

RECOMMENDATIONS FOR IMPROVEMENT
OF THE OPERATION OF
SAN ONOFRE
NUCLEAR GENERATING STATION
UNITS 2 AND 3

—
Prepared For

SOUTHERN CALIFORNIA EDISON COMPANY
2244 Walnut Grove Avenue
Rosemead, California 91770

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Management Analysis Company
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8308230215 830817
PDR ADOCK 05000361
PDR

OVERVIEW

In March and April 1983, in response to a request from Southern California Edison Company (SCE), Management Analysis Company (MAC) performed a management diagnostic to assist SCE in identifying ways to improve operation of San Onofre Nuclear Generating Station (SONGS) Units 2 and 3. In performing the evaluation, MAC conducted over 90 interviews, reviewed many documents and made a number of on-site observations. This report identifies recommendations for improvement resulting from the evaluation.

Unit 2's power ascension program has experienced a number of unscheduled delays. Further, issues concerning regulatory compliance developed and eventually resulted in a Nuclear Regulatory Commission (NRC) enforcement meeting on March 7, 1983.

We identified a number of factors which contributed to that situation. One major factor has been the late staffing of the Unit 2 and 3 Station organization resulting in a lack of significant participation in the start-up program by Station personnel. Though this factor is mainly historical, it will require positive action by SCE management to reduce residual effects.

Fortunately, SCE has a committed and dedicated staff willing to invest the effort required to implement the positive actions required. A number of actions have been taken, including the full-time commitment of an executive vice president to address and remedy problems. In addition, the request for a full power operating license for Unit 3 has been deferred to allow primary focus on Unit 2 activities.

We identified eight principal problems during our evaluation. They are:

- A significant level of maintenance and design change activities were going on at the same time as the power ascension testing. Prior to March 1983, the two units were being brought to power with a relatively short time separation between them. When combined, these factors have had a negative impact on the power ascension program.
- The control room is a restraint to plant activity. In view of this and the above, the operators of the station were having difficulty in efficiently handling the demands being made upon them.

- The basic framework of the Station organization (the infrastructure) is relatively new, yet it must function like a well established organization.
- A natural conflict has developed between the Project's schedule orientation and the Station's safety and compliance orientation during the transition to firm operation.
- Identification, reporting and resolution of compliance issues need improvement.
- The organizations which support SONGS activities are large and complex with unclear responsibilities and accountabilities.
- Administrative control procedures are numerous, complex and inefficient.
- There are communications problems among and within SONGS organizations.

In our report, we have made recommendations which deal with these problems in various ways. Our major recommendations are to:

- Continue to reinforce that safety and compliance take precedence in any conflict with schedule objectives.
- Clearly establish that the Station is the lead organization responsible for resolving conflicts between compliance and schedule.
- Integrate qualified Project personnel into the Station organization.
- Improve conditions in the control room area, focusing especially upon congestion, distractions, communications and system operability status information.
- Complete development in specific areas of the Station Technical support function.
- Establish a Station work management function to coordinate all work activities.
- Integrate Start-up Maintenance into Station Maintenance.
- Improve the reporting of compliance issues by the safety review and quality assurance functions. Also improve the tracking and timeliness of corrective action taken in response to these issues.
- Develop top level policies and administrative control procedures which define and clarify the functions, responsibilities and accountabilities of SONGS-related organizations.
- Improve communications between and within SONGS organizations.

Development and implementation of specific action plans by SCE management addressing the MAC recommendations should result in improved performance in the operation of SONGS.

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1.0 INTRODUCTION

Southern California Edison Company (SCE) has been an operating nuclear utility since 1968 when San Onofre Nuclear Generating Station (SONGS) Unit 1 was declared commercial.

In 1970, SCE announced the construction of SONGS Units 2 and 3 and in 1973 was granted a construction permit. SONGS Unit 2 is only the sixth unit to be granted a full power operating license since the Three Mile Island incident in 1979.

