

October 24, 2012

Mr. Joseph L. Ernst, Senior Vice President Quality  
Shaw Modular Solutions  
Shaw Fabrication & Manufacturing Group  
3191 West Lincoln Road  
Lake Charles, LA 70605

SUBJECT: NRC INSPECTION REPORT NO. 99901401/2012-201 AND NOTICE OF  
NONCONFORMANCE

Dear Mr. Ernst:

During September 10–14, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an unannounced inspection at the Shaw Modular Solutions facility (SMS) in Lake Charles, LA. The purpose of the technically-focused limited-scope inspection was to assess SMS's compliance with the provisions of selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities."

This inspection evaluated SMS's implementation of quality activities associated with the fabrication of structural modules for V.C. Summer Units 2 and 3 and Vogtle Units 3 and 4. The inspectors reviewed selected procedures and records, observed fabrication activities, and interviewed personnel. The enclosed report presents the results of this inspection. This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or 10 CFR Part 21, "Reporting of Defects and Noncompliance," programs.

During this inspection, the inspectors found that the implementation of your QA program did not to meet certain NRC requirements imposed on you by your customers or NRC licensees. Specifically, SMS failed to promptly correct conditions adverse to quality and significant conditions adverse to quality, failed to effectively implement a corrective action regarding documentation of late entries in a quality records procedure, failed to preclude recurrence of significant conditions adverse to quality related to identification and control of items, and failed to perform adequate corrective actions associated with a nonconformance identified during a previous NRC inspection. The specific findings associated with the effectiveness of your corrective action program and references to the pertinent requirements are identified in the enclosures to this letter.

Please provide a written explanation or statement within 30 days of this letter in accordance with the instructions specified in the enclosed Notice of Nonconformance. The NRC will consider extending the response time if you show good cause to do so.

The inspectors determined that overall, the manufacturing activities performed in support of the structural modules for V.C. Summer Units 2 and 3 and Vogtle Units 3 and 4 were conducted in accordance with the Commission's rules and regulations and the technical and quality

requirements passed down from your customers or NRC licensees. The inspectors determined that, with the exception of the cited nonconformance, your programs for implementing the requirements of Appendix B to 10 CFR Part 50 for nonconforming materials, parts, or components; inspection; control of manufacturing activities; traceability; and personnel training generally met the applicable regulations.

However, the inspectors observed several issues related to SMS's implementation of its processes and procedures. These issues were identified as minor findings during the inspection that required corrective action on your part. Specifically, SMS's procedural guidance related to tracking and incorporating engineering and departure change requests (E&DCRs) lacks sufficient detail to ensure consistent implementation of the process. While the NRC did not have findings in the areas of inspection and special processes, the inspectors noted that SMS is still challenged by documentation in its travelers and drawings and that there is inconsistency in how it is documenting inspections, welding, and incorporating E&DCRs through the redline process (a process that identifies revisions or corrections to documents). These issues warrant your attention and consideration for their impact on past and future safety-related work and for determination of the extent of these conditions.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or Safeguards Information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21 "Protection of Safeguards Information: Performance Requirements."

Sincerely,

**/RA/**

Kerri A. Kavanagh, Chief  
Quality Assurance Branch  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

Docket No.: 99901401

Enclosures:  
As stated

requirements passed down from your customers or NRC licensees. The inspectors determined that, with the exception of the cited nonconformance, your programs for implementing the requirements of Appendix B to 10 CFR Part 50 for nonconforming materials, parts, or components; inspection; control of manufacturing activities; traceability; and personnel training generally met the applicable regulations.

However, the inspectors observed several issues related to SMS's implementation of its processes and procedures. These issues were identified as minor findings during the inspection that required corrective action on your part. Specifically, SMS's procedural guidance related to tracking and incorporating engineering and departure change requests (E&DCRs) lacks sufficient detail to ensure consistent implementation of the process. While the NRC did not have findings in the areas of inspection and special processes, the inspectors noted that SMS is still challenged by documentation in its travelers and drawings and that there is inconsistency in how it is documenting inspections, welding, and incorporating E&DCRs through the redline process (a process that identifies revisions or corrections to documents). These issues warrant your attention and consideration for their impact on past and future safety-related work and for determination of the extent of these conditions.

In accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or Safeguards Information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material is withheld from public disclosure, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21 "Protection of Safeguards Information: Performance Requirements."

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Enclosures:

As stated

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**ADAMS Accession No.:** ML12279A119    \*concurred via email    NRO-002

<b>OFFICE</b>	NRO/DCIP/CQAB	NRO/DCIP/CQAB	NRO/DCIP/CQAB	RII/DCI/CIB2
<b>NAME</b>	LTrocine	ABelen	PPrescott *	SSmith *
<b>DATE</b>	10/11/12	10/12/12	10/16/12	10/11/12
<b>OFFICE</b>	NRO/DCIP/CMVB	NRO/DCIP/CAEB	NRO/DCIP/CQAB	
<b>NAME</b>	SCrane (RL for)	TFrye	KKavanagh	
<b>DATE</b>	10/24/12	10/18/12	10/25/12	

## NOTICE OF NONCONFORMANCE

Shaw Modular Solutions  
Lake Charles, LA

Docket No.: 99901401  
Inspection Report No.: 2012-201

Based on the results of an unannounced U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the Shaw Modular Solutions (SMS) facility in Lake Charles, LA, during September 10-14, 2012, it appears that certain of your activities were not conducted in accordance with NRC requirements that were contractually imposed on SMS by its customers or NRC licensees.

Criterion XVI, "Corrective Action," in Appendix B to Title 10 of the *Code of Federal Regulation* (10 CFR) Part 50, states that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality (SCAQs), the measures shall assure that the cause of the condition is determined and corrective action taken to prevent repetition. The identification of the SCAQ, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

Section 16 of the SMS Quality Assurance Manual, Revision 7, dated February 29, 2012, states, in part, that conditions adverse to quality shall be identified and documented. The actions necessary to correct conditions adverse to quality shall be determined and implemented. For SCAQs, actions necessary to correct the root cause shall be included so as to prevent recurrence. The implementation of corrective action for significant conditions adverse to quality shall be verified and shall be assessed to determine its effectiveness.

Contrary to the above, as of September 14, 2012, SMS failed to promptly correct conditions adverse to quality and SCAQs, failed to correct a condition adverse to quality regarding documentation of late entries in a quality records procedure, failed to preclude recurrence of SCAQs related to identification and control of items, and failed to correct a condition adverse to quality associated with a nonconformance identified during a previous NRC inspection. Specifically:

1. SMS failed to promptly correct conditions adverse to quality and SCAQs. SMS failed to implement corrective actions for conditions adverse to quality in a timely manner in that there were numerous repetitive condition reports (CRs) with common causes. Additionally, SMS failed to perform root cause analyses for SCAQs within the 30 calendar days as required by Section 6.7.2.a of Procedure QP-G-16, "Corrective Action Program," Revision 6, dated June 28, 2012.
2. SMS failed to correct a condition adverse to quality. SMS opened CR No. 12-346 to address the documentation of late entries in Procedure QP-G-17, "Quality Records," and SMS subsequently closed CR No. 12-346 by publishing Revision 5 of Procedure QP-G-17. However, SMS later published Procedure QP-G-17, Revision 6, but deleted all of the guidance for the late entries incorporated in Revision 5 that addressed and resulted in the closure of CR No. 12-346.
3. SMS failed to prevent recurrence of SCAQs related to identification and control of items. SMS had a closed SCAQ CR (CR No. 12-177) related to the inadequate

control of issuance of weld wires used in the fabrication of safety-related modules. However, SCAQ CR Nos. 12-272 and 12-543) were open with the same root cause analysis as the one already closed.

