PSNN-2014-1202

Safety-Related

Project Document No.	Rev.	-	3

Commercial Dedication Instruction

Customer Name	N/A (As per each Job Order)
Project Name	N/A (As per each Job Order)
Item Name	N/A (As per each Job Order)
Item Number	N/A (As per each Job Order)
Job Number	N/A (As per each Job Order)

Product Name	PFC (Power Factor Correction module)
Model Number	[ ]a,c

Rev.	Initial Issue Date	Issued by	Approved by	Reviewed by	Prepared by	Document filing No.
0	Mar. 19, 2012	Nuclear Instrumentation Systems Development & Designing Group	T.Tamba Mar. 19, 2012	T.Tarumi Mar. 16, 2012	K.Tamura Mar. 12, 2012	9B8K0046

Table of Contents

1. Product Identification

a. Part Number: See following table

b. Model Number:{ }[a,c]

c. Drawing Number: 5P-00000076-001 Rev.2

d. Manufacturer's Name:{ }[a,c]

e. Manufacturer's Model Number: See following table

f. Manufacturer's Catalog Number: N/A

g. Name plate data: N/A

h. Applicable Material/Part Specification Number: N/A

i. Identification of Parent Component: See Section 2.3

j. Software Version: N/A

k. Firmware Version: N/A

Table 1 Part Number List

Part Number: (Procurement/Purchase Specification Number/ Part Number)	Manufacturer's Model Number	Description
5P-00000076-001	{ }[a,c]	Product name is PFC (Power Factor Correction module)

2. Product Description

2.1 Definitions

a. General Name of Product: PFC

b. Product Name of Manufacturer{ }[a,c]

c. Description of Terms

LVPS: Low Voltage Power Supply that is used in a unit to supply DC power to modules in the unit. Each unit has two LVPS modules that are redundant power supplies of the unit.

d. Abbreviation

AC	Alternate Current
AQ	Augmented Quality
APRM	Average Power Range Monitor
CC	Critical Characteristics
C of C	Certificate of Conformance
CCA	Critical Characteristics for Acceptance
CCD	Critical Characteristics for Design
CDI	Commercial Dedication Instruction
CFI	Counterfeit and Fraudulent Items
CG	Commercial Grade
DC	Direct Current
DTF	Digital Trip Function

EMC	Electromagnetic Compatibility
EQ	Equipment Qualification
FMEA	Failure Mode and Effect Analysis
Fuchu-PS	Toshiba Fuchu Complex Power Systems Segment
LVPS	Low Voltage Power Supply
LPRM	Local Power Range Monitor
MSIV	Main Steam Isolation Valve
NICSD	Toshiba Fuchu-PS Nuclear Instrumentation and Control Systems Department
NISD	Nuclear Instrumentation Systems Development & Designing Group
NSR	Non-Safety-Related
OPRM	Oscillation Power Range Monitor
PFC	Power Factor Correction module
QA	Quality Assurance
QC	Quality Control
RPS	Reactor Protection System
SD	Software Development
SPTM	Suppression Pool Temperature Monitoring System
SR	Safety-Related
SRNM	Startup Range Neutron Monitor
TLF	Trip Logic Function
US	United States

2.2 Function of Product

A PFC receives AC voltage from an external AC power supply. The AC voltage is converted into DC voltage (about 220 VDC) by PFC. PFC supplies DC voltage to an LVPS module mounted on parent components specified in Section 2.3. The DC voltage (about 220 VDC) from PFC is converted into DC voltage (+5VDC, +15VDC,-15VDC) by the LVPS module for use in the parent components specified in Section 2.3.

2.3 Function of Parent Component

Table 2 Function of Parent Component

Part No.	Model No.	Parent Component	Function of Parent Component (Safety Function)	Functional Classification of Parent Component
P001	{ }a,c	LPRM unit, APRM unit, OPRM unit, SRNM unit, SPTM unit, SPTM-S unit, DTF-RPS unit, TLF-RPS unit, DTF-MSIV unit, DTF-MSIV-S unit, TLF-MSIV unit	Parent Components generate safety-related signals.	Safety Related

3. Safety Related Function

The PFC is required to perform before, during, and after abnormal environmental conditions (seismic, environmental and EMC conditions). The PFC shall perform the safety related functions described in the following table. The environmental and EMC qualification of the PFC are not performed as a standalone item. The verification of environmental and EMC qualification will take place at a higher level as part of system equipment qualification effort. (Refer to Section 6.2.1).

