

A Project Management Approach to the Readiness Review Process

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ABSTRACT

A DOE nuclear facility may not legally operate until independent reviewers verify that the safety controls specified in the Authorization Basis (AB) documents are in place and functional, and that the facility is ready to operate safely. The DOE reference, Order 425.1A, focuses on the technical process of evaluating the AB. Very little effort is devoted to managing the process. The resources required to plan, execute and document an Operational Readiness Review are not considered. This can result in unplanned schedule delays and uncontrolled costs to complete safety verifications as well as in poor quality documentation.

At Sandia National Laboratories we employed the ISMS (Integrated Safety Management System) Feedback and Improvement principles to assess past readiness review performance, and applied the lessons learned. The result was a new procedure incorporating requirements contained in DOE Order 425.1A and related directives into a framework of project management.

This paper describes how we improved quality and efficiency by incorporating project management principles and tools into the readiness assessment process. The new procedures were applied to a recent Readiness Assessment to authorize the restart of the Annular Core Research Reactor (ACRR) following modifications to enable pulse-mode operations. The results demonstrated that the new procedures, properly applied, produce the intended benefits.

1. Introduction

Readiness Reviews (RRs) are required by DOE Order 425.1A “Startup and Restart of Nuclear Facilities”. DOE Standard 3006-95 “Planning and Conduct of Readiness Reviews (ORR)” supplements the Order by providing valuable detailed guidance for managing a Readiness Review.

There are two types of Readiness Review. An Operational Readiness Review (ORR), and a Readiness Assessment (RA). In taking a graded approach to the RR, the Order adjusts the depth of the detail of the analysis required for the Review commensurate with the facilities potential impact on safety, environmental compliance, safeguards and security, and programmatic importance. Also, in general lowers the level of approval authority is specified

Whatever grade of review or level approval authority, the conduct of an ORR or RA should be viewed as a project to be managed. Failure to do so is likely to result in a lack of control that leads to cost overrun, missing schedule dates and technical quality problems.

In this paper we describe a project management process developed at Sandia National Laboratories to implement DOE Order 425.1A. We have applied this process to a RA for converting the Annular Core Research Reactor (ACRR) to pulse mode operation. An RA was required (per 425.1A) instead of the more extensive ORR because the reactor had been modified to perform new kinds of tests, and the resumption of operations was classified as a “restart” with authorization authority vested at the local area office level. The scope was reduced by a DOE decision to limit the number of “core criteria” to be addressed per the Order. However, the technical complexity and management issues of the RR were essentially the same as a more complex ORR would have been.

2. Quality Objectives of a Readiness Review

A project management approach begins by stating the objectives to be achieved:

Quality of Safety: Validation that a facility is safe to operate is of course the central and overriding purpose of the RR. It must be based upon actual evidence observed by one or more members of the team. Standard 3006 is an excellent guide to achieving technical quality of safety. Quality criteria include qualifications of the reviewers, understanding of Safety Basis documentation, breadth of issues covered in the review, depth of issues examined, ability to meaningfully grade the approach as function of degree of threat to safety, management cooperation in facilitating the review, and management responsiveness to any findings.

Quality of Documentation: The RR report constitutes a detailed record of the technical evidence for safe operation. Quality criteria include user friendliness, ability to trace issues within the report and back to Authorization Basis Documents, and clear and concise technical writing. Record forms provided in Standard 3006 are helpful and can be readily adapted to local needs.

3. Cost and Schedule Objectives

Achieving the above quality objectives costs money and takes time. Accordingly Line management has concerns in an RR conducted by an independent organization over which they have no technical control:

Concern for Cost: At Sandia National Laboratories Line organizations are charged for the costs of an independent RR normally paid out of project budgets. Excess and unpredictable costs will adversely effect the Line’s ability to meet its customer commitments.

Concern for Schedule: Line organizations have production or other performance schedules to meet. Delays in completing the RR will delay these schedules. Schedule delays can be expected to increase costs to the Line’s project as well as the cost of the RR.

A project management approach addresses these concerns by analyzing what it takes to do a quality job, and establishing cost and schedule objectives before initiating the work. These can be reviewed, modified, and approved before the Review starts.

4. Issues to be Managed

To achieve quality goals within targets of cost and schedule the RR Team Leader needs to consider how certain key issues will be managed very early in the process. Keep in mind that responding to cost and schedule concerns is intended to bring discipline to the process and not diminish the quality goals. In fact, a well-managed process should enhance these goals.

While Standard 3006-95 provides valuable guidance for planning the RR and for documenting the results in the report, it does not address project management issues that can jeopardize quality, cost and schedule objectives including the following.

