July 11, 2005

Mr. Christopher M. Crane
President and CEO
AmerGen Energy Company, LLC
200 Exelon Way, KSA 3-E
Kennett Square, PA 19348

SUBJECT: OYSTER CREEK GENERATING STATION - NRC INSPECTION REPORT 05000219/2005006

Dear Mr. Crane:

On May 27, 2005, the U.S. Nuclear Regulatory Commission (NRC) completed an engineering team inspection at Oyster Creek Generating Station. The enclosed inspection report documents the inspection findings, which were discussed on May 27, 2005, with Mr. J. Randich and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the NRC identified three findings of very low safety significance (Green), two of which were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating the two violations as non-cited violations (NCVs). If you contest the NCVs in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001; with copies to the Regional Administrator Region I; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at Oyster Creek.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document

Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Lawrence T. Doerflein, Chief
Engineering Branch 2
Division of Reactor Safety

Docket No. 50-219
License No. DPR-16

Enclosure: Inspection Report 05000219/2005006
w/Attachment: Supplemental Information

cc w/encl:
Chief Operating Officer, AmerGen
Site Vice President, Oyster Creek Nuclear Generating Station, AmerGen
Plant Manager, Oyster Creek Generating Station, AmerGen
Regulatory Assurance Manager Oyster Creek, AmerGen
Senior Vice President - Nuclear Services, AmerGen
Vice President - Mid-Atlantic Operations, AmerGen
Vice President - Operations Support, AmerGen
Vice President - Licensing and Regulatory Affairs, AmerGen
Director Licensing, AmerGen
Manager Licensing - Oyster Creek, AmerGen
Vice President, General Counsel and Secretary, AmerGen
T. O'Neill, Associate General Counsel, Exelon Generation Company
J. Fewell, Assistant General Counsel, Exelon Nuclear
Correspondence Control Desk, AmerGen
J. Matthews, Esquire, Morgan, Lewis & Bockius LLP
Mayor of Lacey Township
J. Lipoti, Ph.D., Assistant Director of Radiation Programs, State of New Jersey
K. Tosch - Chief, Bureau of Nuclear Engineering, NJ Dept. of Environmental Protection
R. Shadis, New England Coalition Staff
N. Cohen, Coordinator - Unplug Salem Campaign
W. Costanzo, Technical Advisor - Jersey Shore Nuclear Watch
E. Gbur, Chairwoman - Jersey Shore Nuclear Watch
E. Zobian, Coordinator - Jersey Shore Anti Nuclear Alliance

Distribution w/encl: **(VIA E-MAIL)**
Region I Docket Room (with concurrences)
S. Collins, RA
A. Blough, DRS
R. Crlenjak, DRS
R. Bellamy, DRP
R. Summers, Senior Resident Inspector
J. Herrera, Resident Inspector
J. DeVries, Resident OA
S. Lee, RI OEDO
R. Laufer, NRR
P. Tam, PM, NRR
T. Colburn, NRR
ROPreports@nrc.gov

SISP Review Complete: *LTD*

DOCUMENT NAME: E:\Filenet\ML051920312.wpd
After declaring this document "An Official Agency Record" it **will** be released to the Public.
To receive a copy of this document, indicate in the box: "**C**" = Copy without attachment/enclosure "**E**" = Copy with attachment/enclosure "**N**" = No copy

OFFICE	RI/DRS		RI/DRP		RI/DRS		RI/DRS			
NAME	LLScholl***/LLS***		RRBellamy***/RRB***		WLSchmidt***/CGC for***		LTDoerflein***/LTD***			
DATE	07/05/05		07/08/05		07/07/05		07/11/05			

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.	50-219
License No.	DPR-16
Report No.	05000219/2005006
Licensee:	AmerGen Energy Company, LLC (AmerGen)
Facility:	Oyster Creek Generating Station
Location:	Forked River, New Jersey
Dates:	May 9, 2005 - May 27, 2005
Inspectors:	Larry Scholl, Senior Reactor Inspector Stephen Pindale, Senior Reactor Inspector Leonard Cheung, Senior Reactor Inspector Brice Bickett, Reactor Inspector Marlone Davis, Reactor Inspector James Krafty, Reactor Inspector Jeffrey Kulp, Reactor Inspector
Approved By:	Lawrence T. Doerflein, Chief Engineering Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000219/2005006; 05/09/05 - 05/27/05; Oyster Creek Generating Station; Safety System Design and Performance Capability.

The inspection was conducted by seven regional inspectors. The inspection identified three findings of very low safety significance (Green), two of which were also non-cited violations (NCV). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3 dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

- Green. The team identified a finding where the licensee was not performing spray nozzle and header inspections as specified in the Updated Final Safety Analysis Report (UFSAR).

  The team determined that this finding was greater than minor because it is associated with Design Control attribute of maintaining containment functionality under the Barrier Integrity cornerstone objective to provide reasonable assurance that the containment will protect the public from radio-nuclide releases caused by accidents or events. This finding is of very low safety significance because the finding did not result in the actual loss of the safety function of the containment spray system. (Section 1R21.1)

Cornerstone: Mitigating Systems and Barrier Integrity

- Green. The team identified a non-cited violation of 10 CFR 50, Appendix B, Criterion III, Design Control, where the licensee did not maintain the containment spray system's capability to close the pump suction valves from an accessible location during the post-accident phase of a postulated accident. The controlling modification also introduced an unexpected suction valve operational anomaly and did not adequately test the completed modification.

