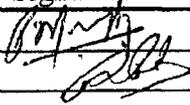


Project:	TRICON v10 NUCLEAR QUALIFICATION PROJECT
<p>TEST REPORT</p> <p>SYSTEM SETUP & CHECKOUT PROCEDURE</p> <p>SEVEN DAY ELEVATED DC VOLTAGE TEST</p> <p>(Run ID 3.12)</p>	
<p>Document No: 9600164-557</p> <p>Revision 0</p> <p>July 26, 2007</p>	

	Name	Signature	Title
Author:	Hariprasad Parthasarathy		R&D Engineer
Reviewers:	Ravindar Baskaran		Independent Review Engineer
	Frank Kloer		Project Engineer
	George Hughes		Project QA Engineer
Approval:	Naresh Desai		Project Manager

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Revision History

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1.0 EXECUTIVE SUMMARY

The Tricon v10 Nuclear Qualification Project System Setup & Checkout Procedure (9600164-502), Seven Day Elevated DC Voltage Test (Run ID: 3.12) was conducted on May 16th to 23rd May of 2007 at Invensys Triconex, Irvine, CA. As required by the Master Test Plan (MTP), the Setup & Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12) was executed to ensure that the nuclear qualification test system shall meet the acceptance criteria in accordance with EPRI TR-107330, Section 4.1.1.6.C. Prior to test execution, the following documents were approved and listed in the Master Configuration List (MCL) (Reference 9.4) in accordance with the requirements of the Nuclear Qualification Quality Plan (NQQP) (Reference 9.3):

1. Nuclear Qualification Quality Plan
2. Master Test Plan
3. System Setup and Checkout Procedure
4. System Drawings
5. Wiring Schedule

The System Setup & Checkout Procedure was developed based on the applicable requirements of the EPRI TR-107330, the MTP and the NQQP. The procedure was designed to demonstrate that the nuclear qualification test system was assembled and configured in accordance with the System Drawings (Reference 9.6 to 9.16), the Wiring Schedule (Reference 9.17), and the MCL (Reference 9.4). In addition, the procedure verified proper functioning of the Tricon-Under-Test (TUT) and that all peripheral systems (TriStation, TriLogger and Data Acquisition System) were connected and logged system data properly.

The fully verified and validated (Reference 9.18) Test Specimen Application Program (TSAP) was downloaded on the TUT during the execution of the System Setup & Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12). In addition, the application programs for Simulator Tricons, i.e. Simulator Tricon - 1 (Chassis 5S) and Simulator Tricon - 2 (Chassis 6S), were downloaded. The test was executed by a certified Project R&D Engineer and witnessed by the Project Quality Assurance Engineer (PQAE).

During execution of the test, no Qualification Project Anomaly Reports (QPAR) were generated.

All acceptance criteria specified in the System Setup & Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12) were satisfied. The nuclear qualification test system was assembled, configured, integrated and functioned properly.

2.0 PURPOSE

This test report documents the results of System Setup & Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12) of the nuclear qualification test system.

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3.0 TEST OBJECTIVE

The objective of the System Setup & Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12) was to ensure that proper assembly, configuration, integration and functioning of the nuclear qualification test system and that all acceptance criteria stated in the procedure are met. This report also documents that the TUT, including the TSAP, functions properly without any failure and is properly integrated with the Simulator Tricons, TriStation, TriLogger and Data Acquisition System (DAS). In addition, the test was intended to ensure the nuclear qualification test system was available for Post-Radiation Operability tests.

4.0 TEST DESCRIPTION

The System Setup and Checkout Procedure provides a systematic approach for setup of the nuclear qualification test system. The procedure is broken into steps and each step records the relevant information. It also provides information about the list of Measurement & Test Equipment (M&TE) used throughout this project and its corresponding calibration date and calibration due date. Apart from setting up the TUT it also provides instruction for setting up the Load Resistor Banks (LRB), manual input devices, external power supplies, Lamp Panel (LP), Simulator Tricons and steps to verify proper integration of the TUT with the Simulator Tricons, TriStation, TriLogger and DAS. At the successful completion of execution of this procedure, the nuclear qualification test system is ready for EMI/RFI tests.

5.0 TEST SETUP

The nuclear qualification test system was assembled in accordance with General Arrangement Drawings (Reference 9.6). The nuclear qualification test system was configured in accordance with System Block Diagram (Reference 9.8), which included integration of the TUT, LRB, LP, external power supplies, manual input devices, Simulator Tricons, TriStation, TriLogger and DAS. In addition, the setup included downloading the fully verified and validated TSAP (V10_TSAP_REV_0.PT2) into the TUT, downloading the Simulation Tricon application programs (SIM_1_REV_0.PT2 and SIM_2_REV_0.PT2) into the two Simulation Tricons, and running the application programs with the Tricon keyswitch set to “Remote”.

6.0 TEST PROCEDURE

Each step of the procedure is described below indicating the applied test conditions and associated acceptance criteria.

