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December 7, 2009

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-001

Subject: Duke Energy Carolinas, LLC

McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370

Response to Request for Additional Information regarding a revision to Commitment in response to Notice of Violation EA-08-220 (NRC Inspection Report Nos. 05000369/2008009 and 05000370/2008009)

References: Duke Energy Letter dated October 1, 2009 to Nuclear Regulatory Commission (NRC) Document Control Desk, Revision to Commitment to Notice of Violation EA-08-220

NRC Letter dated November 6, 2009; Reply to Duke Letter dated October 1, 2009 regarding Revision to Commitment in Response to Notice of Violation EA-08-220

In your letter dated November 6, 2009 a request was made for additional information related to the commitment change made in our letter dated October 1, 2009. Specifically you stated:

> "So that we can fully assess the regulatory and safety implications of this new commitment, please provide a supplemental response within 30 days of the date of this letter that addresses the following:
>
> 1. Provide an explanation addressing what compensatory or other measures you have in place to assure the operability of the NSWS in case macro-fouling does occur before full compliance is restored, and why you believe those measures are adequate.
>
> 2. Provide a discussion of why your activities will not be completed until December 2012. Regarding those activities necessary to restore compliance, please specifically address why the revised date represents the first available opportunity to restore compliance."

In Enclosure 1, we have addressed your request for information regarding compensatory and other measures in place to assure operability of the Nuclear Service Water System (NSWS) in case of macro-fouling and why we believe these measures are adequate. In Enclosure 2, we have provided a discussion on the schedule of activities to be completed and why this represents the first available opportunity to restore compliance.

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NRR

There are no new commitments in this letter or enclosures.

Please direct any questions you may have in this matter to K. L. Ashe at (704) 875-4535.

Very truly yours,

B. H. Hamilton for

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cc w/ Enclosures:

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Provide an explanation addressing what compensatory or other measures you have in place to assure the operability of the NSWS in case macro-fouling does occur before full compliance is restored, and why you believe those measures are adequate.

As was discussed in, and subsequent to, the Atlanta meeting dated September 18, 2008 we have instituted compensatory measures and we have made physical and procedural changes to the facility to ensure the Nuclear Service Water System (NSWS) continues to perform its required safety function. The compensatory measures are as follows:

> A dedicated operator is stationed to perform manual NSWS strainer backwash on 1A, 1B, 2A, and 2B Strainers during events involving a loss of instrument air (VI) (i.e., when automatic backwash is not available). This action is to be performed within 12 minutes for the A train of the NSWS after a loss of instrument air and within 10 minutes for the B train of the NSWS after a loss of VI. These compensatory actions are incorporated in Enclosure 4.17 of OP/1/A/6400/006, "RN Strainer Operation During Loss of VI Events".

The physical and procedural changes we have made include the following:

1. Modified air-operated backwash discharge valves (one per train) to allow manual operation.
2. The Reactor Trip Emergency Procedure and Loss of VI Abnormal Procedure were revised to promptly place the "B" train of the NSWS on the Standby Nuclear Service Water Pond (SNSWP).
3. Installed stainless steel fish fence on Low Level Intake to manage Alewife fouling source for NSWS.
4. Installed safety related strainer differential pressure (DP) instrumentation that:
    a. Removed the Safety Injection (SI) signal that closed the backwash inlet valves.
    b. Provided QA-1 local indication of strainer DP with non-QA feed to the Operator Aid Computer (OAC).
    c. Provided QA-1 automatic backwash control.
5. Took actions to control bio macro-fouling sources in the SNSWP.
6. Procedure changes have been implemented that manually align both the A and B trains of the NSWS to the SNSWP upon operating basis earthquake alarms.
7. Procedure changes have been implemented that reduce the total flow balance flow for each NSWS train. This enhances the ability to establish backwash discharge flow to WZ.
8. Procedure changes have been implemented that direct when a strainer backwash is manually required by comparing the new QA-1 indication of strainer DP to the expected strainer DP (annunciator response procedure).
9. An analysis was performed to ensure downstream effects of current strainer operation have acceptable impacts to operating equipment.

The above mentioned physical and procedural changes in addition to the compensatory measures provide reasonable assurance the NSWS will perform it safety related function when necessary.

