



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, DC 20555 - 0001**

April 15, 2004

Mr. Brij M. Bharteey, President  
Spectrum Technologies  
Utilities Services USA, Incorporated  
112 Erie Boulevard  
Schenectady, New York 12305

**SUBJECT: NRC INSPECTION REPORT and NOTICE of NONCONFORMANCE (NON)  
99901350/2004-201, CORRECTION of VENDOR DOCKET NUMBER**

Dear Mr. Bharteey:

By letter dated March 19, 2004, this office issued NRC Inspection Report and NON 99901350/2004-201 to Spectrum Technologies. We have discovered that we inadvertently used the wrong vendor docket number. The correct vendor docket number for Spectrum Technologies is 99901119. The year and sequential report number remain the same. We regret this error and hope it has not caused you any inconvenience. We have corrected our records accordingly, including the copies in the publicly accessible ADAMS library. Enclosed are the NON and inspection report with the docket number corrected. No action on your part is needed; except we recommend you destroy all copies with the wrong docket number.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the publically accessible portion of the NRC's Agency Document and Management System (ADAMS). Should you have any questions concerning this matter, please contact Mr. Stephen Alexander at 301-415-2995 or by e-mail at [sda@nrc.gov](mailto:sda@nrc.gov).

Sincerely,

*/RA/*

Theodore R. Quay, Chief  
Plant Support Branch  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

Docket No. 99901119

Enclosures:           1. Notice of Nonconformance  
                          2. Inspection Report 99901119/2004-201

cc:     Mr. William R. Willis, Vice President  
          Quality Assurance  
          Spectrum Technologies Utilities Services USA, Incorporated  
          112 Erie Boulevard  
          Schenectady, New York 12305

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2. Inspection Report 99901119/2004-201

cc: Mr. William R. Willis, Vice President, Quality Assurance, Spectrum Technologies  
112 Erie Boulevard, Schenectady, New York 12305

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DATE	4/13/04		04/14/04		04/15/04				

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## NOTICE OF NONCONFORMANCE

Spectrum Technologies  
Utilities Services USA, Incorporated

Docket No.: 99901119  
Inspection Report No.: 2004-201

Based on the results of an inspection conducted on February 2 through 5, 2004, it appeared that certain activities of Spectrum Technologies Utilities Services USA, Incorporated (Spectrum) were not conducted in accordance with NRC requirements as set forth below:

- A. Criterion II, "Quality Assurance Program," of 10 CFR Part 50, Appendix B, states, in part, that the quality assurance program shall provide control over activities affecting the quality of the identified structures, systems, and components, to an extent consistent with their importance to safety. Activities affecting quality shall be accomplished under suitably controlled conditions. Controlled conditions include assurance that all prerequisites for the given activity have been satisfied.

Criterion V, "Instructions, Procedures, and Drawings," of 10 CFR Part 50, Appendix B, states, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Section 5.0, "Instructions, Procedures and Drawings," of Spectrum's Quality Assurance Manual (QAM), Revision 4, dated March 22, 1992, stated in part: "All activities affecting quality shall be prescribed and performed in accordance with documented instructions, procedures or drawings" and also stated in part: "Instructions, procedures or drawings shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished."

1. Contrary to the above, as of February 5, 2004, Spectrum had not established any procedures or instructions officially to prescribe the utilization of and compliance with Spectrum "Policy Memoranda" which were intended to govern various activities affecting quality. Although Spectrum personnel were unofficially required to comply with the memoranda, the documents had not been formally incorporated into the QA program. Nonconformance 99901119/2004-201-01.
  2. Contrary to the above, as of February 5, 2004, Spectrum had not established adequate procedures or instructions to ensure that the quantitative and qualitative acceptance criteria, delineated in Spectrum's Policy Memoranda documents, were appropriately specified in Spectrum's "Acceptance Test Procedures." Nonconformance 99901119/2004-201-02.
- B. Criterion III, "Design Control," of 10 CFR Part 50, Appendix B, requires in part, that measures be established to assure that applicable regulatory requirements and the design basis . . . are correctly translated into specifications, drawings, procedures, and

instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Criterion V, "Instructions, Procedures, and Drawings," of 10 CFR Part 50, Appendix B, states, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Section 5.0, "Instructions, Procedures and Drawings," of Spectrum's Quality Assurance Manual (QAM), Revision 4, dated March 22, 1992, stated in part: "All activities affecting quality shall be prescribed and performed in accordance with documented instructions, procedures or drawings" and also stated in part: "Instructions, procedures or drawings shall include or reference appropriate quantitative or qualitative acceptance criteria for determining that prescribed activities have been satisfactorily accomplished."

Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50, requires, in part, that a test program be established to assure that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents...Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions.

Contrary to the above, as of February 5, 2004, some of Spectrum's generic test procedures lacked certain pertinent references, failed to specify appropriate measuring and test equipment, omitted certain pertinent tests, or lacked adequate specificity when prescribing certain test steps, test parameters or acceptance criteria. Nonconformance 99901119/2004-201-03.

- C. Criterion VIII, "Identification and Control of Materials, Parts, and Components," of Appendix B to 10 CFR Part 50, requires, in part, that measures be established for the identification and control of materials, parts, and components, including partially fabricated assemblies. These measures shall assure that identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of the item. These identification and control measures shall be designed to prevent the use of incorrect or defective material, parts, and components.

Contrary to the above, as of February 5, 2004, Spectrum had not uniquely or adequately identified some components in its dedication and qualification specimen library such that the components were no longer traceable to their item-specific performance records.  
Nonconformance 99901119/2004-201-04.

Please provide a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Chief, Plant Support Branch, Division of Inspection Program Management, Office of Nuclear Reactor Regulation, 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) a description of steps that have been or will be taken to correct these items; (2) a description of steps that have been or will be taken to prevent recurrence; and (3) the dates your corrective actions and preventive measures were or will be completed.

Dated at Rockville, Maryland  
this 19 day of March, 2004

**U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR REACTOR REGULATION**

**Report No:** 99901119/2004-201

**Organization:** Spectrum Technologies Utilities Services USA, Incorporated  
112 Erie Boulevard  
Schenectady, New York 12305

**Vendor Contact:** Mr. William R. Willis, Vice President  
Quality Assurance  
(518) 382-0058

**Nuclear Industry Activity:** Spectrum Technologies Utilities Services USA, Incorporated (Spectrum) performs commercial-grade dedication services (including seismic and environmental qualification) and supplies dedicated commercial-grade electrical and mechanical items as basic components to the nuclear industry.

**Inspection Dates:** February 2-5, 2004

**Lead Inspector:** /RA/ \_\_\_\_\_ Date: \_03/12/04  
Stephen D. Alexander, QMS/IPSB/DIPM

**Inspector:** Joseph J. Petrosino, IPSB/DIPM

**Approved by:** \_/RA/ \_\_\_\_\_ Date: 03/15/04  
Dale F. Thatcher, Section Chief  
Quality and Maintenance Section  
Plant Support Branch  
Division of Inspection Program Management  
Office of Nuclear Reactor Regulation

## 1.0 INSPECTION SUMMARY

The purpose of this inspection was to evaluate the implementation of selected portions of the quality assurance (QA) program of Spectrum Technologies Utilities Services USA, Incorporated (Spectrum), in the area of dedication (including seismic and environmental qualification) of electrical and mechanical equipment and components that it supplies as basic components to NRC-licensed facilities of the commercial nuclear power industry. The inspection was conducted at Spectrum's office and dedication facility in Schenectady, New York. The inspection bases were:

- Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR Part 50, Appendix B)
- 10 CFR Part 21, "Reporting of Defects and Noncompliance"

The inspectors identified nonconformances to five criteria of 10 CFR Part 50, Appendix B: Criterion II, "Quality Assurance program," Criterion III, "Design Control," Criterion V, "Instructions, Procedures, and Drawings," Criterion VIII, "Identification and Control of Materials, Parts and Components," and Criterion XI, "Test Control." In addition, one unresolved item was identified.