4. SMS failed to perform adequate corrective actions associated with a nonconformance identified during a previous NRC inspection. SMS failed to complete procedure revisions by August 31, 2012, as committed to in its March 9, 2012, response (Agencywide Document Access and Management System (ADAMS) Accession No. ML12082A161) to a notice of nonconformance issued on January 6, 2012 (ADAMS Accession No. ML11354A389). These procedure revisions were documented as corrective actions for Nonconformance 99901401/2011-201-09, which was identified during a November 14-18, 2011, inspection for SMS's failure to perform a trend analysis of conditions adverse to quality as required by the Shaw Nuclear Services purchase orders. Additionally, some SMS staff members were performing trending analysis using a draft procedure, but there was no formal guidance provided.

This issue has been identified as Nonconformance 99901401/2012-201-01.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, Attn: Document Control Desk, Washington, DC 20555-0001, with a copy to the Chief, Quality Assurance Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this Notice of Nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the noncompliance, or if contested, the basis for disputing the noncompliance, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid noncompliances, and (4) the date when your corrective action will be achieved. Where good cause is shown, the NRC will consider extending the response time.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's ADAMS, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material be withheld, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Dated this the 24th Day of October 2012.

**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NEW REACTORS  
DIVISION OF CONSTRUCTION INSPECTION AND OPERATIONAL PROGRAMS  
VENDOR INSPECTION REPORT**

Docket No.: 99901401

Report No.: 99901401/2012-201

Vendor: Shaw Modular Solutions  
3191 W. Lincoln Road  
Lake Charles, LA 70605

Vendor Contact: Mr. Joseph Ernst  
Executive Vice President  
Telephone: 337-562-3542  
E-mail: joseph.ernst@shawgrp.com

Nuclear Industry Activity: Shaw Modular Solutions is under contract with Shaw Nuclear Services to fabricate structural equipment modules for the AP1000 units to be constructed at Vogtle and V.C. Summer.

Inspection Dates: September 10-14, 2012

Inspectors: Samantha Crane NRO/DCIP/CMVB Team Leader  
Paul Prescott NRO/DCIP/CQAB  
Leigh Trocine NRO/DCIP/CQAB  
Aixa Belen NRO/DCIP/CQAB  
Steven Smith RII/CIB2/DCI

Approved by: Kerri A. Kavanagh, Chief  
Quality Assurance Branch  
Division of Construction Inspection  
and Operational Programs  
Office of New Reactors

## **EXECUTIVE SUMMARY**

Shaw Modular Solutions  
99901401/2012-201

During September 10-14, 2012, the U.S. Nuclear Regulatory Commission (NRC) staff conducted an unannounced inspection at the Shaw Modular Solutions facility (SMS) in Lake Charles, LA. The inspection focused on manufacturing and inspection activities related to the fabrication of safety-related structural modules for the V.C. Summer and Vogtle projects.

NOTE: This inspection was not performed as part of the NRC's overall strategy for inspecting targeted Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) related to the functional and type testing of safety-related components being supplied by Westinghouse Electric Company and their sub-suppliers as part of the AP1000 certified reactor design.

Specifically, the inspectors observed a corrective action screening meeting and the implementation of supplemental work instructions related to the resolution of nonconforming conditions. The inspectors also observed quality control (QC) inspections on the shop floor that included traceability checks, nondestructive examination (NDE), final welding inspections, and fit and tack inspections. The inspectors reviewed the product identity certification (PIC) tickets and parts lists associated with two modules to ensure material traceability was maintained and could be identified in the modules, and they also conducted an inspection of a sample of material in the modules to ensure there was no uncontrolled material present. Lastly, the inspectors reviewed drawings, shop travelers, and welder sign-off sheets to verify that they appropriately incorporated engineering and departure change requests (E&DCRs) through the redline process, that they appropriately identified welds on the drawings and recorded them in the welder sign-off sheet, and that they appropriately identified inspection points and documented the results of those inspections.

The purpose of this inspection was to verify that SMS performed the quality activities in support of the fabrication of safety-related structural modules in accordance with a quality assurance (QA) program that complied with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities."

The following regulation served as the bases for the NRC inspection:

- Appendix B of 10 CFR Part 50

During this inspection, the inspectors implemented Inspection Procedure (IP) 43003, "Reactive Inspections of Nuclear Vendors," dated April 25, 2011.

The NRC previously performed a vendor inspection at the SMS facility in Lake Charles, LA, during November 14-18, 2011 (Agencywide Document Access and Management System Accession No. ML11354A389). The inspection documented in this report was a reactive inspection based on new issues as well as a followup to the findings of the November 2011 inspection.

With the exception of the nonconformance described below, the inspectors concluded that SMS is effectively implementing its QA programs in support of the fabrication of safety-related structural modules. The information below summarized the results of this inspection.

#### Nonconforming Material, Parts, or Components and Corrective Action

The inspectors determined the implementation of SMS's program for corrective actions was not consistent with the regulatory requirements in Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. Specifically, SMS failed to promptly correct conditions adverse to quality and significant conditions adverse to quality (SCAQs), failed to correct a condition adverse to quality regarding documentation of late entries in a quality records procedure, failed to preclude recurrence of SCAQs related to identification and control of items, and failed to correct a condition adverse to quality associated with a nonconformance identified during a previous NRC inspection. The inspectors identified this finding as Nonconformance 99901401/2012-201-01.

The inspectors determined that the implementation of SMS's program for control of nonconforming material, parts, or components was consistent with the regulatory requirements in Criterion XV, "Nonconforming Materials, Parts, or Components," of Appendix B to 10 CFR Part 50. Based on the limited sample of nonconformance reports reviewed and the observation of activities on the shop floor at SMS related to nonconformances, the inspectors determined that SMS is effectively implementing its quality assurance manual (QAM) and the associated nonconformance procedures.

#### Inspection

The inspectors reviewed drawings, shop travelers and welder sign-off sheets for equipment modules and safety-related structural modules to verify that they appropriately identified welds on the drawings and recorded them in the welder sign-off sheet and appropriately identified inspection points and documented the results of those inspections. In addition, the NRC inspectors observed QC inspections on the shop floor that included traceability checks, NDE, final welding inspections, and fit and tack inspections to verify that inspections are performed in accordance with SMS policies and procedures, as well as applicable codes and standards. The inspectors also reviewed the "SMS Policy on the Treatment of Temporary Bracing" to verify that the vendor followed appropriate practices for welding of temporary bracing on safety-related modules. The inspectors held discussions with the responsible welding engineer to determine how the policy was implemented, which bracing may be considered safety-related, and what actions were required if the temporary bracing was removed.

The inspectors identified several findings of minor significance related to welding studs out of sequence, improperly documenting changes to the welder sign-off sheets, including duplicate welds in the welder sign-off sheets, and using unqualified weld procedure specifications. However, the inspectors concluded that the implementation of the SMS program for inspection is consistent with the regulatory requirements of Criterion X, "Inspection," of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and observation of ongoing inspection activities at the SMS facility, the inspectors also determined that SMS is effectively implementing its QAM and the associated inspection procedures. The inspectors identified no findings of significance.