Unit 2 was loaded with fuel in February 1982 and is currently in power ascension testing. Unit 3 was loaded with fuel in November 1982. The request for a full power operating license for Unit 3 has been deferred in order to focus on Unit 2 activities.

Unit 2's power ascension program has experienced schedule delays, including problems with the Nuclear Steam Supply System (NSSS) and the Balance of Plant (BOP). Issues concerning regulatory compliance developed and eventually resulted in a Nuclear Regulatory Commission (NRC) enforcement meeting on March 7, 1983.

Because of this, SCE retained Management Analysis Company (MAC) to perform a management diagnostic. The objectives of the diagnostic were:

- Review and appraisal of the start-up, power ascension and initial operation activities associated with SONGS Units 2 and 3. Rather than attempting to examine every aspect of the entire station, the effort focused on specific processes and interaction among the Engineering, Construction, Start-up, Operations and Quality Assurance (QA) organizations. Particular attention was given to activities associated with safety and regulatory compliance.
- Determination of the key factors adversely affecting start-up, power ascension, initial operation and associated management systems.
- In conjunction with key SCE personnel, development of recommendations that will assist them in improving performance, with emphasis upon current safety and compliance issues.

MAC assembled a team of senior, experienced personnel to conduct a series of interviews, observations and document reviews. This team consisted of professionals with significant experience in project management, operations management, QA, organizational development and human behavior.

We interviewed more than 90 people in SCE, NRC, Bechtel, Combustion Engineering and other contractor organizations and reviewed associated documentation.

Based on our evaluation, the following recommendations for improvement are made.

2.0 ORGANIZATION OBJECTIVES AND PRIORITIES

We assessed SCE's objectives and priorities for SONGS to determine how these objectives and priorities were addressed at various levels within the company.

Recommendations

- 2.1 Management must continue to reinforce to SONGS personnel at all levels that safety and compliance are the first priority in executing their duties in support of the power ascension program and operation of the plant. This reinforcement should occur in all formal and informal communications.
- 2.2 Management must take action to establish the Station as the lead SONGS organization and specifically identify that the Station is responsible for resolving conflicts between safety and compliance and the power ascension schedule.

3.0 STATION

3.1 STATION MANAGEMENT

We assessed the role of Station management in placing the units into operation.

Recommendations

- 3.1.1 Make maximum use of qualified Project personnel (also processes and systems) to infuse plant knowledge and experience into the Station organization.
- 3.1.2 Establish development plans for each manager and supervisor. Such plans should identify specific managerial strengths and weaknesses and establish priorities and target dates for improvement.

3.2 OPERATIONS

We collected information on operations from a cross section of the organization, including Start-up and the operators themselves:

A number of positive actions have already helped the shift operations team to function more effectively. Among these are:

- Posting someone to better control access to the control room
- Implementation of an equipment control function
- Slowdown of Unit 3
- Additional shift overlap
- Addition of clerical and other help to the shift crew

Recommendations

- 3.2.1 Although much has already been done to relieve the shift crew from distractions, more should be done. Make significant physical improvements in the shift supervisor's office to allow him to function better. It should be determined why the operators do not make significant use of the plant computer. A study should be conducted of control room area activities and appropriate improvements implemented.
- 3.2.2 Action should be taken to ensure that the shift supervisors get out into the plant regularly. This could be in conjunction with training periods, but it should also come at times when they can interact with equipment operators and other people on their own shifts.

- 3.2.3 The control room area study recommended above should include evaluation of development of a system operability status display process. Current system operability status should be readily available to the operators. The evaluation should also consider communication of plant and system status to interfacing organizations and people.
- 3.2.4 The operators will benefit greatly from improvements in plant scheduling and work coordination as identified in the following Work Management section.
- 3.2.5 Make available to the operators a well-defined list of contacts, such as systems engineers for times when they need information or assistance.
- 3.2.6 The Technical Specifications should be reviewed for improvements and reductions in complexity.
- 3.2.7 Make a joint effort, working with the systems engineers, to improve operations procedures and reduce repeat procedural mistakes.

