



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW, SUITE 23T85
ATLANTA, GEORGIA 30303-8931

May 20, 2008

Mr. Mark Capallo, President
Energy & Process Corporation
2146-B Flintstone Drive
Tucker, GA 30085-0125

SUBJECT: REACTIVE VENDOR INSPECTION – NRC TEAM INSPECTION REPORT
99900866/2008-001 AND NOTICE OF NONCONFORMANCE

Dear Mr. Capallo:

During the period March 31 through April 2, 2008, the U. S. Nuclear Regulatory Commission (NRC) conducted a reactive team inspection of Energy and Process Corporation. This reactive team inspection was in response to the identification of a large quantity of nonconforming reinforcing steel purchased for the Mixed Oxide Fuel Fabrication Facility (MFFF). The purpose of the inspection was to determine whether activities authorized by the construction authorization regarding the purchase of items for installation as items relied on for safety (IROFS) at MFFF were conducted safely and in compliance with NRC requirements. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. The enclosed inspection report documents the results of our reactive team inspection for the period March 31 through April 2, 2008. The results of the inspection were discussed on April 2, 2008 with you and members of your staff. A second exit meeting was held on May 13, 2008 to further discuss the characterization and number of nonconformances.

This reactive inspection examined procurement activities related to your contract with Shaw/ Areva to purchase parts that met the requirements of the MFFF's Nuclear Quality Assurance Level 1 (NQA-1) Quality Assurance Program and the requirements of 10 CFR 50 Appendix B, and 10 CFR 21. Our review of purchase orders revealed that the requirements of 10 CFR 50, Appendix B and Part 21 were invoked by the purchase of basic components, including reinforcing steel, plate steel, piping and other components for installation into IROFS at MFFF. Based on the results of this inspection, five nonconformances with the requirements of 10 CFR 50 Appendix B criteria were identified. These nonconformances are described in enclosure 1 to this letter and address problems with your surveillance and audit programs; the review for suitability of plate steel, piping and reinforcing rebar purchased for MFFF; the failure to generate corrective action documentation to address a significant condition adverse to quality; and the failure to correctly disposition an ASME B31.3 code deficiency. These nonconformances represent deficiencies with your quality assurance program that, if left unaddressed, could adversely impact the quality of safety systems, structures, and components at licensees and applicants that rely on your organization to provide safety-related parts.

You are requested to respond to this letter and should follow the instructions specified in the enclosed notice when preparing your response. The NRC will use your response, in part, to determine if further actions are necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of NRC's "Rules of Practice," this document may be accessed through the NRC's public electronic reading room, Agency-Wide Document Access and Management System (ADAMS) in the Internet at [http: www.nrc.gov/reading-rm/adams.html](http://www.nrc.gov/reading-rm/adams.html).

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Mark S. Lesser, Chief,
Construction Inspection Branch 1
Division of Construction Inspection

Docket No. 99900866

Enclosures:

1. Notice of Nonconformance
2. NRC Inspection Report 99900866/2008-001
w/attachment

cc: w/encl: (See page 3)

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cc: w/encl: (See page 3)

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Letter to M. Capallo from Mark S. Lesser dated May 20, 2008

SUBJECT: REACTIVE VENDOR INSPECTION – NRC TEAM INSPECTION REPORT
99900866/2008-001

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NOTICE OF NONCONFORMANCE

Energy & Process Corporation
2146-B Flintstone Drive
Tucker, GA 30085-0125
Docket Number 99900866

Based on the results of an NRC inspection conducted on March 31 – April 2, 2008, it appears that certain of your activities were not conducted in accordance with NRC requirements. These requirements were contractually imposed upon Energy and Process by an NRC construction certificate holder for the purchase and supply of basic components.

1. 10 CFR 50, Appendix B, Criterion X, "Inspection," requires, in part, that "a program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity."

Contrary to the above, from January 2007 through February 2008, Energy and Process performed surveillances (inspections) of fabricated reinforcing steel purchased from Commercial Metals Company Rebar Carolinas that did not verify conformance to specified documents, including the American Concrete Institute (ACI) 349, "Code Requirements for Nuclear Safety-Related Concrete Structures." The failure of Energy and Process to perform adequate surveillances that verified conformance to quality during fabrication of reinforcing steel resulted in a large quantity of nonconforming reinforcing steel, approximately 892 tons, sent to the Mixed Oxide Fuel Fabrication Facility for installation into items relied on for safety structures. (Nonconformance 99900866/08-01-01)

2. 10 CFR 50, Appendix B, Criterion XVIII, "Audits," requires in part, that "audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program."

Contrary to the above, for the period January 2007 through February 2008, audits conducted by Energy and Process were inadequate for determining the effectiveness of the quality assurance (QA) program being audited. Specifically, the audits did not contain the audit scope, objective evidence and review and summation documentation required to determine audit program effectiveness. (Nonconformance 99900866/08-01-02)

3. 10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that "measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components."

Contrary to the above, for the period January 2007 through February 2008, the commercial grade dedication processes for the procurement of piping material procured from Outokumpu, for plate steel procured from Claymont Steel, and for reinforcing steel procured from Commercial Metals Company Rebar Carolinas were inadequate in that these materials were supplied to MFFF for use in items relied on for safety structures,

systems and components without adequate review for suitability of application.
(Nonconformance 99900866/08-01-03)

4. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" requires, in part, that "in the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

Energy and Process Quality System Manual, Section XIV, Rev. 2, "Corrective Action," Item 14.3 states, "Identification of repetitive or significant conditions adverse to quality shall result in issuance of a CAR, Form #107 (Exhibit T), to the responsible vendor or internal department head, as applicable." Energy and Process Quality System Manual, Section IX, Rev. 2, "Nonconforming Material Control," Item 9.2.2 states, "Nonconformances shall be evaluated for reportability under 10 CFR Part 21."

