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U. S. Nuclear Regulatory Commission
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Washington, DC 20555-0001

SUSQUEHANNA STEAM ELECTRIC STATION
10 CFR 50.59 SUMMARY REPORT AND
CHANGES TO REGULATORY COMMITMENTS
PLA-7542

Docket No. 50-387
No. 50-388

Reference: 1) PLA-7247, J. A. Franke (PPL) to Document Control Desk (USNRC), "10 CFR 50.59 Summary Report and Changes to Regulatory Commitments," dated October 24, 2014

Enclosure 1 is the summary report of the Susquehanna Nuclear, LLC 10 CFR 50.59 Summaries of Changes, Tests, and Experiments approved during the period of September 1, 2014 to August 31, 2016. This report is required by 10 CFR 50.59(d)(2) and is to be submitted at intervals not to exceed 24 months. The previous report (Reference 1) included the period from September 1, 2012 to August 31, 2014.

Enclosure 2 is a Summary of Changes to Regulatory Commitments for commitments that were changed in accordance with the guidance of NEI 99-04, "Guidelines for Managing NRC Commitment Changes" and SECY-00-045. Per NEI 99-04, commitment changes are required to be reported to the NRC either annually or with a Final Safety Analysis Report (FSAR) update per 10 CFR 50.71(e).

This letter contains no new regulatory commitments.

Should you have any questions regarding this submittal, please contact Mr. Jason Jennings, Manager – Nuclear Regulatory Affairs at (570) 542-3155.

Sincerely,

R. J. Franssen

Enclosure 1 – 10 CFR 50.59 Summaries of Changes, Tests, and Experiments

Enclosure 2- Summary of Changes to Regulatory Commitments

Copy: NRC Document Control Desk
Mr. J. E. Greives, NRC Sr. Resident Inspector
Ms. T. E. Hood, NRC Project Manager
Mr. M. Shields, PA DEP/BRP

Enclosure 1 to PLA-7542

10 CFR 50.59 Summaries of Changes, Tests, and Experiments from September 1, 2014 - August 31, 2016

50.59 Evaluation No.: 50.59 SE 00015

Cross-Reference: LDCN No. 4554

Description of Change:

The changes involve replacing the existing Reactor Building, Turbine Building and Standby Gas Treatment System (SGTS) Vent Stack Exhaust Monitoring and Sample Radiation Monitoring Systems (RMS) as described in FSAR Sections 11.5.2 and 18.1.30 with a new Vent Effluent Radiation Monitoring System (VERMS) supplied by General Atomics Electronics Systems, Inc. (GA-ESI). The existing Vent Stack Exhaust Monitoring and Sample Radiation Monitoring Systems specifically consists of the System Particulate Iodine and Noble Gas (SPING) systems and the Post Accident Vent Stack Sampling Systems (PAVSSS) that are used for monitoring gaseous effluents (noble gas, particulate, and iodine) released from the five station vent stacks (U1TB, U2TB, SGTS, U1RB, U2RB) during normal operation, operational transients and post-accident conditions. This equipment is used only for continuous monitoring of noble gas releases and for collecting particulate and iodine samples to quantify gaseous releases and does not perform any control functions. The replacement includes all the SPING equipment on the Refuel Floor, all of the PAVSSS equipment in the Turbine Building, the control terminals in the Main Control Room and The Technical Support Center (TSC), interfacing communications, and inputs to the Plant Process Computer (PPC) system and Safety Parameter Display System (SPDS). The changes maintain the existing radiation monitoring function for the five gaseous effluent paths.

Summary:

NRC approval of the changes to Susquehanna Steam Electric Station's (SSES) Systems, Structures and Components (SSC) related to installation of the new Vent Effluent Radiation Monitoring System (VERMS) for normal and accident conditions is not required. Implementation of the proposed changes does not require a change to the SSES Unit 1 and Unit 2 Technical Specifications. In addition, these changes do not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSAR, result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the FSAR, result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR, result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the FSAR, create a possibility for an accident of a different type than any previously evaluated in the FSAR, create a possibility for a malfunction of a SSC important to safety with a different result than previously evaluated in the FSAR, result in a design basis limit for a fission product barrier as described in the FSAR being exceeded or altered or result in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses.