### Control of Manufacturing Activities

The inspectors reviewed SMS's processes and procedures for how design drawings and requirements are reviewed, approved, and distributed for use in the fabrication of the AP1000 structural submodules. The inspectors also reviewed how E&DCRs are incorporated into work orders during various stages of fabrication to ensure that changes were appropriately captured and completed as part of the work order. In addition, inspectors verified that information, such as weld size, weld configurations, and materials incorporated through the redline process, was adequately identified and documented in work orders and drawings.

The inspectors concluded that SMS implemented its control of the manufacturing process consistent with the regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. Based on the limited samples of documents reviewed, the inspectors also determined that SMS implemented its policies and procedures as written. The inspectors identified no findings of significance.

### Traceability

The inspectors reviewed SMS's processes and procedures for ensuring that material traceability was maintained per SMS's requirements and reviewed the PIC tickets and parts lists associated with Module No. KB37 for Vogtle and CA20-25 for V.C. Summer to ensure material traceability was maintained and could be identified in the modules. The inspectors also conducted an inspection of a sample of material in the modules to ensure no uncontrolled material was present. Additionally, the inspectors reviewed the PIC tickets and parts lists associated with Module Nos. KB37 for Vogtle and CA20-25 for V.C. Summer to ensure that material that had been currently used for fabrication in the assembly could be traced to the associated module. The inspectors also conducted an inspection of a sample of material in the modules to ensure no uncontrolled material was present.

The inspectors determined that the implementation of SMS's program for traceability was consistent with the regulatory requirements in Criterion VIII, "Identification and Control of Material, Parts, and Components." Based on the limited sample of PIC tickets and parts lists reviewed and the observation of activities on the shop floor at SMS related to traceability, the inspectors determined that SMS is effectively implementing its QAM and the associated nonconformance procedures. The inspectors identified no findings of significance.

### Personnel Qualification

The inspectors reviewed the personnel training and qualification process for QC personnel and reviewed the training and qualification records of 14 QC inspectors and foremen. The inspectors also attended a safety meeting, interviewed QC inspectors, observed QC inspectors during the performance of their work, and discussed the personnel training and qualification process with SMS management and staff.

The inspectors determined that the training and qualification of SMS personnel conforms to the regulatory requirements in Criterion II, "Quality Assurance Program," of Appendix B to 10 CFR Part 50. In addition, the inspectors determined that, for the limited sample reviewed, the SMS staff has been effectively implementing the SMS QAM and implementing procedures for the training and qualification of its personnel. The inspectors identified no findings of significance.

## REPORT DETAILS

The U.S. Nuclear Regulatory Commission (NRC) inspectors observed various activities associated with the fabrication of safety-related modules for the V.C. Summer and Vogtle projects; conducted interviews with responsible Shaw Modular Solutions (SMS) personnel; and verified that fabrication for Module No. CA05-01-200 for Vogtle, CA20-04 for Vogtle, CA20-05-200-220 for Vogtle, CA20-25 for V.C. Summer, CA20-28-200 for Vogtle, CA20-29 for V.C. Summer, CA20-76 for V.C. Summer, CA20-77 for V.C. Summer, CA20-77 for Vogtle, KB37 for Vogtle, R1-06 for V.C. Summer, and R1-06 for Vogtle was performed in accordance with the applicable quality and technical requirements imposed in the associated purchase orders (POs) and engineering and departure change requests (E&DCRs). Specifically, the inspectors observed a corrective action screening meeting and the implementation of supplemental work instructions related to the resolution of nonconforming conditions. The inspectors also observed quality control (QC) inspections on the shop floor that included traceability checks, nondestructive examination (NDE), final welding inspections, and fit and tack inspections. The inspectors reviewed the product identity certification (PIC) tickets and parts lists associated with two modules to ensure material traceability was maintained and could be identified in the modules, and they conducted an inspection of a sample of material in the modules to ensure no uncontrolled material was present. Lastly, the inspectors reviewed drawings, shop travelers, and welder sign-off sheets to verify that they appropriately incorporated E&DCRs through the redline process, that they appropriately identified welds on the drawings and recorded them in the welder sign-off sheet, and that they appropriately identified inspection points and documented the results of those inspections.

NOTE: This inspection was not performed as part of the NRC's overall strategy for inspecting targeted Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) related to the functional and type testing of safety related components being supplied by Westinghouse Electric Company and their sub-suppliers as part of the AP1000 certified reactor design.

### 1. Nonconforming Materials, Parts, or Components and Corrective Actions

#### a. Inspection Scope

The inspectors reviewed the SMS policies and procedures that govern the programs for the control of nonconforming materials, parts, or components and corrective actions to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," respectively. The inspectors reviewed a sample of condition reports (CRs) and nonconformance reports (NCRs) associated with the fabrication of safety-related modules to verify the adequacy of SMS's implementation and control over nonconforming quality materials, parts, or components and corrective action. In addition, the inspectors discussed the corrective action program with SMS management and technical staff, and observed a corrective action screening meeting and a corrective action program oversight meeting. Also, the inspectors performed walkdowns of material storage areas, work areas, and the facility to inspect the segregation of nonconforming materials, the control of NCRs on ongoing work, and material conditions that could contribute to quality issues. The inspectors observed ongoing craft work and

inspection activities for the identification and control of NCRs. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

The inspectors verified through interviews that SMS personnel knew that they could submit an NCR or CR. The inspectors verified that the SMS process and procedures for corrective action define conditions adverse to quality and significant conditions adverse to quality (SCAQ), conditions that may require a reportability review (e.g., 10 CFR Part 21, "Reporting of Defects and Noncompliance," review), and provisions for a stop work order.

The inspectors noted that the corrective action program has no specific requirements for prompt correction of a condition adverse to quality. The inspectors reviewed CR logs and observed that SMS's average time to close a CR related to a condition adverse to quality is 98 days and to close a CR related to an SCAQ is 120 days. The inspectors noted that there were CRs open with similar issues, such as procedure adherence, bypass of hold points, loss of traceability, and loss of document control. For example, SMS opened CR No. 12-597 and 12-206 to address procedural adherence; CR No. 12-166, 12-358, and 12-784 to address the bypass of hold points; CR No. 12-327, 12-345, and 12-356 to address issues related to heat number and loss of traceability; and CR No. 12-356, 12-401, and 12-504 to address issues with document control in which V.C. Summer documents were with Vogtle assemblies, and vice versa. The inspectors determined that the repetitive nature of these examples was caused by the failure to implement corrective actions for conditions adverse to quality in a timely manner. Additionally, the inspectors noted that the root cause analyses performed for five out of eight SCAQs opened in 2012 were not completed within the 30-calendar-day requirement described in Section 6.7.2.a of Procedure QP-G-16, "Corrective Action Program." The inspectors identified these issues as one example of Nonconformance 99901401/2012-201-01, for the failure of SMS to promptly correct conditions adverse to quality. SMS initiated CR No. 12-938 to address the failure to promptly close out SCAQs.

The inspectors reviewed CR No. 12-346, which was opened to address documentation of late entries in Procedure QP-G-17, "Quality Records." SMS closed the CR by publishing Revision 5 of Procedure QP-G-17. However, the inspectors noted that SMS had published Procedure QP-G-17, Revision 6, and had deleted the guidance for late entries incorporated in Revision 5 that addressed CR No. 12-346. The inspectors identified these issues as a second example of Nonconformance 99901401/2012-201-01 for the failure of SMS to correct a condition adverse to quality.

