



# JUSTIFYING COTS PRODUCTS

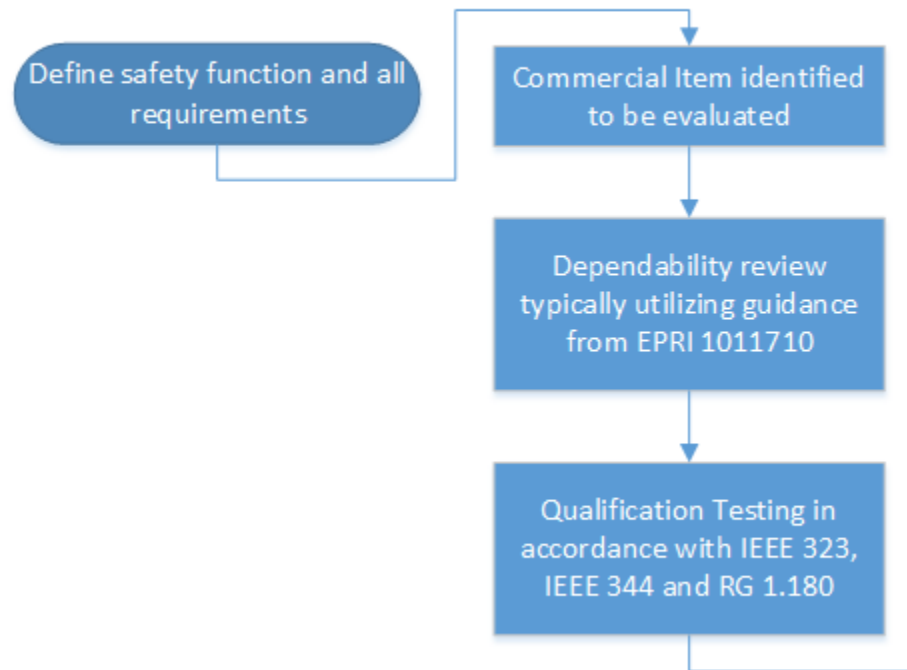
## USING COMMERCIAL GRADE DEDICATION

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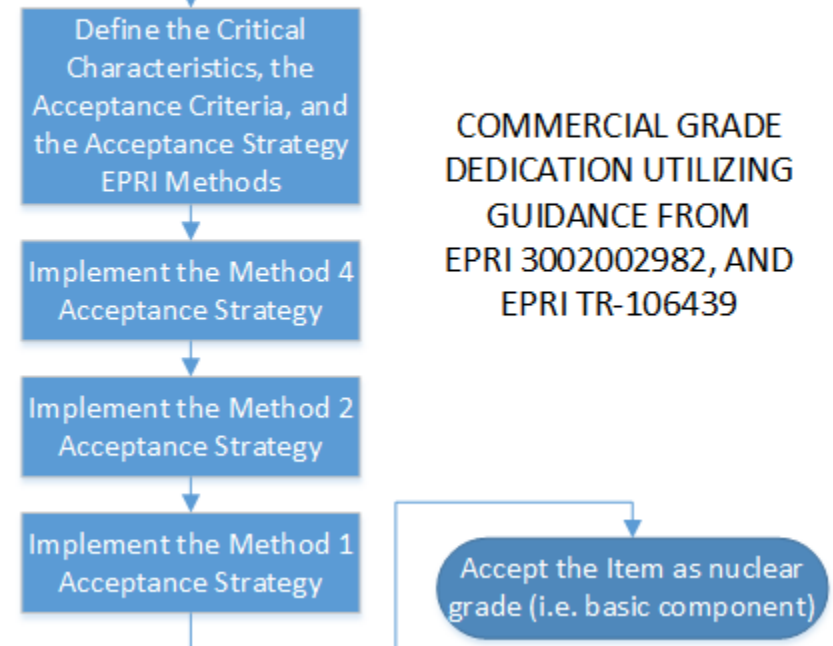
22 October 2019

# JUSTIFICATION PROCESS

## SUITABILITY OF THE DESIGN



## ITEM ACCEPTABILITY



COMMERCIAL GRADE DEDICATION UTILIZING GUIDANCE FROM EPRI 3002002982, AND EPRI TR-106439

# SUITABILITY OF DESIGN

## ■ Dependability Review- EPRI 1011710 Guidance

Topic	CDR Process Stage
Identification of critical attributes	Screening, Off-Site Preparation, On-Site Reviews
Functional review	Screening, Off-Site Preparation
System orientation	Screening, Off-Site Preparation
Process orientation	Screening, Off-Site Preparation
Thread analyses	On-Site Reviews
Staff capabilities and attitude	On-Site Reviews
Risk analysis	Off-Site Preparation, On-Site Reviews
Operating history review	Off-Site Preparation, On-Site Reviews
Resolution of pending issues	Issuing the CDR report
CDR report	Issuing the CDR report

