance Engineering and to lead the new department of Engineering Programs. Engineering leaders, as well as the leaders in other site organizations, are being assessed in order to identify and address any weaknesses. This item may be closed when the new department leaders have been appointed and the assessments of the Engineering leaders have been completed and leader improvement plans have been established as necessary.

1.1.2.2 Reorganize Nuclear Engineering, including

- Creation of an Engineering Programs Department to place more emphasis on engineering program adequacy, use of metrics to monitor program implementation, and enforcement of program requirements.(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, maintain a strong configuration management program, and maintain Design Basis Manuals up to date(complete)
- Defining the roles and responsibilities of Nuclear Engineering organizations and contractors. (complete)

Concept:
The Nuclear Engineering organization is being reorganized in order to place additional emphasis on station support, equipment reliability, and engineering programs. Modification work is being assigned to contractors in order to reduce the heavy workload within engineering and enable a clear focus on core engineering functions needed to support station operating priorities. However, Design Engineering will need to maintain close oversight of the contractors to ensure that the work is performed properly and to maintain configuration control. The reorganization of Nuclear Engineering and delegation of work to contractors will necessitate a redefinition of the roles and responsibilities of the engineering organizations. This item may be closed when the reorganization (including redefinition of roles and responsibilities) is completed.

1.1.2.3 Provide additional personnel for Engineering. In particular, Engineering will:

- Assess its short-term resource needs and add personnel as needed. (complete)
- Develop a long-term plan (pursuant to the Legacy Program) for personnel hiring and development to address expected workforce retirements. (complete)

Concept:
As mentioned above, Engineering has been experiencing high workloads, in part due to attrition. Additional engineers need to be developed and hired to address attrition and

deal with the high workload. Additionally, many engineering personnel are nearing retirement, and attrition may be expected to increase in the long term. Therefore, a long-term plan is needed to prepare to address this long-term trend. This item may be closed when the personnel needed for the short term have been hired, and a long-term plan has been developed.

1.1.2.4 Improve the interfaces between Engineering and other organizations, including:

- Evaluate and initiate methods to improve the interface between Nuclear Engineering and Operations, such as holding periodic interface meetings between Operations to Engineering, and use training in the area of problem-solving and decision-making to improve engineering support and communications with Operations. (complete)
- Establishing and communicating the expectation that Engineering will seek input from licensing and safety analysis personnel on issues that pertain to the licensing basis. (complete)

Concept:
As indicated by recent events such as the response to the unfilled suction piping for the ECCS pumps, timeliness and accuracy of communications between Engineering and Operations needs to be improved to ensure that Operations receives sufficient support to perform its activities in a timely fashion. Additionally, Engineering has sometimes analyzed licensing basis issues without input from safety analysis and licensing personnel. This item is intended to address both of these issues. This item may be closed when methods have been identified and implemented to increase communications between Engineering and other organizations.

1.1.2.5 Revise the engineering handbook in order to provide alignment with site-wide standards and to increase the focus on the need for technical adequacy; qualification, validation and verification; rigor in the operability determination process; identification, evaluation and resolution of adverse conditions; and proactive plans to resolve equipment reliability challenges. (Due 5/15/06)

Concept:
The engineering handbook has not been revised to reflect current station focuses, and reinforcement of engineering principles. The purpose of this item is to update the handbook to provide greater emphasis on the types of behaviors that are needed to reinforce improved human performance, use of new tools, and enhance engineering product quality. This item may be closed when the revision to the handbook has been issued.

1.1.3 Communication Steps

1.1.3.1 Develop a communication strategy to include:

- the reasons for the reorganization of Nuclear Engineering, and the appointment of new department leaders;
- the short and long term plans for hiring new engineering personnel and development of supervisors and managers;
- the need for improved communications across organizations.

This information should be communicated at Engineering Industry Events Training in the 1st Quarter of 2006. (complete)

Concept:
A communication strategy is necessary to ensure these steps are recognized by the staff and are intended to improve organizational performance. A communication strategy consists of necessary elements to determine the appropriate audience, delivery method, means to assess the degree of understanding and methods to adjust the message wherever necessary. Personnel must fully understand the importance of this EIP and the steps to improve in this area. This action step may be closed when a Communication Strategy has been developed and includes the specific topics in the action step.

1.1.4 Training, Coaching and Mentoring Steps

1.1.4.1 Train applicable personnel on the roles and responsibilities of the new departments within Engineering in the 1st Quarter of 2006. (complete)

Concept:
Following the reorganization of Nuclear Engineering, including specification of the roles and responsibilities of each organization and the interfaces with other engineering organizations and contractors, training will need to be provided to essentially all Engineering personnel and to selected personnel in other site organizations to ensure that personnel are aware of the new engineering organizations and their roles and responsibilities. The training for Engineering will need to be more detailed than the training provided to other organizations (which may consist of simple briefings or reading material). This item may be closed when the specified training has been completed.

1.1.4.2 Train Engineering personnel in the 1st Quarter of 2006 on the need for improved communications across organizations and the revised standards and expectations for communications by Engineering. (complete)

Concept:
It is expected that this training will occur as part of the Engineering Industry Events Training and will be received by essentially all personnel within Engineering. The training will discuss the standards and expectations for communications by Engineering with other organizations. In particular, the training will emphasize the need to interact closely with Operations on issues that potentially could affect operability. This item may be closed when the specified training has been completed.

1.1.4.3 Train Nuclear Engineering personnel on the revised engineering handbook in the 2nd Quarter of 2006. (Due – 6/30/06)

Concept:
This training will be provided following revision of the engineering standards handbook. It is expected that this training will occur as part of the Engineering Industry Events Training and will be received by essentially all personnel within Engineering. This item may be closed when the specified training has been completed.

1.1.5 Monitor and Adjust Steps

1.1.5.1 Arrange for an independent assessment of the Engineering leadership and organizational effectiveness in the 3rd Quarter of 2006. (Due - 9/1/06)

Concept:
This assessment will evaluate the new leadership, organization, and standards for Engineering. This review should be conducted by individuals who are not PVNGS personnel in order to ensure a fresh perspective and to provide a comparison against other nuclear plants. This item may be closed when the assessment is complete and the corrective actions for any significant findings are closed.