50.59 Evaluation No.: 50.59 SE 00026

Cross-Reference: LDCN Nos. 5192, and 5196

Description of Change:

This 50.59 evaluation describes the following Unit 1 and Unit 2 Engineering Changes (EC):

1. EC 1811065: ICS Single Point Vulnerability and Diversity Project Unit 1
2. EC 1811069: ICS Single Point Vulnerability and Diversity Project Unit 2

This modification will mitigate Single Point Vulnerabilities (SPV) in the Feedwater System during plant startup and shutdown conditions. These SPVs are end devices, subcomponents of end devices or subcomponents of the Integrated Control System. Failure of the SPVs will result in a high or low feedwater flow, resulting in a Main Turbine/Reactor Feedpump Turbine trip on high water level or low water level. Three of the four scrams that resulted in Unit 2 being placed in 95002 inspection criteria in 2013 were because of these SPVs.

The SPVs of concern include ICS end devices and their supporting controlling devices that are part of a reactor feedpump (RFP) channel. The end devices associated with this modification include the three RFPs, their corresponding reactor feedpump turbines (RFPTs), associated valves, and valves and controls used for Start Up Level Control. The supporting controlling devices include the current to pneumatic converters (I/Ps), air regulators, positioners, actuator diaphragms, hydraulic pistons, linkages, and controls.

The mitigation of these SPVs during plant startup will be accomplished by modifying ICS logic to include Auto Transfer of Standby RFP to Flow Control Mode (FCM) if another RFP malfunctions. This will be called Auto Transfer Enabled or ATE. The second ICS logic change will involve Sequential Tripping of the malfunctioning RFP. This will be referred to as Sequential Trip Logic or STL.

If symptoms indicate a failed RFP channel, the automatic transfer to an available ATE RFP channel will occur and the failed RFP channel will be tripped. This function will be bounded by the availability of three element level control and the Reactor Recirculation Pump (RRP) Limiter #2, or from approximately 8% to 75% power operation. This function includes the domains (power level) where feedwater mode changes are made: from FCM to Discharge Pressure Mode (DPM) on one RFP, DPM to FCM on one RFP, one RFP in FCM to two RFPs in FCM, two RFPs in FCM to three RFPs in FCM, and two RFPs in FCM to one RFP in FCM.

The operators have been challenged to assess and align system equipment in a timely manner to mitigate end device SPVs failures. The symptoms of these failures are increasing high feedwater flow

resulting in a high water level (level 8) Main Turbine trip and RFPT trip, or low feedwater flow resulting in a low water level (level 3) reactor scram.

The ICS-SPV modifications include the new ATE and STL logic changes to ICS. These changes include incorporation of a new compound (a logical collection of blocks that performs a control strategy) containing the ATE/STL logic and changes to existing application logic. It will also require the addition of new ATE and STL buttons to be added to the ICS Human Machine Interface (HMI) displays, new HMI screens, as well as new Plant Computer points. No hardware will be added by this modification. The ICS SPV modifications will require changes to start up procedure GO-100-002 and several operating procedures related to the feedwater system.

Summary:

NRC approval of the changes described herein to SSES Structures, Systems and Components related to the above ECs is not required. Implementation of the proposed changes does not require a change to Technical Specifications or create the possibility of a new or different accident or malfunction as previously evaluated in the FSAR.

The proposed changes do not result in more than a minimal increase in the frequency of occurrence of an accident. The changes will not increase the frequency of an SSC malfunction resulting in an accident as compared to the existing SSCs. Historically, the plant has responded too quickly for operators to identify a failure of an SPV during startup conditions, review symptoms, and manually transfer to a healthy RFP; this has resulted in several unplanned scrams. During certain startup and shutdown conditions, the new ATE/STL logic will automatically trip a degraded feedwater train based on symptoms and transfer to a new stand-by or available feedwater channel. No new SSCs are being introduced by these modifications. The ICS Failure Modes and Effects Analysis (FMEA) has been revised to reflect a reduction in SPVs because of the logic changes associated with this modification.