## 2.0 STATUS OF PREVIOUS INSPECTION FINDINGS

There were no previous NRC inspection findings that were found to be open or unresolved.

## 3.0 INSPECTION FINDINGS AND OTHER COMMENTS

### 3.1 10 CFR Part 21 Program

#### a. Inspection Scope

The NRC inspectors reviewed Spectrum's documents and records related to the implementation of its program that had been established to comply with the requirements of 10 CFR Part 21 (Part 21).

#### b. Observations and Findings

Part 21 Procedure: The inspectors reviewed the procedure and Spectrum Quality Assurance Manual section which Spectrum had adopted to comply with the provisions of Part 21, Quality Assurance Procedure (QAP) 19/001, "10 CFR Part 21 Reporting," Revision 2, dated April 27, 1992, and Section 19.0, "Reporting of Defects and Noncompliance Per 10 CFR Part 21," of the Spectrum Quality Assurance Manual (QAM). The stated purpose of QAP 19/001 was to describe the requirements, responsibilities, and methods of complying with 10 CFR Part 21 and

it also stated that QAP 19/001 supplements Section 19.0 of the QAM. QAP 19/001 stated that it applied to all Spectrum activities intended for safety-related applications.

The inspectors reviewed QAP 19/001 and determined that the procedure satisfactorily addressed the requirements of 10 CFR Part 21 and should contribute to their effective implementation. However, the inspectors discussed with the Vice President of QA, that QAP 19/001 required some clarification to better ensure that the designated responsible officers would be notified in accordance with §21.21(a)(3) of any defects or failures to comply associated with a substantial safety hazard within five (5) working days of the completion of the evaluation that identified such defects or failures to comply. Prior to the exit meeting, the VP of Quality provided the inspectors a draft copy of a revision to QAP 19/001 which appropriately clarified responsible officer notification. The VP of Quality committed to issuing the revised procedure within 30 days of the exit meeting.

Section 21.21(b) of Part 21: Section 21.21(b) of Part 21 states that if the deviation or failure to comply is discovered by a supplier of basic components, or services associated with basic components, and the supplier determines that it does not have the capability to perform the evaluation per §21.21(a) to determine if a defect exists, then the supplier must inform the purchasers or affected NRC licensees within five working days of this determination so that the purchasers or affected licensees may evaluate the deviation or failure to comply. The inspectors and VP of Quality discussed this requirement and Spectrum stated that it typically is not informed of the specific application or system interaction of basic components that it supplies to licensees. As a result, Spectrum stated that its standard practice is to inform its customers in accordance with §21.21(b) of any deviations or failures to comply of which it may become aware in basic components supplied by Spectrum.

The inspectors reviewed Spectrum's corrective action records, which included letters sent under the provisions of §21.21(b). Included in the review were letters dealing with components such as Agastat E7000 and control relays, Allen-Bradley programmable logic controllers, General Electric molded case circuit breakers, Bussman fuses, Cutler-Hammer motor starters, GE Type HGA relays, and Gould-Shawmut fuses. The inspectors determined that Spectrum was appropriately informing its customers of deviations or failures to comply.

Posting: Pursuant to §21.6, Spectrum had posted in an appropriate location Section 206 of the Energy Reorganization Act of 1974, copies of the procedures adopted to implement the provisions of 10 CFR Part 21, and a copy of 10 CFR Part 21 itself. The posting also stated the person to whom employees should make reports. The posting was satisfactory.

### c. Conclusions

The inspectors concluded that Spectrum's draft revision of Procedure QAP 19/001, Revision 4 and Section 19.0, of its QA Manual collectively ensure that the 10 CFR Part 21 requirements are satisfactorily implemented. The inspectors also concluded that Spectrum has appropriately informed its customers of deviations and failures to comply in accordance with §21.21(b) of 10 CFR Part 21. It was further noted that Spectrum has complied with the Posting requirements of §21.6 of Part 21.



