

March 11, 2015

MEMORANDUM TO: Anthony J. Mendiola, Chief  
Licensing Processes Branch  
Division of Policy and Rulemaking  
Office of Nuclear Reactor Regulation

FROM: Joseph J. Holonich, Senior Project Manager /RA/  
Licensing Processes Branch  
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Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF JANUARY 28, 2015, MEETING ON "LICENSING  
TOPICAL REPORT FOR TOSHIBA NRW [NON RE-WRITABLE]-FPGA  
[FIELD PROGRAMMABLE GATE ARRAY]-BASED INSTRUMENTATION  
AND CONTROL SYSTEM FOR SAFETY-RELATED APPLICATION"  
UTLA 0020P, REVISION 0 (TAC NO. ME9861)

On January 28, 2015, staff from the U.S. Nuclear Regulatory Commission (NRC) met with representatives from the Toshiba Corporation and MPR Associates. The purpose of the meeting was to discuss the design process, including commercial grade dedication; self-diagnostic functions; and communication aspects of the Toshiba topical report (TR). Information related to the meeting, including attendees, can be found in the Agencywide Documents Access and Management System (ADAMS) package for the meeting at ADAMS Accession No. ML15029A067.

In its opening remarks, the NRC staff stated that its intent was to identify what was needed to get questions answered and concerns addressed so the NRC staff could prepare a cogent safety evaluation (SE). Toshiba confirmed that its objectives for the meeting were to answer the NRC staff questions and concerns.

To help focus the meeting, Toshiba presented a package of slides. That package focused on the following four topics: 1) the "Design Process Including Commercial Grade Dedication," 2) "Communication," 3) "Self Diagnostics," and 4) "Topical Report (TR) Revision." Due to the extensive amount of proprietary information, a nonproprietary version of the slides was not provided. For each topic area, there was information on each open item the NRC staff had identified as part of its review of the TR. Eventually these open items will be formalized as requests for additional information (RAIs) and made available to the public in ADAMS.

In addition to the topics identified by Toshiba, the NRC staff added an additional item to discuss the schedule for sending the request for RAIs and for the regulatory audit.

Within each topic area, Toshiba provided background information on specific areas. For example, in Topic 1, Toshiba discussed its design process; how Appendix B of Part 50 of the Title 10 of the *Code of Federal Regulations* (10 CFR) was incorporated into the design process; how commercial grade dedication (CGD) was used in the design process; and how the revised design process compared to the original process.

During the discussions on Topic 1, the staff asked if the organization that performed the equipment qualification was under a 10 CFR Part 50, Appendix B quality assurance program. Toshiba indicated that the company was on the Approved Suppliers List (ASL) for the South Texas Project as recent as 2011. However, Toshiba would need to confirm that the company is still on the ASL. In addition, Toshiba and MPR Associates noted that for the South Texas Project 3 and 4, the NRC conducted an alternate vendor inspection. The summary report can be found in ADAMS at Accession No. ML090560120.

The NRC staff explained that the reason for this question was that having a company on an ASL meant the review did not need to include the qualifications of that company because it would have already been evaluated as part of inclusion on an ASL. If this were the case, the NRC staff could focus on the technical merits of the report.

In Topic 2, Toshiba provided background information on its communication basics for the field programmable gate array (FPGA). Specifics discussed the FPGA-to-FPGA communication on a module, module-to-module communication in a chassis, chassis-to-chassis communication, and chassis-to-external-equipment communication. In addition, Toshiba covered communication diagnoses and error processing.

The discussions on Topic 3 covered the Toshiba philosophy of self-diagnostics, such as: self-diagnostics for the low-voltage power supply monitor, watchdog timer, communication, refresh count, Electrically Erasable Programmable Read Only Memory (EEPROM) data check, unit type and identification check, and power supply monitoring.

The final topic discussed in Toshiba's presentation was the schedule for resubmitting the TR. Toshiba discussed the revisions that have been made to the TR. It also described the changes that would be made to the amount of information that was marked as proprietary. Information that would be deleted was discussed as well as what information in response to open items would be incorporated into the revision.

Because of the amount of changes anticipated by Toshiba, it indicated that the revision to the report could be delayed beyond the original commitment date of the end of February. The NRC staff explained to Toshiba that the TR was withdrawn by Toshiba because of proprietary information concerns (see ADAMS Accession No. ML14287A041). Because Toshiba did not plan to significantly change the technical content of the TR and the report was withdrawn for administrative not technical reasons, Toshiba requested the review continue.