3.3 WORK MANAGEMENT

We assessed the station work activities to evaluate the impact on operations.

Recommendations

- 3.3.1 Develop a work management function responsible for planning and coordinating maintenance, ISI, surveillance testing, design change modifications and outages. This function should be a continuous, all-shift effort with a strong, full-time work manager who reports directly to the Station manager.
- 3.3.2 For the long term, this function should include outage planning and management responsibility. This will establish the Station in the lead outage role. Project work during operation and outages would be integrated into the overall Station plan and schedule.
- 3.3.3 Develop a management information system to support the work and outage planning function. Interim processes will have to be used until this system is developed.

3.4 STATION TECHNICAL

We assessed Station Technical management, its functions and its people, to increase our understanding of their roles and how effectively these roles are being carried out.

Recommendations

3.4.1 Define goals and objectives for Station Technical.

3.4.2 Complete the development of the system engineering function which has recently been initiated. Define the functions and responsibilities. System engineers should be fully knowledgeable about the design and function of their assigned systems and components. These system engineers should be responsible for maximizing the performance of their systems. To do this, they need a sense of commitment. Systems engineers should be responsible for providing technical support to station operators, maintenance and other personnel. Specific responsibilities should include:

- ISI testing.
- Knowing, reviewing and improving the operating procedures and technical specifications.
- Being a point of contact on any problem or question related to operations, test, maintenance and modification.
- Knowing the system operability status.
- Knowing about all problems and proposed resolutions.
- Initiating plant betterment proposals.
- Reviewing design changes for maintainability and operability.

3.4.3 Supplement training on plant systems and administrative controls for the system engineers, shift engineers and STAs.

3.4.4 Provide qualified shift engineers for all shifts to provide better support.

3.5 MAINTENANCE

We looked at the Start-up and Station Maintenance organizations with the objective of evaluating their roles and functions.

Recommendations

- 3.5.1 Integrate Start-up Maintenance into Station Maintenance to: resolve the responsibility and accountability issue; take advantage of resources, systems and organizational units of both organizations; and, to improve maintenance planning and execution.
- 3.5.2 Consider integrating instrument and control (I&C) maintenance into Station Maintenance to provide improved activity planning and coordination.
- 3.5.3 Complete development of an integrated maintenance management information system as soon as possible.

4.0 SAFETY REVIEW

We assessed both the on-site and off-site safety review functions to determine the degree of their effectiveness.

Recommendations

- 4.1 Require the On-Site Review Committee (OSRC) to assume more oversight in reviewing plant activities, schedules and operations for regulatory compliance and safety significance.
- 4.2 Emphasize and strengthen requirements for Nuclear Safety Group (NSG) to provide management with an overall assessment of plant safety.
- 4.3 Establish a formal system for follow-up and closeout of recommendations submitted by the Independent Safety Engineering Group (ISEG) and NSG.
- 4.4 Improve communications and interaction between NSG and Station by clarifying the roles and requiring NSG to spend more time at the site.

5.0 QUALITY ASSURANCE

We assessed the QA function to develop an understanding of its role in relation to station activities.

Recommendation

- 5.1 QA must monitor and assure performance of the line organization by providing timely information to the Vice President, NE&O. The current reporting system should be reviewed to determine if adequate emphasis is being communicated to upper management of needed corrective actions and of untimely delay of response to Non-Conformance Reports (NCRs) and Corrective Action Reports (CARs). Problems should be reported in a manner which highlights the more important issues.

6.0 PROJECT ENGINEERING

We assessed the Project Engineering function to develop an understanding of its role in relation to Station activities.

