

**Commercial Grade Dedication
How to Implement The
New EPRI Guidance
RG 1.164 & EPRI 3002002982**

Tracy Bolt
Chief Nuclear Officer



Who is Paragon?

- Created from ATC Nuclear in 2017
- Acquired NLI in Feb 2020
- QA program audited by NUPIC, NIAC, DOE and DOD



Why we need Commercial-Grade Dedication

- Part Availability - The plants still need to install replacement parts that are now commercially available but are no longer controlled or supplied under the OEM nuclear program
- Potential to Reduce Lead Times - 3rd Party Suppliers or the site may be able to purchase a commercial item and dedicate it in less time than the OEM
- Potential for Lower cost – purchasing from a 3rd Party Supplier or performing internal dedication may be more cost effective than buying from the OEM – this is a major component of the DNP Material Cost Reduction Efficiency Bulletin EB 16-30

Implementing CGD per NRC RG 1.164 & EPRI 3002002982

- The basics of the new guidance
- Implementation of the new guidance from a Supplier Perspective
- Old Dedication methods verses the new dedication methods – what changed?

The basics of the new guidance

- Why was the guidance revised? *To consolidate industry information to one guidance document.*
- How do we utilize the process? *Incorporated the guidance into implementing procedures.*
- Is there a differences between 3rd Party providers and licensees? *No, the process is the same.*
- Do you have to dedicate components if you control under a 10CFR50 Appendix B program?
 - *Marc Tannenbaum and John Simmons have a presentation specifically to address this.*

The new guidance does not change the basic process of dedication



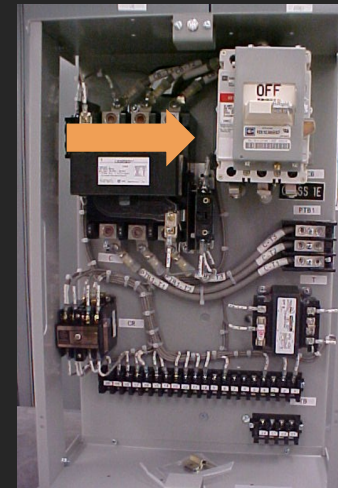
Item



Technical Evaluation / CGD

Inspection and Test – Method 1

Quality “Safety Related” Certification



Parent Equipment /
Application

RG 1.164 & EPRI 3002002982



U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REGULATORY RESEARCH
REGULATORY GUIDE

June 2017
Revision 0
Technical Lead
J. Ortega-Luciano

REGULATORY GUIDE 1.164

(Draft was issued as DG-1292, dated July 2016)

**DEDICATION OF COMMERCIAL-GRADE ITEMS FOR USE IN
NUCLEAR POWER PLANTS**

A. INTRODUCTION

Purpose

This regulatory guide (RG) describes methods that the staff of the U.S. Nuclear Regulatory Commission (NRC) considers acceptable in meeting regulatory requirements for dedication of commercial-grade items and services used in nuclear power plants.

Applicability

All individuals, partnerships, corporations, or other entities as defined in Title 10 of the *Code of Federal Regulations*, Part 21, "Reporting of Defects and Noncompliance" (10 CFR Part 21) (Ref. 1), Section 21.2, "Scope," with consideration for the exceptions specifically provided and annotated in Section 21.2.

EPRI | ELECTRIC POWER
RESEARCH INSTITUTE

Plant Engineering: Guideline for the Acceptance of
Commercial-Grade Items in Nuclear Safety-Related
Applications

Revision 1 to EPRI NP-5652 and TR-102260

2014 TECHNICAL REPORT

NRC RG 1.164

This Regulatory Guide is the endorsement of the EPRI Guidance

- It is not a carte blanche endorsement, there are exceptions
 - Two exceptions are identified in the RG 1.164
 1. NP-7484 and TR 105849 have not been reviewed or approved by the NRC as an acceptable approach for meeting an NRC requirement.
 2. The following four guidance documents referenced in EPRI 3002002982: EPRI 1025283, (Ref. 19); EPRI TR-107339, (Ref. 20); EPRI 1011710, (Ref. 21); and EPRI TR-103291 (Ref. 22), have not been reviewed or approved by the NRC as an acceptable approach for meeting an NRC requirement.
- It is important to understand what has been endorsed by the NRC. Although the NRC has made exceptions to the references in the endorsement of the overall guidance, it does not mean that the guidance documents are not an acceptable method to conduct the activities.

