

ENCLOSURE 3

**Toshiba Field Programmable Gate Array (FPGA) Based Safety Related I&C
Platform– Topical Report Pre-Submittal Meeting**

Non Proprietary Version

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Toshiba Field Programmable Gate Array (FPGA) Based Safety Related I&C Platform –

Topical Report Pre-Submittal Meeting Non Proprietary Version

Toshiba Corporation
Instrumentation & Control Systems Design and Engineering Department
Isogo Nuclear Engineering Center

Agenda

1. Introductions
2. Background
 - Toshiba Experience
 - NRW-FPGA Platform History
3. Topical Report
4. Project Schedule

Personnel

- Bob Schrauder TANE Licensing VP
- Akira Fukumoto Toshiba Senior Fellow
- Naotaka Oda Toshiba Control System
Group Manager
- Tadashi Miyazaki Toshiba Monitoring System
Group Specialist
- Shigeru Suzuki TANE Senior VP &
Chief Technology Officer
- David Herrell MPR Associates
- Craig Swanner MPR Associates

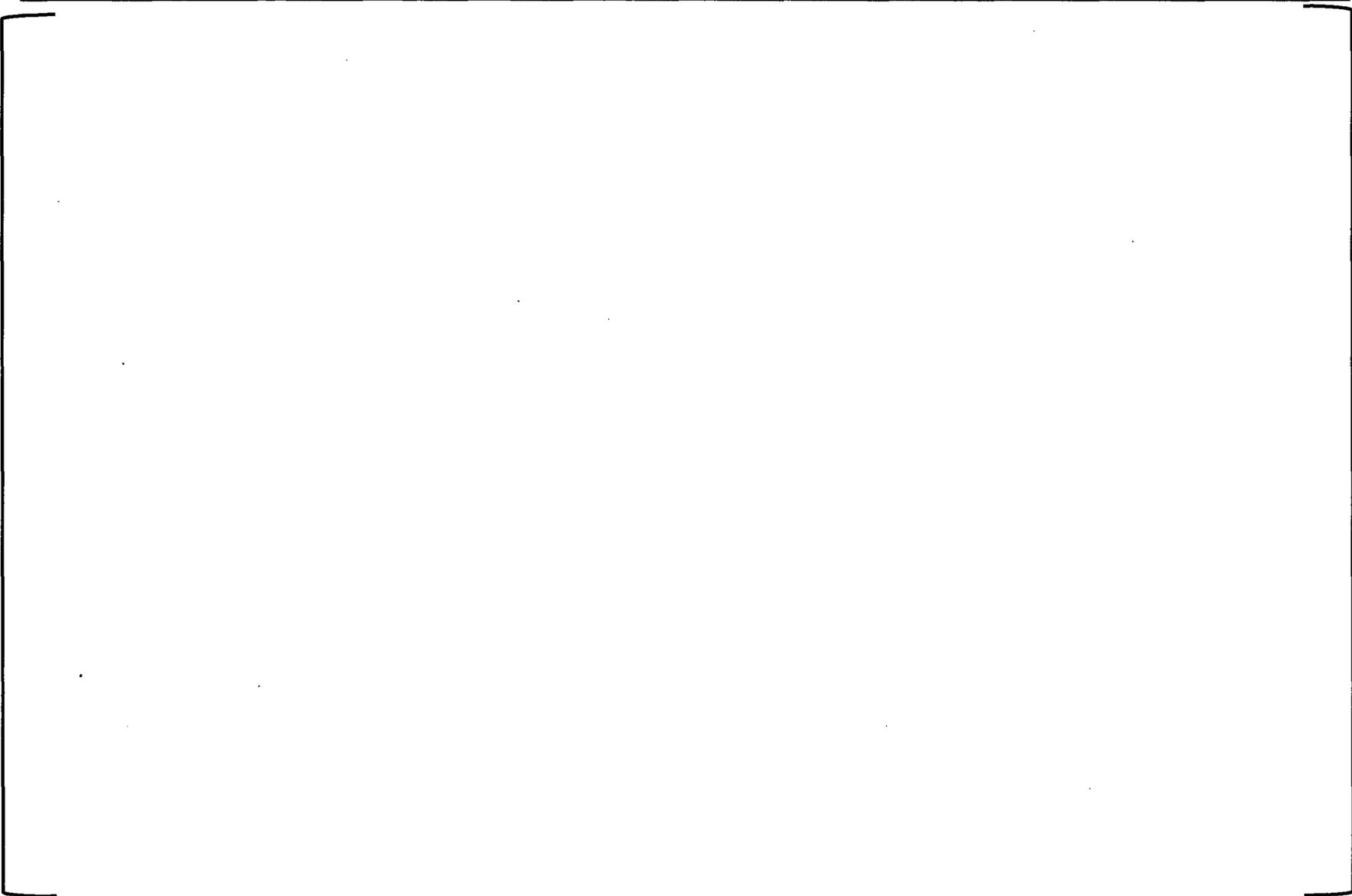
Meeting Objectives

- Facilitate USNRC Topical Report review approval process
- Explain Background of Toshiba Non Re-Writable Field Programmable Gate Array (NRW-FPGA) Based Safety-Related I&C System
- Provide the following information to the USNRC:
 - Outline of topical report
 - Project schedule

Background --- Toshiba Experience

- Toshiba is a leader in the Nuclear Industry
 - Nuclear Steam Supply System (NSSS) and Balance of Plant (BOP) system supplier for numerous Japanese Nuclear Power Plants (NPPs)
 - Safety related and non-safety related analog and digital I&C systems to Japanese NPPs
 - NRW-FPGA based equipment installed in operating nuclear plants includes
 - Radiation Monitoring Systems (safety and non-safety)
