

Implementation of Defense Nuclear Facilities Safety Board Recommendation 2000-2

Evaluating Phase I Assessment Results for Performing Phase II Assessments

Background

Under the Implementation Plan for Defense Nuclear Facilities Safety Board (DNFSB) Recommendation 2000-2, the Department and the DNFSB developed a definition of “Vital Safety Systems” (VSS), and the Department compiled lists of VSS at Defense Nuclear Facilities. At certain facilities listed in the Implementation Plan, the Department conducted Phase I assessments using a Department-wide Criteria, Review and Approach Document (CRAD). In Phase I assessments, line management reviewed existing records and qualitatively determined the operational readiness of VSS. The Implementation Plan describes a further level of assessment:

“Once Phase I assessments are complete, the Department will evaluate the results and identify key facilities and/or systems where issues or concerns are identified regarding the operational readiness of vital safety systems. These key facilities and/or systems will be further assessed in Phase II . . . [where] . . . a vertical slice will be performed upon these key facilities and systems by assembling review teams to tailor assessment criteria and perform a detailed assessment of the operational readiness of systems.”

To maximize the benefit of the Phase II assessments, the Department developed this document to provide a consistent framework for evaluating the results of Phase I assessments. It was developed through a consensus process by the Implementation Plan participants at Headquarters and in the field, and with management and DNFSB input.

Objective of Phase II Assessments

The objectives for Phase II assessments are to obtain the appropriate information where necessary to fully understand and characterize system operability/reliability issues, problems, or concerns identified during the Phase I assessments; to determine the associated causes; and to identify a clear path forward for restoring system operability/reliability to acceptable levels and ensuring these levels are maintained on a continuing basis.

Criteria for Phase 2 Assessments:

Phase II assessments will be conducted where the Phase I results indicate a problem that appears significant on a site level, facility level, system level (either generic, or site or facility specific), or operability/reliability attribute level, and where the appropriate DOE/NNSA Field and Headquarters managers agree that there is sufficient potential safety benefit (i.e., “value added”) to be gained from performing the assessment. A significant problem is defined as a clear system operability/reliability

problem, where the extent of the problem is unclear or unknown and the problem cannot be resolved through simple corrective actions. The Phase II assessment in these cases is expected to clearly define and describe the extent of the problem, identify the causes, and determine the corrective actions required for resolution to restore confidence in system operability/reliability. Phase II assessments should be graded to focus on those areas requiring clarification, understanding, and corrective action, and to avoid unnecessary repetition of Phase I assessments or other efforts.

Although these criteria are general, they are appropriate because analysis of the Phase I assessment results as described below will focus the scope and content (depth and breadth) of Phase II assessments on the specific areas of concern (i.e., the assessment effort will be tailored). Development of more specific criteria is discouraged because it is likely to either force unnecessary Phase II assessments or provide unwarranted justification for eliminating a Phase II assessment where one is actually necessary. The process also allows Headquarters and Field management to take into account unique considerations applicable to specific facilities before committing to a Phase II assessment. Establishing more rigid criteria might discourage consideration of such relevant factors.

Data Analysis Approach

Phase I assessment results are evaluated in two steps. In the first step, DOE Field management characterizes Phase I assessment results and enters them into a matrix to display the data for further analysis. The Office of Defense Programs plans to develop a software tool to assist in compiling, displaying, and analyzing the Phase I data. The matrix will then be analyzed by the appropriate Program Secretarial Officers to identify potential candidate sites, facilities, systems, and/or operability/reliability attributes for Phase II assessments. In the second step, Program Secretarial Officers and Field Management will more thoroughly evaluate the candidates from step 1 against several considerations to determine where Phase II assessments will be done. The Implementation Plan Executive Team will approve final choices for Phase II assessments. Program Secretarial Officers and their Field teams will exercise appropriate technical judgement in this process to ensure a credible safety management product.

Step 1

A three-dimensional matrix will be assembled to assimilate and display the Phase I results. The matrix axes are the seventeen attributes listed on the Phase I CRAD crossed with a listing of sites, facilities, and systems. The operability/reliability attributes from the Phase I CRAD should contain all the information needed to make operational readiness determinations and to populate the matrix. The third dimension of the matrix is a color code to express the Phase I result for a given attribute at a given site/facility/system. The matrix is illustrated below as a paper figure, but it is expected that an electronic implementation will be developed to speed data entry and analysis. The matrix is arranged to display Phase I assessment results by site, facility, specific system or type of system, or operability/reliability attribute basis. Trends, patterns, and areas of concern that raise questions regarding system operability/reliability can then be readily identified.

