PARSONS

PP-02

MILLSTONE UNIT 2 ICAVP
PROJECT PROCEDURES

Title:

Accident Mitigation Systems Review

REVISION 0

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REVISION HISTORY

REVISION	DATE	REVISION DESCRIPTION
0	04/03/97	Procedure Initiation

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1.0 PURPOSE

The Accident Mitigation Systems Review (AMSR) will identify and verify the critical design characteristics for the accident mitigation systems and their components as identified to meet the Design Bases Events (DBEv) identified in Chapter 14 of the Millstone Nuclear Plant Unit 2 Updated Final Safety Analyses Report (UFSAR).

2.0 DEFINITIONS

2.1 Design Bases Event (DBEv) - Design Bases Events are defined as those initiating events as presented in Chapter 14 of the UFSAR that form the bases for the operating license of the Millstone Unit 2 Nuclear Power Plant.

2.2 Critical Safety Functions (CSF) - "Critical Safety Functions" are defined as the required specific set of activities that must occur in order to ensure that a success path associated with the design bases event mitigation is met and maintained.

2.3 Critical Action - "Critical Action" is defined as an active change that must happen in order for the critical function to be met.

2.4 Critical Parameters - "Critical Parameters" are a set of attributes that are required to be met by a system or component in order to achieve success in meeting critical actions.

2.5 Critical Design Characteristic (CDC) - A critical design characteristic is defined as that aspect of a component or system that must be provided by the designer to ensure that the component or system will meet the performance criteria identified in Chapter 14 of the UFSAR.

3.0 PREREQUISITES

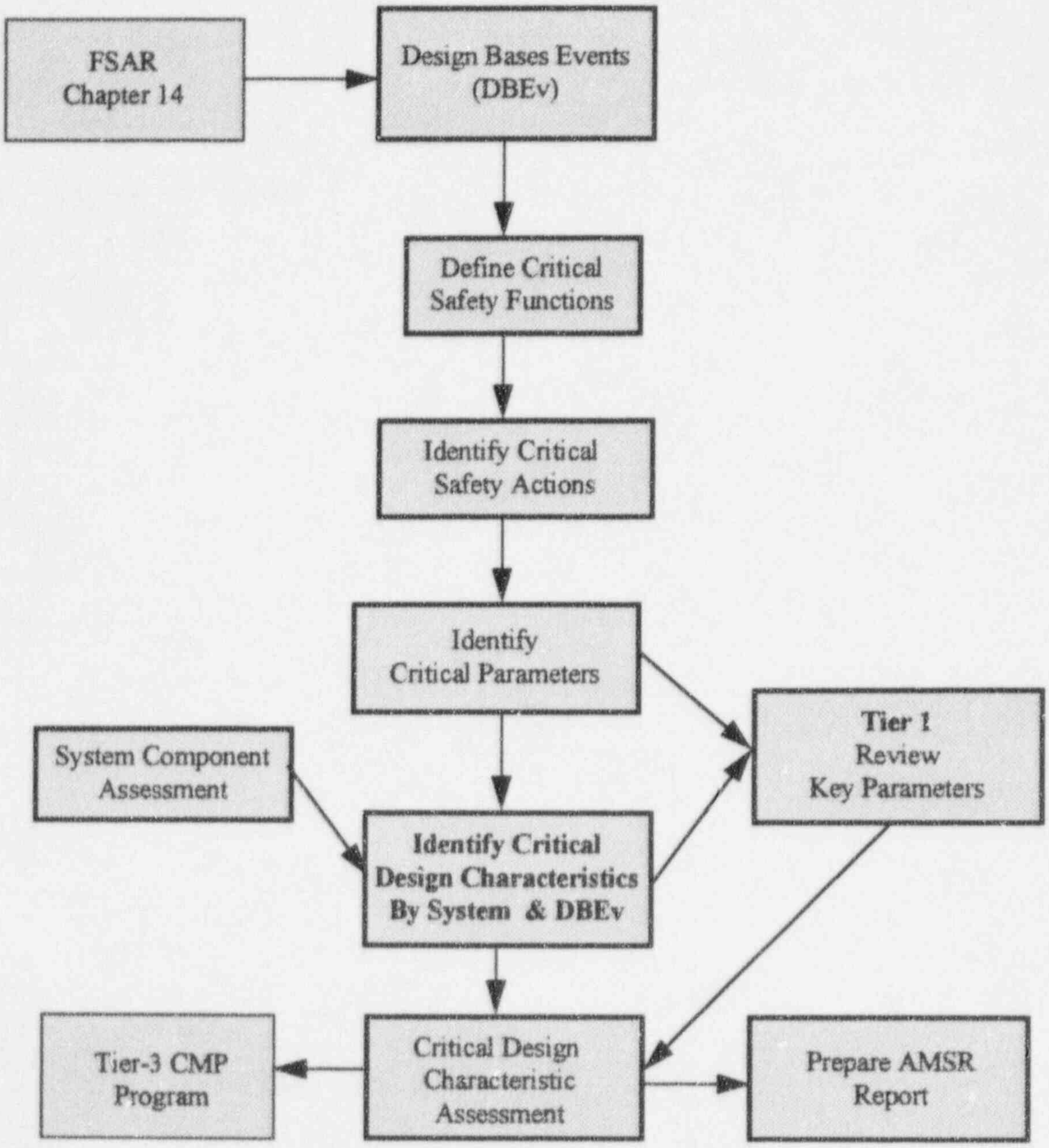
- Copies of Emergency Operating Procedures