Table 3 Safety Related Function

Part No.	Model No.	Safety Related Function	Functional Classification
P001	{ }[a,c]	The PFC is electrically connected to an LVPS module which has an effect on performance of the system safety function. The PFC receives AC voltage from an external AC power supply, and converts the AC voltage into DC voltage (about 220 VDC). The PFC supplies DC voltage to the LVPS module mounted on parent components (safety function).	Safety Related (Having an effect on performance of the system safety function)

The PFC is required to operate during and after the defined design basis events.

- ■ Seismic Sensitive Part/Assembly
- □ Not Seismic Sensitive
- □ Application Does Not Require Seismic Adequacy

The PFC is attached to a parent system, and the seismic integrity of the PFC is verified by qualification testing (Refer to Section 6.2.1).

3.1 Functional Classification

The functional mode and functional classification were evaluated and identified as follows.

a. Functional Mode :
- □ Active Functional Mode
- ■ Passive Functional Mode

b. Functional Classification :
- ■ Safety-Related (SR)
- □ Non-Safety-Related (NSR)
- □ Augmented Quality (AQ)

4. Critical Characteristics for Design

Table 4-1 shows the Critical Characteristics for Design (CCD) and technical evaluations. Table 4-2 shows the result of Failure Mode and Effect Analysis (FMEA). This evaluation is performed base on technical requirements for the PFC.

Nuclear Instrumentation Systems Development & Designing Group (NISD) evaluated following supplier's design:

Manufacturer's Model Number :{ }[a,c] (Commercial use)
Product Specification for PFC :{ }[a,c] Rev.E (Reference (2))
Outline Dimensional Drawing :{ }[a,c] Rev.E (Reference (8))

Parts List	:{	}a,c Rev.F (Reference (9))
Circuit Diagram	:{	}a,c Rev.C (Reference (10))
Printed Circuit Board Diagram	:{	}a,c Rev.- (Reference (11))
Coating Instruction	:{	}a,c Rev.A (Reference (12))

This PFC was developed under the ISO-9001 Quality Assurance (QA) process but not verified under the Nuclear Instrumentation and Control Systems Department (NICSD) Appendix-B QA program. For dedication of this PFC, NICSD requires{ }a,c to apply additional QA and documentation requirements specified in Purchase Specification (Reference (1)).

Table 4-1 CCD and Technical Evaluation

Part No.	No	CCD	Manufacturer's specification	Technical Evaluation
P001	1	Physical Characteristics -Dimension Section 2.3 of Appendix for purchase specification*1 Width 170±1mm Height 35±0.5mm Depth 127±1mm -Mass Section 5.2.9 of Unit DDS*3 0.56kg or less	Dimension is specified in Outline Dimensional Drawing *4 Width 170±1mm Height 35±0.5 mm Depth 127±1mm Mass is specified in Section 6.3 of Specification for PFC*2 0.56kg or less	Manufacturer's item meets the purchaser requirement. This characteristic does not directly contribute to safety function. However, this characteristic related to item compatibility, form or fit is important when considering replacement and Counterfeit and Fraudulent Items (CFI) issues. Mass is a factor which may affect seismic capability of parent component.
	2	Physical Characteristics -General configuration and shape Module configuration and shape is described in Section 2.3 of Appendix for purchase specification*1	Module configuration is described in Outline Dimensional Drawing*4	Manufacturer's item meets the purchaser requirement. This characteristic does not directly contribute to safety function. However, this characteristic related to item compatibility, form or fit is important when considering replacement and CFI issues. These characteristics contribute to Equipment Qualification (EQ) and EMC capability.
	3	Performance Characteristics - Rated Power Input. Section 2.2.1 of Appendix for purchase specification*1 Input Voltage: From 90 to 150VAC [warranty scope] / from 80 to 165VAC [test scope] Input Frequency: From 45 to 70Hz Input Current: Equal to or lower than 1.7A (When input voltage is 100VAC.) Efficiency: Equal to or higher than 90% (rated capacity) Power Factor: Equal to or higher than 0.9 (rated capacity) Inrush Current: Equal to or lower than 10A (except for inrush current of 0.1ms or lower at the circuits of C1, C2 and C8 in PFC module{ }a,c circuit diagram) - Rated DC Output Section 2.2.2 of Appendix for purchase specification*1 Output Voltage(rated voltage): 220VDC Output Current(rated current) :0.65A (When input voltage is 100VAC) Accuracy of setup output voltage: Within plus or minus 4.5 % (10VDC) of 220VDC Output Voltage: Regulation Within	Rated Power Input is specified in Section .3 of Specification for PFC*2. Input Voltage: From 90 to 150VAC [warranty scope] / from 80 to 165VAC [test scope] Input Frequency: From 45 to 70Hz Input Current: Equal to or lower than 1.7A (When input voltage is 100VAC.) Efficiency: Equal to or higher than 90% (rated capacity) Power Factor: Equal to or higher than 0.9 (rated capacity) Inrush Current: Equal to or lower than 10A (except for inrush current of 0.1ms or lower at X Capacitors) Rated DC Output is specified in Section.4 of Specification for PFC*2. Output Voltage (rated voltage):220VDC Output Current (rated current): 0.65A (When input voltage is 100VAC) Accuracy of setup output voltage: Within plus or minus 4.5 % (10VDC) of 220VDC Output Voltage Regulation: Within plus or minus 3 % (6.6VDC) of 220VDC (When input voltage is fluctuated from	Manufacturer's item meets the purchaser requirement. This characteristic contributes to safety function of parent component.