ENCLOSURE 1

As was discussed in the September 18, 2008 meeting in Atlanta, there was a high macrofouling period in August of 2007, during which the NSWS strainers were subjected to the highest backwash frequencies seen at McGuire, due to Alewife fish entering the strainers. Backwash of these strainers was automatically initiating at the high differential pressure setpoint (alarm and auto-backwash setpoint at 1.86 psid), and the differential pressure was successfully reduced by the backwash cycles. Backwashing occurs without the debris being removed from the strainer through the backwash discharge slot due to reverse flow conditions. Therefore, the backwash function provided, consisted only of backwash supply flow. The debris was crushed and ground in the clearances between the backwash outlet pads and the strainer drum, eventually reducing the debris size such that it passed through the strainer. This is plausible since the macro foulant was soft and easily ground between the backwash outlet pads and the strainer drum and then further degraded in the turbulent conditions within the strainer barrel. This type of debris does not cause damage to the individual strainer media. The debris passes through the strainer media under a small enough differential pressure that there is no detectable decrease in pump performance. In addition, an evaluation of the operating experience and analytical analysis shows that downstream affects of the current operation are acceptable.

While reverse or isolated backwash discharge flow is not the original design of the backwashing system for this strainer, the fact that the backwash supply is clearing the strainer and the recirculated backwash debris is ground up and passed through the strainer with no noticeable impact to the total NSWS Pump suction flowrate through the strainer or downstream components, demonstrates these strainers are still performing their function of straining out debris of the approximate size initially intended. The impact of increased clearances at the backwash supply shoe appear to be limited, in that the strainer elements are being cleaned based on reduction of strainer differential pressure when backwash is initiated.

Based on the debris type (soft material) and the grinding capabilities of these strainers, the NSWS strainers (S.P. Kinney Model AP-1) can maintain the design function of straining particles greater than or equal to those initially intended.

Provide a discussion of why your activities will not be completed until December 2012. Regarding those activities necessary to restore compliance, please specifically address why the revised date represents the first available opportunity to restore compliance.

To address the operable but degraded non-conforming condition McGuire is in the process of developing three modifications for the NSWS. The three modifications are described as follows:

- The first modification includes the addition of an assured air source to the backwash inlet valves to allow the NSWS Strainers to automatically back wash for at least 8 hours into a loss of VI event. This will remove the time critical operator actions required to operate the back wash supply inlet valve during the potential loss of VI event.
- The second modification re-routes the backwash return piping to provide a less restrictive flow path for backwash return to the WZ sump via manual operator actions.
- The third modification installs a new nuclear safety related back wash discharge pump to the NSWS return header for each Train of the NSWS. This phase ensures there will be no depletion of the SNSWP by routing the discharge back to the backwash source of water.

Each modification is receiving the highest priority and is being planned, developed, and will be implemented in an expedited manner. However, there are limitations on engineering resources and the amount of parallel work that can be accomplished. In addition, there are limitations associated with the procurement of long lead materials.

Below is a brief description of the three modifications including the challenges associated with each:

1 - Assured Air Source to Strainer Backwash Inlet Air Operated Valve (completion in August 2010)

Each of the 4 NSWS Trains will require approximately 2600 hours of design work (i.e., approximately 10,400 hours). Each Train will require approximately 26 weeks to complete the design process. The 4 Trains will be designed in parallel with a new Train's design beginning about every 3 weeks. Dedicated resources continue to work these design products and will not be diverted during Refueling Outage 1EOC20 (March/April 2010) to facilitate efficient use of craft resources to begin prefabrication immediately following the outage.

The scope of this modification includes purchasing non-typical nuclear safety related accumulators, pressure regulating valves, and check valves. Long lead materials are being purchased in an expedited manner. Mock up testing will be performed to validate the design prior to installation. Portions of the design and work planning task that are normally performed in series are being performed in a staggered/parallel manner where appropriate to improve timeliness. It should be noted that McGuire is managing the work to ensure quality is not sacrificed. This strategy is facilitated by modification personnel very familiar with the details of the design, planning, and implementation processes.

Installation of the modification occurs approximately 3 weeks after each NSWS Train's modification has been technically approved. During the three week window a significant portion of the materials will be pre-fabricated. Major components of the modification will be installed prior to affecting the operability of the NSWS.