# SUITABILITY OF DESIGN

- Dependability Review
  - Functional Features
  - Systematic Integrity
  - Reliability
  - Failure Modes
  - Built-in Safety Features and Diagnostics
  - Security



# SUITABILITY OF DESIGN

- Dependability Review
  - Functional Features
    - Signal Type and Range
    - Logic Capabilities
  - Systematic Integrity
    - Process and People
    - Confirmation Requirements were Fully Implemented



# SUITABILITY OF DESIGN

- Dependability Review
  - Reliability (Random Failure Rate)
    - Operating History
    - Warranty Return Data
  - Failure Modes
    - Dangerous or Safe Fail States



# SUITABILITY OF DESIGN

- Dependability Review
  - Built-in Safety Features and Diagnostics
    - Drive Deterministic Behavior
    - Detect Dangerous Failures and Make Them Safe
  - Security
    - Trustworthy Supply Chain
    - Secure Development Environment



# SUITABILITY OF DESIGN

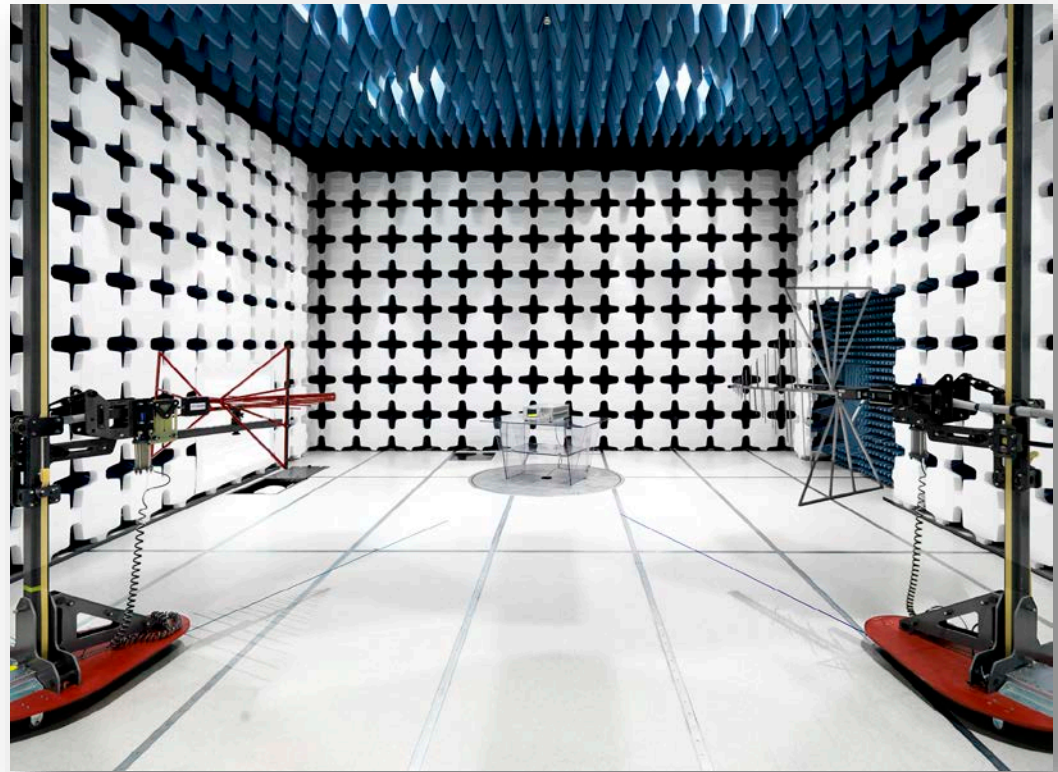
- Environmental Compatibility
  - Temperature, Humidity, etc.
  - Seismic