1.1.6 Acceptance Criteria

1.1.6.1 The results of the independent assessment indicate that the goals for this are satisfied.

Concept:
This item may be closed when the independent assessment is complete and the results are consistent with the goals of this EIP. If the results are not consistent with the goals, Engineering will evaluate the need for further action and assessments (either self-assessments or independent assessments) until the goals are satisfied.

1.2 Improve Technical Adequacy and Rigor

1.2.1 Action Plan Goal:

Design Basis Manuals (DBMs) and the Updated Final Safety Analysis Report (UFSAR) are updated and reflect the current configuration of the plant. Design basis information, including calculations, is accurate and retrievable within a reasonable period to permit timely performance of engineering evaluations that support operability determinations. Engineering personnel are technically rigorous in performing their activities.

1.2.2 Identification Steps

1.2.2.1 Evaluate whether a plan is needed to improve the accuracy of information in the UFSAR. If such a plan is needed, prepare and implement the plan in coordination with Nuclear Regulatory Affairs. (Due 12/31/06)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps included an extent of cause evaluation that identified a number of non-safety-significant discrepancies in the UFSAR. As a result, an evaluation is being conducted to determine whether the number and nature of these discrepancies warrants a broader effort to verify the information in the UFSAR. This item may be closed when this evaluation is completed and, as determined appropriate, a plan has been established and implemented to verify and correct the information in the UFSAR.

1.2.2.2 Update the DBMs (e.g., incorporate outstanding EDCs). (complete)
Review the configuration management process and ensure that it contains appropriate provisions for timely updates of the DBMs. (5/31/06)

Concept:
At the beginning of this year, there were a relatively large number of EDCs that had not been incorporated in the DBMs. The DBMs have since been updated. However, in light of the backlog that existed, the configuration management program should be reviewed and revised as appropriate to ensure that such backlogs do not recur in the future. This item may be closed when the review has been completed and any necessary revisions have been incorporated.

1.2.2.3 Establish a cross-reference from Bechtel calculations to the Combustion Engineering (CE) calculations and interface requirements that provide the basis or input for the Bechtel calculations. This will be performed on a risk significant basis as part of the Palo Verde Component Design Basis Review (CDBR) plan. (Due date to be determined as CDBR plan progresses)

Concept:
During the recent 95002 inspection by the NRC, Nuclear Engineering had difficulty in retrieving CE calculations that provided input for Bechtel calculations that pertained to an operability question. This item is intended to establish a system of cross-references from the Bechtel to the CE calculations to facilitate retrieval of relevant CE calculations in the future. This effort will focus on those calculations that have high safety significance (MSPI systems and components and HRSSCs with high risk worth values). This item may be closed when the cross-references have been verified to be accurate and complete as part of the Component Design Basis Review project, and calculations needing update or clarification identified, prioritized, and corrective actions completed.

1.2.2.4 Improve the accuracy of information in existing calculations, and verify the completeness, accuracy and interrelationship of calculations between A-E and NSSS supplier documentation:

- Prioritize calculations needing corrective action as part of CDBR.
- Complete calculation-related corrective actions for MSPI SSCs and Maintenance Rule HRSSCs as the initial effort.
- Determine whether to expand the calculational improvement effort for other SSCs.

(Due date to be determined as part of CDBR effort)

Concept:
Errors have been found in several calculations during analyses and investigations of plant conditions. These errors were not safety-significant; i.e., they did not affect operability or functionality. However, in order to provide additional assurance regarding the adequacy of the calculations, Nuclear Engineering has determined that a review should be performed to verify that the accuracy of the information in the calculations. Initially, this verification will be conducted on calculations as part of the CDBR effort that have high safety significance. If no safety-significant conditions are identified, this item may be closed. However, if safety-significant errors are identified, Nuclear Engineering will determine whether the review should be expanded to include more SSCs to provide sufficient confidence in the quality of the calculations.

1.2.2.5 As part of the site-wide effort, improve the technical rigor and questioning attitude of Engineering personnel. (complete)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a root cause involving a need for improved technical rigor and questioning attitude, including by Engineering. This CRDR included a number of corrective actions in this area. This may be closed when the applicable corrective actions required by CRDR 2726509 have been closed.

1.2.2.6 Develop and implement a plan for improving qualification, validation & verification (QV&V) of engineering products. (complete)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a root cause pertaining to a need for improved technical rigor and questioning attitude. In order to help ensure that engineers routinely apply adequate technical rigor and questioning attitude, a more rigorous QV&V process is warranted. The purpose of this item is to develop a plan for engineers to routinely apply QV&V for the products and information they provide. This item may be closed when the more rigorous QV&V methods have been established.

1.2.2.7 Evaluate and develop a method (Engineering Products Review Board) for providing independent review and grading of engineering work products as a means of determining whether work products are improving and as a means of providing feedback and lessons learned to preparers of work products to enable them to improve. (complete)

Concept:
In order to provide objective (rather than anecdotal) evidence of improvement in work products, it is necessary to measure or grade work products and trend the resulting grades. Additionally, through grading work products, it is possible to provide feedback to preparers to enable them to learn, avoid repeat errors, and improve their products. This item calls for evaluating various methods for accomplishing this goal. For example, the reviews could be in-line reviews or reviews of final products, the reviews could address 100% or a sample of engineering products, or the reviews could focus on particular types of engineering work products. For example, Palo Verde already uses an Engineering Review Board to evaluate modifications, and this concept could be expanded to provide for grading of modifications, and could be expanded to include other types of work products. Another possibility would be to use contractors to provide for periodic (e.g., quarterly) reviews of selected work product. Another possibility is to use a concept developed by FirstEnergy, which uses an Engineering Assessment Board to provide an in-line review and grading of Engineering products. Regardless of which process is selected, the process should provide for consistent reviews and grading, and provide feedback to the preparers (both an individual basis and generically) to foster further improvement. This item may be closed upon completion of the evaluation and development of the method.

1.2.2.8 Evaluate and develop additional measures or controls to ensure the adequacy of engineering work in cases where there is a need for the work product in a short time frame. (complete)

Concept:
When there is a need for a work product in a short time, it is more likely that the personnel who are preparing the product will make a mistake, overlook an issue, or take short-cuts. This item is intended to develop additional measures or controls in order to

reduce the potential for such errors or to detect and correct such errors should they occur. Various possible measures and controls to evaluate include up-front management briefings to identify the steps that need to be taken and issues that need to be addressed in preparing the work product, checklists to guide the work, back-end reviews by management or review boards to ensure that the necessary issues have been addressed, and/or independent verification. The measures or controls selected should be consistent with the need to produce the final product within a short period. This item may be closed when the evaluation is completed and additional measures or controls have been established.