  This finding is greater than minor because it is associated with the Design Control attribute of the Mitigating Systems cornerstone, and affected the cornerstone's objective of providing containment spray and core spray system availability, reliability and capability to respond to a large break loss of coolant initiating event. Also, the finding is associated with the System and Barrier Performance attribute of the Barrier Integrity cornerstone (containment functionality aspect) and affected the cornerstone's objective of providing reasonable assurance that the containment will protect the public from radio nuclide releases caused by accidents or events. This finding was determined to

be of very low safety significance based on the low frequence of a large loss of coolant accident concurrent with a passive failure of piping. (Section 1R21.2)

Cornerstone: Mitigating Systems

- Severity Level IV. The inspectors identified a Severity Level IV non-cited violation of 10 CFR 50.59 Changes, Tests, and Experiments, requirements for the failure to perform an adequate safety evaluation of a change to the facility. Specifically, the safety evaluation did not evaluate the potential for a new type of malfunction of an installed liner associated with the 30-inch overboard discharge line on the emergency service water (ESW) system.

  This finding was addressed using traditional enforcement since it potentially impacts or impedes the regulatory process in that a required 10 CFR 50.59 evaluation was not adequate. This is contrary to the regulatory process that allows licensees to make changes without a license amendment provided that licensees comply with 10 CFR 50.59 process. The finding is more than minor because there was a reasonable likelihood that the change could have required Commission review and approval prior to implementation. However, the finding has been evaluated as very low safety significance (Green) because the liner was subsequently determined to have not have introduced a new malfunction that would impact on the ESW system. (Section 1R21.3)

B. Licensee-Identified Violations

None

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R21 Safety System Design and Performance Capability (IP 71111.21)

a. Inspection Scope

In selecting systems and components for review, the team focused on risk significance and considered the risk information contained in the licensee's Probabilistic Risk Assessment (PRA) and the U.S. Nuclear Regulatory Commission's (NRC) Simplified Plant Analysis Risk (SPAR) models. Using risk insights, the team selected the Emergency Service Water (ESW) and Containment Spray (CS) systems and their respective components for review. The ESW system provides cooling for the CS heat exchangers, and together, the systems perform the torus cooling, post-accident containment heat removal and long-term decay heat removal functions. In selecting the components for review, the team also considered the maintenance and modification history as well as operating experience.

The team reviewed design and licensing basis documents for the systems to understand CS and ESW system needs, safety functions and regulatory requirements. The documents reviewed included the applicable technical specifications (TS), updated final safety analysis report (UFSAR) and design basis documents (DBD). Selected mechanical, heat transfer, hydraulic, and electrical calculations and analyses were reviewed to verify the appropriate input assumptions were used, and that the results were appropriately applied to the current system and plant configuration. The team's inspection activities were focused on verifying that the design bases were being correctly implemented for the selected systems and components to ensure that the systems can be relied upon to meet their design basis functional requirements during normal, abnormal, and accident conditions.

The team reviewed the piping and instrumentation drawings, electrical drawings and other supporting documents and conducted plant walkdowns of the accessible portions of CS and ESW systems to verify the physical installation was consistent with the design basis. In addition, during these walkdowns, the team evaluated the material condition of the plant to determine if the licensee was adequately identifying and correcting material equipment problems. The team also toured the main control room, performed control board checks and discussed CS and ESW system design and operation with the licensed operators. The team also observed operation of the system in the control room simulator during operator training.

In addition, the team interviewed cognizant system engineers and design engineers regarding the system design, operation, and performance. The team reviewed control diagrams, setpoint calculations, calibration procedures and surveillance tests to verify the capability of both CS and ESW instrumentation and controls to respond to design

basis transient and accident conditions. The team reviewed a selected sample of system operating procedures, off-normal operating procedures, and valve line-up lists to determine that they adequately controlled the plant configuration and supported operator actions assumed in the design basis.

The risk significant components selected for detailed review by the team included the CS and ESW pumps, the CS pump suction and spray header motor operated isolation valves, the associated pump and valve electrical controls, and the CS heat exchangers. The team reviewed a sample of completed pump periodic surveillance test procedures to ensure the tests demonstrated the required component functions, and that the acceptance criteria were consistent with the design basis assumptions and the pump performance curves. The team also reviewed inservice testing (IST) results to verify that acceptance criteria were met or that any discrepancies for the tested components were appropriately dispositioned.

The team also reviewed a selected sample of procedures, test and maintenance records and the licensee's commitments relative to the CS system motor operated valves. The review was done to assess the implementation of the licensee's program for periodic testing of motor-operated valves and for implementing NRC Generic Letter (GL) 96-05, "Periodic Verification of Design-Basis Capability of Safety-Related Power-Operated Valves."