The example matrix is populated with example data to give an indication of how data would be entered and analyzed. The color code system gives the status of each operability/reliability attribute for each system reviewed as part of the Phase I assessment. The general intended meanings of the colors are given below. Engineering judgement must be used in assigning colors to the individual operability/reliability attributes.

- Green** No operability/reliability issues, problems, or concerns. Green indicates that the corresponding system operability/reliability attribute is effectively implemented/performed and that associated expectations are met consistent with applicable Integrated Safety Management System (ISMS) standards and requirements. The Green classification may include minor issues requiring no corrective actions, or issues where alternative operability/reliability measures have been adequately documented and no further action is warranted.
- Yellow** Minor issues, problems, or concerns require corrective action for resolution. In these cases the issues, problems, or concerns are well known, documented, and understood, appropriate corrective actions have been identified, and steps are being taken to implement the corrective actions. The operability of the system is not in question, either because of the nature of the issue, problem, or concern (i.e., the extent of the issue, problem, or concern is not severe enough to raise doubts concerning the ability of the system to perform its safety functions for the near term), or because adequate compensatory measures have been implemented. In general, yellow is not intended to automatically call for a Phase II assessment, but indicates an item that should be tracked to completion. The number and scope of yellow indicators must be evaluated to determine whether a Phase II assessment is needed.
- Red** Significant issues, problems, or concerns where the operability/reliability of the system is either known to be degraded, or is questionable (i.e., unknown). Red typically implies that the associated system operability/reliability attribute is not effectively implemented/performed and that associated expectations consistent with applicable ISMS standards and requirements are not met. The issue, problem, or concern and/or associated corrective actions may not be well defined or identified. Multiple ratings of red within a column or row of the database may be an indication of a potential candidate for a Phase II assessment.
- White** Information needed to evaluate implementation/performance of the operability/reliability attribute either was not provided in the documentation of the Phase I Assessment, or does not exist. Integration of White data points into the decision making process for Phase II assessments will be determined on a case-by-case basis. When the evaluation of a Phase I assessment system operability/reliability attribute concludes that White is the appropriate rating, the preferred approach is to attempt to get more information to complete the matrix and the understanding of system operability/reliability (i.e., the white will then be changed to green, yellow, or red as appropriate). Alternatively, an explanation for why the information cannot be provided should be obtained to help in the Phase II decision making process.

Statistical analysis or even inspection of the matrix data will reveal outlying items. These are input into Step 2 below. Using the example matrix, red and white each make up 3% of the total entries, yellow is 16%, and green is 78%. The example matrix shows outliers on a system basis for system 1 at Facility A at Site X (about 60% yellow or red), on a site basis for operability/reliability attribute 2 at Site X (100% yellow or red), and on a complex-wide basis for operability/reliability attribute 6 (75% yellow or red). These outliers would be potential candidates for Phase II assessments.

The other areas where improvements could be made (i.e., the other individual attributes that are yellow or red) will be highlighted for the Field Element Managers and contractors to focus on for improvement, however Phase II assessments would not be required. Identification of deficiencies is not by itself a trigger for consideration as a candidate for a Phase II assessment. Areas where information is missing (white blocks in the matrix) will be further reviewed to determine if the information exists. If it can be found and entered into the matrix it can be analyzed as discussed above. If the information does not exist, the significance of the missing information will be assessed. It is possible that the absence of information could indicate the need for a Phase II assessment.

Step 2

This step involves a more detailed evaluation of the specific sites, facilities, systems, and/or operability/reliability attributes identified as potential candidates for Phase II assessments in step I above. This step takes into account the unique circumstances and considerations surrounding the specific candidates and examines the appropriateness of conducting a Phase II assessment. This more detailed screening by DOE Field Management in consultation with DOE Headquarters is intended to ensure that conducting a Phase II assessment will add value and provide real safety benefit given the resources expended to conduct the assessment. This second screening will take into account the following factors:

- Safety importance of the VSS (e.g., system safety classification, alternate means available for protecting the public, workers, and the environment, etc.)
- Need for verification or additional information, changes, or clarification of the Phase I results.
- Actual system reliability, extent of the issue, problem, or concern, and age of the system relative to current directives and standards.
- Mission, programmatic, and schedule impacts to the facility and site based upon the scope and depth of the review.
- Consideration of the time required to resolve issues compared to facility life and mission.
- Degree of confidence in the contractor's understanding of the system, the issues, problems, or concerns involved, and their overall responsiveness to safety issues.
- Any other factor bearing on the specific situation.