Contrary to the above, from approximately 2007 to the date of this inspection, Energy and Process did not assure that the cause of a significant condition adverse to quality was determined in that they did not generate a Form #107 (Exhibit T) Corrective Action Request to address the failure to meet the ACI 349, "Code Requirements for Nuclear Safety-Related Concrete Structures," limits on reinforcing steel minimum bend diameter for approximately 892 tons of nonconforming reinforcing steel bars, a significant condition adverse to quality. As a consequence, Energy and Process failed to perform a root cause analysis to determine the cause of the condition, and failed to perform an extent of condition review and a 10 CFR Part 21 reportability analysis. (Nonconformance 99900866/08-01-04)

5. 10 CFR 50, Appendix B, Criterion XV, "Nonconforming Material, Parts, or Components" requires, in part, that "measures shall be established to control materials, parts, and components which do not conform to requirements in order to prevent their inadvertent use or installation."

The Energy and Process Quality System Manual, Section IX, Rev. 2, "Nonconforming Material Control," requires that the QA Manager disposition nonconforming items by: returning material to vendor; downgrading the material classification; requesting the customer to accept the item disposition with a deviation request; scrap; or rework.

ASME B31.3 Section 340 states, in part, that it is the owner's responsibility to inspect the piping to the extent necessary to be satisfied that it conforms to all applicable exam requirements of the code and of the engineering design. It further states that the owner shall have the right to inspect the piping to satisfy the owner's responsibilities. Section 341 states, in part, that inspection does not relieve the manufacturer or fabricator of the responsibility for providing components in accordance with the requirements of the Code. This Section further requires that an examined item with one or more imperfections of a type or magnitude exceeding the acceptance criteria of the Code shall be repaired or replaced.

Contrary to the above, Energy and Process, with assistance from Piping Systems, Inc., did not properly control nonconforming material and prevent its use in that they incorrectly dispositioned nonconforming material associated with Nonconformance Report 09-08 dated January 15, 2008. Specifically, on December 20, 2007, MFFF Services issued Nonconformance Report CE-07-0154, to document receipt of a piping spool piece (F0231) from an Energy and Process subcontractor, Piping Systems, Inc

containing a weld defect that did not meet the acceptance criteria of ASME B31.3, 1996 Edition, 1998 Addenda, paragraph 341.3.2 and Table 341.3.2, which limit incomplete penetration to not more than 1.5 inches in any 6 inch weld length. Energy and Process did not repair or replace the defect nor request MFFF Services to accept the item disposition with a deviation request, but dispositioned the weld defect as use-as-is by inappropriately applying allowances in ASME B31.3 Section 341.3 for acceptance, by leak testing, of joints not subject to examination. (Nonconformance 99900866/08-01-05)

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, Construction Projects Branch 1, Division of Construction Projects, Region II, Suite 23T85, 61 Forsyth St. S.W., Atlanta, Georgia, 30303-8931 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 nonconformance: (1) the reason for the nonconformance, or if contested, the basis for disputing the nonconformance; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid nonconformance; and (4) the date when your corrective action will be completed. Where good cause is shown, consideration will be given to 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 document system (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 deletes such information. If you request withholding of such material, 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 created 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.

Dated this ____ day of May 2008.

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No: 99900866

Report No: 99900866/2008-001

Certificate Holder: Energy and Process Corporation

Location: 2146-B Flintstone Drive
Tucker, GA 30085-0125

Inspection Dates: March 31 – April 2, 2008

Inspectors: B. Burgess, Senior Project Manager, Construction Projects
Branch 2, (CPB2), Division of Construction Projects (DCP),
Region II (RII)
J. Tapia, P.E., Senior Reactor Inspector, Construction Inspection
Branch 2 (CIB2), Division of Construction Inspection (DCI), RII
J. Calle, P.E., Senior Construction Inspector, CIB2, DCI, RII
P. Bell, Senior Quality Assurance Engineer, Fuel Cycle
Safety and Safeguards (FCSS), Office of Nuclear Materials
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K. Heck, Reactor Operations Engineer, Construction Quality
Vendor Branch (CVQB), Division of Construction Inspection
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D. Pasquale, Senior Operations Engineer, CQVB, NRO, HQ

Approved: Mark S. Lesser, Chief
Construction Inspection Branch 1
Division of Construction Inspection

EXECUTIVE SUMMARY

Energy & Process Corporation REACTIVE VENDOR INSPECTION NRC TEAM INSPECTION REPORT 99900866/2008-001

This reactive vendor inspection was conducted in response to the identification of a large quantity of nonconforming reinforcing steel by a team of specialists from the Office of New Reactors (NRO), the Office of Nuclear Materials Safety and Safeguards (NMSS), and Region II. The inspection team reviewed applicable documents and conducted interviews and observations of the implementation of Energy and Process Corporation's Quality Assurance plan and programs related to the supply of parts and components to support facility construction at the Mixed Oxide Fuel Fabrication Facility (MFFF) at the Savannah River Site. The inspection involved a determination of the adequacy of Energy and Process programs for the procurement, storage, and distribution of items relied on for safety (IROFS) for use in Nuclear Quality Assurance Level 1 (NQA-1) structures and systems. The inspection also focused on the identification, analysis and resolution of problems in accordance with the applicable quality assurance program based on the requirements imposed in the purchase orders. The inspectors determined that the parts and components, procured for the MFFF for installation in IROFS, invoked the applicable requirements of 10 CFR 50 Appendix B and 10 CFR 21. By virtue of entering into a contractual agreement to supply parts in accordance with 10 CFR Part 50, Appendix and 10 CFR 21 requirements, Energy and Process agreed to meeting applicable technical and administrative requirements contained in these regulatory documents. Five nonconformances were identified during this inspection. These nonconformances address team identified problems with surveillances, audits, the commercial grade dedication program, the failure to document a significant condition adverse to quality, and the failure to adequately disposition a code deficiency.