The System Setup & Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12) is divided into 18 Steps. Each Step is designed to test one aspect of the nuclear qualification test system. The setup tests performed and the associated step numbers are:

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- Step 10.1 – This step verifies Station-1 and Station-2 are adequately configured to communicate with the TUT and the two Simulation Tricons.
- Step 10.2 – This step is not performed for Run ID: 3.12, as required by the NQQP.
- Step 10.3 – This step is not performed for Run ID: 3.12, as required by the NQQP.
- Step 10.4 – This step is not performed for Run ID: 3.12, of the procedure as it is required to be executed only during the nuclear qualification test system setup for Seismic Tests.
- Step 10.5 – This step is not performed for Run ID: 3.12 of the procedure as it is not required for the nuclear qualification test system setup for the Seven Day Elevated DC Voltage tests.
- Step 10.6 – This step is not performed for Run ID: 3.12 of the procedure as it is not required for the nuclear qualification test system setup for the Seven Day Elevated DC Voltage tests.
- Step 10.7 – This step verifies the proper operation of the manual input devices, i.e., M&TE, by setting pre-defined values to the devices connected to the nuclear qualification test system.
- Step 10.8 – This step executes the procedure to power-up the TUT and the two Simulation Tricons and the test system peripherals including Station-1, Station-2 and the DAS.
- Steps 10.9 thru 10.11 – These steps execute the procedure to download the TSAP (V10_TSAP_REV_0.PT2) to the TUT, SIM-1 application program (SIM_1_REV_0.PT2) to Simulator Tricon - 1 (Chassis 5S) and SIM-2 application program (SIM_2_REV_0.PT2) to Simulator Tricon - 2 (Chassis 6S).
- Steps 10.12 and 10.13 – These steps verify the status LED's of the Main Processors, Communication Modules, Input/Output Modules, Power Supply Modules of the TUT and the two Simulator Tricons.
- Step 10.14 – This step is not performed for Run ID: 3.12 of the procedure as it is not required for the nuclear qualification test system setup for the Seven Day Elevated DC Voltage tests.
- Step 10.15 – This step is not performed for Run ID: 3.12 of the procedure as it is not required for the nuclear qualification test system setup for the Seven Day Elevated DC Voltage tests.
- Step 10.16 – This step is not performed for Run ID: 3.12 of the procedure as it is not required for the nuclear qualification test system setup for the Seven Day Elevated DC Voltage tests.

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- Step 10.17 – This test verifies proper system integration between the TUT, LP, LRB, Two Simulator Tricons, TriStation, TriLogger and DAS.
- Step 10.18 – This step executes the procedure to setup the nuclear qualification test system for Seven Day Elevated DC Voltage tests and to log system data.
- Step 10.19 – This Step ensures that all data from the TriLogger and the DAS are archived and secured to a compact disk for System Setup & Checkout Procedure, Pre- Performance Proof Test (Run ID: 3.11).

7.0 TEST RESULTS

All prerequisites delineated in Section 6.0 of the System Setup & Checkout Procedure were satisfied and all M&TE were determined to be within their calibration cycle before entering into Section 10, Procedure, of the procedure.

All tests performed during execution of the procedure complied with the stated acceptance criteria. The individual results of each step are given below.

- Step 10.1 – No Acceptance Criteria associated with this Step.
- Step 10.2 – Not Applicable for this Run ID.
- Step 10.3 – Not Applicable for this Run ID.
- Step 10.4 – Not Applicable for this Run ID.
- Step 10.5 – Not Applicable for this Run ID.
- Step 10.6 – Not Applicable for this Run ID.
- Step 10.7 – Passed.
- Step 10.8 – Not Applicable for this Run ID.
- Step 10.9 – Passed.
- Step 10.10 – Passed.
- Step 10.11 – Passed.
- Step 10.12 – Passed.
- Step 10.13 – Passed.
- Step 10.14 – Not Applicable for this Run ID.
- Step 10.15 – Not Applicable for this Run ID.
- Step 10.16 – Not Applicable for this Run ID.
- Step 10.17 – Not Applicable for this Run ID.

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- Step 10.18 – Passed.
- Step 10.19 – No Acceptance Criteria associated with this Step.

8.0 CONCLUSIONS

All applicable steps were completed successfully and all acceptance criteria were met. The System Setup and Checkout Procedure, Seven Day Elevated DC Voltage Test (Run ID: 3.12) has been successfully completed.

9.0 REFERENCES

- 9.1 EPRI Technical Report TR-107330, Generic Requirements Specification for Qualifying a Commercially Available PLC for Safety-Related Applications in Nuclear Power Plants
- 9.2 9600164-500, Master Test Plan
- 9.3 9600164-002, Nuclear Qualification Quality Plan
- 9.4 9600164-500, Master Configuration List
- 9.5 9600164-502, System Setup & Checkout Procedure
- 9.6 9600164-100, Sheets 1 - 5: General Arrangement
- 9.7 9600164-102, Sheets 1 - 4: Seismic Equipment Mounting Configuration Details
- 9.8 9600164-103, Sheets 1 - 2: System Block Diagram
- 9.9 9600164-200, Sheet 1: Power Distribution Block Diagram
- 9.10 9600164-201, Sheets 1 - 2: Power Distribution Wiring Diagram
- 9.11 9600164-202, Sheet 1: Test Chassis #1 Power Distribution Wiring Diagram
- 9.12 9600164-203, Sheets 1 - 2: Test Chassis #2 Power Distribution Wiring Diagram
- 9.13 9600164-204, Sheets 1 - 2: Test Chassis #3 Power Distribution Wiring Diagram
- 9.14 9600164-205, Sheets 1 - 2: Test Chassis #4 Power Distribution Wiring Diagram
- 9.15 9600164-206, Sheet 1: Simulator Chassis #5 Power Distribution Wiring Diagram
- 9.16 9600164-207, Sheet 1: Simulator Chassis #6 Power Distribution Wiring Diagram
- 9.17 9600164-700, Wiring Schedule
- 9.18 9600164-515, Software Development Checklist

10.0 APPENDICES

None



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11.0 ATTACHMENTS

None