The NRC staff stated that it agreed to continue the review given the short amount of time for the revision to be submitted. Toshiba committed to get a revision submitted and the fact that the technical content was not significantly changing. However, if Toshiba was planning to make the revision submission beyond the end of February, the NRC staff would need to close its TAC number and stop the review until the revision was received.

Toshiba understood that the ongoing review was based on a quick resubmission of a report that was not significantly different from the one in front of the staff. Therefore, Toshiba agreed to keep, and if possible accelerate, the end of February submission.

During the discussions of the four topics, action items were identified for both the NRC staff and Toshiba. For Toshiba, the action items at the meeting are included in the enclosure to these minutes. The following action items were identified for the NRC staff.

- Identify examples in Appendix A of the Preliminary Technical Evaluation Report to illustrate cases in which the information provided is not clear
- Include an item in the open item list to ask Toshiba how the chassis knows the module is inserted in the correct slot.

One question raised was how Toshiba could formally respond to the action items contained in the enclosure. The NRC staff responded that normally RAIs are used to document its concerns in a manner that ensures that they are made publically available. The documentation in these minutes would be the vehicle for making the items publically available. Thus, Toshiba could make a formal submission providing its responses to the action items from the meeting. Toshiba agreed with this approach and committed to do so.

At the end of the meeting, the NRC staff and Toshiba discussed the schedule for submittal of the RAIs and the regulatory audit. The action item that resulted from this discussion is included in the enclosure to these minutes.

Enclosure:  
Toshiba Action Items

Project No. 729

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Enclosure:  
Toshiba Action Items

Project No. 729

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**ADAMS Accession Nos.: Package (ML15029A067); Summary (ML15029A072);  
Notice (ML14349A675)**

**NRC-001**

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| NAME   | JHolonich   | DHarrison   | AMendiola   | JThorp     | JHolonich   |
| DATE   | 02/27/2015  | 02/19/2015  | 03/10/2015  | 03/06/2015 | 03/11/2015  |

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**Action Items From The January 28, 2015, Meeting  
on “Licensing Topical Report For Toshiba NRW [Non Re-Writable]-FPGA [Field  
Programmable Gate Array]-Based Instrumentation And Control System For Safety-  
Related Application,” UTLA 0020p, Revision 0**

The following summarizes the Toshiba action items for each topic discussed during the meeting.

Meeting Topic 1: Commercial Grade Dedication (CGD)

1. Check whether Toshiba is still on the Approved Supplier List for South Texas Project Units 3 and 4.
2. Confirm that a CGD report was prepared for the old design process. Provide that report or its equivalent report.
3. Provide a formal response that the CGD process is looking at all requirements as critical characteristics in the Equipment Requirement Specifications (ERS).
4. Provide more information on the discussions related to critical characteristics.
5. Explain how the critical characteristics in Appendix A of the Preliminary Technical Evaluation Report (PTER) relate to the information in the Toshiba Acceptance Plan.
6. Explain what activities Toshiba did for the CGD in the PTER for the Oscillation Power Range Monitor.
7. Create a table comparing the old and new design process for CGD.
8. Describe and clarify how validation and verification (V&V) tests are used in the equipment qualification testing.
9. Define the involvement of V&V with the equipment qualification tests.
10. Consider providing a table, including references, for the Final Technical Evaluation Report items listed on proprietary slide 13.

Meeting Topic 2: Communication

11. Docket the picture on module and middle-plane communication on slide 42.
12. Confirm the communication link between the front and back middle planes.
13. Describe the middle plane configuration for each chassis (unit).
14. Confirm the use of time out failures and how the system switches to a secondary link for data.
15. Confirm the new version of the TRN and RCN modules can be used in the Power Range Monitor.
16. Clarify what type of diagnosis is done for communication and what diagnosis is used in each module.
17. Provide justification and explain how the ERS has high-level requirements for communication, and what other documents provide detailed design information.
18. Describe what happens when one of the communication buffers fails.

Meeting Topic 3: Self Diagnostics

19. Provide a self-diagnostic summary table.
20. Provide diagrams for signal processing of watch-dog timers.
21. Describe how failures detected by and failure of the watchdog timers can affect the safety function. Include the human-system interface watchdog timers in this discussion.
22. Describe operation of the watch-dog timer Light-Emitting Diodes
23. Provide communication diagnostics for the modules discussed on slide 61 (proprietary) of the presentation.
24. Correct the last bullet on slide 61 before submitting the presentation to the NRC.

ENCLOSURE

In addition, both Toshiba and the NRC agreed on the following generic action items for Toshiba:

25. Grant access to the Sharepoint site to additional NRC staff.
26. Identify several potential weeks for conducting the regulatory audit.