Purchasing Processes

The inspectors reviewed Energy and Process Quality Systems Manual, Rev. 6 dated 2/23/05, and implementing guidance to assure that the requirements of NQA-1 and 10 CFR 50, Appendix B, Criterion IV, "Procurement Document Control," were effectively implemented. The review included verification that customer requirements were properly translated to Energy and Process purchase orders and sub-suppliers were properly approved for the appropriate scope of supply and services as documented on the Energy and Process Approved Vendors List (AVL). The inspectors verified that Energy and Process's program for accepting and issuing safety-related purchasing documents was adequate to capture and transfer technical and quality requirements specified by the customer. No nonconformances were identified during this inspection. (Section 1)

Quality Control Inspector Certification

A review of Energy and Process's program for certification/re-certification of Quality Control (QC) inspectors was completed to determine if the program adhered to the requirements of Quality Control Procedure (QCP) 23, Qualification of Inspection/Test Personnel, Revision 3. This review evaluated a sample of qualified and re-qualified inspectors to determine if the program was effective in maintaining qualifications of QC inspectors. The inspection concluded that Energy and Process had maintained adequate certification for the three QC inspectors evaluated. No nonconformances were identified during this inspection. (Section 2)

Surveillances

The inspectors determined that the scope of Energy and Process's surveillances were limited and primarily consisted of following the documentation trail from the mill traceability report through tagging during the fabrication process, and inspection of material prior to shipment. Surveillances performed by Energy and Process did not address the fabrication process for the bending of various sizes of reinforcing steel to specific minimum bend diameters in accordance with the American Concrete Institute (ACI) 349 code. Energy and Process failed to perform surveillances that met the requirements of 10 CFR 50, Appendix B, Criterion X, "Inspection" for verifying conformance to quality during fabrication of reinforcing steel for installation into IROFS at MFFF. One nonconformance was identified in the area of Surveillances (Section 3).

Audits

The inspectors verified, by review of audit program documentation and interviews with audit personnel, that internal and external audits were conducted of suppliers of commercial grade items selected to be dedicated as a basic component. The inspection team identified that the audits conducted by Energy and Process were inadequate for determining the effectiveness of the program being audited as required by 10 CFR 50, Appendix B, Criterion XVIII, "Audits." Specifically, the audits conducted by Energy and Process did not contain audit scopes, objective evidence to determine audit program effectiveness, and review and summation documentation. One nonconformance with audits was identified during this inspection (Section 4).

Commercial Grade Dedication

The inspectors reviewed the supplier quality assurance program and supporting documents in order to assess the effectiveness of the program to control the supply of Quality Level 1 (QL-1) materials. The inspectors identified that commercial grade dedication of piping material, plate steel, and concrete reinforcing steel supplied to the MFFF did not meet 10 CFR 50, Appendix B, Criterion III, "Design Control," requirements regarding review for suitability and was not consistent with industry guidance provided in EPRI NP 5652 and Generic Letters (GL) 89-02, Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products and 91-05, Licensee Commercial-Grade Procurement and Dedication Programs. One nonconformance against 10 CFR 50, Appendix B, Criterion III, "Design Control" was identified for inadequate commercial grade dedication for procurement of piping material from Outokumpu, for plate steel procured from Claymont Steel, and for reinforcing steel procured from CMC Rebar Carolinas. As a consequence, Energy and Process sent various materials to MFFF that were not adequately reviewed for suitability of application for use in IROFS structures, systems and components (Section 5b).

Corrective Actions

The inspection team determined that a nonconforming deficiency related to the reinforcing steel bend diameter, a significant condition adverse to quality, was not properly documented and evaluated as required by 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." The failure to generate the appropriate corrective action documentation to address a significant condition adverse to quality, approximately 892 tons of reinforcing steel that did not meet the ACI Code requirements, was a nonconformance with 10 CFR 50, Appendix B, Criterion XVI, (Section 6b). The inspection team also determined that Energy and Process incorrectly dispositioned a B31.3

Code defect subsequently identified by the owner. The failure to correctly disposition an ASME B31.3 Code deficiency was a nonconformance with 10 CFR 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, and Components." (Section 6b).

REPORT DETAILS

1.0 Purchasing Processes

a. Scope

The inspection evaluated the adequacy of Energy and Process's Quality Systems Manual, Rev. 6 dated 2/23/05. Specifically, Section 4.0 "Procurement Control," of the Quality Systems Manual was reviewed against the requirements of NQA-1 and 10 CFR 50, Appendix B, Criterion IV, Procurement Document Control, to determine if the purchase of parts was being effectively implemented. This review also verified that customer requirements were transferred to Energy and Process purchase orders before sending to active sub-suppliers approved for the appropriate scope of supply and services as documented on the Energy and Process AVL.

b. Observations and Findings

The requirement to transfer customer requirements to Energy and Process purchase orders was augmented by Energy and Process by including a separate form (#111) with each safety-related purchase order to furnish any additional information or requirements not provided on the customer's Purchase Order (PO). Form #111 becomes part of, and was distributed with copies of the Energy and Process PO. Additionally, Energy and Process referenced the appropriate customer purchasing specifications and/or engineering drawings with each item procured from a sub-supplier. Energy and Process has a process that will, when necessary, attach copies of customer documents to their PO to be distributed to their sub-suppliers. Inspection activities included the review of a sample of Shaw/Areva MFFF purchase orders to Energy and Process. In addition, the inspectors reviewed three safety-related purchase orders issued by Energy and Process to their sub-suppliers and the AVL for the three suppliers addressed on the POs. The inspectors also interviewed the Energy and Process sales representative for the MOX project to ascertain the process used by Energy and Process to procure items to contract and Quality Assurance program requirements.

c. Conclusions

Energy and Process's program for accepting and issuing safety-related purchasing documents was adequate to capture and transfer technical and quality requirements specified by the customer. No nonconformances were identified as a result of the inspection of purchasing documents.