This translates into a schedule that completes the installation of the assured air source on the last of the NSWS Trains in August 2010.

2 - Pipe from NSWS Strainer Backwash to WZ Sump (completion in July 2011)

Each of the 4 NSWS Trains will require approximately 1750 hours of design work (i.e., approximately 7000 hours) utilizing some of the engineering resources used to design the other two modifications. Each Train will require approximately 22 weeks to complete the design, planning and installation process. The 4 Trains will be designed in parallel with a new Train's design to begin about every 3 to 4 weeks. The scope of this Engineering Change includes flow modeling (to validate debris transport), piping support/stress analysis, and design/fabrication of a basket to capture debris from the strainer backwash outlet. Except for the debris basket to be located between the piping outlet and the WZ sump, all major components for this phase are on site. A significant amount of prefabrication will occur prior to effecting NSWS system operability.

This translates into a schedule that completes the installation of this modification in July 2011.

3 - Backwash Pump Discharging to the NSWS Return Header (completion in December 2012)

Each of the 4 NSWS Trains will require approximately 5000 hours of design work (i.e., approximately 20,000 hours) utilizing some of the engineering resources used to design the other two modifications. Design related tasks that will be performed in parallel with Modifications 1 and 2 include:

- Selection of a third party pump consultant to support development of a specification for a backwash pump (see below scope description),
- Development and approval of a Failure Mode Effects Analysis,
- Development and approval of flow modeling calculation(s),
- Development of a preliminary 10CFR50.59 assessment.

Note that completion of the design tasks associated with this modification is dependent on the design aspects of Modification 2. Therefore, a significant portion of the design activities will occur between October 2010 and March 2012. During this 18 month period, the 4 Trains will be designed in parallel with each Train requiring a design period of approximately 12 months.

The scope of this modification is the most extensive of the three modifications and presently is as follows:

- A nuclear safety related pump for each Train, capable of taking suction from the NSWS Strainer backwash discharge piping in all expected conditions and discharging back to the NSWS discharge header for the applicable Train. The pump shall be capable of pumping the back wash effluent with all expected debris constituents, including biological and abrasive corrosion products. The pump is expected to operate with a potential vacuum at the suction.
- Pump suction piping will not contain vertical loops which could collect air or create debris traps.

- Pump discharge piping will consist of a dedicated line returning to the corresponding NSWS return header.
- The pump discharge will be protected by a check valve.
- A flow meter will be installed on a normally isolated branch line, to facilitate periodic inservice testing.
- The pump discharge piping flow rate will be designed to support a self-cleansing velocity to ensure transport of particulate in the back wash effluent to the NSWS return header.
- Each backwash pump shall be powered and controlled in a nuclear safety related manner. The pumps shall be powered from both a normal source and an emergency source. Loading on the emergency diesel generator will be modified to accommodate the backwash pump as necessary.
- Delete the NSWS backwash return air operated valves (1/2RN-22A, -26B) and the Safety Injection signal to these valves. Also, remove the air operators and install manual hand wheels for 1/2RN-23/27.
- Vent and drain valves installed and positioned to ensure complete filling and venting during normal operations and to test the new system.
- Install flow elements with flange taps for back wash supply flow indication (needed to accurately perform NSWS flow balance and monitor back wash health). Proper flow conditioning must be considered.
- Provide NSWS system pump inlet and outlet pressure indication to the OAC.

Actions to obtain the back wash pumps have already started since this activity will require a significant amount of time (approximately 15 months) to:

- Select a pump consultant to specify the pump,
- Develop testing criteria,
- Develop manufacturing criteria,
- Propose a pump selection to McGuire,
- Manufacture a test pump(s),
- Manufacture production pumps,
- Perform factory acceptance testing,
- Perform additional flow loop testing,
- Perform site acceptance testing and
- Develop commercial grade to nuclear safety related justification documentation.

This translates into a schedule that completes the installation of this modification no later than December 2012.

As stated above and can be seen from the detailed information provided, each modification is receiving the highest priority and is being planned, developed, and will be implemented in an expedited manner. However, there are limitations on engineering resources and on the amount of parallel work that can be accomplished. In addition, there are limitations associated with the procurement of long lead materials. As a result, the schedule for the completion of the three modifications represents the first available opportunity to address this operable but degraded non-conforming issue.