The inspectors reviewed eight SCAQs opened in 2012. CR No. 12-177 was opened to address the use of a weld wire with a hold tag in production. The root cause analysis report described the root causes, which included inadequate control of weld filler material. SMS implemented corrective actions, and the CR was closed. However, the inspectors noted that CR Nos. 12-272 and 12-543 were opened to address the inadequate use of weld wire in the fabrication of modules. In addition, the root cause analysis (RCA) report for CR No. 12-543 concluded that one of the causes was inadequate control of weld filler material and that this contributing cause was identical to Cause No. 2 in the RCA report for CR No. 12-177. The inspectors identified this issue

as a third example of Nonconformance 99901401/2012-201-01 for the failure of SMS to preclude recurrence of SCAQs.

The inspectors verified the corrective actions for Nonconformance 99901401/2011-202-09, which was identified during the November 14-18, 2011, NRC inspection for SMS's failure to do trending required by the POs from Shaw Nuclear Services (SNS) for the submodules at Vogtle and V.C. Summer. Nonconformance 99901401/2011-201-09 was documented in a Notice of Nonconformance issued on January 6, 2012 (Agencywide Document Access and Management System (ADAMS) Accession No. ML11354A389). In SMS's March 9, 2012, response to the NRC (ADAMS Accession No. ML12082A161), SMS committed to complete its transition to an electronic corrective action program that includes procedure revisions, the establishment of the Corrective Action Review Board (CARB), and training for implementation of electronic trending by August 31, 2012. The inspectors reviewed Procedure QP-G-16, "Corrective Action," Revision 6, dated June 28, 2012. The inspectors noted that SMS established the CARB and performed some trending analysis for conditions adverse to quality. The inspectors also noted that Procedure QP-G-16 states that the quality assurance (QA) manager is responsible for assessing and reporting identified trends. However, the procedure does not have further guidance on how to perform the trending. The inspectors were informed that some SMS staff members were performing trending analysis using a draft procedure, but there was no formal guidance provided. The inspectors identified this issue as a fourth example of Nonconformance 99901401/2012-201-01 for the failure of SMS to fully implement the committed actions as of September 14, 2012. SMS initiated CR No. 12-924 to address this issue.

The inspectors reviewed the following CR's to develop an understanding of recurring issues related to the redline process (a process that identifies revisions or corrections to documents) and to evaluated the adequacy of corrective actions.

- The first CR reviewed by the inspectors (CR No. 2012-703) documents that, on Drawing No. APP-CA 20-S5-28-200-2817, a process engineer had incorrectly redlined a seam weld at a location different from the design location. When QC informed the process engineer that it was incorrect, the redline marking was lined through and removed by process engineering. The associated procedure (Procedure QP-PC-06, "Implementation of Shop Travelers," Revision 8) restricts process engineering to redlining only minor changes and clarifications without design authority. The inspectors considered the corrective actions associated with this CR to be appropriate.
- The second CR reviewed by the inspectors (CR No. 2012-704) documents that the original tack weld entry, which had already been signed off by QC, was subsequently lined through and annotated "tack broke" on a welder sign-off sheet for Tack Weld No. 000-20-0027. The broken tack was later removed, and the pieces were re-fit and re-tacked. A QC inspector inspected the new fit-up, including new tack weld, and accepted it. The inspectors noted that rework of in-process items is allowed without initiating an NCR, as specified in Procedure QP-PC-06. The inspectors determined that the condition reported was within the scope of in-process rework, and they considered the corrective actions associated with this CR to be appropriate.

- The third CR reviewed by the inspectors (CR No. 2012-705) documents that welder sign-off sheets showed the original finish welder entries for welds were performed, lined out, and later annotated as lined out in error. A second entry was made noting that the welder was on annual leave when this entry was signed off as welding complete and acceptable by QC. A third entry was made re-logging the original entry; however, the date of welding performed was incorrectly entered. SMS subsequently corrected the problem by lining out the second welder's entries with QC concurrence. With regard to the third entries that restored the original entries, SMS lined out the incorrect dates of welding and entered the correct dates. QC then re-verified the weld entries, re-inspected the welds, and signed off the welds as acceptable. An all-hands meeting was conducted that covered expectations of procedure use and adherence. All of the documentation errors covered in this CR preceded the date of this all-hands meeting, except for the welder's and supervisor's entry. The supervisor is no longer employed at SMS, and the welder was coached by the CR investigator on the importance of using the date the weld was made to maintain traceability. The inspectors considered the corrective actions associated with this CR to be appropriate.

The inspectors considered the safety significance of these issues to be minor because SMS identified the issues and placed them into their CR process to ensure adequate correction and because the issues did not rise to the level of SCAQs. Based on the limited scope of this review, the inspectors also considered the associated corrective actions to be appropriate.

c. Conclusions

The inspectors determined the implementation of SMS's program for corrective actions was not consistent with the regulatory requirements in Criterion XVI of Appendix B to 10 CFR Part 50. Specifically, SMS failed to promptly correct conditions adverse to quality and SCAQs, failed to correct a condition adverse to quality regarding documentation of late entries in a quality records procedure, failed to preclude recurrence of SCAQs related to identification and control of weld wire, and failed to correct a condition adverse to quality associated with a nonconformance identified during a previous NRC inspection. This has been identified as Nonconformance 99901401/2012-201-01.

The inspectors determined that the implementation of SMS's program for control of nonconforming material, parts, or components was consistent with the regulatory requirements in Criterion XV of Appendix B to 10 CFR Part 50. Based on the limited sample of nonconformance reports reviewed and the observation of activities on the shop floor at SMS related to nonconformances, the inspectors determined that SMS is effectively implementing its quality assurance manual (QAM) and the associated nonconformance procedures.

2. Inspection

a. Scope

The inspectors reviewed SMS's policies and procedures that govern inspection to verify compliance with the requirements of Criterion X, "Inspection," of Appendix B to

10 CFR Part 50. The inspectors reviewed drawings, shop travelers, and welder sign-off sheets to verify that they appropriately identified welds on the drawings, recorded them on the welder sign-off sheet, appropriately identified inspection points, and documented the results of those inspections. In addition, the inspectors observed QC inspections on the shop floor that included traceability checks, NDE, final welding inspections, and fit and tack inspections to verify that SMS is performing inspections in accordance with its policies and procedures and applicable codes and standards.

The inspectors also reviewed the “SMS Policy on the Treatment of Temporary Bracing” to verify that the vendor followed appropriate practices for welding of temporary bracing on safety-related modules. The inspectors held discussions with the responsible welding engineer to determine how the policy was implemented, what bracing may be considered safety-related, and what actions were required if the temporary bracing was removed. The inspectors also reviewed the applicable welding code requirements in the American Welding Society (AWS) D1.1, “Structural Welding Code – Steel.” The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

The inspectors verified that SMS had procedures for inspection that provided measures for the generation of inspection control documents, such as travelers, process sheets, instructions, checklists, or other appropriate means.

b.1. Review of Process Control Documents

For a sample of drawings, shop travelers, and welder sign-off sheets, the inspectors verified that inspection control documents include the following information: the item inspected, inspection date, type of observation, results of examination and tests, and the initials of the QC inspector or welder for the activities witnessed. The inspectors verified that mandatory hold points were indicated in the controlling documents and that work does not proceed without appropriate approval.