1.2.2.9 Improve safety and design margins as part of the Component Basis Review (CDBR) efforts (see 1.2.5.1). As the CDBR effort proceeds, identify SSCs with low safety and/or design margins and generate actions to improve unsatisfactory margins by implementing cost-effective modifications or analytical/calculational changes to improve those margins. (Due date tied to CDBR actions, section 1.2.5.1)

- identification of systems and components with little safety margin and high risk significance
- evaluation of whether there are cost-effective modifications or analytical changes to improve the safety margins of those systems and components; and
- implementation of cost-effective modifications or changes in analyses. (Due date TBD as CDBR progresses)

Concept:
The purpose of this item is to identify and implement cost-effective modifications or analytical changes to improve safety margins. This effort will focus on those systems which have the highest risk significance. Systems that contribute relatively little to risk or that already have high safety margins will not be evaluated further. This item may be closed when the modifications and analytical changes are completed.

1.2.2.10 As part of the site-wide effort, improve the implementation of the requirements in 10 CFR 50.59. (complete)

Concept:
In 2004, PVNGS identified the need for improvement in its 50.59 process and the implementation of that process. As a result, PVNGS developed a plan in 2005 to achieve improvements in this area. Engineering plays an important role in this process and in the improvement plan. The purpose of this item is simply to track the implementation of the 50.59 improvement plan that was established independently of the PIP. This item may be closed when the 50.59 improvement plan has been fully implemented.

1.2.3 Communication Steps

1.2.3.1 Develop a communication strategy to include:

- The need for technical rigor. (complete)
- Description of the cross-references between Bechtel and CE calculations and interface requirements. (5/31/06)
- Modifications to improve safety margins. (complete)
- The need for improved QV&V. (complete)

Concept:
A communication strategy is necessary to ensure these steps are recognized by the staff as intended to improve organizational performance. A communication strategy consists of necessary elements to determine the appropriate audience, delivery method, means to assess the degree of understanding and methods to adjust the message wherever necessary. Personnel must fully understand the importance of this EIP and the steps to improve in this area. This action step may be closed when a Communication Strategy has been developed and includes the specific topics in the action step.

1.2.3.2 As part of the site-wide effort, communicate the need for a questioning attitude. (complete)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a root cause involving a need to improve technical rigor and questioning attitude. The corrective actions for this CRDR included communication of the need for technical rigor and questioning attitude. This item may be closed when the communication required by CRDR 2726509 has been completed.

1.2.4 Training, Coaching and Mentoring Steps

1.2.4.1 Improve knowledge of the design and licensing basis by Engineering personnel by:

- Providing training in the 1st Quarter of 2006 on the hierarchy of design and licensing basis documents. (complete)
- Developing material for engineers, providing specific system technical and operational information, including specific design and licensing requirements. (Due Date 9/30/06)

Concept:
It is expected that the training on the hierarchy of the design and licensing basis documents will occur as part of the Engineering Industry Events Training and will be received by essentially all personnel within Engineering. This training will define and explain the relationship among the licensing basis, the design basis, and design basis information (such as calculations). This part of the action step may be closed when the specified training has been completed.

The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a weakness involving training of engineers. The corrective actions for this CRDR included development of material for engineers, providing specific system technical and operational information, including specific design and licensing requirements. This material should be structured to suit the current needs of experienced engineers and for inexperienced engineers. This part of the action step may be closed when the material required by CRDR 2726509 has been developed and has been provided to those existing engineers that need it.

1.2.4.2 As part of the site-wide effort, provide training to Engineering personnel on the need for a questioning attitude. (complete)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a root cause involving a need to improve technical rigor and questioning attitude, including by Engineering. This CRDR included a number of corrective actions in this area, including training. This may be closed when the specified training for Engineering has been completed.

1.2.4.3 Provide training to Engineering personnel on:

- The need to verify calculations and interface accuracy and completeness between Bechtel and CE documents.
- The need for technical rigor and the improved process for QV&V.
- The process for independent review and grading of engineering work.
- The additional controls to ensure the adequacy of engineering work performed under short time constraints. (complete)

Concept:
This training is intended to be provided to essentially all personnel within Engineering to ensure that they are aware of the new processes developed and are able to use them. This item may be closed when the specified training has been completed.

1.2.4.4 Provide training to selected engineering personnel on techniques for effective communication with NRC personnel and ensuring that NRC has the information it needs to perform its responsibilities. (complete)

Concept:
From time to time, engineers need to communicate with NRC inspectors and reviewers. In the past, this communication has not always been effective. This item is intended to identify those engineers and engineering leaders who are likely to need to communicate with the NRC and to provide them with effective communication techniques. It is expected that this training will include the need to provide the NRC with complete and accurate information, avoiding defensive responses and maintaining a professional demeanor, techniques for telling the NRC that the necessary information is not yet available and follow-up with the NRC when the information becomes available, tracking

and supplying information needed by NRC, avoiding speculating with the NRC, etc. This training will also address the interface between Engineering and Nuclear Regulatory Affairs, and the involvement of Nuclear Regulatory Affairs in oral communications between Engineering and NRC. This item may be closed when the specified training has been completed for the selected engineers.

1.2.5 Monitor and Adjust Steps

1.2.5.1 Perform a Component Design Basis Review (CDBR) for MSPI SSCs and other HRSSCs with a Risk Assessment Worth of greater than 2, and for HRSSCs with a Fussell-Vesely value greater than 0.005 as defined by the Palo Verde specific CDF and LERF analyses. (Due Date TBD)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a corrective action to perform annual safety system functional inspection for the next five years. This corrective action is being modified to address the risk significant SSCs with the greatest risk worth, and to ensure design basis information, testing requirements, operational procedures, system configurations, and calculations are accurate. Interface requirements between A -E documents and NSSS Supplier documents will be verified to be accurate and complete as well. The CDBR plan will be developed according to guidance provided in NRC IP 71111.21 and implemented in a phased approach for those HRSSCs identified above.

1.2.5.2 Using the method for reviewing and grading engineering work products, develop a performance indicator and goals for the quality of engineering work products. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied. (Due date 5/30/06)

Concept:
The intent of this item is to monitor the quality of ongoing engineering work activities. This item may be closed when the performance indicators show sustained performance improvement.