Part No.	No	CCD	Manufacturer's specification	Technical Evaluation
		plus or minus 3 % (6.6VDC) of 220VDC (When input voltage is fluctuated from 90 to 150VAC) Load Fluctuation: Within plus or minus 3 % (6.6VDC) of 220VDC (When output current is fluctuated from 13mA to 0.65A) Ripple: Within plus or minus 6 % (13.2VDC) of 220VDC	90 to 150VAC) Load Fluctuation: Within plus or minus 3 % (6.6VDC) of 220VDC (When output current is fluctuated from 13mA to 0.65A) Ripple: Within plus or minus 6 % (13.2VDC) of 220VDC	
	4	Performance Characteristics -Overvoltage Protection Function Equal to or lower than 260VDC Section 2-2-3 of Appendix for purchase specification*1 -Over Current Protection Function From 0.75 to 1.60A Section 2-2-2 of Appendix for purchase specification*1	Over voltage protection function and over current protection function are specified in Section 4-1 of Specification for PFC*2.	Manufacturer's item meets the purchaser requirement. This characteristic contributes to safety function of parent component.

*1 Purchase Specification, 5P-00000076-001 Rev.2 (Reference (1))

*2 Product Specification for PFC ([a,c] Rev.E) (Reference (2))

*3 Unit DDS: Unit Detailed Design Specification, 5B8K0041 Rev.2 (Reference (3))

*4 Outline Dimensional Drawing ([a,c] Rev.E) (Reference (8))

Table 4-2 Failure Mode and Effect Analysis

No.	Function	Failure Mode	Failure Mechanism	Effect on System	Method of Detection	Effect on Plant Operation	Remarks
1	PFC input connector	Output voltage drop or loss	Short circuit failure or contact failure of a connector	+220V DC output drops or decreases to 0V	Minor failure signal and LED indication of parent unit (The parent unit of LVPS module, to which PFC is connected, detects this failure and generates a minor failure signal.).	None. Parent unit have redundant power supply line of LVPS module with PFC.	
2	Input fuse	Output voltage drop or loss	Fuse open, or contact failure of fuse holder contact	+220V DC output decreases to 0V	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
3	Input noise reduction circuit	Output voltage drop or loss)	Open circuit failure of choke coil	+220V DC output decreases to 0V	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
4		Output voltage drop or loss	Short circuit failure of capacitor or surge absorber	+220V DC output decreases to 0V due to fuse open.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
5		Degradation of noise reduction function	Open circuit failure of capacitor or varistor, or short circuit failure of choke coil	+220V DC output is normal. Noise level may be increased.	None	None	