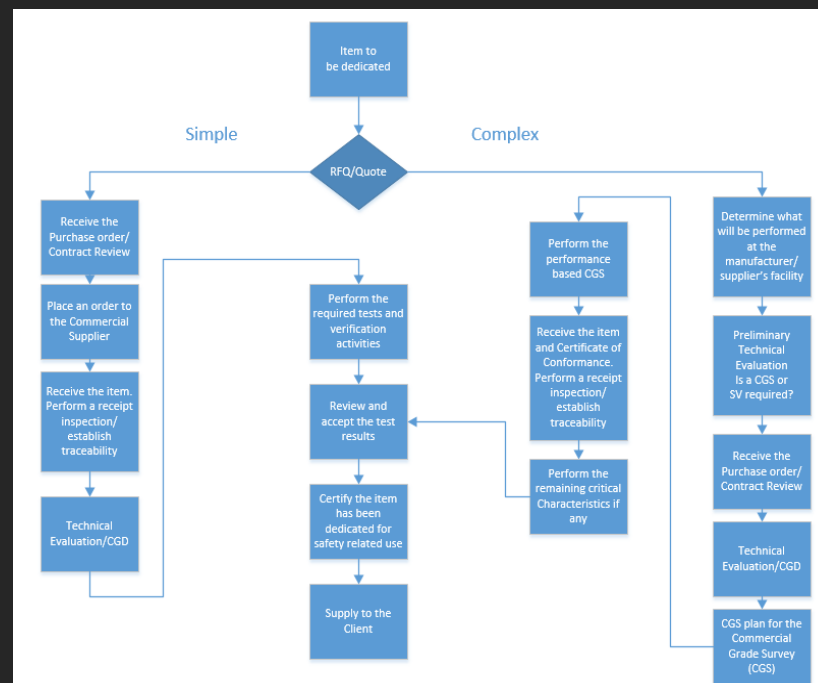
Old Dedication Plans verses New Dedication Plans

- Are the old dedication plans still acceptable for use? *Maybe... it depends...*
- **What Changed? – *The new guidance has bound all the necessary information to one document.***
- What we have done within our two organizations (Paragon and Nuclear Logistics).
 - In Oak Ridge, TN the new guidance has been utilized for all dedication activities since it came out in 2014. Utilizing the new format and documenting the technical evaluation as part of the CGD plan.
 - At the NLI facility in Fort Worth, TX (also now Paragon), we have many dedication plans that were written prior to the revised guidance. A lot of which have already been approved or accepted by the plant. For these, prior to use, the plans are reviewed against the new guidance and are either revised or a new CGD is written.

Dedication from a Supplier Perspective

Examples of Simple Dedication:
Repeat order, the item has a basic safety function. Fuse, circuit breaker, ball valve, gasket, hardware, O-ring, capacitor, etc...

Examples of Complex Dedication:
Multi-function device, assembly of various items, Item containing software/firmware, items that have complicated functions and testing requirements.



Simple Dedication using a Generic Plan

What would qualify to be Generic?

- Commercially available family or series of items that can be used in multiple applications at the plant.

Benefits of a generic dedication plan

- Consistency in the collection of data, reducing errors
- Reduce or eliminate the need for multiple approvals for a series of items.
 - Reduce Plant Expense - Cost savings for the customer in time spent reviewing multiple documents with the same information.
 - Reduce Supplier Cost - Time and cost savings for the supplier using previously accepted dedication plans.

Example of a Simple Dedication Activity

The new guidance provides a consistent format when completing the Dedication plan.

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Revision 6	
Document Number	CGD-MCCB-1		
NLI Project Number	GENERIC		
SECTION A ITEM DESCRIPTION			
Inventory Control No./Cat ID/ Stock Code:	N/A		
Noted Identifier:	Circuit Breaker, Molded Case, Various Poles, Current Ratings, and Voltage Ratings		
MANUFACTURER NAME:	MANUFACTURER MODEL / PART / CAT. NUMBER		
Various			
Revision History:			
Revision	Description of Revision	Date	
0	Original Issue	11/2/2017	
1	Revised acceptance activities/criteria for CC #'s 4, 6, 8	1/26/2018	
2	ECNF-7549: Thermal trip testing CC is not applicable to magnetic-only circuit breakers (i.e. motor circuit protectors). Notice to this effect added to CC#3, and explanation in basis 3. Revised CC#1 to ensure that breakers without mechanical trip are verified mechanically. Minor administrative changes and typographical corrections. No other changes were made to the test method or acceptance criteria, and testing per Rev. 2 of this CGD meets the requirements of Rev. 1.	03/23/18	
3	ECNF-7831: Project number is added in the header. NDSP (minimum viable paragraph is re-worded) No other changes were made to the test method or acceptance criteria, and testing per Rev. 3 of this CGD meets the requirements of Rev. 2.	8/02/2018	
4	ECNF-7858: Expanded on note found in CC#5 No other changes were made to the test method or acceptance criteria, and testing per Rev. 4 of this CGD meets the requirements of Rev. 3.	8/15/2018	
5	ECNF-7956 Added clarification to the note for CC#2 regarding ambient temperature for hold-in.	9/21/2018	

CGD-MCCB-1, Rev. 6, Page 1 of 16

Regardless of the type of component being dedicated, the guidance ensures that all the major attributes of the dedication process are addressed.