Relative to potential system and component degradation, the team conducted interviews with Oyster Creek inservice inspection (ISI) and design engineering personnel, and reviewed design specifications and plant design change documents regarding the material selection processes used for the CS and ESW pumps, pipe materials and coatings. The team verified the structural integrity of these components through the review of design calculations, problem reports and corrective actions, field revision notices, and test results.

A list of documents reviewed is included in the attachment to this report.

b. Findings

1. Failure to Inspect Containment Spray Header Nozzles

Introduction. A finding was identified for the failure of the licensee to perform inspections on the containment spray headers and nozzles to ensure potential blockages did not exist.

Description. The team identified that Oyster Creek's UFSAR, Section 6.2.2.4, was revised circa 1997 to state that a percentage of the spray nozzles and portions of the internal spray headers are visually inspected to ensure that potential blockages do not exist.

The containment spray system consists of two loops that provide flow to four drywell spray headers (two per loop) and a common torus spray header. All of the spray

headers are made of carbon steel and are therefore susceptible to degradation caused by corrosion. These spray headers are normally dry and inerted with nitrogen during operation. However, Oyster Creek has had significant outage periods with the system exposed to an open air environment; and the system has been wetted previously (twice) due to inadvertent containment spray initiations. In addition, during surveillance testing the containment spray system is pressurized with water up to the drywell and torus spray header inlet isolation valves, which provides a potential for moisture intrusion due to valve seat leakage. The inspections would verify system integrity and assess potential corrosion degradation and nozzle blockage concerns. Periodic containment spray air tests are also performed to confirm nozzles are not blocked. However, since it is a low volume air test, the test alone may not ensure that, when subjected to high volume water flow, corrosion products would not block nozzles.

The inspectors also noted that in November 2000, two blocked nozzles on the torus spray header were identified during the periodic air test. The licensee initially identified the need to remove the nozzles, clean, and inspect portions of the nozzles and associated piping. However, the licensee subsequently performed a safety evaluation that allowed the proposed corrective actions for the plugged nozzles to be deferred until the 2002 outage. During the 2002 outage the torus spray header was flushed to clear the blocked nozzles. However, the team noted that in reviewing this event, AmerGen missed an opportunity to identify and resolve the failure to perform the inspections discussed in the UFSAR. During the inspection AmerGen initiated a work order to perform the specified inspection of the system headers and nozzles during the next refueling outage.

Analysis. The team determined that the performance deficiency was the failure to perform inspections on the containment spray system to prevent spray nozzle blockage. The team determined that this finding was greater than minor because it is associated with design control attribute of maintaining containment functionality under the Barrier Integrity cornerstone objective to provide reasonable assurance that the containment will protect the public from radio-nuclide releases caused by accidents or events.

This finding was assessed in accordance with NRC Manual Chapter 0609, Appendix A, Attachment 1, "Significance Determination Process (SDP) for Reactor Inspection Findings for At-Power Situations," and was determined to be of very low safety significance (Green) since the failure to perform the inspections did not result in an actual adverse effect on the containment spray system performance. Therefore, this issue screened out of the Phase 1 SDP as a Green finding.

Enforcement. The failure to perform the header and nozzle inspections was associated with testing and inspection activities discussed in the UFSAR. No violations of NRC requirements were identified. The licensee entered the performance deficiency into the correction action program (CAP 2005-2178). **(FIN 05000219/2005006-01, Failure to Perform Containment Spray System Header Nozzle Inspections)**

2. Inadequate Design Control Associated with Containment Spray Suction Valves

Introduction. The team identified a finding of very low safety significance (Green) associated with the inadequate design and implementation of a modification that removed the auto-start feature of the containment spray system. The issue was determined to be a non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, Design Control.

Description. The team identified that the capability to shut the containment spray pump suction valves from an accessible location during post accident conditions was inadvertently eliminated during a modification to the containment spray system implemented in 1993.

The design feature to have the capability to shut the suction valves from an accessible location for leak isolation purposes was identified in an NRC safety evaluation contained in the Integrated Plant Safety Assessment/Systematic Evaluation Program (SEP) Final Report (NUREG 0822) dated January 1983. The licensee subsequently verified that the valves could be shut from the 460V switchgear room, an accessible location during post-accident conditions (including fuel failure scenarios) in 1986. In July 1988, Supplement 1 to NUREG 0822 documented that the procedures and operating location specified by the licensee were adequate to support this function.

In 1991, a design modification to remove the pump auto-start feature from the containment spray system was developed and approved. In their review of the modification documentation, the team noted that none of the documents referred to or discussed the need to be able to operate the suction valves from an accessible location post-accident. The modification changed the control circuit for the containment spray pump suction valves by eliminating some relays in the control circuit. The relays were physically located in the 460V switchgear room and, following the modification, the capability to operate the suction valves from the 460V switchgear room was eliminated. The system modification was implemented in 1993. The post-modification configuration permitted remote operation of the suction valves from either the associated reactor building corner room (local electric or manual operation) or from the associated motor control center (MCC), located in the reactor building, 23' elevation. Valve operation at the associated MCC can be accomplished only by lifting leads and installing jumpers, an action specified by station procedures. However, both of these locations are inaccessible in post-accident conditions for postulated accidents that result in fuel damage. The suction valves cannot be operated from the control room.