- Chapter 14 of the UFSAR
- System P&IDs
- Accident Analyses
- System Design Descriptions (SDD)
- Safety System Logic Documents
- Shut Down Logic
- Safety Evaluation Report (SER)
- Design Bases Documents (DBD)

4.0 PROCEDURE

Overview: Determine the critical design characteristics for systems and components that must be confirmed in order to ensure that the plant will comply with the safety analyses identified in Chapter. 14 of the UFSAR. The simplified process flowchart is presented in Exhibit 2-1. The DBEv groups covered by this procedures are identified in Table 1.

Exhibit 2-1
AMSR PROCESS



4.1 DEFINE CRITICAL SAFETY FUNCTIONS

Resources

- System Engineer
- Accident Analyst
- Electrical Engineer
- Mechanical Engineer
- Controls Engineer
- Safety Evaluation Report(SER)
- FSAR
- Emergency Operations Procedures
- Technical Specifications
- PC database

Action

1.1 Review UFSAR Chapter 14 and identify design bases events by logical groups (refer to Table 1).

1.2 Evaluate DBEv groups to identify Critical Safety Functions essential to achieve and maintain safe shutdown following an event. (e.g. RCS Heat Removal, Reactivity Control, RCS Inventory Control, etc.)

1.3 Identify Critical Safety Function objectives and system level plant processes/actions to achieve objectives.

1.4 Identify design and licensing criteria that apply to UFSAR Chapter 14 DBEv mitigation.

Table 1
DBEv GROUPS

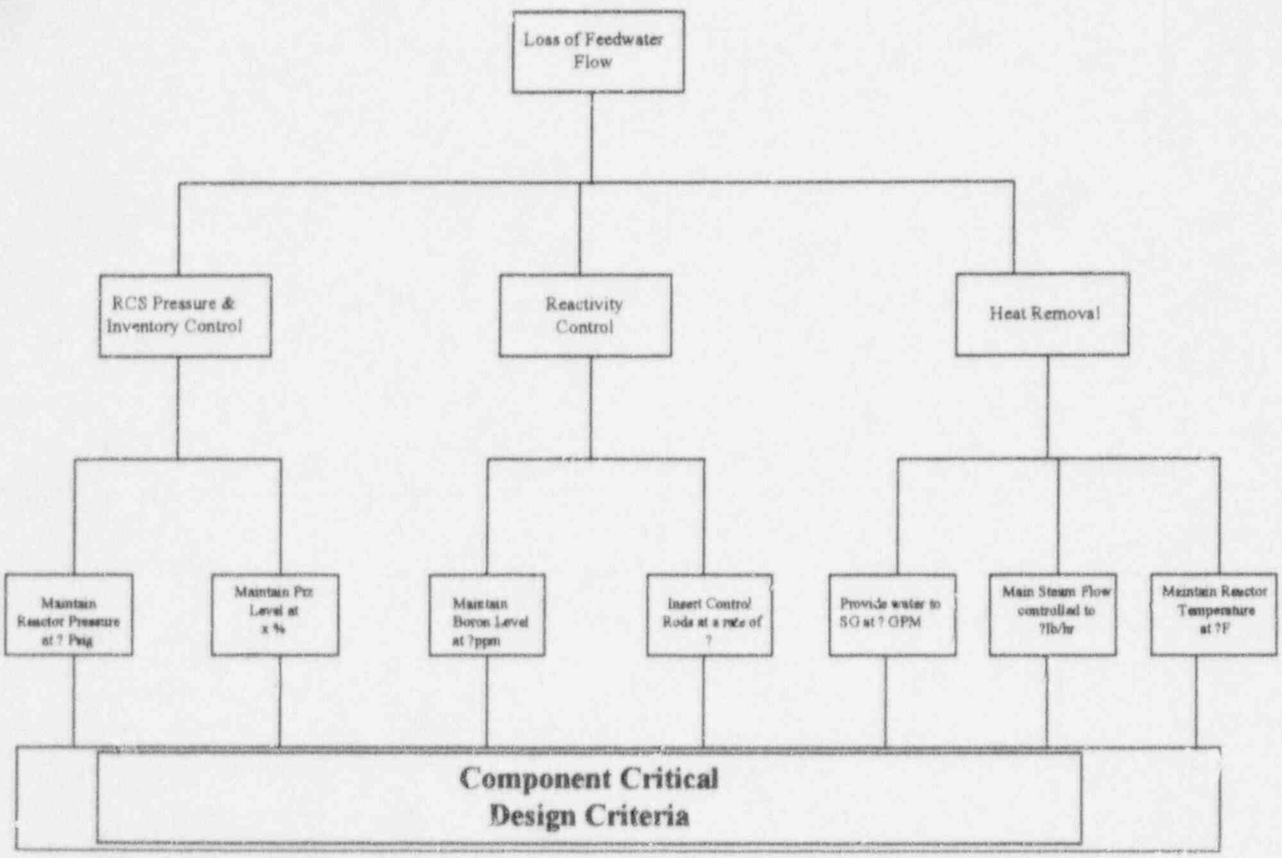
DBEv	Variation
Increase in Heat Removal by the Secondary System	Decrease in Feedwater Temperature
	Increase in Feedwater Flow
	Increase in Steam Flow
	Inadvertent Opening of a Steam Generator Relief or Safety Valve
	Steam Pipe Failure Inside and Outside containment
Decrease in Heat Removal by the Secondary System	Loss of External Load
	Turbine Trip
	Closure of Main Steam Isolation Valve
	Loss of Normal Feedwater Flow
Decrease in Reactor Coolant System flow	Loss of Forced Reactor Coolant Flow
	Reactor Coolant Pump Rotor Seizure
Reactivity and Power Distribution Anomalies	Uncontrolled Control Rod Bank Withdrawal From a Subcritical or Low Power Startup Condition
	Uncontrolled Control Rod/Bank Withdrawal at Power
	Control Rod Misoperation
	Startup of an Inactive Loop
	CVCS Malfunction That Results in a Decrease in the Boron Concentration in the Reactor Coolant
	Control Rod Ejection Accident
Decrease in Reactor Coolant inventory	Inadvertent Opening of a Pressurizer PRV
	Steam Generator Tube Failure - Rad Consequences
	LOCA From Breaks in the RCP Boundary
Radioactive Releases from a Subsystem or component	Waste Gas System Failure
	Fuel Handling Accident
	Spent Fuel Cask Drop Accident
Non-Standard Review Plan Events	Containment Analyses