1.2.5.3 Monitor the performance indicators for noteworthy events and significant events caused by engineering human performance errors. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied. (Existing ongoing activity)

Concept:
Engineering already has established performance indicators and goals for noteworthy events and significant events caused by engineering human performance errors. These indicators will continue to be implemented and therefore this will be an ongoing activity without a termination point.

1.2.5.4 As part of the site-wide effort, perform periodic assessments of human performance by Engineering. (Human Performance monitoring is accomplished in departmental monthly performance indicators)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a need to improve human performance, including by Nuclear Engineering. The corrective actions for this CRDR included annual assessments for five years of human performance. This item may be closed when these assessments required by CRDR 2726509 have been completed.

1.2.5.5 Monitor the errors in the UFSAR, DBMs, and calculations. (Due date 12/31/06)

Concept:
Such errors shall be documented on CRDRs. It is expected that there many be occasional errors in the UFSAR, DBMs, and calculations. Such errors are significant if they impact the operability of an SSC, or if the number is so large that it calls into question the overall reliability of the UFSAR, DBMs, and calculations. The monitoring will focus are whether there are any significant errors or numerous errors that warrant extent of condition or cause reviews of past engineering products. This item may be closed if there are not significant or numerous errors during the next two years.

1.2.6 Acceptance Criteria

1.2.6.1 The CDBR plan is executed and does not identify, or results in resolution of, issues found for the scope of HRSSCs identified as the targeted effort:

- Generic or widespread problems regarding the accuracy or currentness of the UFSAR, DBMs, or calculations, or the retrievability of calculations are corrected or dispositioned to not be impactive to the Licensing Basis.

Concept
The purpose of this item is to assess the results of the reviews and inspections performed and to take any necessary corrective actions. If any significant conditions are identified, corrective and preventive action will be necessary, including identification of the extent of condition and cause. Similarly, if numerous errors are identified, an extent of condition and cause evaluation may be warranted. This item may be closed following completion of the review and inspections and corrective action for any safety-significant conditions or numerous errors.

1.2.6.2 The quality of the engineering work products being produced satisfies the goals established.

Concept:

This item may be closed when the goals have been satisfied for a sustained period with a positive trend.

1.2.6.3 The number of noteworthy events and significant events caused by engineering human performance errors per year is less than or equal to 10 and 0, respectively.

Concept:
These acceptance criteria reflect the existing goals for Engineering. This item may be closed if the acceptance criteria are met for a period of two years.

1.2.6.4 There are no cases in which a safety significant SSC was rendered inoperable or non-functional, or an inoperable or non-functional safety significant SSC was not identified and corrected, due to a lack of technical rigor or insufficient questioning attitude.

Concept:
Deficiencies are not safety-significant if they do not affect operability or functionality. If any safety-significant conditions are identified due to errors by Engineering, corrective and preventive action will be necessary, including identification of the extent of condition and cause. This item may be closed if no operability or functionality issues are identified for two years due to errors by Engineering,(non-historical errors), and if there are no cases in which Engineering should have, but did not, identify or correct an inoperable or non-functional SSC in a timely fashion.

1.2.6.5 There are no cases in which a safety significant SSC is inoperable or non-functional due to an error in the UFSAR, DBMs, or calculations, produced after training and implementation of EDG-01 and EDG-02.

Concept:
Deficiencies are not safety-significant if they do not affect operability or functionality. If any safety-significant conditions are identified, corrective and preventive action will be necessary, including identification of the extent of condition and cause. This item may be closed when no such errors have been identified in the UFSAR, DBMs, and calculations for a sustained period with a positive trend in documentation quality.

1.3 Improve Evaluation and Resolution of Adverse Conditions

1.3.1 Action Plan Goal:

Engineering utilizes a systematic and conservative process for solving problems and making decisions. Engineering promptly documents and informs Operations of nonconforming and degraded conditions, and supplies Operations with sufficient information to make operability determinations for such conditions. Engineering uses a rigorous approach for identification of the causes of such conditions and develops corrective actions to prevent recurrence. Engineering thoroughly evaluates new reports of operating experience, and utilizes existing reports of operating experience in its day-to-day activities.

1.3.2 Identification Steps

1.3.2.1 Improve problem-solving and decision-making in Engineering using the following process:

- Benchmark other plants with problem-solving and decision-making procedures (e.g., FirstEnergy). (complete)
- Based upon the results of the benchmarking, develop a process for Palo Verde. This process should include, for example, review of relevant operating experience. (complete)

Concept:
The intent of this item is to develop a formal problem-solving and decision-making process in Engineering to provide a structured process for evaluating adverse conditions and events. Other utilities, such as FirstEnergy, have such a process that has been effective when properly implemented. It is expected that the process will provide a graded-approach to problem solving, with more resources and formality being applied to resolve issues with higher safety-significance. For example, for high risk significant issues, it is expected that multi-disciplinary teams be established with checklists to guide their investigation and evaluation of issues. This item may be closed when the process has been established.

1.3.2.2 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. (complete)

Concept:
Over the last year, issues have been identified with the implementation of the OD process by Engineering, including the timeliness of the communication of the issue involving the unfilled ECCS suction piping to Operations, and the quality of the information being provided by Engineering to Operations to support ODs. Additionally, the NRC has recently issued RIS 2005-20, which includes a substantial revision to NRC's guidance for performing ODs on nonconforming and degraded conditions. The purpose of this item is to revise the OD process to account for NRC's new guidance, and to incorporate lessons learned from recent events at PVNGS to improve the performance of Engineering in the OD process. For example, it is expected that the revised OD process will include a checklist to provide a more structured approach for Engineering to identify and communicate issues warranting ODs and to provide Operations with sufficient information needed to make ODs. This item may be closed when the revised OD process has been established.