During further review of the modification and interviews with station personnel, the team identified that the suction valve circuit was modified such that the valve would not remain closed when operated by the local switch or the manual operator on the valve. The circuit had been inadvertently modified such that the valve automatically reopened upon reaching the closed position, an unintended result of the 1993 control circuit wiring change. The team also found that the modification test plan was inadequate in that it did not test the operation of the suction valve and therefore did not identify the suction valve wiring design discrepancy.

Analysis. The performance deficiency was a failure to ensure that the containment spray pump suction valves could be closed from an accessible location following a large break loss of coolant accident (LLOCA). The valve control circuit design change did not consider and maintain the SEP (NUREG 0822) design feature to provide the capability to shut the suction valves from an accessible location for leak isolation purposes. Specifically, while a procedure existed to close these valves in the event of identified leakage (by lifting leads and installing jumpers from the MCC), the radiological conditions that may exist following some LLOCAs would not permit access to the specific MCCs.

The issue was more than minor because it is associated with the Equipment Performance attribute of the Mitigating Systems cornerstone, and affected the cornerstone's objective of providing containment spray and core spray system availability, reliability and capability to respond to a large break loss of coolant initiating event. Also, the issue is associated with the System and Barrier Performance attribute of the Barrier Integrity cornerstone (containment functionality aspect) and affected the cornerstone's objective of providing reasonable assurance that the containment will protect the public from radio nuclide releases caused by accidents or events. Specifically, the containment spray system acts to control containment pressure and as a barrier to a radiological release to the secondary containment in the event of an LLOCA.

The Senior Risk Analyst (SRA) determined the issue to be of very low safety significance (Green) using a modified Phase 2 risk analysis in accordance with the Significance Determination Process (SDP). A Phase 2 risk analysis was needed because the issue degraded both the Mitigating Systems and the Barrier Integrity cornerstones. The risk analysis used the Oyster Creek Risk Informed Inspection Notebook, Revision 1, Table 3.4 for an LLOCA. The very low safety significance was based on the extremely low frequency (in the range of E-9 per year) of an LLOCA with an independent, concurrent (within a 24-hour period), passive failure of the approximately 300 feet of susceptible piping downstream of the four containment spray suction valves.

Enforcement. 10 CFR 50 Appendix B, Criterion III, Design Control, requires that measures be established to assure that applicable regulatory requirements and the design basis for structures, systems and components are correctly translated into specifications, drawings, procedures and instructions. Contrary to the above, during the implementation of a modification to remove the auto-start feature from the containment spray system, the licensee did not maintain the system's capability to operate the containment spray pump suction valves from an accessible location during the post-accident phase. The modification also introduced an unexpected valve operational feature in that the valve would automatically reopen upon its manual closure. Since this finding is of very low safety significance (Green) and has been entered into the licensee's corrective action program (CAP 02005-2230), this violation is being treated as a non cited violation (NCV), consistent with Section VI.A of the NRC Enforcement

Policy. **(NCV 05000219/2005006-02, Inadequate Design Control Associated with Containment Spray Suction Valves)**

3. Inadequate 10 CFR 50.59 Evaluation for Overboard Piping

Introduction. The team identified a Severity Level IV violation of 10 CFR 50.59 where the licensee did not perform an adequate safety evaluation of a change to the facility. Specifically, the licensee's safety evaluation did not assess the potential for the introduction of a new malfunction of a cured in place pipe (CIPP) liner in the 30-inch overboard discharge line on the emergency service water (ESW) system. The issue was determined to be a non-cited violation (NCV) of 10 CFR 50.59, Changes, Tests, and Experiments.

Description. The licensee installed a CIPP liner in the 30-inch overboard discharge line in accordance with modification No. OC-MD-H496-003, Rev. 2, and the associated safety evaluation, which was approved on November 30, 2000. The 30-inch overboard discharge line is not a safety-related component; however, a failure of this line could impact the ESW safety system, which discharges directly into it. The team noted that the safety evaluation for the modification package stated that there were no new components added by the modification and therefore concluded that there was no possibility of a malfunction of a different type than evaluated previously in the Safety Analysis Report. However, the team concluded new components, of a different material (the liner), had been added and questioned whether there was a possibility of a liner failure that could impact the ESW system. The licensee subsequently performed a failure modes and effects analysis on the overboard line with the installed CIPP liner; and concluded that the modification did not introduce any new malfunctions. The team determined that, while the results of the revised evaluation did not indicate the need for prior NRC approval, the original safety evaluation was inadequate.

Analysis. The team determined that the performance deficiency was that the licensee did not perform an adequate safety evaluation to assess possible malfunctions and evaluate the potential consequences of a failure of the 30-inch overboard discharge liner on the ESW system as required by 10 CFR 50.59. This finding was addressed using traditional enforcement since it potentially impacts or impedes the regulatory process in that a required 10 CFR 50.59 evaluation was not adequately performed. In accordance with Supplement 1 of the NRC Enforcement Policy the finding is more than minor because there is a reasonable likelihood that the change could have required Commission review and approval prior to implementation. However, the finding has been evaluated as very low safety significance (Green) because a subsequent detailed failure modes and effects' analysis determined that no new possible malfunction had been introduced by the modification.