	Hydrogen Accumulation in Containment
	Radiological Consequences of the Design Bases Accident

1.1 Create generic Critical Safety Function Diagrams for each Critical Safety Function identifying system level active components that support the process or action. (Example shown as Exhibit 2-2

1.2 Identify support system requirements for each system level component or action Critical Safety Function Diagram.

1.3 Develop a specific critical safety function data base or diagram for each DBEv

Exhibit 2-2
SAFETY FUNCTION DIAGRAM



Action Output

- Critical Safety Function and affected systems for each DBEv
- Critical Safety Function Diagram.

- Documents identifying references used to determine the Critical Safety Functions.

4.2 IDENTIFY CRITICAL PARAMETERS

Resources

- System Engineer
- Accident Analyst
- PC database
- Design Calculations
- Regulatory Commitments
- Accident Analyses
- Engineering Calculations
- System Design Descriptions
- Emergency Operating Procedures (EOP)
- Technical Specifications
- Critical Safety Function Diagrams
- Electrical Systems Diagrams
- System Logic and Control Diagrams

Action

1.1 Review each DBEv group accident analyses including , DBD's, system calculations and analyses, as necessary, to identify key system level process.

1.2 Using the Critical Safety Function Diagrams for each DBEv, evaluate each Critical Safety Function and identify the system and component critical parameters essential to achieving the safety function.

1.3 Identify where analyses parameters are bounding and document key assumptions made.

1.4 Create DBEv critical parameter list by system and component.

1.5 Confirm critical parameter requirements by defining the critical parameter and the definitive references that identifies the critical parameter.

1.6 If an inconsistency exists, the System Engineer will prepare a discrepancy notice identifying the critical parameter, and the documentation that supports the potential finding. Resolution will be in accordance with the potential finding evaluation process (PP-07).

1.7 If it is determined that the critical parameter is not specified, the System Engineer will prepare a potential finding notice identifying the missing critical parameter, and why it is critical to the safe operation of the plant. Resolution will be in accordance with the potential finding evaluation process (PP-07).

1.8 If it is determined that the parameter is not critical and is not essential to the safe operation of the plant, then the System Engineer will document this information. The document will include, the parameter or function, the material reviewed and the conclusion reached.