1.3.2.3 Improve engineering involvement in the problem identification and resolution process by developing guidance on:

- When to prepare Condition Report/Disposition Requests (CRDRs)(complete)
- Brief engineering personnel on the use of CRDR templates to improve CRDR quality. (5/31/06)
- Identification of causes and extent of condition evaluations when appropriate. (5/31/06)
- Transportability Evaluations, including implications of an inoperable SSC on the operability of other similar or redundant SSCs (this topic is discussed in RIS 2005-20 and NUREG-1022)(5/31/06)
- When to perform technical evaluations in the evaluation phase of problem or issue identification (rather than documenting calculations or analyses in CRDRs). (5/31/06)

Concept:
Events over the last year have indicated that there is a need for improvement by Engineering in the corrective action process. The purpose of this item is to provide guidance to Engineering for achieving such improvement. In particular, this guidance should provide examples of the types of issues that warrant CRDRs, and should encourage Engineering to prepare CRDRs in cases in which there is uncertainty whether an adverse condition exists at PVNGS (in which case, the problem description in the CRDR should clearly indicate that the CRDR is documenting a question, and not an adverse condition). Additionally, there have been occasions in which Engineering has focused on correcting symptoms rather than identifying and correcting the causes, and this guidance will provide tools to assist Engineering in identification of causes. Additionally, the transportability evaluations (extent of condition and extent of cause reviews) by Engineering have not always been comprehensive. This item will provide guidance to facilitate such reviews to ensure they are appropriately comprehensive. In this regard, there are sometimes situations in which one component is inoperable due to

a cause that is applicable to another similar component (e.g., unqualified grease used in two similar components), with the result that there may not be reasonable assurance that the other component is operational. This guidance will address such situations and provide directions for handling them in accordance with NRC guidance such as NUREG-1022 and RIS 2005-20. Finally, there have been occasions in which Engineering has included analyses or calculations in the body of a CRDR to resolve an adverse condition, rather providing a stand-alone analysis or calculation and then referencing it in the CRDR. This practice could result in a loss of control of or difficulty in retrieving the analysis or calculation. The guidance will address the situations in which a stand-alone analysis or calculation should be prepared. This item may be closed when the guidance is issued.

1.3.2.4 Improve Engineering evaluations and use of operating experience (OE) by:

- Implementation of the site-wide actions to improve evaluation of OE. (6/30/06)
- Developing guidance specifying when OE should be used in day-to-day engineering activities, such as development of corrective actions, modifications, performance improvement teams, etc (6/30/06)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a weakness in the OE program and its implementation, including implementation by Engineering. The corrective actions for this CRDR included a number of actions to improve the OE program and its implementation. This part of the action step may be closed when these actions required by CRDR 2726509 have been completed.

In addition, OE can provide valuable information for identifying possible solutions to problems and in avoiding mistakes in day-to-day activities. Therefore, in addition to the OE program, engineering should refer to OE in its day to day activities, such as development of corrective actions and modifications, performance improvement team activities, etc. This part of the action step may be closed when guidance for using OE in day-to-day activities is developed.

1.3.3 Communication Steps

1.3.3.1 Develop a communication strategy to include:

- Informing Engineering of the problem-solving and decision-making process and the importance of using this process.
- Informing Engineering of the change in regulatory requirements related to the OD process, and the new procedure and guidance for implementing the process.
- Informing Engineering of the revision to the OE process, and the new guidance for using OE in day-to-day activities. (complete)

Concept:
A communication strategy is necessary to ensure these steps are recognized by the as Intended to improve organizational performance. A communication strategy consists of necessary elements to determine the appropriate audience, delivery method, means to assess the degree of understanding and methods to adjust the message wherever necessary. Personnel must fully understand the importance of this Action Plan and the steps to improve in this area. This action step may be closed when a Communication Strategy has been developed and includes the specific topics in the action step.

1.3.4 Training, Coaching and Mentoring Steps

1.3.4.1 Provide training to Engineering personnel in the 1st Quarter of 2006 on the problem-solving and decision-making process. (complete)

Concept:
This training will occur after issuance of the new problem-solving and decision-making process per PIP 6.3.2.1. It is expected that this training will occur as part of the Industry Events Training and will be received by essentially all personnel with Nuclear Engineering. This item may be closed when the specified training has been completed.

1.3.4.2 Provide training in the 1st Quarter of 2006 to applicable personnel on the revision to RIS 2005-20, the OD procedure, the OD guidance, and the interfaces between the OD process and the corrective action program. (complete)

Concept:
This training will occur after revision of the OD process The training will stress the new provisions in RIS 2005-20, the changes in the OD process, and techniques for avoiding past problems with implementation of the OD process. It is expected that this training will occur as part of the Industry Events Training and will be received by essentially all personnel within Engineering. This item may be closed when the specified training has been completed.

1.3.4.3 Provide training in the 1st Quarter of 2006 to improve engineering involvement in the problem identification and resolution process, including:

- Training on when to prepare CRDRs;
- Training on identification of causes; and
- Training on transportability evaluations (including implications of an inoperable SSC on the operability of other similar or redundant SSCs). (included in CRDR templates briefings, due 5/31/06)

Concept:

This training will occur following the issuance of guidance on corrective actions This training will emphasize that CRDRs need to be promptly prepared for adverse conditions, and that CRDRs may be prepared when questions are raised and further investigation is needed to determine whether an adverse condition exists (in the latter case, the CRDR is used to track the investigation). The training will also emphasize the need to identify and correct causes (not just symptoms). Finally, the training will discuss the need to perform an extent of condition and cause review for an inoperable SSC, including the need to evaluate whether other similar SSCs are inoperable because they have been subject to the same conditions that caused the inoperability of the initial SSC. It is expected that this training will occur as part of the Industry Events Training and will be received by essentially all personnel with Nuclear Engineering. This item may be closed when the specified training has been completed.

1.3.4.4 Provide training in the 1st Quarter of 2006 on the revised OE process and the guidance on the use of OE in day-to-day activities. (complete)

Concept:
This training will occur after revision of the OE process, and will focus of the changes in the OE process and the need for using OE as part of day-to-day activities. It is expected that this training will occur as part of the Industry Events Training and will be received by essentially all personnel within Engineering. This item may be closed when the specified training has been completed.

1.3.5 Monitor and Adjust Steps

1.3.5.1 Perform the following assessments:

- Assess the implementation of the problem-solving and decision-making process in the 3rd Quarter of 2006. (Due date 9/29/06)
- Perform a self-assessment in the 3rd Quarter of 2006 of the quality and thoroughness of Engineering's developed inputs and evaluations used to support implementation of the OD process. (Due date 9/29/06)
- As part of the site-wide activities, perform periodic integrated assessments of the problem identification and resolution process. (Due date 10/31/06)

Concept:
As discussed above, Engineering is developing a problem-solving and decision making process, and the OD process is being revised. These actions should be completed by the 1st Quarter of 2006, and by the 3rd Quarter of 2006 there should be six months of experience with implementation of the new and revised processes. At that time, self-assessments (preferably by NAD) should be performed of the implementation of these processes. The first two parts of the action step may be closed when these assessments have been completed and any significant findings have been closed.