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Revision 6	
Document Number	CGD-MCCB-1		
SLI Project Number	GENERIC		
SECTION B END USE / PARENT / HOST EQUIPMENT INFORMATION			
Note: If the specific end-use(s) / plant applications are not known, complete Section C of this form in lieu of Section B prior to proceeding.			
<input checked="" type="checkbox"/> Not Applicable (Section C Completed Below)			
EQUIPMENT ID (TAG) NUMBERS OR DESCRIPTION OF ITEM USAGE:			
N/A			
PARENT COMPONENT/HOST DESCRIPTION:			
N/A			
FUNCTIONAL SAFETY CLASS OF COMPONENT / HOST:		BASIS / SOURCE:	
<input type="checkbox"/> Safety-Related <input type="checkbox"/> Non-Safety Related (If non-safety, item is not a candidate for dedication)		N/A	
IDENTIFICATION OF PARENT COMPONENT/HOST EQUIPMENT FUNCTION(S)			
FUNCTIONAL MODE	BASIC SAFETY FUNCTION(S)	DESCRIBE (AS REQUIRED)	
<input type="checkbox"/> Active	N/A	N/A	
<input type="checkbox"/> Passive	N/A	N/A	
<input type="checkbox"/> Active	N/A	N/A	
<input type="checkbox"/> Passive	N/A	N/A	
<input type="checkbox"/> Active	N/A	N/A	
<input type="checkbox"/> Passive	N/A	N/A	
PARENT COMPONENT/HOST EQUIPMENT IS (CHECK ALL THAT APPLY):			
<input type="checkbox"/> EQ <input type="checkbox"/> CLASS 1E <input type="checkbox"/> SEISMIC CLASS 1 <input type="checkbox"/> OTHER: (see below) <input type="checkbox"/> N/A		<input type="checkbox"/> ASME SECTION III <input type="checkbox"/> CONTAINMENT PRESSURE BOUNDARY <input type="checkbox"/> SERVICE LEVEL 1 COATING	

CGD-MCCB-1, Rev. 6, Page 3 of 16


This generic CGD is not dependent on the actual location in the plant.

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Paragon	
Document Number	CGD-MCCB-1	Revision	6
PLI Project Number	GENERIC		
SECTION C BOUNDED SCOPE OF USE			
Only complete Section C when specific end-use of the item being dedicated unknown.			
<input type="checkbox"/> Not Applicable (Section B Completed Above)			
Is the item being dedicated a commodity or standard item designed and constructed in accordance with an industry standard?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
IF "YES", LIST THE STANDARD(S) BELOW			
NEMA AB-4, "Guidelines for Inspection and Preventative Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications."			
LIST FUNCTIONS AND/OR APPLICATIONS CONSIDERED WHEN COMPLETING THIS EVALUATION			
The breaker is designed to protect an electrical circuit from damages caused by excess current, typically resulting from an overload or short circuit. It is required to interrupt current flow after a fault is detected. The breaker application consist in mild or harsh environment Class 1E equipment.			
EQUIPMENT QUALIFICATION CONSIDERATIONS / LIMITATIONS (CHECK ALL THAT APPLY):			
CONSIDERATION		QUALIFICATION BASIS / LIMITATIONS OF USE: Customer Purchase Order or Specification	
<input checked="" type="checkbox"/> ENVIRONMENTAL QUALIFICATION			
<input checked="" type="checkbox"/> SEISMIC QUALIFICATION			
<input type="checkbox"/> OTHER: (see below)			
<input type="checkbox"/> N/A			

Regardless of where the item is installed, the Basic Safety Functions are the same

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Revision 6	
Document Number	CGD-MCCB-1		
NLI Project Number	GENERIC		
SECTION D ITEM INFORMATION			
ITEM DESCRIPTION:			
Circuit Breaker, Molded Case, Various Poles, Current Ratings, and Voltage Ratings			
FUNCTIONAL SAFETY CLASS OF ITEM:		BASIS / SOURCE:	
<input checked="" type="checkbox"/> Safety-Related <input type="checkbox"/> Non-Safety Related (If non-safety, item is not a candidate for dedication)		Customer Purchase Order	
IDENTIFICATION OF ITEM FUNCTION(S)			
FUNCTIONAL MODE	BASIC SAFETY FUNCTION(S)	DESCRIBE (AS REQUIRED)	
<input checked="" type="checkbox"/> Active	Trip on fault	Circuit breakers act as protective devices to open the circuit upon an overcurrent or fault condition.	
<input type="checkbox"/> Passive			
<input type="checkbox"/> Active	Conduct rated current.	During normal operations (i.e., no fault) the breaker carries rated load of class 1E power.	
<input checked="" type="checkbox"/> Passive			
ITEM IS (CHECK ALL THAT APPLY):			
<input checked="" type="checkbox"/> EQ <input checked="" type="checkbox"/> CLASS 1E <input checked="" type="checkbox"/> SEISMIC CLASS I <input type="checkbox"/> OTHER		<input type="checkbox"/> ASME SECTION III <input type="checkbox"/> CONTAINMENT PRESSURE BOUNDARY <input type="checkbox"/> SERVICE LEVEL 1 COATING <input type="checkbox"/> N/A	
SECTION E ELIGIBILITY FOR DEDICATION			
Is the item eligible for dedication in accordance with 10CFR, Part 21?			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
If the answer is no, this item cannot be dedicated.			