### **3.2 Shop Travelers and Associated Inspection Documents:**

#### **a. Inspection Scope**

The inspectors reviewed Spectrum's procedures for inspection and verification and records of safety-related activities documented in Spectrum shop travelers, including records of results of acceptance tests and inspections. The inspectors also interviewed Spectrum personnel regarding their understanding of quality controls for safety-related activities and observed some inspection and verification in progress.

#### **b. Observations and Findings**

While observing verification and documentation of certain critical characteristics for seismically qualified circuit breaker retrofit kits for the Clinton Power Station, the inspectors noted that one item in the retrofit kits was lock washers that were specified as ASTM Grade-5-to-8. However, neither the shop traveler, nor the associated acceptance test procedure, No. AP04P0130/1, had any documented requirements for verification of the ASTM Grade-5-to-8 designation. Instead, Spectrum technicians stated that they relied upon a so-called "standing order" that required routine verification of ASTM Grade 5 or better "fasteners." A binder at the Inspection and Test Supervisor's work area contained several such standing orders, called "policy memoranda", that required verification of various attributes by testing and inspections.

The hardness testing requirements for ASTM Grade 5 or better fasteners were prescribed by Spectrum's Policy Memorandum 92-4, Revision 4, dated July 31, 1996. It required that Grade 5 fasteners or better be used wherever structural or load-bearing considerations are involved. It also required that all Grade 5 or better (e.g., Grade 8) fasteners obtained from commercial sources be checked by performance of a Rockwell hardness test upon receipt. However, the acceptance test procedure did not reference any of the policy memoranda, including No. 92-4.

Discussion with Spectrum personnel regarding control of these policy memoranda within the QA program revealed some additional weaknesses. First, Spectrum inspection and testing technicians stated that acceptance test procedures typically did not prescribe tests or inspections covered by policy memoranda, nor did they typically reference applicable policy memoranda. Further, the policy memoranda in the binder were not officially part of Spectrum's documented QA program. The policy memoranda were actually stand-alone documents and were not controlled within Spectrum's QA procedures or instructions.

One additional issue that was not fully dispositioned by the inspectors was Spectrum's use of the term "fasteners," and what that actually encompassed. Spectrum stated that the intent of the policy memorandum was that only bolts and nuts were required to be tested. However, the inspectors pointed out that in critical bolting applications, it is typical industry practice to verify the quality and suitability and material or material properties, including, hardness, strength, and often corrosion resistance and compatibility, as required for the application, of all the associated hardware, including flat and lock washers or other locking devices. The inspectors found that if Policy Memorandum 92-4 was only supposed to cover nuts and bolts, then it was, at best, ambiguous in that it did not specify which types of hardware, commonly considered to come under the heading of "fasteners", were required to be tested and which were not. The

inspectors did not verify whether any additional objective evidence may have been available at Spectrum to confirm that interpretation. Therefore, Unresolved Item 99901119/2004-201-05 was identified in this area.

Criterion II of 10 CFR Part 50, Appendix B, requires that activities affecting quality shall be accomplished under suitably controlled conditions. Controlled conditions include assurance that all prerequisites for the given activity have been satisfied. This means that program documents and procedures should have been developed under QA program controls and are incorporated in the program for compliance and change control. Criterion V of Appendix B and Section 5.0 of Spectrum's QA manual require that instructions and procedures for activities affecting quality be of a type appropriate to the circumstances. However, contrary to those requirements, as of February 5, 2004, Spectrum had not officially established procedures or instructions to require the utilization of and compliance with Spectrum "Policy Memoranda" which were intended to prescribe various activities affecting quality. Although Spectrum personnel were expected to comply with the memoranda, the documents had not been formally incorporated into the QA program. Nonconformance 99901119/2004-201-01 was identified in this area.