The inspectors reviewed the drawings, assembly shop travelers, and welder sign-off sheets for the following modules to verify that documents were appropriately signed, that the drawings included weld symbols that appropriately documented the welds to be performed, and that changes to the travelers and welder sign-off sheet were made in accordance with SMS procedures:

- CA05-01-200 for Vogtle
- CA20-05-200-220 for Vogtle
- CA20-28-200 for Vogtle
- CA20-76 for V.C. Summer
- CA20-77 for V.C. Summer
- CA20-77 for Vogtle
- R1-06 for V.C. Summer
- R1-06 for Vogtle

For the reviewed drawings and portions of the assembly shop travelers and welder sign-off sheets for Module No. R1-06 for Vogtle and V.C. Summer, Module

No. CA20-76 for V.C. Summer, and Module No. CA05-01-200 for Vogtle, the inspectors did not identify any findings of significance.

For Module No. CA20-05-200-220 for Vogtle, the inspectors identified that Step 130, "Weld CA-20-05-200-220 Stud Welds," in the assembly shop traveler identified specific studs to be omitted when welding the submodule. These studs were to be welded in the assembled module. However, Stud No. 220-10-0851, 220-10-0951, 220-10-0935, and 220-10-0936 were welded and listed in the welder sign-off sheet. The inspectors discussed this issue with SMS staff, who indicated that the omission of these studs during the assembly of the submodule is included in the traveler for ease of assembly of the module and that the welding of the studs during submodule fabrication does not affect the safety function of the module. The stud welds were included in the welder sign-off sheets and had received appropriate QC inspection. While the welds were performed out of sequence, this issue is of minor significance because the welds do not affect the ability of the module to perform its safety function and the welds were documented. In addition, the traveler is still under review, and SMS still has the opportunity to correct the documentation.

For Module No. CA20-05-200-220 for Vogtle, Fillet Weld No. 220-20-0100 was lined out on Page 22 of the welder sign-off sheet. The note says that Weld No. 220-20-0100 is no longer an existing weld and that two new weld numbers are to be issued per NCR No. 12-000340. NCR No. 12-000340 is listed in the traveler. The inspectors verified that the NCR included the supplemental work instructions, that they were completed and signed-off on, and that the new welds were documented in the welder sign-off sheet in accordance with the NCR.

However, the inspectors did identify an issue of minor significance related to documenting changes to the welder sign-off sheets for Module No. CA20-05-200-220 for Vogtle. Procedure QP-G-17, "Quality Assurance Records," Revision 1, dated March 8, 2010, Step 6.2.2 states, "Records shall be legible, accurate, and verified complete as appropriate for the work accomplished." In addition, Step 6.2.3 states, "Corrections/changes on documents shall be made by a single line through the incorrect information and typing or writing the correct information in an adjacent area or be written on a supplemental page, if insufficient space on the document to add the correction. The individual making the change/correction shall initial and date the change."

The inspectors identified that Stud Weld Nos. 220-10-0084 through 220-10-0099 were originally logged as a group on Page 11 on the welder sign-off sheet. The welds were performed on April 16, 2012, and the entry was lined-out on April 18, 2012. The note says that the welds were re-logged on the next page. The inspectors verified that the welds were re-logged on the next page and noted that the date of the welds on the new weld log entry was April 18, 2012, even though the welds were welded on April 16, 2012. Welds 220-10-0094, 220-10-0095, 220-10-0096, and 220-10-0099 were rejected and listed in the stud re-weld section as having been re-welded on April 17, 2012, which is prior to the date listed in the log for the original welds. Stud Weld No. 220-10-0098 was logged on page 15 and dated May 9, 2012. While the changes to the welder sign-off sheet were not made in accordance with QP-G-17, the issue is of minor significance because the welds and associated QC inspections were documented

and the welder sign-off sheet has not yet undergone final review. SMS took immediate corrective action and opened CR No. 2012-936 to address the improper change to the welder sign-off sheet.

For Module No. CA20-28-200 for Vogtle, the inspectors identified that entries for Stud Weld Nos. 200-10-3738 through 3743 and 200-10-3746 through 3756 on page 26 were logged without the stud welder or weld date recorded and with no supervisor signature or visual test recorded. These are duplicate entries to weld log entries on page 15 that have the stud welder and date as well as the supervisor and QC sign off. This issue is a documentation issue of minor significance since the welds were entered into the welder sign-off sheet and had received appropriate inspection and sign-offs. SMS took immediate corrective action and issued CR No. 2012-935 to address the issue.

During the course of the inspection SMS self-identified that Drawing APP-CA20-11-77-000-7701 for V.C. Summer and Drawing APP-CA20-S5-77-000-7702 for Vogtle call out partial joint penetration (PJP) welds on welds 40-0001 through 40-0011. PJP Weld Nos. 40-0001 through 40-0011 on Submodule No. CA20-77 for Vogtle and V.C. Summer were made using welding procedure specification (WPS) 1-1-107, Revision 4, which was not qualified to produce PJP welds. There was no supporting procedure qualification record for this WPS, but it was still released to the floor and used to create the welds. This issue was identified by SMS QC inspectors, NCR Nos. 12-000914 and 12-000916 were immediately opened, the submodules were tagged as nonconforming, and SMS issued CR No. 2012-921 to address the issue. This issue is of minor significance since SMS self-identified the issue and took immediate corrective action.

#### b.2. Observation of Inspection Activities

The inspectors observed and assessed actual techniques being used and their acceptability relative to contract and procedural requirements. Specifically, the inspectors observed QC inspections that included those with customer quality representative hold and notification points for a fit and tack inspection for Mechanical Module No. KB37 for Vogtle, a final weld-out inspection for Module Nos. R1-06 for Vogtle and V.C. Summer, and material verification inspection for Module No. CA20-76 for V.C. Summer. The inspectors verified that the traveler included items to be inspected and documented the inspection date, type of observation, results of the examination, and the initials of the QC inspector. The inspectors verified that the travelers contained mandatory hold points and that work did not proceed without appropriate approval. The inspectors also verified through direct observation that the QC inspectors were using the correct drawings and documentation, that the documents and drawings in the work package matched the job, and that the QC inspector's sign-off attested to this. In addition, the inspectors verified that the welder sign-off sheets for the activities observed, appropriately identified the weld number, welder, and type of weld. For the activities observed, the QC inspectors performed the verification of work and records required by Procedure QP-WI-01, "Welding Inspection Procedure," Revision 9, dated July 18, 2012. The inspections were performed by qualified personnel other than those who performed or directly supervised the work being inspected.

The inspectors also witnessed NDE activities. They observed personnel performing the activities, verified the associated light meters and temperature meters were calibrated, the chemicals were correct and within the expiration date, and reviewed the associated Procedure QP-NDE-PT-01, "Liquid Penetrant Testing Procedure," Revision 9, and Procedure QP-NDE-VT-01, "Visual Examination Procedure," Revision 6.

Module No. CA20-29 for V.C. Summer, Work Order No. 1933408, required removing two sections of backing bar protruding past the leak chase of the module and installing leak chase end caps. The section of backing bar was removed and the affected area was ground down to base metal. The QC inspector performed the inspection in accordance with the requirements of Procedure QP-NDE-PT-01. However, the results of the penetrant test indicated that the welds were not sufficiently ground down. The area was subsequently wire-brushed, and a penetrant test was performed again. The area of removed backing bar was found to be acceptable. However, an adjacent weld indicated insufficient fusion of the weld. The engineer was initially going to allow excavation of the weld area in question. However, the QC inspector noted that supplemental work instructions were needed for expansion of the work scope. Supplemental work instructions were subsequently developed to allow for excavation of the problem weld area, re-welding, and NDE of the replacement weld segment.