 - Neutron Monitoring Systems (safety and non-safety)

Background -- Toshiba NRW-FPGA Experience



(d)

Background --- Toshiba NRW-FPGA Experience



(a)

Background --- NRW-FPGA Platform History

- Toshiba implemented 10 CFR 50 Appendix B program in early 2000s
- Applied Appendix B program to NRW-FPGA-based I&C
 - Started development for a BWR-5 in 2005
 - Two Topical Reports (ML080780577 and ML082950631) submitted for NRC Review in 2008 documenting
 - FPGA Technology
 - Life Cycle Process
 - Commercial Grade Dedication
 - Equipment Qualification

Background --- NRW-FPGA Platform History

- Toshiba selected as EPC Contractor for STP 3&4
 - NRW-FPGA based systems selected by STPNOC for Reactor Trip and Isolation System (RTIS) and NMS
 - STPNOC elected to license the NRW-FPGA platform through Design Acceptance Criteria (DAC) process
 - Topical Reports converted to Technical Report
 - Technical Report made available to support DAC Inspection
 - Key platform design information regarding independence, determinism, diversity, redundancy, and simplicity is included in COL and has been reviewed by USNRC Staff and ACRS with no pending open items
 - Procurement and engineering activities (including DAC inspections) for STP 3&4 has been extended; COL related activities continue
- Toshiba desires platform review to continue
 - A new Topical Report will be submitted November 2011

Topical Report

- NRW-FPGA processes have been improved since submittal of 2008 topical reports
- Original process was adequate
- Current process improved the original process by extending 10 CFR 50 Appendix B into design and closer to manufacturing
 - Reduces scope of commercial grade dedication