The standard sections are addressed regardless of the type of component. A Failure Modes and Effects Analysis is included in the new CGD format.



Commercial Grade Item Dedication Technical Evaluation And Test Plan					
Document Number		CGD-MCCB-1		Revision 6	
NLI Project Number		GENERIC			
SECTION F FAILURE MODES / MECHANISMS AND EFFECTS ANALYSIS					
CREDIBLE FAILURE MODE/MECHANISM		EFFECTS ON SYSTEM/COMPONENT FUNCTION			
Short Circuit		Fault a class 1E circuit			
Open Circuit or failure to carry rated load		Inability to carry load to safety related components			
Failure to trip per rated design		Failure to trip would allow cascading failures of safety related equipment and possible cable damage or fire.			
Accessories not functioning to design		Shunt trip failure would prevent breaker from being tripped by an external electrical signal			
<ul style="list-style-type: none"> - Shunt trip doesn't trip - Auxiliary switch/alarm switch does not change states as required - Undervoltage trip release trips 		Auxiliary and alarm switches normally are used for indication purposes but may be used in relay/sequence circuits where failure to change states could prevent additional protective actions or indications. Undervoltage trip release failure would inadvertently trip the breaker by external electrical signal			
BASIS FOR SELECTION OF CREDIBLE FAILURE MODE(S)/MECHANISM(S)					
1. This dedication plan is based upon NEMA AB-4 criteria for molded case circuit breakers. 2. This test plan does not consider milli-volt drop test as a critical characteristic. The contact resistance is verified during mechanical operation of the breaker and verified to be open ($R > 40M\Omega$) or closed ($R \leq 1\Omega$) which provides reasonable assurance that the contact is in the correct state. 3. This test plan does not consider circuit breaker interrupt rating to be a critical characteristic. The manufacturer interrupt rating is verified visually from the breaker nameplate/package but is not verified through testing.					
SECTION G OPERATING EXPERIENCE / HISTORICAL PERFORMANCE INFORMATION					
SOURCES REVIEWED AND RESULTS					
1. NEMA AB-4, "Guidelines for Inspection and Preventative Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications." 2. The client purchase order information is in line with the manufacturer catalog.					

Operating experience and Historical information also has a place to be included when available.

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Revision	
Document Number	CGD-MCCB-1	Revision	6
NLI Project Number	GENERIC		

SECTION F FAILURE MODES / MECHANISMS AND EFFECTS ANALYSIS

CREDIBLE FAILURE MODE/MECHANISM	EFFECTS ON SYSTEM/COMPONENT FUNCTION
Short Circuit	Fault a class 1E circuit
Open Circuit or failure to carry rated load	Inability to carry load to safety related components
Failure to trip per rated design	Failure to trip would allow cascading failures of safety related equipment and possible cable damage or fire.
Accessories not functioning to design <ul style="list-style-type: none"> - Shunt trip doesn't trip - Auxiliary switch/alarm switch does not change states as required - Undervoltage trip release trips 	Shunt trip failure would prevent breaker from being tripped by an external electrical signal Auxiliary and alarm switches normally are used for indication purposes but may be used in relay/sequence circuits where failure to change states could prevent additional protective actions or indications. Undervoltage trip release failure would inadvertently trip the breaker by external electrical signal

BASIS FOR SELECTION OF CREDIBLE FAILURE MODE(S)/MECHANISM(S)

1. This dedication plan is based upon NEMA AB-4 criteria for molded case circuit breakers.
2. This test plan does not consider milli-volt drop test as a critical characteristic. The contact resistance is verified during mechanical operation of the breaker and verified to be open ($R > 40M\Omega$) or closed ($R \leq 1\Omega$) which provides reasonable assurance that the contact is in the correct state.
3. This test plan does not consider circuit breaker interrupt rating to be a critical characteristic. The manufacturer interrupt rating is verified visually from the breaker nameplate/package but is not verified through testing.

