July 31, 2015

MEMORANDUM TO: Anthony J. Mendiola, Chief
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Office of Nuclear Reactor Regulation

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SUBJECT: SUMMARY OF JULY 1, 2015, PUBLIC WORKSHOP ON DIGITAL INSTRUMENTATION AND CONTROL TOPICS

On July 1, 2015, staff from the U.S. Nuclear Regulatory Commission (NRC) held a public workshop to discuss lessons learned in digital instrumentation and control (DI&C) reviews. The morning session was focused on lessons learned in the application of DI&C-Interim Staff Guidance-06 (ISG-06), "Task Working Group #6: Licensing Process Interim Staff Guidance" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML110140103). In the afternoon the workshop covered the review of Topical Report (TR) WCAP-17867, Revision 0, "Westinghouse SSPS [solid-state protection systems] Board Replacement Licensing Summary Report." Information related to the meeting including presentations and attendees list can be found in the ADAMS package at Accession No. ML15141A140.

In the opening remarks, the NRC staff stated that the workshop was intended to be a lessons learned discussion in the two areas. Further, the NRC staff stated that it was looking for feedback from the industry and stakeholders on what the NRC staff can do better and more efficiently. The NRC staff emphasized that its view was there had been a lot of progress in the past couple of years in the DI&C program.

Continuing, the NRC staff said that it believed the program was at a point where ISG-06 lessons learned needed to be identified. It also stated that given the success of the SSPS TR review, the NRC staff was looking to identify what made that review so successful and how those could be applied in other DI&C reviews.

The Nuclear Energy Institute (NEI) representatives provided the industry opening remarks. The NEI representatives thanked the NRC staff for getting the guidance issued. They also noted that ISG-6 was an interim document and that firm guidance for digital modifications in controls systems was needed.

The NEI representatives further said that a countervailing approach was the use of Section 50.59 of Title 10 of the *Code of Federal Regulations*. The industry representatives stated that their view was that the 50.59 process could be used to identify digital modifications that were not safety systems. In addition, the industry representatives reported that they were looking to have the NRC staff identify what was needed in license amendment requests (LARs) for digital modifications.

Starting the discussion on lessons learned from the application of ISG-06, the NRC staff provided its perspective. In its presentation, the NRC staff noted that the use of an open-item list (OIL) was particularly effective in helping the review efficiency. The NRC staff discussed how the OIL was initially not a public document but that for the Diablo Canyon review, it was made public once the routine status calls had become open to the public.

As part of this discussion, the NRC staff emphasized that making the OIL public was unique for the Diablo Canyon LAR. However, because these lists were mainly administrative in nature and might also contain proprietary information, not every OILs would necessarily be public. It was noted that any significant topics in the OIL that would be relied upon in the review would be made into a request for additional information (RAI). Thus this would provide stakeholders the ability to see what technical information was needed to support the review.

A question that was asked was why the NRC review took so long to complete. The NRC staff responded that its goal was to prepare a safety evaluation (SE) with no conditions on the design. Thus the review process was not like the Inspections, Tests, Analyses, and Acceptance Criteria program for new reactors because the SE does not rely on future activities.

Another question on the review time was why the NRC staff had to wait until the factory acceptance testing (FAT) was done. The NRC staff answered that previous experience shows design changes had resulted from the FAT. Some of the design changes required re-work by the staff to revise its draft SE, while others had the potential of invalidating some of the staff's original conclusions. In support, Diablo Canyon reported that both of its vendors made design changes after the FAT. Thus, before the NRC staff could complete its review, it needed to know the design was final.

An advantage during the Diablo Canyon ISG-06 review discussed by the staff was the use of the OIL to identify and address technical issues. When RAIs were then issued, the topic was understood and the responses provided the needed information.

Because of the success in using the OIL to identify and resolve issues, the industry representatives suggested that the NRC staff consider issuing an interim review-status letter or a series of review-status letters. The NRC staff noted that issuing a series of review-status letters could result in a large administrative workload. As an alternate it was suggested that a review-status table showing what areas in the SE had been resolved could be placed in ADAMS and made publically available. It was agreed that this suggestion would be considered. The staff requested interested industry stakeholders to provide (through NEI) the staff with a proposed description of status information such a table should contain, along with any precautions or limitations the staff may need to consider before making such a table public.

Next Diablo Canyon discussed its experience in the LAR review process using ISG-06. It was noted that although the LAR was submitted and the review had been ongoing for four years, the length of time it was taking was not related to the use of ISG-06. Rather it was a function of the fact that the LAR involved a major change to the protection system and was subject to licensee scheduling.

Diablo Canyon identified the use of multiple Phase-0 meetings as very beneficial in making the LAR submittal more complete. These meetings helped to make the review more efficient.