No.	Function	Failure Mode	Failure Mechanism	Effect on System	Method of Detection	Effect on Plant Operation	Remarks
6	Primary rectifier circuit	Output voltage drop or loss	Open circuit failure of diode	+220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
7		Output voltage drop or loss	Short circuit failure of capacitor	+220V DC output decreases to 0V due to fuse open.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
8		Increase of Ripple	Failure of capacitor, diode	+220V DC output is normal. Ripple level may be increased.	None	None	
9	Inrush current reduction circuit	Output voltage drop or loss	Open circuit failure of diode or resistor	Since TRIAC cannot be in on-state, the thermal fuse blows out, and then +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
10		Output voltage drop or loss	Short circuit failure of capacitor or resistor	+220V DC output decreases to 0V due to fuse open.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
11		Increase of Inrush current	Failure of capacitor, resistor, or TRIAC.	+220V DC output is normal. Inrush current may be increased when power is turning on.	None	None	
12	Transformer	Output voltage drop or loss	Open circuit failure of Transformer at primary side	+220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
13		Output voltage drop or loss	Open circuit failure of Transformer at secondary side-No.1	Since TRIAC cannot be in on-state, the thermal fuse blows out, and then +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
14		Output voltage drop or loss	Open circuit failure of Transformer at secondary side -No.2	The thermal fuse blows out, and then +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
15	Output voltage monitoring circuit	Loss of output voltage monitoring function	Open circuit failure of resistors	The output voltage is limited to the overvoltage limit due to overvoltage protection circuit.	None	None	
16	Current detection circuit and time constant setting circuit	Output voltage drop or loss	Short circuit failure of capacitor.	The FET becomes ON state due to shot circuit failure of capacitor. Then, the thermal fuse blows out due to the stop of boost chopper control. Then, +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
17		Output voltage drop or loss	Open circuit failure of capacitor	The boost chopper control may become unstable. +220V DC output may decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	

No.	Function	Failure Mode	Failure Mechanism	Effect on System	Method of Detection	Effect on Plant Operation	Remarks
18	Power supply circuit for hybrid-IC	Output voltage drop or loss	Open circuit failure of transistor, or zener diode	Since voltage cannot be supplied to Vcc of the hybrid IC, the IC does not work. Then, thermal fuse blows out due to stop of chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
19		Output voltage drop or loss	Short circuit failure of transistor, zener diode or capacitor	Since abnormal voltage is supplied to Vcc of the hybrid IC, the IC fails. Then, thermal fuse blows out due to stop of chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
20	Oscillation control circuit in hybrid-IC	Output voltage drop or loss	Failure of capacitor, diode, or resistor	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
21		Output voltage drop or loss	Short circuit failure of capacitor	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
22		Output voltage drop or loss	Open circuit failure of capacitor	The boost chopper control may become unstable. +220V DC output may decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
23	Oscillation control circuit in hybrid-IC	Output voltage drop or loss	Malfunction of IC	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
24	Boost chopper control circuit	Output voltage drop or loss	Short circuit failure of diode or resistor	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
25		Output voltage drop or loss	Open circuit failure of diode or resistor	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
26		Output voltage drop or loss	Open circuit failure of FET transistor	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
27		Output voltage drop or loss	Short circuit failure of FET transistor	Since thermal fuse blows out due to the stop of boost chopper control, and +220V DC output decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
28	Reverse current protection diodes	Output voltage drop	Open circuit failure of diodes	+220V DC output drops or decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
29		Loss of reverse current protection function.	Short circuit failure of diode	Loss of reverse current protection function.	None	None	

No.	Function	Failure Mode	Failure Mechanism	Effect on System	Method of Detection	Effect on Plant Operation	Remarks
30	Smoothing circuit (ripple filter)	Output voltage drop or loss	Short circuit failure of capacitor	+220VDC output decreases to 0V due to over current protection circuit.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
31		Increase of ripple	Failure of capacitor	+220V DC output is normal. Ripple level may be increased.	None	None	
32	PFC output connector	Output voltage drop or loss	Short circuit failure or contact failure of a connector	+220V DC output drops or decreases to 0V.	Minor failure signal and LED indication of parent unit	None. Parent unit have redundant power supply line of LVPS module with PFC.	
33	Overvoltage protection circuit)	Loss of overvoltage protection function)	Open circuit failure of resistors	+220V DC output is normal.	None	None	

5. Critical Characteristics for Acceptance, Verification Methods and Responsibilities

The physical characteristics and performance characteristics are able to be measured as CCAs by the supplier testing and Nuclear Instrumentation and Control Systems Department (NICSD) intends to receive Certificate of Conformance (C of C) and the supplier's test record during the receiving inspection, the following supplier's process to control CC shall be verified as CCAs, as a minimum, through Commercial Grade (CG) survey of [ ]^{a,c} and receiving inspection.