SECTION G OPERATING EXPERIENCE / HISTORICAL PERFORMANCE INFORMATION

SOURCES REVIEWED AND RESULTS

1. NEMA AB-4, "Guidelines for Inspection and Preventative Maintenance of Molded Case Circuit Breakers Used in Commercial and Industrial Applications."
2. The client purchase order information is in line with the manufacturer catalog.

Non-Safety related attributes are now verified in Section H.

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Revision 6			
Document Number	CGD-MCCB-1				
NEI Project Number	GENERIC				
SECTION H IDENTIFICATION & INSPECTION ATTRIBUTES					
IDENTIFICATION & INSPECTION ATTRIBUTES	DESCRIPTION OF INSPECTION	ACCEPTANCE CRITERIA			
Manufacturer	Visual inspection	Part nameplate or manufacturer catalog / cutsheets			
Part Number / Model Number	Visual inspection	Part nameplate or manufacturer catalog / cutsheets			
Physical Condition	Visual inspection	No Indication of Damage/Defects			
Interrupt Rating and Industry Standards Markings on Item	Visual inspection	Part nameplate or manufacturer catalog / cutsheets			
SECTION I CRITICAL CHARACTERISTICS					
CC#	CRITICAL CHARACTERISTICS	ACCEPTANCE METHOD	DESCRIPTION OF ACCEPTANCE ACTIVITY	SAMPLING PLAN	ACCEPTANCE CRITERIA (INCLUDING TOLERANCES)
1	Mechanical Operation (See Basis #2)	Method 1	Operate the breaker manually and verify contact resistance, using the push-to-trip feature if present. Cycle the breaker five times.	Normal Sample	Handle moves to the ON and OFF positions without mechanical binding. Push-to-trip feature operates properly, if present. Closed contact resistance < 1Ω Open contact resistance > 40MΩ
2	Rated Hold-in (See Basis #3) Note: Test 1 hour for breakers ≤ 50A Test 2 hours for breakers > 50A	Method 1	Hold-in test. Record applied current and trip time.	Normal Sample	When 100% of rated current is applied to all poles simultaneously, breaker does not trip as designed. Note: Testing will be performed at 40°C ± 5°C or testing may be performed at 25°C ± 5°C if using the manufacturer rerating table for the rated current.

Section I contains all the Safety Related Critical Characteristics

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Revision 6	
Document Number	CGD-MCCB-1		
NLI Project Number	GENERIC		

SECTION H IDENTIFICATION & INSPECTION ATTRIBUTES

IDENTIFICATION & INSPECTION ATTRIBUTES	DESCRIPTION OF INSPECTION	ACCEPTANCE CRITERIA
Manufacturer	Visual inspection	Part nameplate or manufacturer catalog / cutsheets
Part Number / Model Number	Visual inspection	Part nameplate or manufacturer catalog / cutsheets
Physical Condition	Visual inspection	No Indication of Damage/Defects
Interrupt Rating and Industry Standards Markings on Item	Visual inspection	Part nameplate or manufacturer catalog / cutsheets

SECTION I CRITICAL CHARACTERISTICS

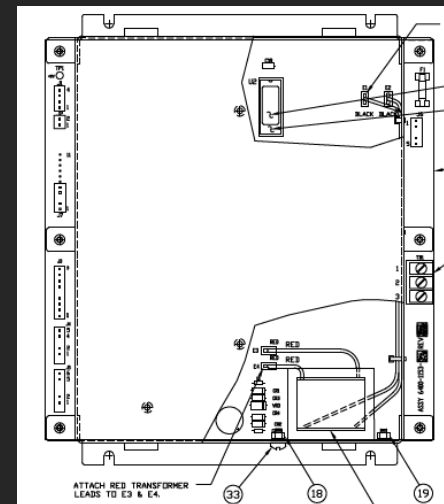
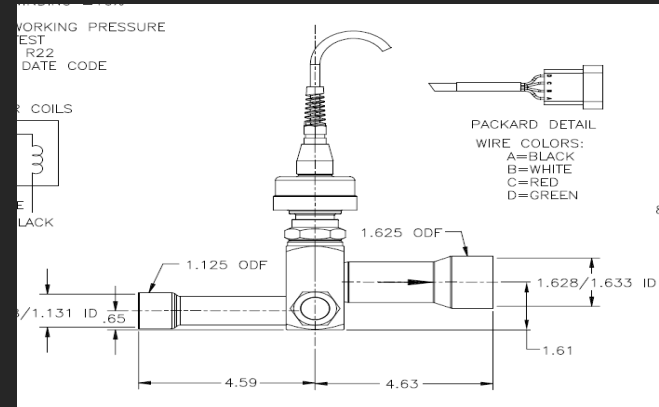
CC#	CRITICAL CHARACTERISTICS	ACCEPTANCE METHOD	DESCRIPTION OF ACCEPTANCE ACTIVITY	SAMPLING PLAN	ACCEPTANCE CRITERIA (INCLUDING TOLERANCES)
1	Mechanical Operation (See Basis #2)	Method 1	Operate the breaker manually and verify contact resistance using the push-to-trip feature if present. Cycle the breaker five times.	Normal Sample	Handle moves to the ON and OFF positions without mechanical binding. Push-to-trip feature operates properly, if present. Closed contact resistance < 1Ω Open contact resistance > 40MΩ
2	Rated Hold-in (See Basis #3) Note: Test 1 hour for breakers ≤ 50A Test 2 hours for breakers > 50A	Method 1	Hold-in test. Record applied current and trip time.	Normal Sample	When 100% of rated current is applied to all poles simultaneously, breaker does not trip as designed. Note: Testing will be performed at 40°C ± 5°C or testing may be performed at 25°C ± 5°C if using the manufacturer rerating table for the rated current.