2.0 Quality Control Inspector Certification

a. Scope

A review of Energy and Process's program for certification/re-certification of Quality Control (QC) inspectors was completed to determine if the program adhered to the requirements of Quality Control Procedure (QCP) 23, Qualification of Inspection/Test Personnel, Revision 3. This review evaluated a sample of qualified and re-qualified inspectors to determine if the program was effective in maintaining qualifications of QC inspectors.

b. Observations and Findings

The Energy and Process document governing the certification/re-certification of QC inspectors was QCP 23, Qualification of Inspection/Test Personnel, Revision 3, dated 08/18/98. Successful certification was predicated on the successful completion of six activities; 1) a high school diploma or equivalent, 2) successful completion of a written examination, 3) successful completion of a proficiency examination, 4) a documented annual eye examination, 5) completion of training to the technical objectives of their work, including all applicable Energy and Process corporate procedures for inspection/test personnel, and 6) completion of on-the-job training under the direct supervision of a qualified inspector, trained test technician, or the QA Manager. An inspection of certification documents for three Energy and Process certified QC inspectors indicated that all the stated conditions had been satisfied and documented.

c. Conclusions

The inspectors concluded that Energy and Process had maintained adequate certification for the three QC inspectors evaluated. No nonconformances were identified as a result of this review.

3.0 **Surveillances**

a. Scope

The inspectors reviewed the following documents: procurement documents relating to the scope of QA/QC responsibilities delegated to the contractor; plans and activities relating to the attainment of surveillance objectives; information on previously identified deficiencies including planned corrective actions; surveillance plans for adequacy including scope and overall surveillance objectives; and records related to qualification of individuals assigned to perform surveillances.

b. Observations and Findings

Energy and Process Corporation's Quality System Program establishes a Quality System in accordance with ASME Section III, NCA-3800, WA-3800, and 10 CFR 50 Appendix B and Nuclear Quality Assurance Level 1 (NQA-1) Basic Requirements. The inspectors reviewed section 8.5 of the Energy and Process Quality Systems Manual, which established the surveillance program. No implementing guidance for conduct of surveillances was available in the Energy and Process QC procedures or other documentation made available to the inspectors. The Energy and Process Quality Systems Manual stated that surveillances were not mandatory; i.e., "The QA manager may perform source inspection and/or program surveillance (Form #109) of a vendor to ascertain that he is complying with his quality system program and that purchased material complies with all aspects of the specification and/or purchase order."

Based on examination of 70 documented Energy and Process surveillances conducted during fabrication of reinforcing steel at Commercial Metals Company (CMC) Rebar Carolinas, the inspectors determined that neither the Energy and Process qualification audit of CMC nor the surveillances conducted during fabrication of the reinforcing steel for MOX Services were sufficient to meet the 10 CFR 50 Appendix B, Criterion X

“Inspection,” standards for fabrication of materials. 10 CFR 50, Appendix B Criterion were invoked by the purchase orders that specified reinforcing steel as a basic component that would be installed in IROFS applications. The surveillances for reinforcing steel, documented on Form #109, did not contain specific surveillance objectives or a scope of inspection. The scope of the surveillances focused primarily on tracking the documentation trail from the mill traceability report through shop tagging during the fabrication process, and inspection of material prior to shipment. Further, the scope of the qualification audit was limited to an evaluation of material traceability and did not address the fabrication process. The fabrication process for reinforcing steel involved bending various sizes of reinforcing steel to specific minimum bend diameters in accordance with the ACI 349 code. The Energy and Process AVL for CMC Rebar Carolinas identifies the subcontractor as a commercial grade supplier, accepted for material traceability. Of note, the inspection team observed that no deficiencies or rejected materials were identified or documented in the surveillances conducted by Energy and Process during the time period from January 2007 through February 2008.

10 CFR 50, Appendix B, Criterion X, “Inspection”, and NQA-1 requires, in part, that “a program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity.” The failure of Energy and Process to perform surveillances that met the requirements of 10 CFR 50, Appendix B, Criterion X, “Inspection,” for verifying conformance to quality during the fabrication of reinforcing steel for installation into IROFS at the MFFF is a nonconformance. (Nonconformance 99900866/08-01-01)

c. Conclusions

The inspectors determined that the scope of Energy and Process surveillances of CMC Rebar Carolinas process activities were limited and primarily consisted of following the documentation trail from the mill traceability report through tagging during the fabrication process, and inspection of material prior to shipment. The Energy and Process surveillances did not address the fabrication process for the bending of various sizes of reinforcing steel to specific minimum bend diameters in accordance with the ACI 349 code. The failure of Energy and Process to perform surveillances that met the requirements of 10 CFR 50, Appendix B, Criterion X, “Inspection,” for verifying conformance to quality during fabrication of reinforcing steel for installation into IROFS at MFFF is a nonconformance.

4.0 Audits

a. Scope

The inspectors reviewed the audit system used by Energy and Process to verify compliance with all aspects of the quality assurance program. This inspection also evaluated the effectiveness of quality processes by sampling various aspects of Energy and Process’s quality program implementation. Supplemental sections of the Energy and Process Quality System that were evaluated for implementation of auditing program requirements included the following:

- Verification of requirements for qualification of quality assurance audit personnel

- Verification that organizational responsibilities for the selection of audit personnel were independent from activities audited
- Verification that Energy and Process's sub-suppliers technical and quality capabilities were determined by direct evaluation of their facilities, personnel, and implementation of their quality assurance program
- Verification that sub-supplier performance evaluations established appropriate measures to verify performance
- Verification that the planning of audits included identification of relative importance and complexity of the function being audited
- Verification that source evaluation and selection were determined based on the items complexity and importance to safety

b. Observations and Findings

The inspection team reviewed and evaluated the audit program and identified that the Energy and Process QA manager relied on audits performed by outside organizations as a basis for validating and verifying their compliance with NQA-1 and 10 CFR 50, Appendix B requirements. Consequently, Energy and Process QA personnel interviewed by the team were unable to describe which of the applicable portions of Appendix B and NQA-1 programs were a part of their quality program as stated in the Energy and Process Quality Systems Manual.