In addition, Spectrum had not established adequate procedures or instructions to ensure that the quantitative and qualitative acceptance criteria, delineated in Spectrum's Policy Memoranda documents, were appropriately specified in Spectrum's "Acceptance Test Procedures." Nonconformance 99901119/2004-201-02 was identified in this area.

c. Conclusions

On the basis of discussions with the Spectrum test and inspection personnel, the inspectors concluded that although the policy memoranda were not formally in the QA program, personnel interviewed were familiar with these documents, their requirements and under what conditions they were expected to use them. Nevertheless, this area of the QA program required strengthening to ensure consistency and continuity of adequacy of activities affecting quality with less sensitivity to future changes in personnel and the potential for varying levels of competency and conscientiousness.

**3.3 Personnel Training and Qualification, Working Environment and Safety Culture**

a. Inspection Scope

The NRC inspectors reviewed Spectrum's documents and records related to personnel training and qualification and interviewed Spectrum inspection and test personnel. As part of the interviews, the inspectors asked the Spectrum employees whether they felt intimidated or uncomfortable raising concerns with their supervisors or felt pressured into accepting components without adequately verifying the quality attributes.

b. Observations and Findings

The overall program provisions were clearly specified and the associated basis for certifications was found in the individual certification and qualification records for each person in Spectrum's technical training and qualification program. Interviews with test and inspection personnel revealed that employees were generally enthusiastic and satisfied in their jobs and were proactive in bringing issues to their supervision. The employees interviewed indicated that while there was sometimes pressure placed on them to finish jobs as expeditiously as practicable, they did not feel pressure to take shortcuts in an inspection or verification. Some of the individuals interviewed indicated that the rigorous QA oversight by the VP of Quality allowed them to interact with QA on a continual basis.

c. Conclusions

The inspectors found Spectrum's inspection and test personnel to have adequate educational backgrounds and training for their assigned duties. Their qualification and certification was satisfactorily documented. The QA oversight exercised by the VP of Quality could be considered as a strength in Spectrum's QA program implementation. No concerns were identified in this area.

### **3.4 Test Procedures**

a. Inspection Scope

The NRC inspectors reviewed selected Spectrum test procedures to verify technical and quality adequacy, including appropriate approvals, change control, control of M&TE, references, technical basis, and acceptance criteria. The inspectors reviewed generic test procedures (GPs) and custom acceptance test procedures which are developed when existing GPs are not suitable for a particular item or application. GPs reviewed included the latest revisions of the following:

- GP 0010, Revision 6, dated February 21, 2003, for molded-case circuit breakers (MCCBs)
- GP 0030, Revision 1, dated February 21, 2003, for starters and contactors
- GP 0032, Revision 5, dated July 11, 2003, for overload relays and heaters
- GP 0036, Revision 1, dated February 21, 2003, for auxiliary/control relays,
- GP 0060, Revision 2, dated June 2, 1995, for similarity analysis
- GP 0065, Revision 0, dated May 4, 1999, for rewinding and recertifying Class 1E harsh environment qualified electric motors
- GP 0070, Revision 1, May 15, 2002, for thermal aging (of seismic and EQ specimens)

b. Observations and Findings

GPs reviewed were generally adequate. However, some lacked certain pertinent references, failed to specify appropriate M&TE, omitted certain pertinent tests, or lacked adequate specificity when prescribing certain test steps, test parameters or acceptance criteria.

The standard language for all the GPs in Section 1, "Scope," was strong in that it required

purchase from approved suppliers and documented traceability to the original equipment manufacturer (OEM). However, Section 2, "Equipment Identification," simply stated "A memo shall be forwarded for each item to be tested according to this procedure and applicable information required for each item." [sic] It was not clear from this cryptic statement that the memo referred to was supposed to be a pre-positioned test parameter and data sheet. The so-called memos attached to each GP did identify the equipment to be tested, including the customer's purchase order (PO) line item number. However they did not prescribe equipment identification by unique serial numbers or specimen numbers by which test data could be traced to individual items, nor did the memos or the GPs themselves refer to Spectrum QAP 008/001, Revision 2, dated December 4, 1993, which specified how items were to be marked or labeled upon receipt as would be expected under Equipment Identification.