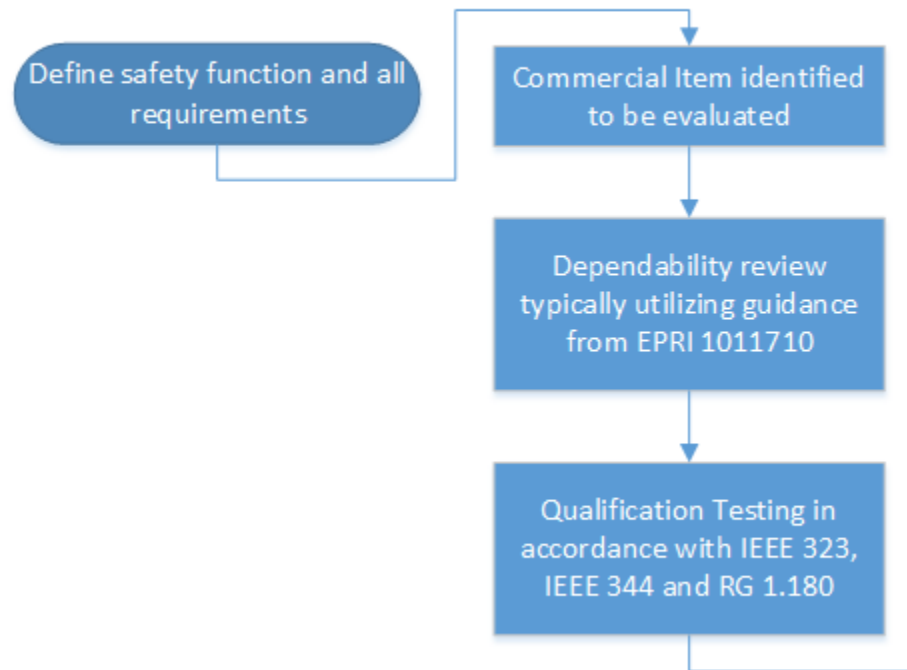
# SUITABILITY OF DESIGN

- Environmental Compatibility
  - Electromagnetic Compatibility

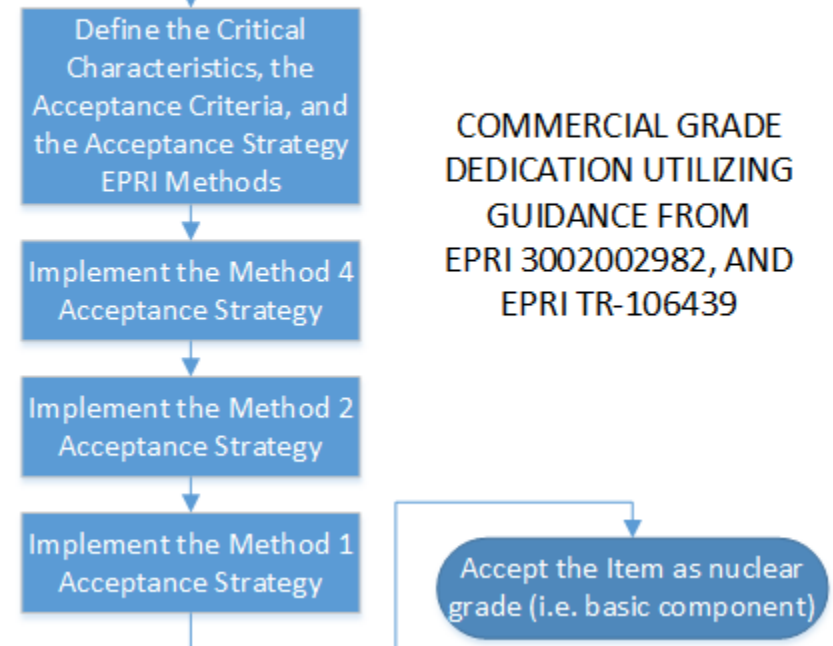


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## SUITABILITY OF THE DESIGN



## ITEM ACCEPTABILITY



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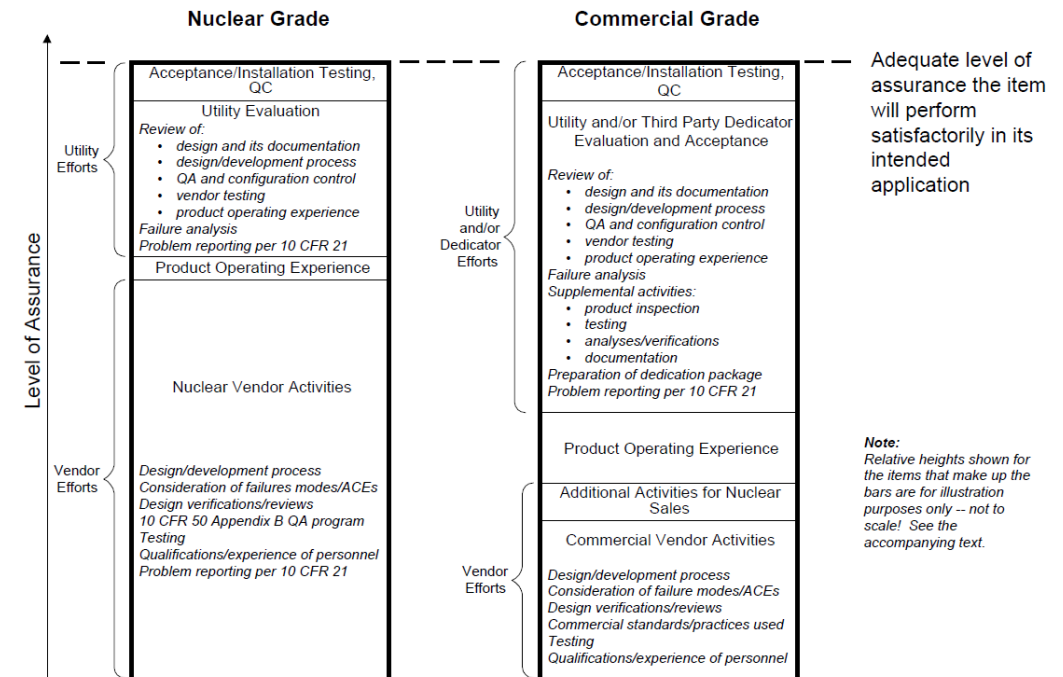
# ITEM ACCEPTABILITY