- Design Control (Document Control)
- Inspection and Test Control
- Measuring and Test Equipment Control

The NICSD also performs a review of supplier document and special test to supplement the verification of the physical characteristics and performance characteristics. To supplement verification of the general configuration and shape, supplier's control capability regarding "Configuration Control and Traceability of Hardware" shall be verified through CG Survey of [ ]^{a,c} and receiving inspection.

Table 5-1 CCA and Verification Method

Item No	Critical Characteristics for Acceptance	Verification Method for Qualification	Responsibility	Verification Method for Production	Responsibility
1	Physical Characteristics -Dimension -Mass -General configuration and Shape	-	-	Receiving Inspection (Receiving C of C and supplier's test record, Section 6.1.1)	NICS-QC
				Review of Supplier Documents (Section 6.1.2)	NICSD Verifier
2	Performance Characteristics - Rated Power Input. - Rated DC Output -Overvoltage Protection Function -Over Current Protection Function	-	-	Receiving Inspection (Receiving C of C and supplier's test record, Section 6.1.1)	NICS-QC
				Review of Supplier Documents (Section 6.1.2)	NICSD Verifier
				Special Test (Section 6.1.3)	NICS-QC

Item No	Critical Characteristics for Acceptance	Verification Method for Qualification	Responsibility	Verification Method for Production	Responsibility
3	Design Control (Document Control)	CG Survey of [redacted] a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC
4	Inspection and Test Control	CG Survey of [redacted] a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC
5	Measuring and Test Equipment Control	CG Survey of [redacted] a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC
6	Configuration Control and Traceability of Hardware	CG Survey of [redacted] a,c (Section 6.2.2)	NICS-QA	Receiving Inspection (Receiving C of C, Section 6.1.1)	NICS-QC

NICSD Nuclear Instrumentation and Control Systems Department
NICS-QA Quality Assurance Group for Nuclear Instrumentation & Control Systems
NICS-QC Quality Control Group for Nuclear Instrumentation & Control Systems

6. Verification Instruction

6.1 Recurring Activities

6.1.1. Receiving Inspection

Receiving inspectors or QC inspectors assigned by QC section shall implement the receiving inspection in accordance with the "Receiving Inspection Procedure (Section 9-(1))" and the "Receiving Inspection Specification (Section 9-(2))." The verification results are recorded in the form of "Receiving Inspection Check List/Report (Section 7-(1))."

6.1.2. Review of Supplier Documents

The NICSD verifiers or independent reviewers perform review of the supplier documents. The results of the review are recorded in the "Design Verification Reports (Section 7-(4))." This activity is conducted at the first qualification and when a major design change which needs documents review occurs after the first qualification. The acceptance criteria are as follow;

- The design and test documents shall satisfy requirements from procurement documents, and shall be complete, correct, consistent, and accurate.

6.1.3 Special Test

The QC inspector of NICSD performs a special test to verify "Rated DC Output" supplementing the supplier testing. The acceptance criteria for verification of this CCA are as follows:

Table 6-1 Acceptance Criteria

Part No.	CCA No.	CCA	Acceptance Criteria
P001	2-2	Performance Characteristics - Rated DC Output	At no load condition with 120VAC/60Hz input, DC output is within +210 VDC to +230VDC.

This activity is performed in accordance with the System Test Specification (Reference (13)) with above

criteria. The result is recorded in a test record in accordance with NQ-3015 (Reference (14)).

6.2 Periodic Activities

6.2.1. Environmental Conditions Qualification

Equipment qualification testing and EMC qualification testing are performed in a type test using test specimen. Successful completion and continued application of qualification testing verifies that the item is capable of performing its intended safety function. Any time a design change is made to the item or item is used in another application, impact on all previous qualification programs shall be evaluated to determine if re-qualification is required.

The responsible design engineers from NISD shall identify a test report in Section 7 of this CDI after qualification test, which shows successful compliance with qualification test requirements. If any changes are made to a configuration as the result of qualification test, the responsible design engineers shall identify a baseline after change in the CDI. The NICSD SD Team or responsible design engineers evaluates any changes to an item that are made after baseline establishment, determines the need for an additional qualification test, and documents the evaluation result in the CDI. In order to continuously purchase items with same configuration, the "Configuration Control and Traceability of Hardware" of supplier shall be verified through CG Surveys as described in Section 6.2.2.