The inspection team reviewed Energy and Process procedures and standards, used to conduct both internal and external audits, and identified that audit procedures and checklists were not comprehensive in scope and did not provide objective evidence that would support evaluation of audit results for activities important to safety. Energy and Process's audit program was based on audit checklists used by Appendix B and NQA-1 auditors from previous audits. Furthermore, evaluation of these audit checklists identified that they were completed by paraphrasing the requirements taken from audit organizations and consequently lacked objective evidence that would be used to determine the effectiveness of the program being audited. Specifically, the audits did not contain the scope, review, and summation documentation associated with audits conducted in compliance with 10 CFR 50, Appendix B, Criterion XVIII, "Audits."

10 CFR 50, Appendix B, Criterion XVIII, "Audits," requires in part, that "audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program." Audits conducted by Energy and Process, both internally and of vendors, were inadequate for determining the effectiveness of the quality assurance program in that they did not contain sufficient objective evidence to evaluate the program being audited. The audits reviewed by the inspectors for the period January 2007 through February 2008 did not contain the standard scope, review, and summation documentation needed to evaluate the effectiveness of the quality assurance program being audited." (Nonconformance 99900866/08-01-02)

c. Conclusions

The inspection team identified that the audits conducted by Energy and Process were inadequate for determining the effectiveness of the program being audited as required by 10 CFR 50, Appendix B, Criterion XVIII, "Audits." Specifically, the inspectors

identified that audits conducted by Energy and Process did not contain the standard scope, review, and summation documentation required to determine program effectiveness. One nonconformance with audits was identified during the inspection.

5.0 Review of Commercial Grade Dedication (Energy and Process Materials Supplied to MFFF)

a. Scope

The inspectors reviewed the supplier Quality Systems Manual and supporting documents in order to assess the effectiveness of the program to control the supply of safety-related or items relied on for safety materials. Specifically, the commercial grade dedication of piping material, plate steel, and concrete reinforcing steel supplied to the MFFF was reviewed to determine the methodology used by Energy and Process to dedicate commercial grade items for use in IROFS structures and systems. These reviews evaluated conformance of the quality assurance processes and documents used to meet 10 CFR 50, Appendix B, Criterion III, "Design Control," and guidance provided in EPRI NP-5652 and NRC Generic Letters (GL) 89-02, Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products and 91-05, Licensee Commercial-Grade Procurement and Dedication Programs, associated with their commercial grade dedication programs.

b. Observations and Findings

One nonconformance was identified for failure to meet 10 CFR 50, Appendix B, Criterion III, "Design Control" requirements for three items purchased as commercial grade that required commercial grade dedications before installation into IROFS at MFFF. For commercially procured items, a commercial grade dedication process is used to provide reasonable assurance that the item procured is suitable for application in safety related or IROFS structures, systems and components.

(1) Commercial Grade Dedication of Piping Material

The commercial grade dedication of piping material supplied to MFFF under customer PO S10888-S1384 was reviewed. Piping material was purchased as commercial grade from material manufacturer Outokumpu. The piping material was dedicated at Energy and Process and then forwarded to Piping Systems, Inc. for welding activities. The QC Inspection Plan Form #105, dated 2/25/08, for ASTM/ASME Grade SA-312 Stainless Steel Pipe Type 304L was reviewed for compliance to QCP 11, "Commercial Grade Item Dedication," Revision 2, dated August 8, 1996, in the performance of a commercial grade dedication. QCP 11.3 stated that the QA Manager was responsible for establishing the methodology of identifying and verifying critical characteristics. Further, QCP 11.4.7 required that a commercial grade dedication specification (CGDS) identify the critical characteristics of the item to be validated and that Form #105 become the CGDS. Form #105, "QC Inspection Plan," used by Energy and Process for dedication of commercial grade piping procured from Outokumpu, did not specify critical characteristics required for commercial grade dedication. Instead, the form listed attributes that only included general design characteristics associated with the piping being procured. The inspectors concluded that the commercial grade dedication of the piping material supplied to MFFF was inadequate in verifying the suitability of the item

for its intended application as required by 10 CFR 50, Appendix B, Criterion III, "Design Control."

An issue identified with Form #105 was associated with QCP 11.6.3, which stated: "Appropriate quantitative criteria shall be specified for the critical characteristics to allow for acceptance." The Form #105 reviewed for the purchase of piping from Outokumpu did not specify the appropriate quantitative criteria that would verify acceptability of the critical characteristics. Therefore, the QC Inspector did not have the required information to determine that all of the required critical characteristics were satisfied. Although Form #105 referred to the applicable Certified Material Test Report (CMTR), which documented some of the applicable quantitative criteria, this information was not reviewed as part of the commercial grade dedication process by the QC inspector. The information captured in the CMTR only addressed a portion of the attributes listed in the Form #105.

(2) Commercial Grade Dedication of Plate Steel

The commercial grade dedication of ASTM Grade A572 plate material supplied to Specialty Maintenance Construction Incorporated (SMCI) under MFFF PO 24095 was reviewed. Plate material was purchased as commercial grade from Claymont Steel and then direct shipped to SMCI. Several QC Inspection Plan Form #105s (dated 1/1/06, 11/2/06, 11/3/06, and 11/8/06) for the plate steel were reviewed for compliance to QCP 11 in the performance of the commercial grade dedication. The completed Form #105s stated that the majority of the attributes were to be verified by SMCI. QCP 11 did not have a provision to require SMCI to conduct the verification of critical characteristics as part of the commercial grade dedication process. Also, QCP 11.3 stated that the Energy and Process QA Manager was responsible for performing commercial grade dedication evaluations. There was no objective evidence that the QA Manager or any authorized representative at Energy and Process reviewed the applicable Form #105 for the commercial grade dedication process of plate material. The team concluded that the commercial grade dedication of the plate material supplied to MFFF was inadequate in verifying the suitability of the item for its intended application as required by 10 CFR 50, Appendix B, Criterion III, "Design Control."