A question was asked on whether a maintenance and operation (M&O) plan was included in the LAR. Diablo Canyon responded that ISG-06 did not require the submission of an M&O plan. However, Diablo Canyon noted that one of its lessons learned was to include the maintenance department in the design process. It was recommended that including maintenance in the design process could be identified in other methods like industry guidance or plant procedures.

The final presentation on the ISG-06 experience was from the nuclear steam system supplier and automation equipment vendor, Westinghouse Electric Company (Westinghouse). During this presentation it was noted the use of the OIL was beneficial and should be considered in the ISG-06 revision.

Next, the NRC staff discussed its proposed action plan for work in the DI&C area. The NRC staff noted that it was ready to receive DI&C applications but was looking at ways to improve the efficiency of its reviews. In particular, the NRC staff reported that it was identifying areas where it could improve the process, the guidance, and communications with licensees.

Continuing, the NRC staff reported that it was looking at what additional tools are available to help the staff. The NRC staff noted that the current Standard Review Plan (SRP) was difficult to use and was augmented with branch technical positions. However, the NRC staff said it was looking for ways to make the SRP more usable. In addition, the NRC staff discussed that Regulatory Guide 1.152, "Criteria for Digital Computers in Safety Systems of Nuclear Power Plant," would be revised in conjunction with its accompanying SECY paper, now being prepared.

In closing this discussion, the NRC staff identified nine areas where it was working and that these areas would be made more public in a few months. An action plan with resources, staffing, prioritization, and sequencing of reviews would be issued for approval by NRC management by the working group the NRC staff had formed. The nine areas identified are:

1) Information content and submittal timing for LARs
2) Reaffirm or revise the criteria identified in Item II.Q of SECY 93-087, “Policy, Technical, And Licensing Issues Pertaining To Evolutionary and Advanced Light-Water Reactor (ALWR) Designs”
3) Assist the industry in guidance development for the 50.59 process
4) Identify appropriate evaluation criteria for highly-integrated digital control and safety systems
5) Improve the overall structure, content, and usability of the SRP
6) Review regulatory processes for international plants and other industries standards for applicability to US nuclear plant licensing
7) Improve consistency among NRC organizations
8) Consider security-related technical evaluations in the early development stage
9) Extend current lessons learned in other LAR and TR reviews

The final topic in the morning session was an open discussion on DI&C licensing reviews. The NEI representatives made a presentation on DI&C activities.

A topic discussed was an August industry meeting where the Electric Power Research Institute (EPRI) guidance related to the revisions to NEI 01-01, “Guideline on Licensing Digital Upgrades: EPRI TR-102348, Revision 1, NEI 01-01: A Revision of EPRI TR-102348 To Reflect Changes To The 10 CFR 50.59 Rule” (ADAMS Accession No. ML020860169) will be discussed.

A point raised in the open discussion was the interest in implementing DI&C modifications. It was reported that DI&C modifications have the potential to improve safety but that the industry was concerned with the delays in reviews and uncertainty in the process. It was also noted that ISG-06 is a consistent guidance document but changes in staff results in it being applied in different ways. Because of this different application, the industry representatives stated that they believe regulatory predictability was an issue but regulatory stability was not.

The NRC staff indicated that having a priority view from industry would help the NRC staff in its TR reviews. It was noted the TRs currently with the staff were designs for DI&C that would be marketed by individual companies; thus, it may not be possible to identify which TR has higher priorities. The final topic discussed was the consideration of human factors in DI&C design and review.

In the afternoon, Westinghouse representatives and the NRC staff made separate presentations on the experiences in the review of WCAP-17867 (Complex Programmable Logic Device (CPLD)-based SSPS card TR). All attendees agreed this TR review was very successful in the time it took to complete it; however, the NRC staff emphasized that this review was unique.

First, it was a TR submitted in response to an operational issue; therefore, it received a higher priority. Second, the NRC staff used a multiple-person team to do the review. This resulted in the delay of several other DI&C design TR reviews. Third, the review was performed for a replacement component in an existing safety system with extensive system requirements that were already defined and it had a well-understood operating performance. In conclusion, the NRC staff noted that the uniqueness of this review was probably not indicative of how a majority of reviews are done.

Both presenters for the CPLD-based SSPS card TR identified the value of SharePoint site for rapid sharing of information towards the timely identification of material for docketing. Both presenters also described the frequent technical exchanges as being very beneficial.

The final agendum was an open discussion on DI&C topics. Discussions covered how to define “digital,” participation in standards development activities, embedded digital devices, and other general areas. In addition, the feedback during this session was that the workshop was a success.

It was agreed that if participants had any additional thoughts, they should provide them to the NRC staff by July 31, 2015. The NRC staff will create a list that will be placed in ADAMS.

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