Intermittent RR Work Load: At Sandia National Laboratories our RR workload is highly intermittent. We do not have a full-time interdisciplinary staff whose principal job is conducting RRs. This creates the following two problems:

- (1) Recruiting the Team: Technically qualified people must be recruited from various organizations where they have full time jobs other than performing RRs. Availability must be planned with each person and sometimes with their managers.
- (2) Training the Team: However well-qualified they may be in their technical expertise, team members often lack familiarity with the specific procedures used in the RR, and with the facility to be reviewed. Training is thus required prior to the actual conduct of the RR to ensure their effective participation. Training materials need to be developed well in advance.

Communications: Effective three way communication between the Line, the RR Team Leader, and the DOE is essential from early planning to final DOE acceptance of the RR. Accordingly, we have built this into the process from earliest planning to final documentation. The process includes daily briefings by the RR Team of the Line and DOE to discuss and resolve specific issues discovered in the course of the review.

Capturing the Results of Review: Reviewers cover a myriad of often complex and overlapping issues. Documentation begins with the notes of each team member. At Sandia we require that notes be electronically transcribed into a prescribed format at the end of each day and submitted to the Team Leader for review. These notes serve the following purposes:

- (1) They enable the Team Leader to discover significant issues to be resolved by further examination, or in discussion with the Line or DOE.
- (2) They serve as the detailed technical record of the review and are incorporated in the RR report as an Appendix.

All of these issues must be addressed and essentially resolved at the earliest possible time before actually starting the RR. The following section presents our Ten Step process for carrying out the RR.

5. Readiness Review Process

Readiness Reviews (ORR or RA) are performed following the Ten Step Process illustrated on Figure 1. The process is a project management approach designed to meet the requirements of 425.1A while ensuring that project quality, schedule and cost goals are met. Notice that each step has an associated end product and a designated party responsible for its production. Figure 2 provides comments on each step.

Figure 1 illustrates that the planning and conduct of a RR at Sandia is a carefully structured process. The significant addition is Task 3, Preparing Budget and Schedule as part of a Project Management Plan. Note that Tasks 1 and 2 are required by the DOE Order. Task 1 establishes the need for a RR. Task 2 results in the Plan of Action that defines the scope of the review. There is now sufficient information to cost the project. The RR Team Leader, in conjunction with preparation of the Implementation Plan (Task 4), prepares his budget and schedule. This results in a Project Management Plan that is presented to cognizant management for approval, before the Implementation Plan is complete. Addressing the budget and schedule at this stage provides a “reality check” for the Review. It ensures that management has a clear understanding of what resources are necessary to complete the task. If there is not agreement, then the scope and objective of the Review will have to be revisited against available resources. In any event, there is an understanding and commitment by management and the RR Team Leader before work begins. In addition, we have built management control steps into Tasks 6, 8, and 10. Specifically, we have prescribed some minimum standards for tracking and reporting open Review Findings. Again, the DOE instructions do not address the management of this process and it can be poorly handled if not given some emphasis.

These tasks are not only essential to a well managed process, but they build confidence between the independent Sandia RR Team and Line management, as well as between Sandia National Laboratories and the Department of Energy RR Team.

6. Summary

This process is familiar to all who have done project management. It is not unique. What Sandia has done is to incorporate project management philosophy into the Readiness Review process and provided some budgeting and scheduling structure. Our experience is that it works. It requires all parties to plan ahead and coordinate their efforts. Most importantly, it helps ensure there are no surprises.