(3) Commercial Grade Dedication of Concrete Reinforcing Steel

The supply of #11 reinforcing steel by Energy and Process for MFFF under Customer PO 10888-S1383 was reviewed. Supply of concrete reinforcing steel was subcontracted by Energy and Process to CMC Rebar Carolinas. Concrete reinforcing steel was purchased from CMC as a commercial grade item. Material testing of the reinforcing steel for compliance to ASTM-615 requirements was performed for Energy and Process by STORK, a testing laboratory. Once testing was completed, reinforcing steel was shipped directly from CMC to MFFF. QCP 11.4.7 specified the use of Form #105 to document the critical characteristics of the item(s) to be validated as part of the commercial grade dedication. According to QCP 11.4.7, Form #105 becomes the commercial grade dedication specification. However, in this case, instead of Form #105, Energy and Process used Surveillance Form #109. Form #109 only documented traceability of the reinforcing steel and did not capture any verification of critical characteristics required by Energy and Process's commercial grade dedication process per QCP 11.

In addition, MFFF (Shaw/Areva) conducted a surveillance of the commercial grade dedication process on 2/21/08 and documented numerous weaknesses with Energy and Process's commercial grade dedication process of reinforcing steel. In response, Energy and Process generated CAR #02-08, dated 2/22/08, referencing the MFFF surveillance and Energy and Process's proposed corrective action. Energy and Process documented that although they did not use the required QC Inspection Plan (Form #105); Form #109 was the appropriate form. Energy and Process stated that Form #109 was used for verification of the fabrication of dedicated reinforcing steel based on pre-award submittals of Energy and Process's Quality Execution Plan and was discussed with MFFF (Duke, Cogema, Stone and Webster) during pre-award meetings. Energy and Process's corrective action proposed the continued use of Form #109, but with sufficient detail on the form and/or records attached to adequately document inspection of the concrete reinforcing steel. In addition, Energy and Process indicated that they will work with MFFF to develop a unique commercial grade dedication plan for concrete reinforcing steel. The team observed that the use of a modified Form #109, combined with a unique concrete reinforcement steel dedication plan, would help resolve some of the dedication problems, such as the lack of designated critical characteristics, observed by the inspection team.

Another problem was identified in connection with issues regarding documenting critical characteristics. The applicable MFFF construction specification required that ACI Code 315, "Details and Detailing of Concrete Reinforcement and ACI-349, "Code Requirements for Nuclear Safety-Related Concrete Structures" be met. Energy and Process was questioned regarding minimum bend diameter measurement of the fabricated reinforcement steel. Energy and Process indicated that their interpretation of ACI Code 315 identified minimum bend diameter as a non-mandatory attribute and therefore did not recognize this requirement as a critical characteristic of the fabricated reinforcement steel. However, Energy and Process had inappropriately disregarded the requirements for meeting minimum bend diameter as specified in ACI-349. Instead, Energy and Process based their interpretation strictly on ACI Code 315. Consequently, Energy and Process did not include the verification of minimum bend diameter in the commercial grade dedication of fabricated reinforcing steel, resulting in approximately 892 tons of concrete reinforcing steel identified as non-conforming to the ACI 349 code. The team concluded that the commercial grade dedication of the concrete reinforcement steel supplied to MFFF was inadequate in verifying the suitability of the item for its intended application as required by 10 CFR 50, Appendix B, Criterion III, "Design Control."

10 CFR 50, Appendix B, Criterion III, "Design Control," requires, in part, that "measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the structures, systems and components." For the period January 2007 through February 2008, the commercial grade dedication process for the procurement of piping from Outokumpu, for plate steel procured from Claymont steel, and for reinforcing steel procured from CMC Rebar Carolinas was inadequate in that these materials were supplied to MFFF without adequate review for suitability of application of materials for use in IROFS structures, systems and components (Nonconformance 99900866/08-01-03).

c. Conclusions

The inspectors identified several problems with the commercial grade dedication of piping material, plate steel, and concrete reinforcing steel supplied to the MFFF regarding adherence to industry guidance specified in EPRI NP 5652 and GLs 89-02 and 91-05. Collectively, these problems were characterized as one nonconformance against 10 CFR 50, Appendix B, Criterion III, "Design Control" for inadequate commercial grade dedication for procurement of piping material from Outokumpu, for plate steel procured from Claymont Steel, and for reinforcing steel procured from CMC Rebar Carolinas. As a consequence, Energy and Process sent various materials to MFFF that were not adequately reviewed for suitability of application of materials for use in IROFS structures, systems and components.

6.0 **Corrective Actions**

a. Scope

The inspection team reviewed the nonconforming deficiency related to the reinforcing steel bend diameter to determine if it was evaluated for potential adverse effects and included a root-cause analysis because it represented a significant condition adverse to quality. The inspection team also reviewed significant conditions adverse to quality to determine whether 10 CFR 21 evaluations and notifications were performed. Specific attributes of the Energy and Process Quality System that were subject to review during this portion of the inspection included:

- Verification that the corrective action program contained appropriate provisions to ensure that conditions adverse to quality were promptly identified and corrected.
- Verification that criteria for determining a significant condition adverse to quality were established and those significant conditions adverse to quality were evaluated for their extent and impact.
- Verification that, for significant conditions adverse to quality, the root cause of the condition and the corrective actions to prevent recurrence were documented.
- Verification that procurement documents included the reporting of defects and noncompliances as required by 10 CFR 21.

b. Observations and Findings

Regulatory requirement 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that "in the case of significant conditions adverse to quality, measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition." 10 CFR 50, Appendix B, Criterion XVI was invoked in the purchase order for supplying commercial grade reinforcing steel to MFFF as a basic component subject to 10 CFR 21 requirements. The inspectors identified that the Energy and Process Quality System Manual, Section XIV, Rev. 2, "Corrective Action," required that significant conditions adverse to quality result in issuance of a CAR. Specifically, Item