With regard to including or referencing the applicable regulatory requirements, design basis and applicable industry standards, in Section 3.1, "Codes, Industry Standards and Guidelines," (under Section 3, "Standards" or in some cases "Standards and Customer Specifications"), the GPs appropriately generically referenced Electric Power Research Institute (EPRI) Report NP-5652, the commercial-grade item (CGI) dedication guidelines and NRC Bulletin 88-10 on screening for counterfeit MCCBs for its OEM traceability provision. However, they did not reference EPRI Report NP-6406, "Technical Evaluation of Replacement Items; nor did they all reference NRC Generic Letter 89-02 which endorsed the acceptance methods of NP-5652, but imposed restrictions and caveats on the use of Methods 2 and 4 alone. Also not referenced was NRC Generic Letter 91-05 which, among other things promulgated the NRC staff positions on critical characteristics and so-called "like-for-like" or "identical" determinations which are often essential in dedication for verification of the critical characteristics of seismic and/or environmental qualification of dedicated production items.

The inspectors also noted that the GPs' Section 4 specified critical characteristics for acceptance, as distinguished from critical characteristics for design. This distinction is contrary to the guidance of NRC Generic Letter 91-05; although it is defined in EPRI NP-6406. Also, Paragraph a, under Section 7, "Additional Dedication," of GP 0070 for similarity analysis, stated "Ordering identical parts using the same manufacturer and part number/catalog numbers provide[s] assurance that these parts are the same as those previously qualified." This statement is inconsistent with the guidance in NRC Generic Letter 91-05 that only parts of the same manufacturer, part number, and same time frame of manufacture can be considered identical because even if form, fit and function of CGIs remain the same, there may have been in the interim important changes in manufacturing process and/or materials that were not reflected by a change in part number. Therefore, without having the same time of manufacture (e.g., as determined possibly by date code, lot or batch number, etc., provided lot or batch homogeneity can be established), one would need to determine from the manufacturer what changes have been made in the interim and then reconcile those changes with the performance and durability requirements of the plant application.

The inspectors also noted that the GPs did not reference any of the item-specific EPRI Joint Utility Task Group (JUTG) Technical Evaluations or manufacturers' specifications in Section 3.1; although some of the memos provided for identifying certain manufacturer data such as MCCB time-current characteristics to be listed on the memo for GP 0010 on MCCBs. Section 3.1 of the GPs did not list EPRI Report NP-7218 on sampling as a reference, yet its provisions were sometimes specified in Section 5.

Section 4 of the GPs listed the critical characteristics to be verified for acceptance of the items being dedicated. However, in some cases, not all critical characteristics were addressed. For example, GP 0010 for MCCBs, did not address individual pole resistance (although temperature rise was addressed). It also did not address interrupting capacity which must be verified; even if by indirect means for dedication of production item purposes.

Finally the GPs did not address published industry operating experience (OE) documents relevant to dedication and qualification of commercial-grade items. These would include component- or component-type-specific NRC generic communications, notifications pursuant to 10 CFR Part 21, manufacturers' technical/service bulletins, or various OE publications and data sources from the Institute for Nuclear Power Operations (INPO). Vendors such as Spectrum often obtain these documents, as they do EPRI documents, through their nuclear utility customers.

Section 3.1 of GP 0010 for MCCBs appropriately listed Underwriters' Laboratories (UL) Standard UL-489 and National Electrical Manufacturers Association (NEMA) Standard AB 4 - 1996, but omitted pertinent references such as EPRI NP-7410, Volume III, which contains important guidance on MCCB testing, the GE MCCB Applications guide, NEMA Standards AB 1 or AB 3, and NUMARC 90-14, the counterfeit MCCB recognition guide published by the former Nuclear Management and Resources Council (now the Nuclear Energy Institute or NEI). None of the numerous NRC generic communications on MCCBs (except for Bulletin 88-10) were addressed.