Enforcement. 10 CFR 50.59 defines changes to the facility that require detailed evaluations to determine whether the changes can be implemented without obtaining prior NRC approval. Contrary to the above, the licensee implemented a change to the facility that required a detailed evaluation without performing a 10 CFR 50.59 analysis

that addressed all of the criteria in the regulation. Specifically, on November 30, 2000, the licensee evaluated a change to the facility as described in the UFSAR without a determination that the liner modification did not create the possibility of a malfunction of a structure, system or component important to safety with a different result than any previously evaluated in the UFSAR. Because the failure to provide adequate written evaluation of the impact of a liner malfunction on the ESW system is of very low safety significance and has been entered into the licensees corrective action program (CAP 02005-2230), this violation is being treated as a non-cited violation (NCV), consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000219/2005006-03, Failure to Perform an Adequate 10 CFR 50.59 Analysis)**

4. OTHER ACTIVITIES (OA)

4OA2 Problem Identification and Resolution

a. Inspection Scope

The team assessed whether AmerGen personnel were identifying issues at the proper threshold and entering them in the corrective action program by reviewing a sample of condition reports associated with the CS and ESW systems. The team's selection of items to review focused on design related issues which may have an effect on the design bases capabilities of the selected systems. In addition, the team reviewed a sample of condition report operability determinations and condition report follow-up actions to verify that problems were identified, documented, and effectively resolved.

The team also reviewed the results of the licensee's focused area self-assessment of the CS and ESW systems that was performed in March and April of 2005.

b. Findings

No findings of significance were identified.

4OA6 Meetings, including Exit

Exit Meeting Summary

On May 27, 2005, the team presented the inspection results to Mr. J. Randich and other members of the Oyster Creek staff. The licensee acknowledged the findings presented. An update to the inspection results were presented to Mr. D. Barnes by telephone on July 8, 2005. The team verified that the inspection report does not contain proprietary information.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Barnes, Engineering
T. Carroll, MOV Coordinator
P. Cervenka, Operations
D. Fawcett, Licensing Engineer
M. Godknecht, Risk Analyst
J. Kandasamy, Manager, Regulatory Assurance
J. Magee, Director, Engineering
J. O'Rourke, Assistant Engineering Director
P. Procacci, Engineering
J. Randich, Plant Manager
H. Ray, Engineering
S. Schwartz, System Manager
P. Tamburro, Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000219/2005006-01	FIN	Failure to Perform Containment Spray System Header Nozzle Inspections
05000219/2005006-02	NCV	Inadequate Design Control Associated with Containment Spray Suction Valves
05000219/2005006-03	NCV	Failure to Perform an Adequate 10 CFR 50.59 Analysis (ESW Overboard)

LIST OF DOCUMENTS REVIEWED

Calculations/Analysis/ECR

EXOC005-CALC-001, Suction Strainer Effects on Core Spray Pump NPSH, Rev. 0
EXOC005-CALC-002, System Acceptance Criteria for Containment Spray and ESW Flow Rates, Rev. 0
C-1302-241-E540-096, OCNGS Containment Spray/Emergency Service Water System Pressure Profile, Rev 1
C-1302-732-5350-005, Class IE Solid State Trip Device Setting for 480V USS Circuit Breakers, Rev. 5
C-1302-730-5350-004, Generic Letter 89-10 MOVs Degraded Grid Voltage Calculation, Rev. 8
C-1302-700-5350-004, OCNGS Electrical Model for Short Circuit and Voltage Drop Analyses, Revision 8
C-1302-241-5450-039, Containment Response to a DBA LOCA with 3200 gpm Containment Spray and 3000 gpm ESW Flows, Rev. 1
C-1302-741-5350-001, Loading of Emergency Diesel Generators and Unit Substations, Revision 7
C-1302-243-5450-044, OC DBA LOCA Containment Response with Reduced Containment Spray Heat Exchanger Area, Rev. 0
C-1302-241-E610-082, Containment Accident Response to the Removal of Automatic Spray Logic, Rev. 0
C-1302-241-E540-103, OC NSR Piping Analysis, Containment Spray System Inner and Outer Rings, Rev. 1
C-1302-240-5450-004, Evaluation of Peak Drywell Pressure for TRACG and RELAP5 Blowdowns, Rev. 2
C-1302-241-5450-073, Acceptable Containment Spray Heat Exchanger Fouling Resistance, Rev. 0
C-1302-241-E120-085, Containment Spray System Heat Exchanger Performance Evaluation, Rev. 1
C-1302-226-E620-379, OC Decay Heat Power with Uncertainty, Rev. 0
C-1302-241-5360-004, Containment Spray/ESW System Performance, Rev. 0
C-1302-241-5360-006, Containment Spray System Pressure Profile, Rev. 1
C-1302-241-5450-012, Suppression Chamber Spray Initiation, Rev. 3
C-1302-241-5450-044, Containment Spray System Flow Scenarios, Rev. 0
C-1302-241-5450-069, Core and Containment Spray Suction Header Flow Distribution, Rev. 1
C-1302-241-E120-086, Significance of Suppression Chamber Spray Nozzle Blockage, Rev. 0
C-1302-241-E120-109, Containment Spray Heat Exchanger Performance Evaluation, Rev. 0
C-1302-241-E320-095, Containment Spray Flow Loop Error (FT-IP0003A/B), Rev. 0
C-1302-241-E610-074, Core Spray NPSH Assessment, Rev. 2
C-1302-241-E610-080, Calculation of Torus Pool Temperature an NPSH Input, Rev. 2
C-1302-241-E610-108, BWROG EPGs/SAGs, Minimum Drywell Spray Flow, Rev. 0
C-1302-532-5310-026, Emergency Service Water RO Modification, Rev. 0
C-1302-532-5310-028, Evaluation of Loss of ESW Heat Tracing, Rev. 1
C-1302-532-5310-031, OC ESW Pump Available NPSH, Rev. 1