- Commercial Grade Dedication- EPRI 3002002982 and EPRI TR-106439
- CGD Relevance in the International Community
  - Varies based on incorporation of 10 CFR 50 App B and 10 CFR 21 type requirements into each country's regulatory structure
  - ASME NQA-I incorporates CGD



# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Manufacturers that don't have 10 CFR 50 App B compliant programs produce "Commercial Grade" products



# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Use the safety function to determine the critical characteristics
  - Physical
  - Performance
  - Dependability
    - Built-in Quality
    - Configuration Control
    - Reliability
    - Problem Reporting
- Determine the acceptance criteria for the critical characteristics



# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Determine the methods to be used to verify the acceptance criteria
  - Method 1- Special Tests and Inspections
  - Method 2- Commercial Grade Surveys
  - Method 3- Source Surveillance
  - Method 4- Operating History



# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Method I- Special Tests and Inspections
  - Each Item Procured is Tested, Unless a Sample Plan is Applicable
    - Measure Dimensions
    - Check Physical Configuration
    - Input and/or Output Signal Accuracy
    - Check Pressure Integrity
    - Verify Diagnostics Operate as Expected
    - Verify All Critical Features Function Correctly



# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Method 2- Commercial Grade Surveys
  - A Visit to the Manufacturer's Facility (Sometimes Multiple Sites)
  - Typically Expires After Three Years
  - Take Credit for Aspects of Manufacturer's QA Program
    - Not a Full Nuclear Audit
    - Dependability Critical Characteristics
    - Sometimes Addresses Performance Critical Characteristics





# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Method 3- Source Surveillance
  - A Visit to the Manufacturer's Production Facility
  - Must be Repeated for Each Procurement
    - Limited Usefulness for Digital Devices
    - Can Mitigate Observed Shortcomings in Configuration Control



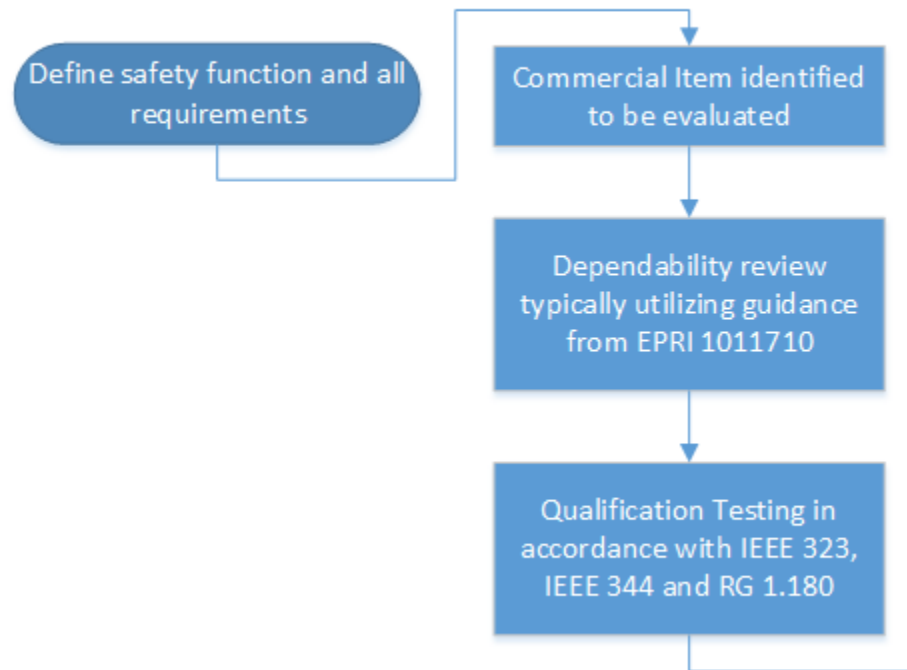
# ITEM ACCEPTABILITY- COMMERCIAL GRADE DEDICATION

- Method 4- Operating History
  - Warranty Return Data
  - Attempt to Survey Other Customers Directly
  - Dependability Critical Characteristics
    - Reliability



# CONCLUSION

## SUITABILITY OF THE DESIGN



## ITEM ACCEPTABILITY