Scope of Phase II Assessments

Phase II assessments can be performed at the system level, facility level, site level, or complex level, and can involve single systems, multiple systems, specific types of systems (e.g., fire alarm systems, radiation monitors, or diesel generators), or system operability/reliability attributes. Phase II assessments conducted for an individual system are expected to focus on those areas (operability/reliability attributes) where issues, problems, or concerns have been identified during Phase I assessments. Phase II assessments, when combined with the results of Phase I assessments, are intended to verify overall system operability and reliability.

In most cases, system-specific Phase II assessments will involve Safety Class and Safety Significant systems. In rare instances, Phase II assessments may be performed on defense-in-depth systems where judged to be appropriate by line management. Factors to be considered include the thoroughness of the SSC grading process (e.g., a recently approved SAR vs an older BIO), the significance of the issues, problems, and concerns, and other overlapping Phase II assessments (e.g., if the major problems are being addressed by a Phase II assessment at the operability/reliability attribute level, then it may not be necessary to perform a Phase II assessment at the system level).

Where issues, problems, or concerns are limited to a particular facility, any resulting Phase II assessments will be limited to that facility. In these cases the scope of Phase II assessments will not be expanded to systems at other facilities at that site because the results of the Phase I assessments show that the issue, problem, or concern does not extend to these other facilities.

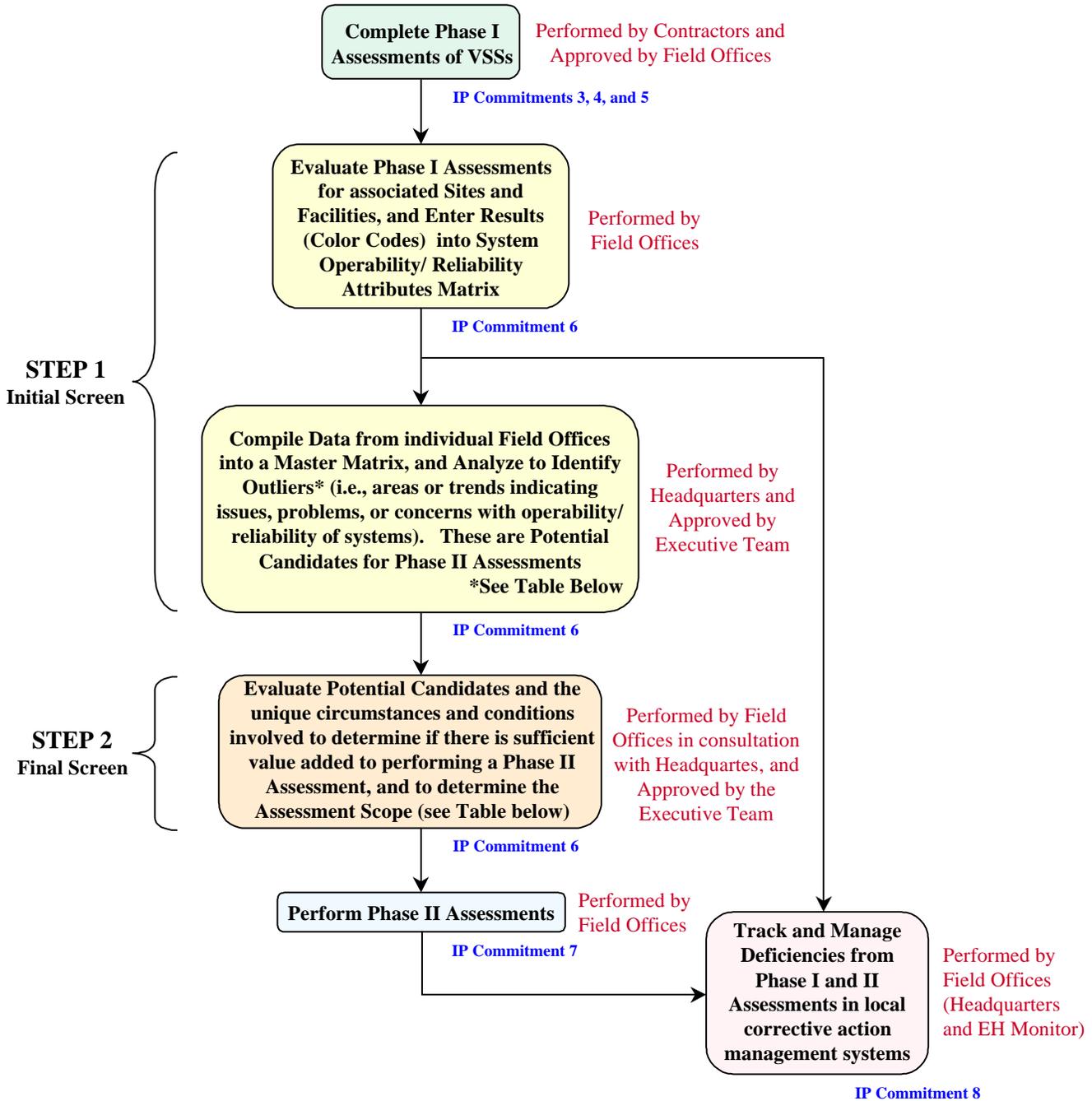
When issues, problems, or concerns are associated with the type of system, involve systems at the site level, or involve operability/reliability attributes at the site or complex levels, then the scope of the Phase II assessment may extend beyond systems for which Phase I assessments were performed or facilities listed in Appendix E of the Implementation Plan. This is because there may be a more widespread problem that may affect other systems at other facilities.