C-1302-700-5350-003, OC-4160V Class IE Protective Device Relay Set Points, Rev. 5
C-1302-731-E320-017, 4160V Degraded Voltage Setpoint Uncertainty
C-1302-731-E510-015, OC Degraded Grid Voltage Relay Setpoint Evaluation Study, Rev. 3
C-1302-732-E510-048, Circuit Breaker Coordination Curves, Rev. 0
C-1302-900-E540-013, MOV Delta P and Basis, GL89-10, Rev. 2
C-1302-900-E610-026, BWROG EPGs/SAGs, Appendix C Plant Specific Inputs, Rev. 0
CC-AA–309-1001, 4160V Class IE Protective Device Relay Set Points

Procedures

607.4.005, CS/ESW Pump System 2 Operability and Comprehensive / Preservice / Post-Maintenance Inservice Test, Rev. 50
607.4.004, CS/ESW System 1 Pump Operability and Comprehensive / Preservice / Post-Maintenance Inservice Test, Rev. 56
607.4.009, Containment Spray System 1 and System 2 Inservice Test Valve Position Check, 11/19/04
607.4.016, Containment Spray and Emergency Service Water System 1 Pump Operability and Quarterly Inservice Test, Rev. 4
2000-GLN-3200.01, Plant Specific Technical Guidelines for the Symptom Based Emergency Operating Procedures, Rev. 8
ER-AA-302-1001, MOV Rising Stem Motor Operated Valve Thrust and Torque Sizing and Set-up window determination Methodology, Rev. 3
2000-OPS-3024.05, Containment Spray System - Diagnostic and Restoration Actions, Rev. 13
2400-SME-3780.06, Dielectric Testing for 2.3kV and 5kV Cables and Equipment
2400-SME-3915.03, ESW 4160V Breakers Preventive Maintenance, Rev. 8
2400-SME-3915.08, CS 480V Pump Breakers Preventive Maintenance, Rev. 15
607.3.002, Containment Spray Component Calibration, Rev. 56
607.4.007, CS/ESW System 1 Pump Operability Test, Rev. 18
607.4.008, CS/ESW System 2 Pump Operability Test, Rev. 17
607.4.017, CS/ESW Pump System 2 Operability / Quarterly Inservice Test, Rev. 5
632.2.001, Normal Emergency Interlock Test, Rev. 21
665.4.010, Containment Spray Leak Reduction Procedure, Rev. 16
ABN-32, Abnormal Intake Level, Rev. 3
EMG-3200.02, Primary Containment Control EOP Flowchart, Rev. 5
EMG-3200.02, Primary Containment Control, Rev. 17
EMG-3200.11/12, Secondary Containment and Radioactivity Release Control EOP Flowchart
ER-AA-300-1001, MOV Program Performance Indicators, Rev. 2
RAP-B1a, Drywell Pressure Lo, Rev. 0
RAP-B2a, System 1 Flow Lo, Rev. 0
RAP-B3a, Control Power 1 Lost, Rev. 0
RAP-B5a, Tube / Shell ΔP (differential pressure) Lo 1, Rev. 0
RAP-B6a, ESW Pump A Trouble, Rev. 0
RAP-B7a, ESW Pump B Trouble, Rev. 0
RAP-B8a, Recirc Fan 10 Trip, Rev. 0
RAP-NSSS, NSSS Annunciator Response Procedure, Rev. 1
Special 02-002, Common Torus Spray Header Flush, Rev. 0