The changes will not result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety as previously described in the FSAR. No new SSCs are being introduced by these ECs. Systems important to safety are not affected. The software logic changes were developed in accordance with NEI-01-01: Guideline on Licensing Digital Upgrades TR-102348 Rev 1. The Software Quality Assurance Program elements are in accordance with SSES procedures. A calculation that provides validation and verification of the Simulator/FSIM modeling tool as well as the basis for the level setpoints for these modifications was performed.

The changes will not result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR. The SSCs that interface with the feedwater system are not employed for accident prevention and mitigation. The changes described do not alter the physical condition or performance of any related reactor coolant pressure boundary or containment. The changes do not affect the operation of any FSAR described safety-related components.

The proposed changes do not result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety as previously evaluated in the FSAR. The ICS application logic

design change does not mitigate the radiological consequences of a malfunction. No new failure modes affecting radiological release have been introduced. Annunciator and Plant Computer PICSY points alerting the operator of the ATE and STL logic status and initiating conditions have been added. The ICS FMEA was revised to reflect a reduction in SPVs because of the logic changes associated with this modification.

The proposed changes do not create a possibility of an accident of a different type than any previously evaluated in the FSAR. The ATE/STL logic changes do not revise nor are they connected to, any safety-related components. All internal logic connections are related to power generation equipment. In the unlikely event that an unknown failure propagates through the system, the resulting failure would not affect safety-related mitigation techniques. Historically, the operators have been challenged to identify the end device failure and align equipment in a timely manner to manually transfer to a healthy RFP. This has resulted in several unplanned scrams. The ATE/STL logic will prevent a feedwater transient that results in a scram by placing a second RFP in ATE during startup and shutdown conditions. In the event of the failure of this logic to perform its intended function, the existing high water (level 8) and low water level (level 3) trips would continue to operate as designed. The proposed engineering changes do not adversely affect an SSC important to safety which would result in an increase in radiological dose. The changes described do not alter the physical condition or performance of any reactor coolant pressure boundary or containment.

The proposed changes do not create a possibility for a malfunction of an SSC important to safety with a different result than that previously evaluated in the FSAR. This logic, as is all of ICS, maintains bounding system limits and has no real or digital connections to safety-related equipment. The ATE/STL logic and HMI changes were developed in accordance with SSES and Schneider-Electric (Invensys) Software Quality Assurance (SQA) programs. These ICS-SPV modifications operate within the system limits.

The proposed changes do not cause a design basis limit for a fission product barrier as described in the FSAR to be exceeded or altered. The feedwater system provides the moderator to the reactor. Failure of the new ATE/STL logic will result in an increase or decrease in coolant inventory. The most severe applicable event is a feedwater controller failure to maximum flow demand. The ICS Reactor Vessel high level 8 trips to the Main Turbine and RFPT will terminate feedwater flow and are unaffected by these modifications.

The proposed activity does not result in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses. The feedwater system in modeled in the transient analysis that forms the basis for the vents and accidents outlined in FSAR Chapter 15. Installation of the ICS-SPV modifications does not alter the logic input assumptions used in the transient analysis. Existing system input parameters and system limits are maintained by this modification.

50.59 Evaluation No.: 50.59 SE 00028

Cross-Reference: LDCN Nos. 5219 and 5220

Description of Change:

The proposed activity is the installation of an On-Line Noble Chemistry (OLNC) system at Susquehanna (SSES) Units 1 and 2. Additionally the noble metal application with OLNC is evaluated. The installation of the new OLNC system, which includes an injection system and a mitigation monitoring system, interfaces with and impacts the reactor water clean-up (RWCU) system, the feedwater system, the instrument air system, the makeup demineralizer system, the non-Class 1E AC system and the liquid radwaste collection system. The OLNC application will impact the reactor vessel components and attached reactor coolant system piping and will impact nuclear fuel.