The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a weakness in problem identification and resolution by the site, including by Nuclear Engineering. The corrective actions for this CRDR included annual assessments for five years of the problem identification and resolution process. This part of the action step may be closed when these inspections required by CRDR 2726509 have been completed.

1.3.5.2 As part of the site-wide activities, perform periodic integrated assessments of implementation of the OE program. (PIT to perform periodic assessments)

Concept:
The investigation report for CRDR 2726509 on the unfilled suction piping for the ECCS pumps identified a weakness in the OE program and its implementation, including implementation by Engineering. The corrective actions for this CRDR included annual assessments for five years of the OE program. This item may be closed when these assessments required by CRDR 2726509 have been completed.

1.3.5.3 Monitor the performance indicator for the percentage of acceptable CRDR resolutions and repeat significant CRDRs due to Engineering. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied or there are errors or inadequate corrective action. (Existing ongoing activity)

Concept:
Engineering already has established performance indicators and goals for acceptable CRDR resolutions and repeat significant CRDRs. These indicators will continue to be implemented and therefore this will be an ongoing activity without a termination point.

1.3.6 Acceptance Criteria

1.3.6.1 The results of the assessments of the problem-solving and decision-making process, OD process, and problem identification and resolution process satisfy the following acceptance criteria:

- There are no cases of an untimely OD for an inoperable safety significant SSC, and no cases of an incorrect (non-conservative) OD, due to inadequate input or evaluation from Engineering.
- There are few cases, with a positive trend, in which a safety significant SSC is inoperable or non-functional due to inadequate corrective action by Engineering or in which an inoperable or non-functional safety significant SSC is not identified or corrected in a timely manner due to delays caused by Engineering.
- There are no generic or widespread problems with the timeliness of Engineering documentation of adverse conditions, or with its adequacy

of its evaluations of such conditions, including identification of causes and corrective actions.

Concept:
Deficiencies are not safety-significant if they do not pertain to operability or functionality, or if they are not generic or widespread. If any safety-significant conditions or generic problems are identified, corrective and preventive action will be necessary, including identification of the extent of condition and cause. This item may be closed if there are no such cases for two years due to the causes listed in this action step.

1.3.6.2 The results of the assessments of the OE program satisfy the following acceptance criteria:

- There are no cases in which an inadequate OE review or inadequate use of OE by Engineering is a cause of an inoperable or non-functional safety significant SSC or a failure to identify an inoperable or non-functional safety significant SSC.
- There are no generic or widespread problems with evaluations or use of OE by Engineering.

Concept:
Deficiencies are not safety-significant if they do not affect operability or functionality, and if they are not generic or widespread. If any safety-significant conditions or generic problems are identified, corrective and preventive action will be necessary, including identification of the extent of condition and cause. This item may be closed if there are no such cases for two years due to Engineering.

1.3.6.3 More than 95% of the CRDR resolutions by Engineering are acceptable. There are no repeat significant CRDRs due to Engineering ineffective or inappropriate corrective actions.

Concept:
This acceptance criterion is the same as the existing goals for Engineering. This item may be closed if the acceptance criteria are met for a period of two years.

1.4 Improve Processes and Reduce Backlogs

1.4.1 Action Plan Goal:

Engineering programs reflect industry best practices, and implementation of the programs is monitored and enforced. Plant processes provide for the efficient use of engineering resources. Engineering work is identified, prioritized, and planned to levelize workload while ensuring that high-priority work is accomplished in a timely manner. Engineering backlogs are reduced and maintained at a level commensurate with the capability of Engineering to perform in a timely manner without excessive overtime. Engineering resources are focused on high value work, aligned to maintain equipment reliability in top condition on SSCs important to safety.

1.4.2 Identification Steps

1.4.2.1 Enhance Engineering programs, by taking the following steps:

- Benchmark the management of Engineering programs at top performing plants.
- Establish administrative controls for the ownership and monitoring of Engineering programs, including the development of program templates.
- Assign leaders as the owners of Engineering programs.
- Assess Engineering programs health and implementation against established performance metrics.
- Based upon assessment results, develop actions to improve individual Engineering program content or implementation as appropriate. (Due date 6/30/06)

Concept:
In 2005, PVNGS conducted an evaluation of a number of engineering programs. As a result of this review, it was determined that issues with program health were not as visible to senior management as desired, and a few issues were not known by program owners because routine assessment and reporting of program health was not required. The purpose of this item is to improve the quality of Engineering programs. Improvements will include assignment of program owners and establishment of metrics to monitor the effectiveness of program implementation. This item may be closed when engineering program administrative controls for ownership and monitoring have been established, metrics have been established to monitor implementation, improvement actions have been identified, and for programs determined to be red or yellow, the improvement actions have been presented to the system team steering committee (STSC). Monitoring of Engineering program health and implementation will be accomplished by management review of metrics and performance indicators, with action plans developed to address performance deficiencies.

1.4.2.2 Implement the plan to improve procurement engineering.

(Due date 12/31/06)

Concept:
The Nuclear Assurance Department (NAD) identified issues pertaining to procurement engineering processes as one of their top Station Quality Issues. Nuclear Engineering has developed a procurement engineering improvement plan to address this issue. This item is intended to track implementation of that improvement plan. This item may be closed when the improvement plan has been implemented.

1.4.2.3 Enhance the efficiency of processes in order to reduce unnecessary workloads on procurement engineering. This will include the following steps:

- Identify processes that are time-consuming to Procurement Engineering and low value to the station's goals and objectives; and
- Identify actions that can be performed more efficiently by other Engineering groups or that do not need Engineering input (e.g., maintenance activities for SSCs that are not quality-related and not important to safety); and
- Based upon the results of these reviews, revise the processes for procurement engineering accordingly.
  (Due date 12/31/06)

Concept:
Engineering has had high workloads, which have contributed to large backlogs and impacted the ability of Engineering to be proactive. It should be possible to reduce workloads without impacting quality or safety, by improving existing processes. In particular, Engineering is currently providing support upon request by other organizations, even though the support does not pertain to a quality-related activity or otherwise affect safety. It should be possible to streamline existing processes and refocus Engineering on activities that are quality-related or important to safety (or that are important to continued generation) and that need engineering input. This item may be closed when the processes have been revised to be more efficient.

