

EFCOG Best Practice #41
Use of Reliability Centered Maintenance
Concepts for Fire Protection Components

04/21/2006

Facility: Savannah River Site

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Brief Description of Best Practice:

Reliability Centered Maintenance (RCM) concepts are used to determine if the NFPA Code frequencies for tests and inspections contained in NFPA 10 - *Standard for Portable Fire Extinguishers*, NFPA 25 - *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems* and NFPA 72 - *National Fire Alarm Code* can be revised while maintaining the desired level of reliability. When specific components are identified whose test and inspection frequencies may be appropriate for evaluation using RCM concepts, an Engineering Evaluation is written to provide technical justification for revising the test and inspection frequencies. These evaluations identify the expected failure modes, expected reliability if the test and inspection frequency is changed and identify any references that show a revised frequency does not impact reliability. Local Department of Energy representatives review and approve any change to testing and inspection frequencies using established protocols before any changes are implemented.

Why the Best Practice was used:

NFPA Codes identify the frequency at which testing and inspection should be done for various fire protection components/systems. NFPA Codes also give the Authority Having Jurisdiction the leeway to establish other testing and inspection frequencies that may be more appropriate for the specific conditions. The use of Reliability Centered Maintenance (RCM) concepts can be used to establish frequencies for testing and inspection that are more cost effective while retaining the reliability desired.

What are the benefits of the Best Practice:

The benefits from the use of this Best Practice is a reduction in testing and maintenance costs and a reduction in the number of incidents of equipment damage caused by testing and maintenance activities. As an example, internal inspections of check valves that would normally be done every five years requiring complete disassembly of the valve are now done only if indicators show a problem exists. Another example is the monthly inspection of fire extinguishers required per NFPA 10 - *Standard for Portable Fire Extinguishers*. Based on RCM concepts, the majority of extinguishers are now inspected quarterly.

What problems/issues were associated with the Best Practice:

Not all components can be easily evaluated using RCM concepts. In particular, electronic components are the least likely candidates for revising test and inspection frequencies based on RCM concepts.

How the success of the Best Practice was measured:

The Best Practice involves two issues. Maintaining reliability of system operation and reducing test and inspection costs. System reliability is measured using maintenance records and by tracking the number and duration of maintenance related impairments. Cost reductions can be calculated by determining the cost for completing tests and inspections at the NFPA specified frequency and then comparing that to the RCM based frequency. At the Savannah River Site, both indicators have been positive.

Description of process experience using the Best Practice:

There have been no negative experiences using this Best Practice to date. Some process facilities have chosen not to implement the revised frequencies because of Safety Analysis issues, but all administrative facilities, which represent the majority of facilities at the Savannah River Site, have adopted the revised frequencies.