The basis for selecting the critical characteristics is included for each new dedication plan.

Commercial Grade Item Dedication Technical Evaluation And Test Plan		Paragon	
Document Number	CGD-MCCB-1	Revision	6
NLT Project Number	GENERIC		
SAFETY FUNCTION(S) SUPPORTED / BASIS FOR SELECTION OF CRITICAL CHARACTERISTICS / ACCEPTANCE CRITERIA INCLUDING MAINTAINING SEISMIC AND ENVIRONMENTAL QUALIFICATION			
<ol style="list-style-type: none">1. Verification of the manufacturer name and part number supports reasonable assurance that the item received is the item ordered. This is performed in section H of this evaluation.2. Verification of the breaker's manual operation provides reasonable assurance that breaker operation is available at all times. The acceptance criteria is based on reference 4.3. Verification of the breaker's electrical operation at rated current, overcurrent, and instantaneous trip provides reasonable assurance that the breaker will operate (open and close) as designed, operate in limited abnormal conditions, the breaker will interrupt a fault, and will protect against overcurrent conditions. The acceptance criteria is based on a combination of reference 4, 5 and 6. The 300% test is only applicable to breakers with thermal trip elements, because magnetic-only circuit breakers (i.e. motor circuit protectors) do not typically trip at 300%. The pre-mature trip testing and instantaneous trip testing are sufficient to verify the magnetic trip functionality.4. Verification of the breaker's and breaker accessories' insulation resistance integrity provides reasonable assurance that there are no unwanted paths that would cause an electrical short to ground. The acceptance criteria is based on a reference 4.5. Verification of the shunt trip, aux switch, alarm switch, and undervoltage operation provides reasonable assurance that the shunt trip will trip the breaker as designed, the aux switch and alarm switch changes state as required, and the undervoltage release will not trip the breaker as designed. The acceptance criteria is based on a combination of reference 5 and 6.6. Verification of customer specific test provides reasonable assurance that the items tested meets the customer's specific application or design. The acceptance criteria is based on customer purchase order.			

Example of a Complex Dedication Activity

- Thermal expansion valve , module, cable and connector. Spare replacement parts for a Safety Related RTAA chiller.
- Original equipment was supplied 20 years ago. The OEM has changed some of the items that were originally supplied to NLI back in 1998.



A new Dedication plan was created for the replacement components for the original equipment that was supplied. These components have a specific application to where they will be installed.

Paragon | Nuclear Logistics Commercial Grade Dedication Plan
 Document Number: CGD-RTAA EXV-2, Rev. 0
 NLI Project #: _____ (PE to fill before issuing JOF for testing)



SECTION A ITEM DESCRIPTION

Inventory Control No./Cat ID/ Stock Code): N/A	
Noun Identifier: Electronic Expansion Valve, Control Module, Cable, and Connectors	
MANUFACTURER NAME:	MANUFACTURER PART NUMBERS / TAG NUMBERS/ STOCK CODES:
Trane	VAL08030 (EXV), MOD01562 (Control Module), CAB00872 (Cable), CON002046 (Connector), CON00294 (Connector), CON01027 (Connector), CON00577 (Connector)

REVISIONS

Revision	Description of Revision	Date
0	Initial issue.	May 4, 2020





SECTION B END USE / PARENT / HOST EQUIPMENT INFORMATION

Note: If the specific end-use(s) / plant applications are not known, complete Section C of this form in lieu of Section B prior to proceeding.