Module No. CA20-25 for V.C. Summer, Work Order No. 1907249, required removing a corner plate that had piping holes oriented incorrectly. The corner plate was removed and the affected area was ground down to base metal. The inspectors identified that the supplemental work instructions in NCR No. 12000894 did not identify the location of the area to be inspected by a drawing. The personnel involved in the inspection stopped work and had the supplemental work instructions revised to reflect the drawing. An initial visual test identified that several spots had been ground down below the base metal surface of 1/32 inch. In accordance with Procedure QP-NDE-VT-01, the areas were marked, the drawing revised to reflect the area, and a supplemental work instruction was developed to fill in the affected area. The QC inspector also did a penetrant test of the areas to ensure there was no exposed surface cracking as a result of the grinding. The inspectors verified that the removed corner piece was appropriately identified as "scrap."

### b.3. Inspection of Temporary Bracing

During fabrication of AP1000 modules, SMS engineering determined there are instances in which installation of temporary welded attachments (i.e., temporary fabrication bracing) is necessary to facilitate construction and to ensure all necessary contractual quality requirements are met. The purpose of this policy was to define SMS's process for the treatment of temporary bracing and construction aids. SMS developed five categories of temporary bracing:

- Temporary bracing and construction aids that are welded to safety-related products designed by Westinghouse Electric Company and that will not remain as part of the permanent plant. Temporary bracing falling into this category may be removed by SMS or at the job site.

- Temporary bracing and construction aids that are welded to other temporary bracing. Construction aids and that are utilized for engineered structural integrity but will not remain as part of the permanent plant. Temporary bracing falling into this category will be removed at the job site.
- Temporary jigs and fixtures that are welded to other temporary bracing and construction aids for the sole purpose of aiding in the module fabrication process. Temporary bracing falling into this category will be removed by SMS prior to shipment.
- Temporary bracing and construction aids that are issued in an E&DCR as part of the AP1000 design, by request of SMS (leave in-place bracing that will be part of the permanent plant).
- Vertical lifting frames engineered for lifting submodules into place at the job site.

If the temporary attachment is removed, then it is classified as nonsafety-related, nonseismic and does not have special QA requirements. However, SMS must select and use material for the temporary attachment that meets the requirements of the approved WPS that documents the welding. The supplemental work instructions are documented in accordance with SMS Procedures QP-PE-10, "Development of Shop Traveler," and QP-PC-06, "Implementation of Shop Traveler." If the temporary attachment is removed, the welding engineer stated that the area is inspected by a QC inspector to ensure the base material was unaffected.

The welding engineer stated that Category 4 bracing will meet the requirements specified in the corresponding E&DCR; therefore it will be inspected by QC. Category 5 bracing will meet the same quality requirements for safety-related fabrication including full material, weld traceability and QC inspection. The inspectors reviewed the requirements in AWS D1.1 and did not identify any deviations from practices specified in the code.

#### c. Conclusions

The inspectors concluded that the implementation of the SMS program for inspection is consistent with the regulatory requirements of Criterion X, of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and observation of ongoing inspection activities at the SMS facility, the inspectors also determined that SMS is effectively implementing its QAM and the associated inspection procedures. The inspectors identified no findings of significance.

### 3. Control of Manufacturing Activities

#### a. Scope

The inspectors reviewed SMS's policies and procedures that govern the control of manufacturing processes to verify compliance with the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. The inspectors reviewed work

orders for a sample of eight structural submodules currently in fabrication, conducted interviews with responsible SMS personnel, and reviewed fabrication documents to determine if SMS performed fabrication activities were in accordance with the applicable design, quality, and technical requirements imposed through design drawings, specifications, procedural requirements, and changes made through E&DCRs. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

The inspectors verified that SMS established and implemented processes and procedures to ensure that design, specification, and procedural requirements were adequately translated into documents used to support the fabrication of the AP1000 structural submodules. Documents reviewed included shop travelers, project instruction sheets, supplemental instructions, weld logs, traceability logs, and associated drawings used for fabrication. While the inspectors found the processes and procedures used to develop documents to be adequate, the inspectors also observed that difficulties were encountered during their implementation and use during fabrication. Specifically, inspectors identified several instances in which personnel did not document inspections in the appropriate location, did not properly log supplemental instructions in the shop traveler, and had not yet performed required inspections on completed welds. These issues were not identified as nonconformances because these packages were considered in-process with the final reviews incomplete.

The inspectors also verified the process and procedures for implementing clarifications and changes to fabrication documents through the use of redlines and E&DCR's. During this review, the inspectors compared SMS's E&DCR tracking log to corresponding work orders, clarifications, and changes to drawings or work instructions incorporated through either drawing revisions or redlines as required by E&DCRs. In addition, inspectors also reviewed SMS CR Nos. 2012-703 and 2012-559, which identified that a redline was improperly made to the CA20-28 submodule and that improper implementation of changes made through an E&DCR led to missing studs on the CA20-04 submodule for Vogtle. These CRs were reviewed to help inspectors further understand recent issues related to the E&DCR and redline processes.

c. Conclusions

The inspectors concluded that the implementation of the SMS program for control of manufacturing activities is consistent with the regulatory requirements of Criterion III of Appendix B to 10 CFR Part 50. Based on the limited sample of documents reviewed and observation of ongoing inspection activities at the SMS facility, the inspectors also determined that SMS is effectively implementing its QAM and the associated procedures for control of manufacturing activities. The inspectors identified no findings of significance.

4. Traceability

a. Scope

The inspectors reviewed the SMS policies and procedures that govern traceability to verify compliance with Criterion VII, "Identification and Control of Material, Parts, and Components," of Appendix B to 10 CFR Part 50. The inspectors reviewed the PIC

tickets and parts lists associated with Module No. KB37 for Vogtle and CA20-25 for V.C. Summer to ensure material traceability was maintained and could be identified in the modules. The inspectors reviewed the associated Procedure QP-WH-01, "Material Control," Revision 9, to ensure that material traceability was maintained per SMS's requirements. The inspectors also conducted an inspection of a sample of material in the modules to ensure no uncontrolled material was present. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

The inspectors reviewed the PIC tickets and parts lists associated with Module Nos. KB37 for Vogtle and CA20-25 for V.C. Summer to ensure that material that had been currently used for fabrication in the assembly could be traced to the associated module. The inspectors identified that PIC Ticket No. 12-1718 was missing for Module No. CA20-25 for V.C. Summer. SMS was subsequently able to produce a copy, and the PIC ticket was placed back in the Work Order Package No. 2355750. The inspectors also conducted an inspection of a sample of material in the modules to ensure no uncontrolled material was present.

c. Conclusions

The inspectors determined that the implementation of SMS's program for traceability was consistent with the regulatory requirements in Criterion VIII of Appendix B to 10 CFR Part 50. Based on the limited sample of PIC tickets and parts lists reviewed and the observation of activities on the shop floor at SMS related to traceability, the inspectors determined that SMS is effectively implementing its QAM and the associated nonconformance procedures. The inspectors identified no findings of significance.