1.4.2.4 Improve engineering work planning, including:

- Improving the use of the 3-cycle plan to reduce the amount of emergent work.
- Establishing a process for identification and prioritization of existing, planned and emergent engineering work, including responsible individuals/organizations and personnel resources needed to perform the work.
  (Due date 12/31/06)

Concept:
Engineering work activities have not always been effectively planned, resulting in some activities that have not been performed on schedule or imposing a disproportionate work load on some engineers. The purpose of this item is to provide enhanced work

planning and management of engineering activities. This will include better use and adherence to the 3-cycle plan to ensure that modifications and other major engineering projects are identified and managed early in the process, without the need to address them as emergent activities, and establishing a process for identification of engineering work activities. This item may be closed when the revised processes are established.

1.4.2.5 Reduce engineering backlogs (e.g., backlog of CRDRs and EDCs), including
- Develop and implement a backlog reduction plan;
- Identify activities in which contractors should be used to reduce backlogs.

Concept:
Engineering currently has had relatively large backlogs (especially backlogs of CRDRs) that imposed high workloads on engineering personnel and contributed to delays in completing work. The purpose of this item is to reduce those backlogs to normal levels and maintain low backlogs going forward.. A backlog reduction plan was developed, including as appropriate use of contractors to reduce backlogs. Additionally improvements in equipment reliability will, in the long term, result in reduced workloads and backlogs. This item may be closed when the backlogs have been reduced to the levels specified in the backlog reduction plan.

1.4.3 Communication Steps

1.4.3.1 Develop a communication strategy to include:
- Description of plans to improve engineering programs and to improve the efficiency of processes involving engineering. (Due date 9/30/06)

Concept:
A communication strategy is necessary to ensure these steps are recognized and intended to improve organizational performance. A communication strategy consists of necessary elements to determine the appropriate audience, delivery method, means to assess the degree of understanding and methods to adjust the message wherever necessary. Personnel must fully understand the importance of this EIP and the steps to improve in this area. This action step may be closed when a Communication Strategy has been developed and includes the specific topics in the action step.

1.4.4 Training, Coaching and Mentoring Steps

1.4.4.1 Provide training to applicable personnel on the expectations of maintaining robust engineering programs, performance metrics for those programs, and corrective action plans for programs not meeting expectations. (Due date 6/30/06)

Concept:

This training is intended to be provided to personnel who utilize or implement the revised engineering program. The purpose of this item is to ensure that personnel are aware of the revised processes and are able to use them. This item may be closed when the specified training has been completed.

1.4.5 Monitor and Adjust Steps

1.4.5.1 Monitor implementation of the revised engineering programs using the performance metrics established by the program owners. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied. (Due date 6/30/06)

Concept:
Each engineering program will have a separate set of performance metrics. This item may be closed when those metrics have been specified for all of the programs.

1.4.5.2 Monitor implementation of the performance indicator for the number of deficiency work orders (DF) removed from the engineering schedule. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied. (Existing ongoing activity)

Concept:
Engineering already has established performance indicators and goals for DFs removed from the schedule, which is a measure of the effectiveness of management of work. These indicators will continue to be implemented and therefore this will be an ongoing activity without a termination point.

1.4.5.3 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. (Due date 6/30/06)

Concept:
Engineering already has established performance indicators and goals for the backlogs of undispositioned DFs and CRDR evaluations assigned to Engineering. Engineering needs to develop a performance indicator for the backlog of EDCs, which should be based upon the normal workload for engineering. This item may be closed when the performance indicator and goals are established for the backlog of EDCs.

1.4.5.4 Perform an assessment of the process used by Engineering for management of workloads associated with DFs, CRDRs, and EDCs. (Due date 12/31/06)

Concept:

Engineering's management of work will be improved. An assessment (either a self-assessment or independent assessment) will be performed to evaluate the effectiveness of the engineering's management of work. This item may be closed when the assessment has been completed. (Due date 12/31/06)

1.4.6 Acceptance Criteria

1.4.6.1 The engineering programs satisfy the goals associated with the program metrics.

Concept:
This item may be closed when the goals established have been satisfied with a sustained positive trend for both Programs health and implementation (e.g., with some isolated exceptions, the engineering programs satisfy their goals).

1.4.6.2 The number of DFs removed from the engineering schedule is less than or equal to the established goals.

Concept:
The acceptance criteria are based upon the existing goals for Engineering. This item may be closed when the goals have been satisfied for a period of two years.

1.4.6.3 The backlogs of undispositioned priority 1, 2, and 3 DFs satisfy established goals, the backlog of EDCs meets standards and expectations and the backlog of CRDR evaluations assigned to Engineering is less than established goals.

Concept:
The acceptance criteria for DFs and CRDR evaluations are based upon the existing goals for Engineering. The acceptance criterion for EDCs is based upon the normal workload for Engineering, as established. This item may be closed when criteria for backlogs are satisfied.

1.4.6.4 The results of the assessment of the engineering management of incoming work as well as backlogs indicate that engineering work is being identified, prioritized, and planned to levelize workloads and focus on high-priority work and equipment reliability, and that the work is being accomplished as planned.

Concept:
An assessment will be performed of Engineering's management of work. If the results of the assessment indicate that the goals specified in this action step are satisfied, this item may be closed. If the goals are not satisfied, Engineering will take appropriate action to improve work management, and further assessments will be performed (either

self-assessments or independent assessments) until the goals are satisfied.

1.5 Improve Equipment Reliability

1.5.1 Action Plan Goal:

Engineering has a strong intolerance for equipment performance issues. Equipment operates on demand according to its design function, operational challenges are reduced or eliminated, and there are no significant station events caused by equipment reliability issues. Equipment reliability challenges are resolved, including action to address the causes of equipment failures, so that equipment challenges do not recur.