<u>Action Output</u>

- Database file and reports of the critical parameter for each system and DBEv safety function. (See Exhibit 2-2 as reference for type of information)
- Discrepancies report

Exhibit 2-2
EXAMPLE OF CRITICAL PARAMETER REPORT

Design Bases Event:____

System:____

Component	Function	Design Parameter / Action	Design Characteristic	Source References
Pump				
Valve 1				
Valve 2				
Instrument 1				
Instrument 2				

4.3 CRITICAL COMPONENT/SYSTEM ASSESSMENT

<u>Resources</u>

- System Engineer
- Mechanical Engineer
- Electrical Engineer
- Controls and Instrument Engineer
- Accident Analyst
- PC database
- Engineering Calculations
- System Design Descriptions
- Design Bases Documents
- PRA
- SER
- Electrical System Diagrams
- Control Loop Diagrams

Action

1.1 Develop system composite database or diagrams including all essential support systems for critical safety function systems using "As-Built" design bases information

1.2 Develop list of component design performance requirements

1.3 Document active component as-is performance capabilities from IST data and logs.

1.4 Create critical component list

1.5 Document references and source information used to identify the important to safety components and systems.

1.6 If a component or system is found to contain a discrepancy, a potential finding notice shall be prepared. Resolution will be in accordance with the potential finding evaluation process (PP-07).

Findings shall contain the following information:

- Critical Function
- Critical component
- Discrepancy
- Effect of Discrepancy
- Documents supporting potential finding
- References

Action Output

- Critical Component/System Listing including performance requirements and capabilities (See Exhibit 2-2)

4.4 IDENTIFY CRITICAL DESIGN CHARACTERISTIC

Resources

- System Engineer
- Mechanical Engineer
- Electrical Engineer
- Controls Engineer
- PC database from System Assessment and Critical Parameter Identification
- Accident Analyses
- Engineering Calculations
- System Design Descriptions
- SER
- Electrical System Diagrams
- EOP
- Technical Specification
- Critical Safety Function Diagrams

Action

1.1 Review critical parameter list and establish critical characteristics at the system component level through the review of appropriate design documents and calculations. It may be necessary to review additional system level documents in order to establish any non-safety related system level interfaces.

1.2 Correlate CDC's with the critical component list to check component performance requirements. There may be multiple requirements that are derived for different DBEv, check to ensure that all the bounding information is identified on the matrix before confirming with performance information.

1.3 Review technical specifications versus critical design characteristic.

1.4 Prepare a matrix that documents the following information:

- Critical Safety Function
- Applicable Design Bases Event
- Critical Component
- Critical Parameter
- Critical Characteristic
- Reference source for confirmation

__Action Output__

- Critical Design Characteristic Matrix.

4.5 CRITICAL DESIGN CHARACTERISTIC ASSESSMENT

__Resources__

- System Engineer
- Walkdown personnel
- PRA
- PC database

<u>Action</u>

1.1 The Critical Design Characteristic team lead will review the list Of Critical Design Characteristics and with the AMSR team determine the CDCs to be proposed for verification. The PRA will be used to identify risk significant systems and components.

1.2 The Team Leader will identify a selection of Critical Design Characteristics that will be validated by the Critical Design Characteristic walkdown team and submit the list to the NRC for approval.

1.3 Verify through visual inspection that the Critical Design Characteristics are inplace and properly documented.

1.4 Verify through the review of maintenance and testing procedures that the characteristics are properly maintained and tested to meet safety function requirements

1.5 Verify through a review of in-service tests and visual inspection that critical parameters are sensed and controlled to meet their safety function requirements.

1.6 Review of operations, maintenance and inservice testing records to ensure that the Critical Design Characteristic is maintained in its required condition.

1.7 In those cases where the SVSR Team is evaluating a system having a group of Critical Design Characteristics, the Critical Design Characteristic walkdown team will not verify them in the field, the SVSR Team will provide the validation.

1.8 For all other selected Critical Design Characteristics, the Critical Design Characteristic walkdown team will be responsible for validating the existence of the Critical Design Characteristic for the component through either visual verification in

the plant, collection of valid documents, or other solid evidence that the c Critical Design Characteristic is in place and maintained.

1.9 Identify as a potential findings components not having the Critical Design Characteristic met. It will be compared to the results of the NNECo program finding to determine if it is on the list. If it is on the list, the parameter will be documented as being covered under the NNECo program.

1.10 Components with Critical Design Characteristics that must exist and have not been found by NNECo will be documented as potential findings. Resolution will be in accordance with the potential finding evaluation process (PP-07).

Action Output

- Validation report containing the following information:
  - Critical component
  - Critical parameter
  - Critical Design Characteristic(s)
  - Validation method
  - References
  - Final Report