An example data matrix and a diagram of the 2-step process for selecting Phase II assessments are provided below. The diagram also shows the scope of the assessments.

Example Matrix for Compiling Results of Phase 1 Assessments

System Operability/Reliability Attribute (From Phase I CRAD)		Site A						...	Site X							
		Facility A			...	Facility N				Facility A			...	Facility N		
		VSS 1	...	VSS N		VSS 1	...	VSS N		VSS 1	...	VSS N		VSS 1	...	VSS N
1	Safety Function Defined/Understood	G		G		G		G		Y		G		G		G
2	Performance Criteria/System Requirements Identified	G		G		G		G		Y		Y		Y		R
3	Surveillance Test Acceptance Criteria Adequate	G		G		G		G		Y		G		G		G
4	Appropriateness of Test Requirements (Admin. Controls)	G		Y		G		G		G		G		G		G
5	Control of Test Procedures	G		G		G		G		G		Y		G		G
6	Appropriate System Drawings Available	Y		Y		Y		G		Y		R		G		Y
7	Control of Drawings	G		G		Y		G		G		G		G		G
8	Backlog (Testing, Maintenance, Corrective Actions, etc.)	G		G		G		G		Y		G		G		G
9	Preventive Maintenance Adequate	G		G		G		G		Y		G		G		G
10	Performance of Walkdowns, Inspections, & Assessments	G		G		G		G		W		G		Y		G
11	Control of Work on System	G		G		G		Y		G		G		G		G
12	Change Control (including USQ Process)	Y		R		G		G		G		G		G		Y
13	Control of Procedures used in items 9 - 12 above	G		G		G		G		Y		G		G		G
14	System Requirements/Performance Criteria Maintained	G		G		G		G		Y		G		G		G
15	Operational Readiness Responsibility Formally Assigned	G		G		G		W		G		G		G		G
16	System Reliability & Availability (Operating Experience)	G		G		G		G		Y		G		G		W
17	Operability of Essential Support Systems/Equipment	W		G		G		G		R		G		G		G

Process for Evaluating Phase I Assessment Results and Selecting Phase II Assessments



Outlier Categories (Potential Candidate Areas)	Scope of Phase II Assessments
1. Individual Systems	1. Safety Class and Safety Significant Systems
2. Facility Systems	2. 2000-2 Implementation Plan Appendix E Facilities Only
3. Facility Operability/Reliability Attribute	3. 2000-2 Implementation Plan Appendix E Facilities Only
4. Specific Type of System across Site	4. } The scope is not necessarily restricted to Appendix E Facilities or VSSs for which Phase I Assessments were performed
5. Several Systems at a Site	
6. Site Operability/Reliability Attribute	
7. Specific Type of System across Complex	
8. Complex Operability/Reliability Attribute	