Toshiba FPGA Quality Assurance

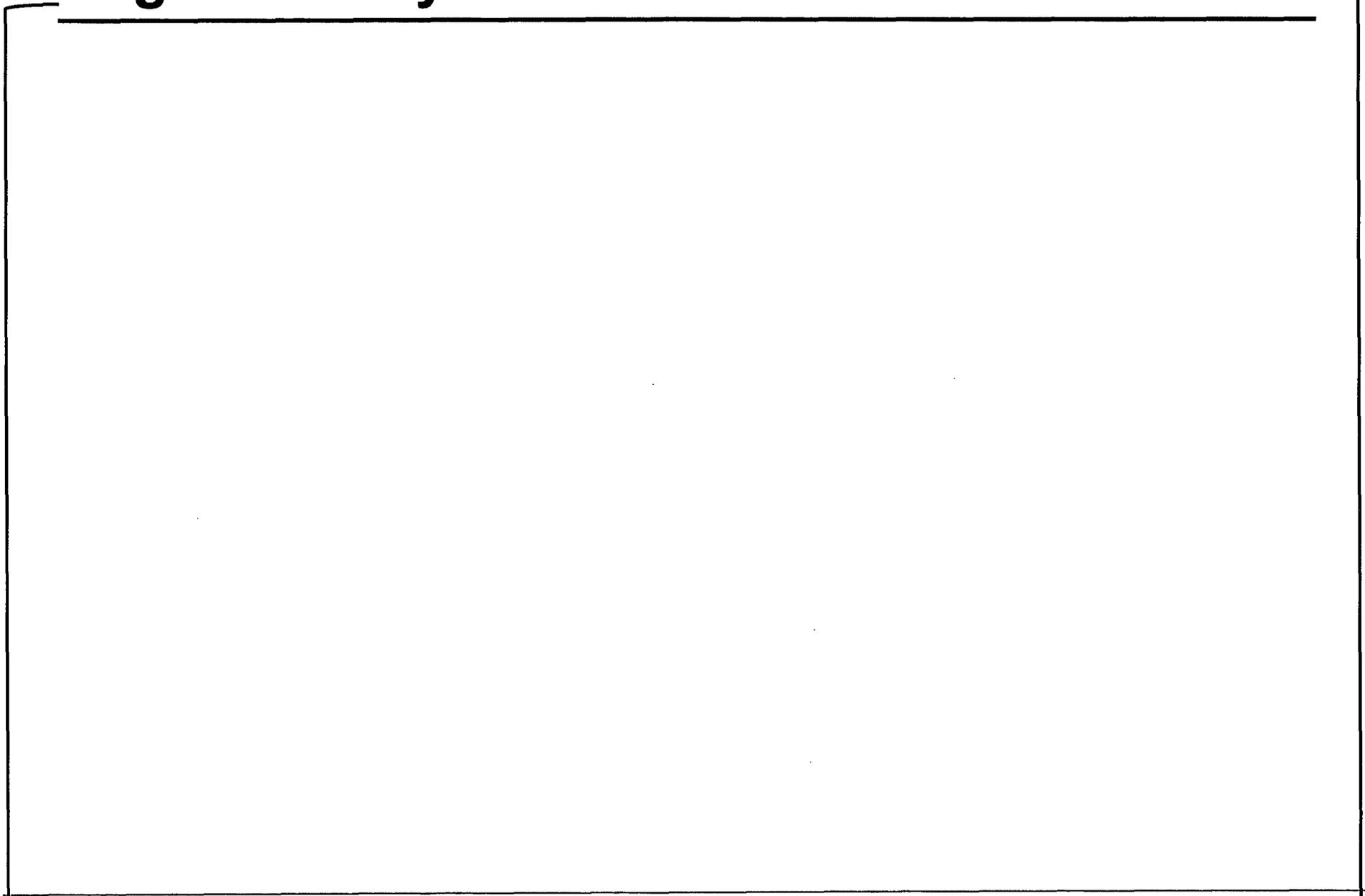
Original

Current

(a)