Corrective Action Reports

A0702634	O2003-1252	O2004-0718	O2004-2818	O2004-3988
A0703677	O2003-1346	O2004-0876	O2004-3052	O2005-0054
A0703678	O2003-1357	O2004-0893	O2004-3098	O2005-0094
A0705413	O2003-1420	O2004-0894	O2004-3469	O2005-0253
A2113833	O2003-1445	O2004-0915	O2004-3471	O2005-0359
O1999-0534	O2003-1448	O2004-1001	O2004-3525	O2005-0714
O2000-0861	O2003-1468	O2004-1079	O2004-3563	O2005-1248
O2000-1162	O2003-2341	O2004-1111	O2004-3583	O2005-1318
O2000-1164	O2003-2399	O2004-1148	O2004-3614	O2005-1495
O2000-1788	O2003-2407	O2004-1175	O2004-3632	O2005-1501
O2001-0044	O2003-2591	O2004-1183	O2004-3651	O2005-1514
O2001-0190	O2004-0012	O2004-1267	O2004-3663	O2005-1742
O2001-1888	O2004-0044	O2004-1271	O2004-3793	O2005-1892
O2001-3939	O2004-0084	O2004-1318	O2004-3850	O2005-1893
O2002-1363	O2004-0105	O2004-1545	O2004-3857	O2005-2052
O2002-1687	O2004-0110	O2004-1749	O2004-3876	O2005-2171
O2003-0201	O2004-0379	O2004-1769	O2004-3880	O2005-2249
O2003-0317	O2004-0395	O2004-1777	O2004-3912	O2005-2263
O2003-0679	O2004-0575	O2004-2216	O2004-3943	O2005-2280
O2003-1131	O2004-0578	O2004-2237	O2004-3945	O2005-2281
O2003-1178	O2004-0713	O2004-2430	O2004-3947	

Drawings

BR 2192, Composite Yard Piping Key Plan, Rev. 12
4018-3 - Exhaust Tunnel and Fan Foundation Miscellaneous Sections and Details
79847-001, Mechanical Rehabilitation 30" SW Overboard Line, Rev. 0
148F740, Containment Spray System Flow Diagram, Rev. 43
BR 2005, Emergency Water System Flow Diagram, Rev. 75
GE 237E901, Sh 1 & 2, Containment Spray Logic Electrical Elementary Diagram, Systems 1 & 2
GE 116B8328, Sh 11, Containment Spray System Electrical Elementary Diagram, Containment Spray Pumps
GE 223R0173, Sheet 16, Emergency Service Water Pump Electrical Elementary Diagram
GE 157B6350, Containment Spray Valves and Pump Suction Valves Elementary Diagrams
BR 3002, 480V System One Line Diagram
BR 3004, Reactor Building 460V MCC One Line Diagram
GE 148F912, Process Instrumentation
BR 2162, Vacuum Relief Piping Plans & Sections - Suppression Chamber Reactor Building, Rev. 5

Miscellaneous

Oyster Creek Inservice Testing Program Bases Document, Containment Spray System, Volume 17 of 28, Rev. 0
Oyster Creek Inservice Testing Program Bases Document, Emergency Service Water System, Volume 5 of 28, Rev. 0
NUREG 0822 Supplement 1, Integrated Plant Safety Assessment, Systematic Evaluation Program, Oyster Creek Nuclear Generating Station, July 1988
TDR 993, Evaluation of Containment Spray/ESW Performance at Elevated Intake Temperature, Rev. 1
125 File No. 0399-00, Oyster Creek Engineering Tasking and Technical Evaluations - Torus Nozzle Blockage, Rev. 21
SE 315403-015, 50.59 Evaluation: DBA LOCA Response With Intake Temperature of 95 F, Rev. 0
Report # 2003-006-001, Containment Spray Heat Exchanger System 2 Eddy Current Inspection, April 2003
LER 05000219/85-17, Drywell Bulk Temperature Exceeds Limit
Letter from Dennis Crutchfield (USNRC) to Mr. P. B. Fiedler (OC), Appendix J to 10CFR Part 50, dated Mar 4, 1982
Letter from Ivan R. Finfrock to USNRC (NRR), Request for Parial Exemption from the Requirements of 10CFR50 Appendix J, Nov. 22, 1978
OC-02-00926-000, Evaluate Containment Spray / Emergency Service Water IST Acceptance Criteria
Letter from T. E. Bloom to R. A. Huggins, Oyster Creek #1 Containment Spray System Valves, Feb. 28, 1969
Oyster Creek NRC Communication Form Number 24. Greasing of Containment Spray Pumps, May 11, 2005
Generic Letter (GL) 89-10, Safety-Related Motor-Operated Valve Testing and Surveillance, June 28, 1989
Generic Letter (GL) 96-05, Periodic Verification of Design-Basis Capability of Safety-Related Power Operated Valves, September 18, 1996
Generic Letter (GL) 97-04, Assurance of Sufficient Net Positive Suction Head for Emergency Core Cooling and Containment Heat Removal Pumps, October 7, 1997
Regulatory Guide (RG) 1.82, Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident, Rev. 3
LS-AA-125-1002, Common Cause Assessment for failure of 125VDC control room indicating lamps and sockets, Rev. 3
NUREG 0822, Integrated Plant Safety Assessment, Systematic Evaluation Program, Oyster
21A5410, GE Containment Spray System Pump Specification, April 30, 1965
Containment Spray Pumps - Quarterly Surveillance Test Results (Graphs), May 2005
Containment Spray Heat Exchanger Specification Sheet, October 1977
ECR 02-00926, Evaluate CS/ESW Inservice Test Acceptance Criteria, 9/23/02
ESW Pumps - Quarterly Surveillance Test Results (Graphs), May 2005
LER 05000260/88-003, Rust Found in Lower Containment Spray Header
LER 05000206/88-021, Containment Fire Protection Spray Inoperable Due to Plugged Nozzles