5. Training and Qualification of Personnel

a. Inspection Scope

The inspectors reviewed SMS's policies and procedures to verify that SMS was implementing training activities in a manner consistent with regulatory requirements and industry standards. The inspectors reviewed the personnel training and qualification process for QC personnel, as well as the training and qualification records of 14 QC inspectors and foremen to verify conformance with the requirements in Criterion II, "Quality Assurance Program," of Appendix B to 10 CFR Part 50. In addition, the inspectors discussed the personnel training and qualification process with SMS management and staff, attended a safety meeting, interviewed QC personnel, and observed them during the performance of their work. Particular attention was placed on SMS's training of QC personnel performing quality activities associated with the fabrication of structural submodules being supplied to U.S. commercial nuclear power reactors as part of Westinghouse's AP1000 design. This included SMS's QC program commitments and controls for the qualification and certification of the QC personnel responsible for conducting (1) NDE, including visual, liquid penetrant, magnetic particle, ultrasonic (excluding pre-service), radiography, and leak testing, (2) non-NDE-related inspections and tests for acceptance of items per the SMS QA program, and (3) coating inspections related to and testing for acceptance of Level III or PIC II and Coating Service Level II safety-related coating modules. The attachment to this inspection report lists the documents reviewed by the inspectors.

b. Observations and Findings

The inspectors verified that SMS has programs and procedures in place for the qualification and training of QC personnel performing activities that affect quality, and these programs and procedures are consistent with regulatory requirements and with the American Society for Nondestructive Testing, Inc. (ASNT), Recommended Practice No. SNT-TC-1A 2006, "Personnel Qualification and Certification in Nondestructive Testing." The programs and procedures also take into account the need for special skills to attain the required quality and the need for verification of quality by inspection and testing. In addition, the programs and procedures provide for the indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained.

To verify effectiveness, the inspectors reviewed a representative sample of training and certification records for QC staff members (14 of 48), including nine QC inspectors, three QC foremen, the current QC ASNT Level III, and the previous QC Level III. This sample represented seven SMS employees and seven contract employees (three from Quality Inspection Services, Inc. (QISI); two from Project Assistance Corporation (PAC); one from Industrial Testing Laboratory Services, LLC (ITLS); and one from Legacy (LEG)). QISI and ITLS were both on SMS's approved suppliers list for NDE services. The sampled QC staff member training and certification records also included the following certifications: eight visual testing certifications, eight liquid penetrant testing certifications, eight magnetic particle certifications, five ultrasonic testing certifications, three radiographic testing certifications, two certified welding inspector certifications, one coating (paint) inspector certification, and four receipt inspector certifications. The inspectors verified that qualification, training records, and certifications exist for the QC foremen and QC inspectors and that these records are maintained in accordance with SMS's program requirements and consistent with industry standards.

The inspectors interviewed the QC Foreman, a QISI Visual Level II QC inspector, a welding foreman, a PAC QC inspector, a customer QCR inspector (SNS QC), and an SMS trainee. As stated in Section 2, "Inspection," of this inspection report, the inspectors also observed QC personnel during the performance of their work, including those jobs with customer quality representative hold and notification points for a fit and tack inspection for mechanical Module No. KB37 for Vogtle, a final weld-out inspection for Module Nos. R1-06 for both Vogtle and V.C. Summer, and material verification inspection for Module No. CA20-76 for V.C. Summer. The interviewed individuals were knowledgeable of their job requirements, and the QC inspections were performed by qualified personnel other than those who performed or directly supervised the work being inspected.

c. Conclusions

The inspectors concluded that SMS's program requirements for training and qualification of personnel are consistent with the requirements of Criterion II of Appendix B to 10 CFR Part 50. The inspectors also concluded that SMS's quality assurance manual and associated training and qualification procedures were adequate and effectively implemented. The inspectors identified no findings of significance.

## 6. Entrance and Exit Meetings

On September 10, 2012, the inspectors discussed the scope of the inspection with Mr. Joseph Ernst, SMS's Executive Vice President, and with the SMS management and staff. On September 14, 2012, the inspectors presented the inspection results and observations during an exit meeting with Mr. Ernst and other SMS staff. The attachment to this report lists the entrance and exit meeting attendees, as well as those interviewed by the inspectors.

**ATTACHMENT**

**1. ENTRANCE AND EXIT MEETING ATTENDEES AND INDIVIDUALS INTERVIEWED**

<b>Name</b>	<b>Title</b>	<b>Affiliation</b>	<b>Entrance</b>	<b>Exit</b>	<b>Interviewed</b>
Samantha Crane	Inspection Team Lead	U.S. Nuclear Regulatory Commission (NRC)/Office of New Reactors (NRO)	X	X	
Aixa Belen	Inspector	NRC/NRO	X	X	
Paul Prescott	Inspector	NRC/NRO	X	X	
Leigh Trocine	Inspector	NRC/NRO	X	X	
Steven Smith	Inspector	NRC/Region II	X	X	
Daniel Adams	Quality Assurance (QA) Manager	Shaw Modular Solutions (SMS)	X	X	X
Joseph Ernst	Executive Vice President	SMS	X	X	X
Richard Fay	QA	SMS	X	X	X
Cecilia Gayle	QA Specialist	SMS	X	X	X
Janet Gray	Document Control Manager	SMS	X	X	
Lee Gros	Assistant General Manager	SMS	X	X	
Jack Martin	Senior Vice President Operations	SMS	X	X	
Jeffrey Randles	Quality Control (QC) Manager	SMS	X		X
Roy Rehkugler	Director Turnover	SMS	X	X	X
Ashley Taylor	Corrective Action Program (CAP) Manager	SMS	X	X	
Gregory Core	Construction Engineer	The Shaw Group	X	X	
Chris Fordham	Engineer	SMS		X	
Jack Gallagher	Employee Concerns	SMS		X	
Daniel Grannan	Director of QA	SMS		X	X
Mary Hart	Executive Assistant	SMS		X	
Cayla Johnston	CAP Coordinator	SMS		X	X
Michael Moser	General Manager	SMS		X	X
David Portus	Project Manager	SMS		X	X

<b>Name</b>	<b>Title</b>	<b>Affiliation</b>	<b>Entrance</b>	<b>Exit</b>	<b>Interviewed</b>
Al Taylor	CAP Manager	SMS		X	X
Dennis Dreyfus	Vice President QA	Shaw Nuclear		X	
Elvin Dumas	QA	Shaw Nuclear		X	
Keyes Niemer	Director of Modules	Shaw Nuclear		X	
Ronald Andrews		Southern Nuclear		X	
Charles Pierce	Director of Regulatory Affairs	Southern Nuclear		X	
Michael Hunt		V.C. Summer		X	
Levi Marcus	Resident Engineer	Westinghouse Electric Company		X	
Greg Boben	Scheduling Manager	SMS			X
David Bosell	Procedure Writer	SMS			X
Kenny Catchot	QA Supervisor	SMS			X
Matthew Celestine	Welding Foreman	SMS			X
Lawrence Fruge	QC Inspector	SMS			X
Armond Jones	QC Inspector in Training	SMS			X
David Marcentel	QC Foreman	SMS			X
Scott Matthews	Assistant Production Manager	SMS			X
Robert Pinell	American Society for Nondestructive Testing, Inc. (ASNT) Nondestructive Examination Level III	SMS			X
Nick Toti	Lead Bay Planner	SMS			X
Melissa Wilson	Project Business Administrator	SMS			X
Jesus Caro	QC Inspector	SMS/Project Assistance Corporation			X
Ken Shirey	Visual Test Level II	SMS/Quality Inspection Services, Inc.			X
Doug Percle	Customer Quality Representative	Shaw Nuclear			X

## **2. INSPECTION PROCEDURES USED**

Inspection Procedure (IP) 43003, "Reactive Inspections of Nuclear Vendors," dated April 25, 2011

### 3. **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

The following items were found during this inspection:

<b>Item Number</b>	<b>Status</b>	<b>Type</b>	<b>Description</b>
99901401/2011-201-09	Discussed	NON	Criterion XVI
99901401/2012-201-01	Open	NON	Criterion XVI