☐ Not Applicable (Section C Completed Below)

EQUIPMENT ID (TAG) NUMBERS OR DESCRIPTION OF ITEM USAGE:

P/N: RTAA1854XR01A3DIBGK, S/N: U99C06596 through U99C06599

PARENT COMPONENT/HOST DESCRIPTION:

Trane RTAA Air Cooled Chillers

FUNCTIONAL SAFETY CLASS OF COMPONENT / HOST:

- ☒ Safety-Related
☐ Non-Safety Related (If non-safety, item is not a candidate for dedication)

BASIS / SOURCE:

TVA Contract

IDENTIFICATION OF PARENT COMPONENT/HOST EQUIPMENT FUNCTION(S)

FUNCTIONAL MODE	BASIC SAFETY FUNCTION(S)
<input checked="" type="checkbox"/> Active <input type="checkbox"/> Passive	Provide adequate cooling to ensure that the leaving water temperature stays with TVA's specifications.
<input type="checkbox"/> Active <input checked="" type="checkbox"/> Passive	Maintain refrigerant and water pressure boundary.
<input type="checkbox"/> Active <input checked="" type="checkbox"/> Passive	Maintain system electrical and structural integrity.

PARENT COMPONENT/HOST EQUIPMENT IS (CHECK ALL THAT APPLY):

- | | |
|---|---|
| <input type="checkbox"/> EO | <input type="checkbox"/> ASME SECTION III |
| <input checked="" type="checkbox"/> CLASS 1E | <input type="checkbox"/> CONTAINMENT PRESSURE BOUNDARY |
| <input checked="" type="checkbox"/> SEISMIC CLASS 1 | <input checked="" type="checkbox"/> SERVICE LEVEL 1 COATING |
| <input type="checkbox"/> OTHER: (see below) | |
| <input type="checkbox"/> N/A | |

For this project since the parent Host equipment was originally supplied by NLI we know the specific application to where this assembly will be installed. Section B is now applicable.



SECTION D ITEM INFORMATION

ITEM DESCRIPTION:		
Electronic Expansion Valve, Control Module, Cable, and Connectors		
FUNCTIONAL SAFETY CLASS OF ITEM:		BASIS / SOURCE:
<input checked="" type="checkbox"/> Safety Related <input type="checkbox"/> Non-Safety Related (If non-safety, item is not a candidate for dedication)		TVA PO#
IDENTIFICATION OF ITEM FUNCTION(S)		
FUNCTIONAL MODE	BASIC SAFETY FUNCTION(S)	DESCRIBE (AS REQUIRED)
<input checked="" type="checkbox"/> Active	Conduct proper signals between the EXV and the control module.	Conduct proper electronic signals to the safety related equipment.
<input type="checkbox"/> Passive		
<input checked="" type="checkbox"/> Active	Maintain pressure boundary.	The EXV is required to retain pressure to prevent the loss of process fluid.
<input checked="" type="checkbox"/> Passive		
<input checked="" type="checkbox"/> Active	Maintain circuit integrity.	Maintain electrical circuit integrity with no unnecessary current path.
<input checked="" type="checkbox"/> Passive		
<input checked="" type="checkbox"/> Active	Provide insulation.	Provide adequate insulation between the conductor and external equipment.
<input checked="" type="checkbox"/> Passive		
<input checked="" type="checkbox"/> Active	Maintain seismic integrity.	Maintain structural integrity during a seismic event.
<input checked="" type="checkbox"/> Passive		
<input checked="" type="checkbox"/> Active	Regulate flow of process fluid.	The EXV is a flow device which regulates flow of refrigerant to the evaporator in order to match the compressor capacity. This function increases the part load efficiencies.
<input checked="" type="checkbox"/> Passive		
<input checked="" type="checkbox"/> Active	Input/output (I/O).	The control module is to communicate a step valve command to the EXV to ensure the EXV position correctly corresponds to the RTD input.
<input checked="" type="checkbox"/> Passive		
ITEM IS (CHECK ALL THAT APPLY):		
<input type="checkbox"/> CLASS 1E <input checked="" type="checkbox"/> SEISMIC CLASS 1 <input checked="" type="checkbox"/> EMBEDDED DIGITAL DEVICES <input type="checkbox"/> OTHER: (see below)		
<input type="checkbox"/> ASME SECTION III <input type="checkbox"/> CONTAINMENT PRESSURE BOUNDARY <input type="checkbox"/> SERVICE LEVEL 1 COATING <input type="checkbox"/> N/A		

The functional Mode (Active or Passive) and safety functions of all the components of the assembly are identified.

Critical Characteristic #6 is verified using Method 1 and Method 2

Paragon | Nuclear Logistics Commercial Grade Dedication Plan
Document Number: CGD-RTAA EXV-2, Rev. 0
NLI Project #: _____ (PE to fill before issuing JOF for testing)



SECTION E ELIGIBILITY FOR DEDICATION

Is the item eligible for dedication in accordance with 10CFR, Part 21?

☒ Yes ☐ No

If the answer is no, this item cannot be dedicated.