Presently SSES uses a Hydrogen Water Chemistry (HWC) system to mitigate intergranular stress corrosion cracking (IGSCC) in the reactor vessel. The new OLNC system will work in conjunction with the HWC system to improve the protection of the reactor vessel internals by assisting in the mitigation of IGSCC during HWC injection and during those periods when the HWC system is not in service. The initial OLNC application at each unit will be performed by GE-Hitachi (GEH) Technical Advisors and SSES personnel based on industry experience at over 30 other BWRs using Noble Chem and based on GEH procedure GEH-OLNC-001N6050-03 (SSES document FF62299 sheet 36), "On-Line NobleChem Application Procedure for Susquehanna Unit 2" and GEH procedure GEH-OLNC-001N6049-03 (SSES document FF62299 sheet 25), "On-Line NobleChem Application Procedure for Susquehanna Unit 1", which will be converted into SSES procedures prior to the initial applications. The applications will be performed with HWC flow expected to be reduced to less than 15 scfm (less than 0.28 ppm feedwater H_2) and with the zinc injection system at normal operation. The overall applications normally take 9-13 days with a maximum injections rate of 3.66 g/hr and the total mass of injected platinum will not exceed 866 g. In addition the application criteria ensure that the fuel cladding surface does not exceed the equivalent of 10μg/cm^2. Required changes to the HWC system to support the OLNC applications will be addressed by EC 1877090 (Unit 2) and EC 1877093 (Unit 1).

The overall OLNC system is a standard product purchased by SSES from GEH. GEH provided revision 1 of GEH document 002N3932 (SSES document FF62299 sheet 26), "On-Line NobleChem (OLNC) Applications Technical Safety Evaluation for Susquehanna Unit 1" and revision 1 of GEH document 002N3934 (SSES document FF62299 sheet 37), "On-Line NobleChem (OLNC) Application Technical Safety Evaluation for Susquehanna Unit 2" that provided the required information to support the evaluation for the noble metal application with OLNC. BWRVIP-62A Revision 1 addresses OLNC and is in the review process by the NRC.

Since OLNC application has not been approved by the NRC it cannot be credited for reducing the frequency or extent of vessel internal inspections. Until OLNC application is approved the by NRC, the reduction of HWC flow will require increased inspections due to the calculational methods used to determine frequency of inspections.

The installation of this new OLNC system will require addition to the FSAR similar to the manner in which the HWC system was previously added.

Summary:

Injecting noble metal compounds into the reactor vessel via the feedwater system and the process of injection such as OLNC does not affect the safe operation of the plant or the health and safety of the public. The OLNC equipment installation and the noble metal injection process also have been reviewed and it has been concluded that plant safety will not be compromised. OLNC application will be conducted during a period when the reactor is at high power and high core flow operating conditions. During such a period the reactor coolant system is in a high energy state as assumed in the applicable safety analysis in the FSAR. This evaluation has concluded that the frequency of occurrence or consequences of a loss of coolant accident (LOCA) will not increase. Because of the benefit of OLNC, which will reduce the potential of IGSCC, the frequency of occurrence of a LOCA will not increase after the noble metal injection. The frequency of occurrence of a postulated control rod drop accident (CRDA) or fuel handling accident (FHA) is not affected. OLNC does not affect the results of the accident radiological analyses. Therefore the frequency of occurrence and the consequences of accidents previously evaluated will not increase.

During the time period when OLNC application is conducted the conditions within the reactor coolant pressure boundary are such that no new scenario can be postulated that could result in fission product release. Therefore there is no possibility of an accident of a different type than any evaluated previously.

Because OLNC does not create any adverse equipment interaction, no new malfunction of any equipment important to safety can be postulated during OLNC application. After the noble metal application is completed the reactor vessel, reactor internals and some of the associated primary pressure boundary piping and equipment will potentially become better protected from IGSCC and thus potentially have reduced probabilities of failures and/or malfunctions.