14.3 states that identification of significant conditions adverse to quality shall result in issuance of a CAR, Form #107, to the responsible vendor. Subsequent to being informed by MFFF Services that a substantial portion of the reinforcing steel provided by Energy and Process did not meet the ACI 349, "Code Requirements for Nuclear Safety-Related Concrete Structures," limits on reinforcing steel minimum bend diameter, Energy and Process did not generate a CAR. The substantive number of reinforcing steel bars that were nonconforming (approximately 892 tons) represented a significant condition adverse to quality. Further, while the CAR form required a determination of probable cause, it did not require an extent of condition determination nor a 10 CFR 21 review. Energy and Process failed to consider the deficiency a significant condition adverse to quality based on their interpretation of the purchase documents. The failure to generate the appropriate corrective action documentation to address the ACI Code deficiency was a nonconformance with 10 CFR 50, Appendix B Criterion XVI, "Corrective Action," and Energy and Process's Quality System Manual Section XIV requirements (Nonconformance 99900866/08-01-04). As a consequence of the failure to generate a CAR or a Nonconformance Report, Energy and Process also failed to determine a cause and take actions to preclude repetition and perform a 10 CFR 21 reportability analyses.

With respect to reportability, Energy and Process Quality System Manual, Section IX, Rev. 2, "Nonconforming Material Control," required that nonconformances be evaluated for reportability under 10 CFR 21. A 10 CFR 21 analysis was not performed because Energy and Process considered minimum bend diameter a non-mandatory requirement. The underlying cause for the failure to perform a 10 CFR 21 analysis was a failure to generate a CAR, which would have been the first required step for evaluating a significant condition adverse to quality. The failure to perform a 10 CFR 21 analysis is a consequence of the failure to generate a CAR; therefore, the failure to perform a 10 CFR 21 analysis will not be cited. Had a 10 CFR 21 analysis been completed by Energy and Process, the analysis should have included an evaluation to determine if the nonconformance associated with concrete reinforcing steel existed at other facilities and a determination as to compliance with ACI Code requirements for those purchase orders. This is particularly significant because the NRC inspectors determined that Energy and Process had provided fabricated (bent) reinforcing steel to other nuclear power plant facilities. It should be noted that Shaw/Areva issued a voluntary 10 CFR 21 notification for the nonconforming reinforcing steel at MFFF on April 4, 2008.

The inspectors also performed a review of documents related to the Energy and Process supply of stainless steel pipe for embedded drains. Energy and Process provided MFFF Services with pipe from Piping Systems, Inc. On December 20, 2007, MFFF Services issued Nonconformance Report CE-07-0154 to document receipt of a piping spool piece (F0231) that contained a weld that exceeded the ASME B31.3, 1996 Edition, 1998 Addenda criteria. The weld defect did not meet the acceptance criteria of ASME B31.3, paragraph 341.3.2 and Table 341.3.2 which limit incomplete penetration to not more than 1.5 inches in any 6 inch weld length. Energy and Process subsequently generated Nonconformance Report 09-08, dated January 15, 2008, to address the MFFF Nonconformance Report. Energy and Process, with assistance from Piping Systems, Inc., incorrectly dispositioned the weld defect as use-as-is or acceptable based on allowances in ASME B31.3 Section 341.3 for acceptance, by leak testing, of joints not subject to examination. The Energy and Process QA Manager did not request MFFF Services to accept the item disposition with a deviation request. ASME B31.3 Section 340 states that it is the owner's responsibility to inspect the piping to the extent necessary to be satisfied that it conforms to all applicable exam requirements of the

code and of the engineering design. It further states that the owner shall have the right to inspect the piping to satisfy the owner's responsibilities. Section 341 states that inspection does not relieve the manufacturer or fabricator of the responsibility for providing components in accordance with the requirements of the Code. The Section further requires that an examined item with one or more imperfections of a type or magnitude exceeding the acceptance criteria of the Code shall be repaired or replaced. Energy and Process incorrectly dispositioned a Code defect subsequently identified by the owner. MFFF Services subsequently replaced the defective weld. The MFFF Nonconformance Report disposition was to cut out and re-weld Spool F0231 weld D.

As a consequence of the disposition, ASME B31.3 Code requirements were not satisfied. The purchase order from MFFF for this piping spool piece invoked the requirements of 10 CFR 50 Appendix B. The regulatory requirement to control material, parts and components is contained in 10 CFR 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, or Components," and requires that "measures shall be established to control materials, parts and components which do not conform to requirements to prevent their inadvertent use or installation." The failure to correctly disposition the ASME B31.3 Code deficiency was a nonconformance with the requirements of 10 CFR 50, Appendix B, Criterion XV, in that nonconforming material was not properly prevented from use (Nonconformance 99900866/08-01-05).

c. Conclusions

The inspection team determined that a nonconforming deficiency related to the reinforcing steel bend diameter, a significant condition adverse to quality, was not properly documented and evaluated as required by 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action." The failure to generate the appropriate corrective action documentation to address a significant condition adverse to quality, approximately 892 tons of reinforcing steel that did not meet the ACI Code requirements, was a nonconformance with 10 CFR 50, Appendix B, Criterion XVI. The inspection team also determined that Energy and Process incorrectly dispositioned a B31.3 Code defect subsequently identified by the owner. The failure to correctly disposition an ASME B31.3 Code deficiency was a nonconformance with 10 CFR 50, Appendix B, Criterion XV, "Nonconforming Materials, Parts, and Components."

7.0 Exit Meeting Summary

The NRC inspectors presented inspection findings and results to members of Energy and Process's management team following the inspection on April 2, 2008. A re-exit was held on May 13, 2008 to discuss re-characterization of the nonconformances as 10 CFR 50, Appendix B issues and the addition of two nonconformances regarding audits and surveillances. Energy and Process's management acknowledged the findings presented and indicated that a review of the report would be completed before a response would be sent. Although proprietary documents may have been reviewed during this inspection, the proprietary nature of these documents or processes was deleted from this report.