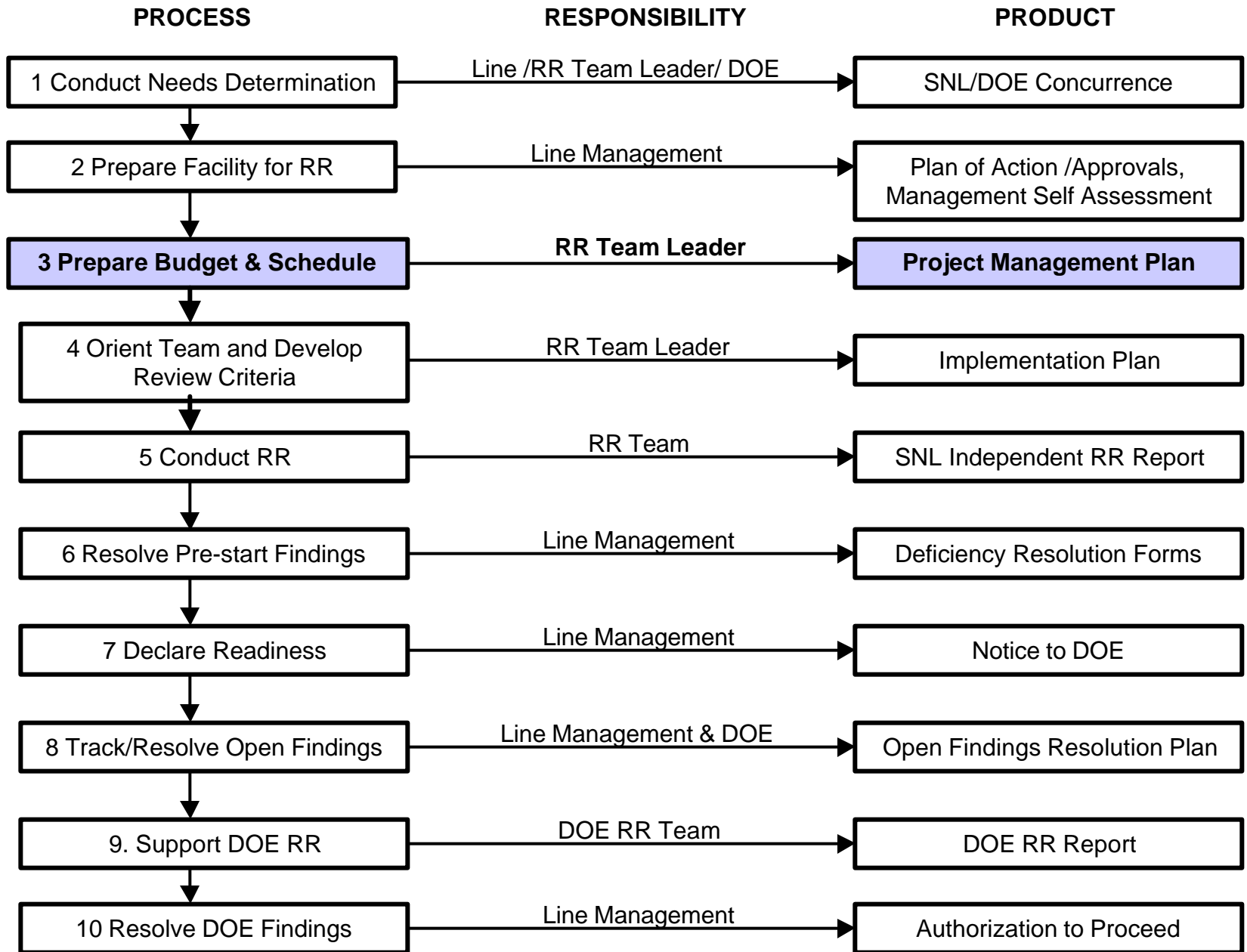


FIGURE 1: READINESS REVIEW PROCESS AT SANDIA NATIONAL LABORATORIES

TASK	COMMENTS
1. Conduct Needs Assessment	Answers following questions: ORR or RA? What level of Authorization Authority? Any special issues or concerns?
2. Prepare Facility for RR	Line management documents its readiness to proceed with the RR and obtains DOE approval.
3. Prepare Budget & Schedule	This is a key project management tool. It establishes realistic expectation of performance among all participants. We use standard project management software to document this step and to track progress.
4. Orient Team and Develop Review Criteria	This is another key project management tool. It includes formal training of the RR team in DOE Orders and other expectations, the management process, and key technical aspects of the facility under review. Following the training each team member plans his or her review tasks in detail and writes a Criteria Review and Assessment Document (CRAD) to be entered on a the Appraisal Form. Copies go to the entire team to facilitate coordination of review. Finally the results are incorporated into the Implementation Plan which is shared with Line Management and the DOE.
5. Conduct Readiness Review	The field or facility investigation is conducted according to the Implementation Plan by reviewing documents, interviewing operators, and observing key operations and activities. Each team member records the results of the review at the end of each day, Line Management and the DOE are briefed, and review issues such as potential findings are discussed.
6. Resolve Pre-Start Findings	The objective is to remove pre-start findings prior to proceeding so that the Sandia Independent RR does not report them. However, under certain circumstances when DOE concurs, pre-start findings are reported with the intent of removing them prior to DOE's completion of it RR.
7. Declare Readiness	A written declaration of Readiness to Operate is submitted to DOE together with Sandia's Independent RR, and a Findings Resolution Plan.
8. Track and Resolve Open Findings	Findings at issue will normally be limited to post-start findings, and pre-start findings that will be resolved prior to DOE completing its ORR with DOE prior concurrence.
9. Support DOE RR Team	This is normally limited to Line support of DOE's RR Team similar to that provided to the Sandia RR Team. The Sandia RR Team may also provide assistance.
10. Resolve DOE Findings	Pre-start findings must be resolved to DOE satisfaction prior to DOE authorization to start operations. Line is responsible for closing out post-start findings on a schedule stated in the Finding Action Plan and obtaining DOE concurrence as each item is closed out.

FIGURE 2: COMMENTS ON THE TEN-STEP PROCESS