Recommendations

- 6.1 One SCE organization should have primary and overall responsibility for design changes throughout the anticipated long-term retrofit work. Assign responsibility for the adequacy of plant design to Project Engineering and communicate this to appropriate organizations.
- 6.2 Assign assistant project engineers within Project Engineering and define their functions and responsibilities in conjunction with those of Station Technical to ensure compatibility of functions and establish appropriate interfaces.
- 6.3 Assess the work load, duty assignments and staffing for the on-site Project Engineering function to determine how best to improve its ability to meet performance expectations.
- 6.4 Clarify the roles of Project Engineering and Station Technical functions by establishing responsibilities of each, defining compatible goals and objectives and by working to a common set of priorities.

- 6.5 Establish long-term roles for Project Engineering and Station Technical which are consistent with policies for role of Station and Project support functions.

7.0 CONFIGURATION MANAGEMENT

We reviewed selected areas relating to configuration identification, change control and status information reporting.

Recommendations

- 7.1 Complete efforts underway to update the master equipment list. This work should be given a high priority.
- 7.2 Assign high priority to completing the review of the temporary modifications and to performing the necessary engineering and safety evaluations of those changes considered permanent. Establish an administrative control process for temporary modifications that clearly define conditions for their utilization.
- 7.3 Review Station and Project design change control procedures to assure compatibility. These procedures should clearly define the functions and responsibilities of each. The effort should build upon the work recently completed by the Configuration Task Group for Unit 1.
- 7.4 Immediate training and clarification on the use of existing procedures should be provided to those Station and Project staff personnel who are involved with design change activities.
- 7.5 Consider establishing a change management function to review, prioritize and approve all requests for changes in plant configuration.
- 7.6 Develop an integrated configuration status reporting system which serves the needs of both Project and Station for tracking the status of plant change requests and plant modification packages (SPRs, PFCs, DCPs temporary modifications).

- 7.7 Resolve the problems associated with corporate document management providing timely copies of requested documents.

8.0 TRAINING

The nuclear training function was assessed to develop an understanding of its support of the Station staff.

Recommendations

- 8.1 Establish regular meetings between Station and Nuclear Training management to assess training needs and effectiveness.
- 8.2 Improve training program effectiveness in the areas of supervisory training and management development.

9.0 ORGANIZATION STRUCTURE, POLICIES AND PROCEDURES

A review was made of the SONGS-related organizational structure and the way that responsibilities, commitments and policies are communicated to organizational elements.

Recommendations

- 9.1 Perform a complete review of functions and clarify responsibilities and accountabilities, eliminating gaps and overlap. This should be done with the objective of streamlining the organization. Specific emphasis should be placed on the Station organization and its interfaces with other organizations related to SONGS, such as Nuclear Engineering, Safety and Licensing, Project and Quality Assurance.
- 9.2 Develop top level administrative control procedures which include programmatic commitments, management policies and organizational responsibilities and interfaces.
- 9.3 Establish a clear plan and hierarchy for administrative control procedures. Top level administrative control procedures should establish requirements for procedures and instructions by the implementing organizations. The plan should address interfacing of procedures among implementing organizations.

9.4 Establish a control process that tracks regulatory requirements and commitments from their source to the implementing procedures.

9.5 Much use can be made of the material currently existing in procedures. However, it is strongly recommended that existing procedures be reviewed for inconsistencies and gaps.

10.0 ORGANIZATIONAL COMMUNICATIONS

We examined organizational contacts, interfaces and channels of communication in order to understand how managers and supervisors commonly interact.

Recommendations

10.1 Evaluate the need for additional regularly scheduled meetings with key managers of the SONGS-related organizations to improve communication of general and specific issues, review of commitments, coordination of efforts and planning. Address key interface areas such as:

- Key managers of NE&O and QA
- Station managers

10.2 Senior and middle management should communicate clearly to their subordinates the need for initiating individual face-to-face communications.

10.3 Emphasize team building to improve coordination and problem solving among key organizational units.

Southern California Edison Company **SCE**

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ROSEMEAD, CALIFORNIA