6.2.2. Vendor Evaluation

NICSD shall perform CG Survey of [a,c] in accordance with Section 9.2.5 of the Commercial Dedication Instruction (Reference (6)).

7. Acceptance Documentation

(1) Receiving Inspection Check List/Report (Attachment to NQ-3024 (Reference (4))
(2) Certificate of Conformance (Attachment to Reference (1))
(3) Test record by supplier (As per supplier's form)
(4) Design Verification Report (Attachment to Reference (7))
(5) Test record for special test (As per NQ-3015 (Reference (14))
(6) Nuclear Instrumentation & Control Systems Department
Environmental Qualification Report for Safety-Related Oscillation Power Range Monitor (OPRM)
FC51-7513-1000 Rev.0 (5B8K0077 Rev.0)
(7) Nuclear Instrumentation & Control Systems Department
Dynamic Qualification Report for Safety-Related Oscillation Power Range Monitor (OPRM)
FC51-7513-1003 Rev.0 (5B8K0094 Rev.0)
(8) Nuclear Instrumentation & Control Systems Department
EMC Qualification Report for Safety-Related Oscillation Power Range Monitor (OPRM)
FC51-7513-1001 Rev.0 (5B8K0078 Rev.0)

8. References

(1) PFC Purchase Specification (5P-00000076-001 Rev.2)
(2) Product Specification for PFC ([a,c] Rev.E)
(3) OPRM Unit Detailed Design Specification for Power Range Neutron Monitor (5B8K0041 Rev.2)

(4) Receiving Inspection Procedure, NQ-3024
(5) Receiving Inspection Specification (5T8K0003 Rev.1)
(6) Commercial Dedication Instruction for Dedication of Modules from Commercial Supplier (Common Requirements) (9B8K0057 Rev.1)
(7) Design Verification Procedure, AS-200A002
(8) Outline Dimensional Drawing ({ }[a,c] Rev.E)
(9) Parts List ({ }[a,c] Rev.F)
(10) Circuit Diagram ({ }[a,c] Rev.C)
(11) Printed Circuit Board Diagram ({ }[a,c] Rev.-)
(12) Coating Instruction ({ }[a,c] Rev.A)
(13) Nuclear Instrumentation & Control Systems Department System Test Specification for Safety-Related Oscillation Power Range Monitor (OPRM) (FC51-7012-1002 Rev.0)
(14) Toshiba Nuclear Instrumentation & Control Systems Department NQ-3015 "Test Control Procedure"

9. Inspection and Test Procedure

(1) Receiving Inspection Procedure (Reference (4))
(2) Receiving Inspection Specification (Reference (5))
(3) Nuclear Instrumentation & Control Systems Department System Test Specification for Safety-Related Oscillation Power Range Monitor (OPRM) (Reference (13))

10. Supplements

N/A

変 更 記 録 REVISIONS						
変更記号 REV. MARK 変更発行日 REV. ISSUED	ページ PAGE	変更箇所・変更内容 CHANGED PLACE AND CONTENTS	承認 APPROVED BY	調査 REVIEWED BY	担当 PREPARED BY	保管 REGISTERED
(1) May.30,2012	3,6,7,13 6 7,11 8-10	Document revisions were updated. Dimension (Height) was added in the Table 4-1. Overvoltage Protection Function and Over Current Protection Function were added in the Table 4-1 and Table 5-1. FMEA was added. For detailed changed contents and impact evaluation, refer to DECN-9B8K0042-01 Rev.0.	K.Wakita May.30,2012	T.Furusawa May.30,2012	K.Tamura May.30,2012	H. Ito May.30, 2012
(2) Aug.22, 2012	-	For detailed changed contents and impact evaluation, refer to DECN-9B8K0046-02 Rev.0.	K. Wakita Aug.22, 2012	T. Tarumi Aug.21, 2012	T. Furusawa Aug.20, 2012	K. Tamura Aug.22, 2012
(3) Jan.16.2014	-	For detailed changed contents and impact evaluation, refer to DECN-9B8K0046-03 Rev.0.	K.Wakita Jan.16.2014	T.Tarumi Jan.16,2014	T.Furusawa Jan.16 2014	H.Ito Jan.16.2014