Therefore it is concluded that OLNC does not affect any safety related equipment, the safe operation of the plant or the health and safety of the public.

Enclosure 2 to PLA-7542

Summary of Changes to Regulatory Commitments from September 1, 2014 - August 31, 2016

Commitment Change No: LDCN 5189

Description of Change:

In Attachment 2 to PLA-6866 dated June 11, 2012, Susquehanna Nuclear, LLC committed to "Purchase, install and maintain portable generators (recommend 3) for establishing 2 or 3 temporary portable battery charging stations and for re-energizing the installed plant radio system." The commitment date was December 31, 2012. This commitment was in response to a request for information related to insights from the Fukushima Dai-ichi Accident dated March 12, 2012.

As documented in Condition Report 2014-26752, the revision to the commitment was in response to a corrective action required for failure to meet the required commitment date, and as such, this revision to the commitment is to change the commitment date to the date when Susquehanna was in compliance with the requirement, June 4th, 2014.

Commitment Change No: 5076

Description of Change:

In Attachment 2 to PLA-6866 dated June 11, 2012, Susquehanna committed to perform more extensive review to ensure at least 24 hour usage of the following systems:

1. Plant radio battery back up

2. Plant phone system battery back up

3. Public address system (Gai Tronics)

4. NERO Pager Transmitter/Repeater located on site.

If battery backup power is less than 24 hours, perform necessary modifications to install appropriate batteries and battery charger/ conditioners and the ability to re-energize with portable generators by December 31, 2012. This commitment was in response to a request for information related to insights from the Fukushima Dai-ichi Accident dated March 12, 2012.

Following the commitment made in PLA-6866, Susquehanna provided a communications assessment in PLA-6927 dated October 31, 2012 and made commitments regarding satellite phones and completing modifications to provide FLEX power to the Site Radio System/ Plant PA System battery charger (24 hour backup power) by June 30, 2014. As a result, some parts of the original commitment could be considered to be superseded and changed by the PLA-6927 commitments. This commitment change is intended to document and justify the commitment changes in PLA-6927 as well as the parts of the original commitment not addressed in the PLA. CR-2014-26753 documents the change in Susquehanna's Corrective Action Program and ACT-1606574 tracked the original commitment and was closed on July 11, 2014 describing the actions taken to complete the required actions.

The additional requirements of the design modification process, completion of installed equipment, and associated procedures, instructions and other documents necessary to complete the work resulted in the needed extension to the due date. The commitment is now complete.

Commitment Change No: LDCN 5076

Description of Change:

In Attachment 2 to PLA-6866 dated June 11, 2012, Susquehanna committed to the following:

"Ensure the following actions are incorporated in procedures, communicated to NERO personnel and covered during annual NERO training. These commitments were included in the PPL response to RFI 9.3 90 day response to the NRC. (Reference AR 1562249)"

Request #3 – Identify how the augmented staff would be notified given degraded communications capabilities.

Response:

Current Communication capabilities to notify the Nuclear Emergency Response Organization (NERO) could be affected by large-scale disasters occurring within 25 miles of a site.

The onsite satellite phones can be used to activate an emergency mass notification system, communicate with Luzerne and Columbia to Activate sirens, and communicate with PEMA for activation of the Emergency Alert System to notify the NERO responders.

The station NERO response expectations will be revised to instruct NERO responders to report to their assigned emergency response facilities whenever they become aware of an area wide loss of grid.

The above expectations will be incorporated in procedures, communicated to NERO personnel and covered during annual NERO training."

The commitment date was December 31, 2012.

This commitment was in response to a request for information related to insights form the Fukushima Dai-ichi Accident dated March 12, 2012.

As documented in Condition Report 2014-26755, the revision to the commitment was in response to a corrective action for the failure to meet the required commitment date of December 12, 2012, and as such this revision to the commitment is to change the commitment date to the date when Susquehanna was in compliance with the requirement. The last action required to meet the commitment was the issuance of NDAP-QA-0777, Revision 15 that occurred on March 26, 2013, which is the commitment completion date.