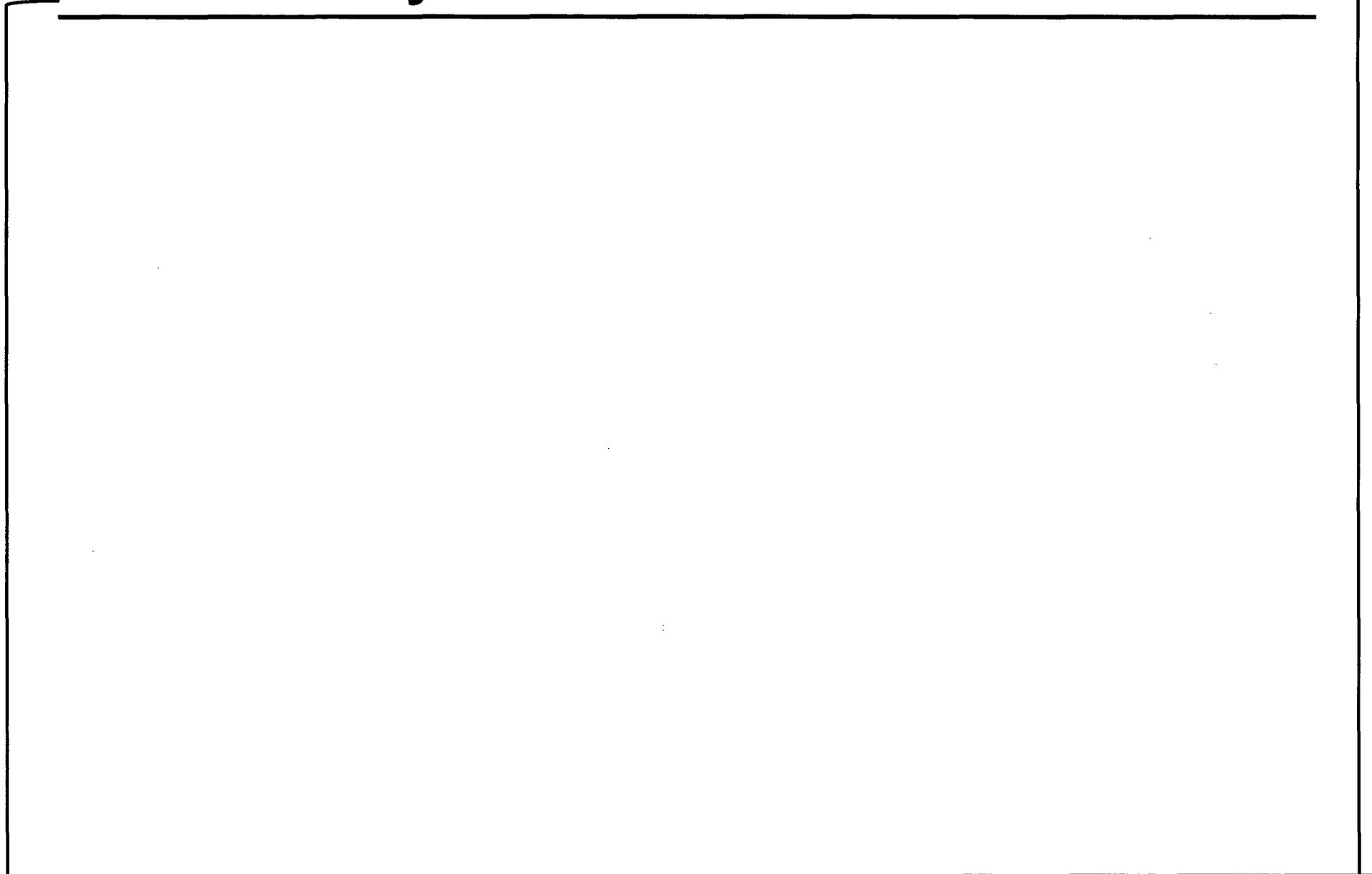
Original Lifecycle Process

(a)



Current Lifecycle Process

(a)



Topical Report (TOC)



(e)

Topical Report Content

- Addresses process and technology for all NRW-FPGA based systems
- Systems to demonstrate process and qualification

[] (e)

- Application Guide provides guidance to adapt NRW-FPGA based systems to
 - Other BWR types

[] (e)

Topical Report Submittal

- Topical Report submittal will include:
 - FPGA technology
 - Design of each application (PRM, OPRM, SRNM and RTIS)
 - Life cycle processes
 - Commercial grade dedication
 - Qualification results

(e)

Project Schedule

Project Milestones



(e)

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