SUPPLEMENTAL INFORMATION
PARTIAL LIST OF PERSONS CONTACTED

Energy and Process Corporation

Mark Capallo, President
Charles E. Thornton, QA Manager
Douglas Walker, Operations Manager

INSPECTION PROCEDURE USED

IP 88155 Supplier/Vendor Inspection (Construction Phase)

ITEMS OPENED, CLOSED, AND DISCUSSED

<u>Opened:</u>	<u>Type</u>	<u>Summary</u>
Nonconformance 99900866/08-01-01	NC	Failure to perform surveillances that met the requirements of 10 CFR 50, Appendix B, Criterion X, "Inspection" for verifying conformance to quality during the fabrication of reinforcing steel for installation into IROFS at the MFFF
Nonconformance 99900866/08-01-02	NC	Failure to perform Audits that met 10 CFR 50, Appendix B, Criterion XVIII in that the audits were inadequate for determining the effectiveness of the quality assurance program being audited
Nonconformance 99900866/08-01-03	NC	Failure to generate a commercial grade dedication package that identified critical characteristics and provide clear guidance on the means to dedicate commercially procured items
Nonconformance 99900866/08-01-04	NC	Failure to generate the appropriate Corrective Action documentation to address an ACI Code deficiency
Nonconformance 99900866/08-01-05	NC	Failure to correctly disposition an ASME B31.3 Code deficiency

Closed and Discussed: None

PARTIAL LIST OF DOCUMENTS REVIEWED

Quality Assurance/Quality Control Documents

Energy and Process Quality System Manual, Section IV, Rev. 5, "Procurement Control"
 Energy and Process Quality System Manual, Section VIII, Rev. 5, "Vendor Qualification" Energy
 and Process Quality System Quality System Manual, Section IX, Rev. 2, "Nonconforming
 Material Control"
 Energy and Process Quality System Manual, Section XII, Rev. 3, "Internal Audit Management
 Reviews"
 Energy and Process Quality System Manual, Section XIV, Rev. 2, "Corrective Action"
 Energy and Process Quality Control Procedure 5, Quality Control Inspection, dated 1/30/98
 Energy and Process Quality Control Procedure 11, Commercial Grade Item Dedication, dated
 8/8/96
 Energy and Process Quality Control Procedure 14, Auditor Qualification and Certification, Rev.
 1, 3/22/96
 Energy and Process Quality Control Procedure 16, Rev. 1, "Reporting of Defects and
 Noncompliance"
 Energy and Process Quality Control Procedure 20, Receiving Inspection, dated 9/20/95
 Energy and Process Quality Control Procedure 23, Qualification of Inspection/Test Personnel,
 dated 8/18/98
 Energy and Process Quality Control Procedure 24, Commercial Grade Orders, dated 1/7/94
 Energy and Process Vendor Surveillance Report (Form 109), Piping Systems Inc., dated 2/21-
 22/07
 Energy and Process Vendor Evaluation (Form 101), Piping Systems Inc., dated 5/17-18/06

Miscellaneous Documents

Duke, Cogema, Stone & Webster Transmittal No. DCS-Vendor 002275, 10/9/06
 Mox Services, LLC Transmittal No. DCS-Vendor-002714, 3/8/07
 Approved Vendors List, Rev 03/08, Dated 3/28/2008 CMC Rebar Carolinas, Revision 1, Dated
 2/28/2007, "Accepted for Manufacture & Traceability of Commercial Rebar"

Purchase Documents

PO Package 10888-S1383 to MOX (Reinforcing Steel)
 PO Package S10888-S1384 (Piping for MOX)
 PO Package 24095 (Plate Material to SMCI – Eventually for MOX use)
 PO 10888-S1383 Shop Inspection Procedures Submitted to Shaw/Areva Mox Services and
 Approved per Contract Requirements
 PO 10888-S1383 Quality Assurance/Quality Control Procedures Submitted To Shaw/Areva Mox
 Services and Approved per Contract Requirements

Corrective Action Documents

Corrective Action Request #02-08 dated 2/22/08
 Energy and Process Nonconformance Report 09-08

Personnel Qualification Records

Energy and Process Personnel Qualification Binder

Certified Material Test Reports

Energy and Process CMTR Mox Invoice No. 8500825641
 Energy and Process CMTR Mox Invoice No. 8500826491
 Energy and Process CMTR Mox Invoice No. 8500830697
 Energy and Process CMTR Mox Invoice No. 8500810801
 Energy and Process CMTR Mox Invoice No. 8500829545
 Energy and Process CMTR Mox Invoice No. 8500822250
 Energy and Process CMTR Mox Invoice No. 8500830489
 Energy and Process CMTR Mox Invoice No. 8500831807
 Energy and Process CMTR Mox Invoice No. 8500833917
 Energy and Process CMTR Mox Invoice No. 8500838974

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ACI	American Concrete Institute
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AVL	Approved Vendors List
CAR	Corrective Action Request
CFR	Code of Federal Regulations
CGD	Commercial Grade Dedication
CGDS	Commercial Grade Dedication System
CMC	Commercial Metals Company
CMTR	Certified Material Test Report
EPRI	Electric Power Research Institute
GL	Generic Letter
IROFS	Item Relied On For Safety
ISO	International Standards Institute
MFFF	Mixed Oxide Fuel Fabrication Facility
NC	Nonconformance
NQA-1	Nuclear Quality Assurance Level 1
NRC	Nuclear Regulatory Commission
NRO	Office of New Reactors
NMSS	Office of Nuclear Materials Safety and Safeguards
PDR	Public Document Room
PO	Purchase Order
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Procedure
RII	Region II
SMCI	Specialty Maintenance Construction Incorporated