

Code Compliance Review of Fire Protection Program

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1. Introduction

MOST Regulatory Guide 2003-19, Establishment and Implementation of Fire Protection Program, require fire protection program must be established at each nuclear power plant. The program should establish the fire protection policy for the protection of structures, systems, and components important to safety and the procedures, equipment, and personnel required to implement the program at the plant site. Every nuclear plant has rewritten extensively the fire protection program by the end of 2004, according to MOST RG 2003-19. This paper describes the results of compliance review of the fire protection program of nuclear power plant to the MOST RG.

2. Methods and Results

2.1 The scope of fire protection program

The fire protection program should extend the concept of defense in depth to fire protection in fire areas important to safety, with the following areas;

○ Organization, Staffing, and Responsibilities

The fire protection program should be under the direction of an individual who has been delegated authority commensurate with the responsibilities of the position and who has available staff personnel knowledgeable in both fire protection and nuclear safety.

Responsibility for the overall fire protection program should be assigned to a person who has management control over all organizations involved in fire protection activities

○ Fire Prevention

Administrative controls and procedures should be established to minimize fire hazards in areas containing structures, systems, and components important to safety. Normal and abnormal conditions or other anticipated operations such as modifications and transient fire hazard conditions such as those associated with maintenance activities should be reviewed by appropriate levels of management, and appropriate compensatory measures such as fire watches or temporary fire barriers should be implemented to ensure adequate fire protection and reactor safety.

○ Fire Protection

Administrative controls and procedures should be established to minimize the adverse effects of fires on

structures, systems, and components important to safety. A firefighting capability should be provided throughout the plant to limit the extent of fire damage. Standpipes, hydrants, and portable equipment consisting of hoses, nozzles, and extinguishers should be provided for use by properly trained firefighting personnel.

○ Post-Fire Safe Shutdown Procedures

Procedures for effecting safe shutdown should reflect the results and conclusions of the safe shutdown analysis. Implementation of the procedures should not further degrade plant safety functions. Time-critical operations for effecting safe shutdown identified in the safe shutdown analysis and incorporated in post-fire procedures should be validated.

○ Fire Brigade Training and Qualifications

The fire brigade training program should ensure that the capability to fight credible and challenging fires is established and maintained. The program should consist of initial classroom instruction followed by periodic classroom instruction, firefighting practice, and fire drills.

2.2 Code Compliance review

In this compliance review, USNRC RG 1.189 is applied also where MOST RG 2003-19 does not give detail guideline for fire protection program. Typical structure of plant fire protection is shown on figure 1.

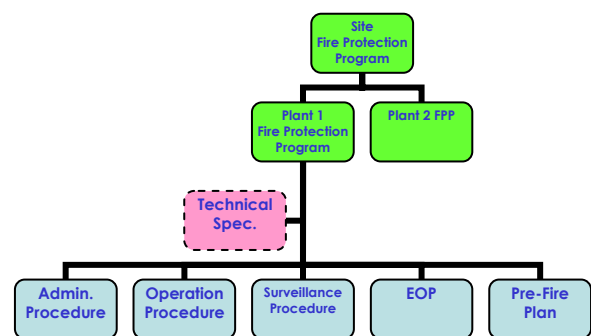


Figure 1 A hierarchy of plant fire protection program

The significant non-compliance items are as follows.

○ Fire reporting

Lack of reporting and record keeping procedure of fire event is being existence.

○ Fire watch training

Fire watches may be used as a compensatory measure when fire protection facility is inoperable, until facilities are to restore operability. No

procedure for fire watch training is described in fire protection program.

- Fire brigade qualification

Fire brigade members should have a physical shape to perform strenuous firefighting activities. But there is no qualification requirement as such in fire protection program.

- Fire brigade equipments

No requirements on compressor for recharging air supply bottles, breathing apparatus for containment entrance, and portable ventilation fan in fire protection program.

- Pre-fire plan

The existing pre-fire plan does not provide sufficient information needed in fire fighting such as fire suppression facilities, safe shutdown equipment, and etc. The example drawing fulfilling the fire fighting requirements is shown on figure 2.

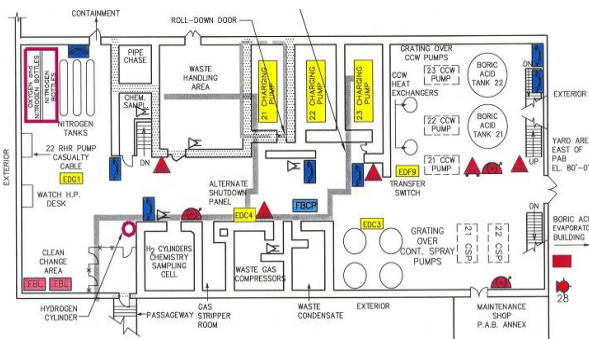


Figure 2 Plant layouts for fire fighting

- Coordination with offsite fire fighting resources

Lack of drill to exercise the fire event command structure between the plant fire brigade and offsite responder is revealed.

3. Conclusion

The compliance review results shows that existing plant fire protection program fully satisfy the requirements of MOST RG 2003-19. But, compare to NRC RG 1.189, the plant fire protection program is not good enough to fulfill the concept of defense in depth to nuclear fire protection. So, supplementary revision of the existing plant fire protection program to meet NRC RG 1.189 requirements is necessary. To enhance usefulness of pre-fire plan for fire brigades the pre-fire plan should be divided from the existing fire protection program and reorganized in compact size and volume.

REFERENCES

- [1] MOST, Establishment and Implementation of Fire Protection Program, Regulatory Guide 2003-19, Nov. 2003.
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