Paragon | Nuclear Logistics Commercial Grade Dedication Plan
Document Number: CGD-RTAA EXV-2, Rev. 0
NLI Project #: _____ (PE to fill before issuing JOF for testing)



SECTION F FAILURE MODES / MECHANISMS AND EFFECTS ANALYSIS

CREDIBLE FAILURE MODE / MECHANISM	EFFECTS ON SYSTEM/COMPONENT FUNCTION
Leakage/Failure of Pressure Boundary	Pressure loss and leakage due to failure or improper material composition can lead to premature failure of the material's susceptibility to corrosion.
Material Degradation/Corrosion	Incorrect material composition can lead to premature failure of the material's susceptibility to corrosion.
Failure to Operate Valve	Incorrect operation of circuits, or the motor does valve.
Breakdown of Electrical Insulation	Internal short circuits and possible equipment damage due to microprocessor behavior.
Incorrect Firmware	Unintended valve position or system failure due to microprocessor behavior.
Infant Mortality	Unintended valve position or system failure due to microprocessor behavior.
Growth of Whiskers in Circuit Board	A lack of coating on the circuit board could cause eventually cause system failure.

BASIS FOR SELECTION OF CREDIBLE FAILURE MODE(S)/MECHANISM(S)

1. Leakage and pressure loss in the pressure boundary can prevent the distribution of the parent system.
2. If the EXV is subject to a corrosive medium, material degradation can result in leakage or which can prevent the distribution of medium and cause catastrophic failure of the parent system.
3. EXV operation is reliant on proper circuit paths and signal processing.
4. Electrical insulation failure would result in failure of the control module and/or EXV operation.
5. Firmware verification per VVR-351029120-1 (latest revision) ensures that the control module outputs to connected equipment.
6. Early failure of the command module hardware needs to be evaluated via a burn in test in defects.
7. Tin whiskers have been documented in equipment which used tin solder in their products grew between metal solder pads causing short circuits. Acrylic conformal coatings of circuit board whisker formation.

CC#	CRITICAL CHARACTERISTICS	ACCEPTANCE METHOD	DESCRIPTION OF ACCEPTANCE ACTIVITY	SAMPLING PLAN	ACCEPTANCE CRITERIA (INCLUDING TOLERANCES)
4	EXV Shell Test	Method 1	With the valve in the fully closed position, apply 620 psig of nitrogen to both the inlet and outlet of the EXV of a minimum of 30 seconds.	DSP: Option 2	The EXV can withstand a maximum design pressure of 620 psig without any damage or leakage through the valve body.
5	EXV Pressure Boundary Material	Method 1	Perform PMI via x-ray fluorescence spectroscopy (XRF).	NDSP: Normal	EXV pressure boundary material is brass, copper, or stainless steel.
6	Verification and Validation of Firmware	Method 1 and Method 2	Project Engineer to verify and record on test data sheet.	100%	The digital configuration of embedded firmware and digital hardware is documented and approved via Paragon Nuclear verification and validation report VVR-351029120-1 (latest revision).
7	Circuit Board Coating	Method 1	Perform visual inspection.	100%	The circuit board has a clear conforming coating.

BASIS FOR SELECTION OF SAMPLING PLANS (IF SAMPLING PLANS ARE USED)

Sampling Plans Evaluation: The sampling plans selected below are based on technical review and engineering judgment of the product, lot formations, complexity of the item, and safety significance of the item. These inputs are evaluated by Nuclear Logistics engineering in determining the appropriate sampling plan to be employed. The sampling plans utilized in the test plan are as follow (as applicable):

Non-Destructive Sampling Plans (NDSP):

- ☒ NDSP: Normal: When "Normal" Plan is selected, the test shall be performed per the normal plan column in Table 2-1 of EPRI TR-017218-R1.
☐ NDSP: Reduced: When "Reduced" Plan is selected, the test shall be performed per the reduced plan column in Table 2-1 of EPRI TR-017218-R1.
☐ NDSP: Tightened: When "Tightened" Plan is selected, the test shall be performed per the tightened plan column in Table 2-1 of EPRI TR-017218-R1.
☐ N/A

Destructive Sampling Plans (DSP):

- ☐ DSP: Option 1: All Samples are from the same lot, heat, production lot number, or batch number. When Option 1 is selected as a destructive sampling plan, the test shall be performed on 1 sample per lot.
☒ DSP: Option 2: All Samples are procured from a single line item in a single purchase order from the same manufacturer. When Option 2 is selected as a destructive sampling plan, the test shall be performed per Table 2-2 of EPRI TR-017218-R1.



Wrapping Up

The New EPRI Guidance is a comprehensive collection of industry information covering Dedication.

Utilizing the guidance provides consistency in the format and helps provide the users a better understanding of how Dedication is performed.

Using the new Guidance with the NRC endorsement RG 1.164, provides the best chance of obtaining an acceptance of a new dedication plan from the customer.

The recommended format in the guidance provides the complete package for documenting the Engineering evaluations and judgement that is the primary part of dedication.



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Questions?

TENNESSEE - TEXAS - NEW YORK
(865) 966-5330 | info@ParagonES.com

www.ParagonES.com