Modification OC-MD-G979-001, ESW System 1 Pipe Vent, 5/11/98
Non-licensed Operator Tour Sheets, Reactor Building and Outside Tours
OC-01-01171-000, Containment Spray pump(s) 1-1 & 1-2 Replacement
OC-2002-07, MOV Program Performance Indicators, Rev. 2
Oyster Creek PRA, Appendix E - Detailed Human Reliability Analysis, 2001 Update
Oyster Creek PRA, Appendix F.25, Systems Analysis Notebook - Containment Vent, 2001
SE 315403-018, Safety Significance of Torus Spray Nozzle Blockage, Rev. 1
SWSOPI - Emergency Service Water System Operational Performance Inspection, 1995
System Analysis Notebook, CS/ESW (Oyster Creek PRA Appendix F.11), 2001 Update
Topical Report 140, Emergency Service Water and Service Water System Piping Plan, Rev. 2
Creek Nuclear Generating Station, Final Report, January 1983
SDBD-OC-241, System Design Basis Document for Containment Spray System.
SDBD-OC-532, System Design Basis Document for Emergency Service Water System.
OC-MD-H496-003, Rehabilitation of the 30-Inch Overboard Discharge Line Configuration
347-95, Configuration Change Removal from Service of Iso. Cond. Vent & ESW RMS
513-89, Evaluate Lift Setting for Byron Jackson Supplied ESW Pumps
0183-00, Rebaseline ESW Pump 52A Following Replacement
0065-01, Rebaseline IST Limits Following Pump 52D Replacement
S-2299-43, Emergency Service Water Pumps, Burns and Roe, Inc., August 1965
Amendment 32, Response to AEC Letter of January 9, 1968

Safety Evaluation

SE 000241-001, Containment Spray Heat Exchanger Tube/Shell Pressure Differential
SE-000531-037, Rehabilitation of the 30-Inch Overboard Discharge Line, Rev. 3
SE-000661-017, Removal of Isolation Condenser Vent Read & CS/ESW System Heat Exchanger Monitoring System

Work Orders

R2037313, Intake Level Instrument Calibration
R2059388, Cont Spray/ESW Sys I - Comprehensive Test
R2012504, ESW/SW Instrument Calibrations and Flushings
A0702634, CS Pump 1-1 and 1-2 coupling inspection and bearing greasing, Apr. 8, 2003
A2112061, Motor for ESW Pump 52A conduit deteriorated. April 1, 2005
A2099214, SWS to Containment Spray Heat Exchanger Inspection, October 18, 2004
A2077504, Motor for ESW Pump 52D Megger Test.,08December 8, 2003
WO-R2063956, CS/ESW System 1 Quarterly Surveillance, April 18, 2005
WO-R2058994, CS/ESW System 2 Quarterly Surveillance, January 16, 2005
WO-R2047404, CS/ESW System 1 Quarterly Surveillance, January 19, 2005
WO-R0802637, CS Pump 1-3 and 1-4 Coupling Inspection, May 11, 2003
R2027026, Normal Emergency Interlock Test, Nov. 17, 2004
R2015048, Emergency Service Water System I Annubar Flow Calibration, Jan. 20, 2005
R0803675, Containment Spray System 1 Flow and HX DP Loop Calibration, June 29, 2001
R0808678, Containment Spray System 2 Flow and HX DP Loops Calibration, Aug. 7, 2001
R2055088, Containment Spray Systems I & II Component Calibrations, May 15, 2002

R2038954, Containment Spray System Component Calibration, April 24, 2004
R2016395, Emergency Service Water System II Annubar Flow Instrument Calibration, April 14, 2004
R0800479, 4160V ESW Pump Switchgear Breaker Inspection and Cleaning, June 29, 2001
R0800612, 480V Containment Spray Pump Switchgear Breaker Inspection, Cleaning, Testing, June 29, 2001
M2036944, Containment Spray System Flow Transmitter (FT-IP0003A) Calibration
C2009144, Test and Install New Relay for ESW System, November 18, 2004

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
AmerGen	AmerGen Energy Company, LLC
AR	Action Request
CAP	Corrective Action Process
CFR	Code of Federal Regulations
CS	Containment Spray
DBD	Design Basis Document
ESW	Emergency Service Water
IMC	Inspection Manual Chapter
LLOCA	Large Break Loss of Coolant Accident
MCC	Motor Control Center
NCV	Non-Cited Violation
NRC	Nuclear Regulatory Commission
PI&R	Problem Identification & Resolution
PRA	Probabilistic Risk Assessment
SDP	Significance Determination Process
SEP	Systematic Evaluation Program
SPAR	Simplified Plant Analysis Risk
SRA	Senior Risk Analyst
SSC	Systems, Structures and Components
ST	Surveillance Test
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order