### 4. **DOCUMENTS REVIEWED**

#### a. **Procedures – Including Forms, Manuals, and Other Related Guidance Documents**

- ASNT Recommended Practice No. SNT-TC-1A 2006, “Personnel Qualification and Certification in Nondestructive Testing”
- Quality Assurance Manual (QAM), Revision 7, dated February 29, 2012
- Quality Procedure (QP) QP-DC-301, “Document Review,” Revision 0, issued on August 1, 2012
- Section 2, “Quality Assurance Program,” of SMS Quality Procedure QP-G-02, “Training,” Revision 10, issued February 29, 2012, and implemented March 1, 2012
- Procedure QP-G-03, “Shop Travelers,” Revision 10, dated December 6, 2011
- Procedure QP-G-05a, “Managing Detail Drawings,” Revision 01, dated January 31, 2012
- Procedure QP-G-06, “Document Control,” Revision 5, issued September 13, 2012
- Procedure QP-G-10, “Inspection,” Revision 7, dated June 28, 2012
- Procedure QP-G-15, “Control of Nonconforming Items,” Revision 6, dated June 28, 2012
- Procedure QP-G-16, “Corrective Action Program”, Revision 6, dated June 28, 2012
- Procedure QP-G-17, “Quality Assurance Records,” Revision 06, issued and implemented August 24, 2012
- Procedure QP-DC-05, “Shop Travelers Control,” Revision 2, dated August 10, 2011
- Procedure QP-PC-06, “Implementation of Shop Travelers,” Revision 8, dated February 9, 2012
- Procedure QP-PC-09, “Rework/Repair of Welds and Effective Weld Area,” Revision 4, dated August 3, 2012

- Procedure QP-NDE-WP-01, "Certification of NDE Personnel," Revision 09, issued August 14, 2012, and implemented August 15, 2012
  - Form FRM000027, "Nondestructive Examination of Personnel Qualification Record," Revision 09, issued August 14, 2012, and implemented August 15, 2012
  - Form FRM000028, "Eye Exam Record," Revision 09, issued August 14, 2012, and implemented August 15, 2012
  - Form FRM000029, "NDE Experience Log," Revision 09, issued August 14, 2012, and implemented August 15, 2012
  - Form FRM-000061, "Annual Technical Evaluation," Revision 09, issued August 14, 2012, and implemented August 15, 2012
  - Form FRM-000180, "NDT Practical Worksheet," Revision 09, issued August 14, 2012, and implemented August 15, 2012
- Procedure QP-PE-01, "Impact Reviews," Revision 04, dated May 3, 2012
- Procedure QP-PE-10, "Development of Shop Travelers," Revision 1, dated June 14, 2012
- Procedure QP-PE-08, "Innovative Steel Detailing Detailed Drawing Models," Revision 02, dated January 11, 2011
- Procedure QP-QA-01, "Qualification of Auditors," Revision 06, issued May 9, 2012, and implemented May 10, 2012
- Procedure QP-QC-306, "Qualification and Certification of Inspection and Test Personnel," Revision 00, dated on August 3, 2012
  - Form QP-QC-306-F-1, "Annual Physical Examination Record," Revision 00, dated on August 3, 2012
  - Form QP-QC-306-F-2, "Experience Evaluation Records," Revision 00, dated on August 3, 2012
  - Form QP-QC-306-F-3, "Certificate of Qualification/Certification," Revision 00, dated on August 3, 2012
  - Form QP-QC-306-F-4, "Coatings Inspector Examination of Personnel Qualification Record Certificate of Qualification," Revision 00, dated on August 3, 2012
- Procedure QP-WI-01, "Welding Inspection Procedure," Revision 9, dated July 18, 2012

**b. Work Orders – Including Shop Travelers, Weld Logs, Project Instruction Sheets, Material Traceability Log, and Drawings**

- Drawing APP-CA20-S5-77-000-7702, Revision 0
- Drawing APP-KB37-13-37-000-3708, Revision 0
- Drawing APP-R106-13-106-000-10603, Revision 0, dated July 27, 2012
- Traveler and welder sign-off sheet for Module No. KB37, Job No. 430013, Work Order No. 2169867
- Traveler and welder sign-off sheet for Module No. R1-06 for Vogtle, Work Order No. 2169859
- Traveler and welder sign-off sheet for Module No. R1-06 for V.C. Summer, Work Order No. 2169869
- Traveler for Submodule No. CA05-01-200, Job No. 430001, Work Order No. 2542328
- Traveler for Submodule No. CA20-05-200-220, Job No. 430001, Work Order No. 2256946
- Traveler and welder sign-off sheet for Submodule No. CA20-28-200 , Job No. 43001, Work Order No. 2349562
- Traveler and welder sign-off sheet for Submodule No. CA20-76, V.C. Summer
- Traveler and welder sign-off sheet for Submodule No. CA20-77, Job No. 43001, Work Order No. 1907628
- Work Order No. 1907252, for Submodule No. CA20-28, Project No. 430001
- Work Order No. 1933394, for Submodule No. CA20-16, Project No. 430011
- Work Order No. 1933395, for Submodule No. CA20-17, Project No. 430011
- Work Order No. 2256944, for Submodule No. CA20-05-200, Project No. 430001
- Work Order No. 2349556, for Submodule No. CA20-28-100, Project No. 430001
- Work Order No. 2349562, for Submodule No. CA20-28-200, Project No. 430001
- Work Order No. 2544257, for Submodule No. CA05-04-200, Project No. 430001
- Work Order No. 2542328, Revision 0, for Module No. CA05-01-200 Vogtle Shop Traveler, Project No. 430001

**c. Engineering and Departure Change Requests**

- APP-CA00-GEF-035, Revision 0, Engineering and Departure Change Request (E&DCR) to Modify Module General Note Clarification
- APP-CA00-GEF-038, Revision 0, E&DCR to revise Module General Notes
- APP-CA01-GEF-199, Revision 0, Module No. CA01-23 Additional Studs
- APP-CA01-GEF-200, Revision 0, Module No. CA01-24 Additional Studs
- APP-CA05-GEF-015, Revision 0, Module No. CA05 Overlay Plate Hole Interface

**d. Reports – Including Corrective Action Reports, Condition Reports, Nonconformance Reports, and Other Pertinent Documents**

- Condition Reports (CRs) Related to Significant Conditions Adverse to Quality (SCAQs): CR Nos. 11-006, 12-076, 12-177, 12-272, 12-543, 12-250, 12-333, and 12-559
- CRs Not Related to SCAQs: CR Nos. 12-597, 12-206, 12-166, 12-358, 12-784, 12-327, 12-345, 12-356, 12-356, 12-401, 12-504, 12-938, 12-346, 12-704, 12-705, and 12-924
- Condition Report (CR) No. 2012-559, “SNS Notified SMS CA20-04 Submodule Shipped to Vogtle Site had Several Missing Studs”
- CR No. 2012-703, “Incorrect Redlining of Drawing”
- Nonconformance Report (NCR) No. 12-000914
- NCR No. 12-000916
- QAM Form FRM-000058-06, “Approved Suppliers List,” Revision 59, dated July 31, 2012
- QC Departmental Training Matrix – Record of Assigned Reading (ROAR)

**5. APPLICABLE INSPECTIONS, TESTS, ANALYSES, AND ACCEPTANCE CRITERIA (ITAAC) FROM AP1000**

This inspection was not performed as part of the NRC’s overall strategy for inspecting targeted Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) related to the functional and type testing of safety related components being supplied by Westinghouse Electric Company and their sub-suppliers as part of the AP1000 certified reactor design.