1.5.2 Identification Steps

1.5.2.1 Establish the expectations that:

- There shall be a strong intolerance for equipment performance issues.
- There shall be a strong bias in favor of permanently fixing adverse equipment conditions, rather that accepting the conditions as-is or implementing temporary fixes or workarounds for the conditions.
- Issues that could impact equipment reliability should be identified and corrected before operation of the equipment is impacted.
- Corrective maintenance is performed in a timely manner, and the preventive and predictive maintenance is performed on schedule without being late or entering the grace period.
- The causes of equipment failures and nonconforming and degraded conditions shall be identified and action shall be taken to prevent recurrence.
- System teams will be strongly supported and display strong equipment reliability ownership, and the Director of Operations will chair the System Teams Steering Committee to drive plant health to high levels.

(complete)

Concept:
The purpose of this item is to establish the overall goal of maintaining equipment reliability and the fundamental principles that need to be applied to ensure that the goal is achieved. The expectations will be in writing and will be distributed to Engineering personnel. These expectations could be included in the engineering standards handbook or in another high level, visible document that is routinely referenced by engineers. This item may be closed when the written expectations have been established and issued to Engineering personnel.

1.5.2.2 Identify existing long-standing issues that affect equipment reliability, determine the causes of those issues, and implement corrective action for the causes. (complete)

Concept:
Equipment reliability at Palo Verde is currently adversely impacted by several long-standing issues that have not been fixed or whose symptoms have been addressed but continue to recur because the causes have not been identified and corrected. The purpose of this item is to identify and correct the causes of these issues, thereby permanently eliminating the impacts of these long-standing issues on equipment reliability. This item may be closed when the long standing issues have been identified, their causes determined, and corrective action implemented for the causes.

1.5.2.3 Develop and initiate action plans and corrective actions to resolve existing Red or Yellow system health windows. (complete)

Concept:
If a system health window is Red or Yellow, it is typically due to the existence of significant issues pertaining to equipment reliability or availability (such as a system that does not meet its goals under the Maintenance Rule). The purpose of this item is to develop and implement action plans and corrective actions needed to change the system health windows to White or Green. This item may be closed when the action plans have been developed and implemented.

1.5.2.4 Perform a common cause evaluation of the long-standing equipment reliability issues and Red and Yellow system health windows. Based upon the results of the evaluation, identify and implement preventive actions to address any significant or recurring causes. (Due date 6/30/06)

Concept:
Completion of items 1.5.2.2 and 1.5.2.3 should result in correction of the immediate causes of significant issues that current affect equipment reliability at Palo Verde. However, there may be more fundamental programmatic or organizational issues that led to those issues. The intent of this item is to perform an evaluation of the causes of the long standing issues and Red and Yellow system windows to identify any common causes indicative of a more fundamental or organizational issue which, if not corrected, could lead to other equipment reliability issues in the future. This item may be closed when the common cause evaluation has been completed, and preventive actions have been identified and implemented.

1.5.2.5 Review and revise as appropriate Predictive Maintenance technologies and resources, preventive maintenance tasks, and equipment performance monitoring and trending to ensure that they identify necessary actions to improve equipment performance and to identify and correct potential problems before they impact equipment operation or safety. This review should include benchmarking against other good plants with high equipment reliability. (Due date 7/31/06)

Concept:
Predictive maintenance, preventive maintenance, and trending of equipment performance are fundamental to ensuring high reliability and availability of equipment. The purpose of this item is to review the predictive maintenance, preventive maintenance, and trending practices at Palo Verde to verify their adequacy. This review should include benchmarking against other nuclear power plants with high equipment reliability. It is not the intent of this item to review and validate every preventive maintenance procedure (unless such a need is indicated by the results of the review). Instead, this item can be satisfied by reviewing the overall philosophy for preventive maintenance or reviewing a sample of preventive maintenance procedures. This item may be closed when the review has been completed and practices have been revised, as appropriate.

1.5.2.6 Develop performance indicators that measure equipment reliability. (complete)

Concept:
Engineering maintains various performance indicators that extend across station organizational lines for equipment reliability. These indicators cover a range of issues, including maintenance backlogs, functional failures, and plant and system performance. This item may be closed when the final list of performance indicators with goals is developed.

1.5.3 Communication Steps

1.5.3.1 Develop a communication strategy to include:

- Informing Engineering of the expectations for maintaining equipment reliability.
- The steps to be taken to improve equipment reliability.
- The performance indicators to measure equipment reliability. (complete)

Concept:
A communication strategy is necessary to ensure these steps are recognized by the staff as intended to improve organizational performance. A communication strategy consists of necessary elements to determine the appropriate audience, delivery method, means to assess the degree of understanding and methods to adjust the message wherever necessary. Personnel must fully understand the importance of this EIP and the steps to improve in this area. This action step may be closed when a Communication Strategy has been developed and includes the specific topics in the action step.

1.5.4 Training, Coaching and Mentoring Steps

1.5.4.1 Provide training to Engineering personnel on the expectations for maintaining equipment reliability. (complete)

Concept:
Expectations for maintaining equipment reliability have been established. The purpose of this action step is to provide training on those expectations to applicable Engineering personnel (especially personnel in System Engineering and Maintenance Engineering).

1.5.5 Monitor and Adjust Steps

1.5.5.1 Monitor the performance indicators for equipment reliability. Action plans for improvement are developed and implemented for those cases in which the goals are not satisfied. (Due date on going)

Concept:
Under item 1.5.2.6, performance indicators for equipment reliability have been developed. These performance indicators are intended to be used on a continuous basis. Therefore this item will be an ongoing activity without a termination point.

1.5.5.2 Monitor the system health windows. (Existing ongoing activity)

Concept:
System health windows already exist and are being used. These indicators will continue to be implemented and therefore this will be an ongoing activity without a termination point.

1.5.6 Acceptance Criteria

1.5.6.1 Equipment reliability is sustained in accordance with the goals for the equipment reliability performance indicators.

Concept:
If the equipment reliability goals are satisfied, equipment reliability should be at desired levels. This item may be closed when the goals in general have been satisfied for a period of two years (i.e., with some isolated exceptions, the goals have been met).

1.5.6.2 System health windows are Green or White, with some exceptions of emergent system health challenges that will receive focused action plans to promptly return performance to Green or White.

Concept:
The system health performance windows include parameters that pertain to system reliability, including satisfaction of goals set under the Maintenance Rule. If the

windows are rated as either Green or White, the overall system health is acceptable. This item may be closed when the system health windows in general are Green or White for a period of two years (i.e., with some isolated exceptions, the systems are Green or White).