Section 3.1 of GP 0036 on auxiliary/control relays listed UL-508, a general standard on industrial control equipment, but failed to list the two most important references specifically for relays, NEMA Standard ICS 1 and Institute of Electrical and Electronic Engineers (IEEE) Standard C37.90. None of the numerous NRC generic communications on relays were addressed.

The inspectors noted that not only were some pertinent standards not referenced in Section 3.1 of the GPs, but in some cases, certain provisions of the those standards were omitted from the test procedures themselves. Examples of such instances are cited below.

Section 5 of the GPs specified the actual acceptance testing. However, some pertinent tests were omitted or the necessary range of test parameters was not adequate. For example, GP 0010 for MCCBs did not specify a trip-free function test, an overvoltage withstand test for accessory devices, or all the necessary tests for proper function of undervoltage trip devices. GP 0030 for starters and contactors appropriately specified checking pickup and dropout voltages, but did not verify the capability of the contactor to operate continuously at the maximum DC control voltage to which the coil might be exposed for some time during an equalizer battery charge. A maximum dropout voltage test specifying dropout voltage  $\leq 70\%$  of rated voltage was appropriate, but the GP did not specify a minimum dropout value, i.e., the voltage below which the contactor must dropout. The maximum dropout voltage demonstrates adequate force developed by the coil/electromagnet at reduced voltage, but the minimum dropout test demonstrates adequate return spring strength and positive freedom of operation at reduced forces. Finally, the GP did not specify that the functional tests be conducted with the coil at its maximum continuous operating temperature at which coil winding resistance is highest and hence coil current and resultant magnetic force are lowest.

GP 0036 for auxiliary/control relays did not address the critical characteristics of mechanical function, i.e., state of normally open and normally closed contacts, interlocks, armature over-travel, and contact wipe where applicable. In addition, the GP specified an insulation resistance test of 1000 Vdc for one minute with  $\geq 1$  megohm. However, the applicable industry standards, NEMA ICS-1 and IEEE C37.90 call for hi-pot testing (dielectric withstand) at twice rated voltage plus 1000 Vdc for example. In functional tests, maximum dropout was specified at  $\leq 70\%$  of rated coil voltage, but there was no minimum dropout voltage verified. As with starters, the relay GP did not address hot-coil functional tests as prescribed by the industry standards.

With regard to specifying the appropriate measuring and test equipment (M&TE), the GPs did not do so; nor did the attached memos. Section 3.3, "Instrumentation," of all the GPs reviewed simply contained a blanket statement requiring calibration per MIL-STD-45662 and traceable to the National Institute of Standards and Technology (NIST), or other recognized and documented standards or basis. While these requirements are appropriate, they are very general and incomplete. MIL-STD-45662 (no longer in effect) describes a calibration quality control program. The GPs did not specify calibration requirements, such as those of industry standards (e.g., ASTM) or M&TE manufacturers, pertinent to the types of M&TE that would or should be used for the testing the types of components being dedicated. The inspectors noted that a previous NRC inspection of Spectrum identified that the company had used a calibration service contractor that had a nuclear QA program, but was not competent or properly equipped to perform the calibration for which it was hired (nonconformance closed), in that case, Spectrum's Rockwell hardness tester. The inspectors determined that selection and use of M&TE was left largely to the skill and discretion of the technicians, which even with supervision, is contrary to QA requirements. The inspectors recognized that in many cases, the only M&TE available was of the proper type, but in other cases, technicians would need to choose among more than one piece of M&TE, not all of which might be optimum or even appropriate, not to mention the various settings and modes of use available without documented guidance in the GPs. For example, in performing a test of the instantaneous magnetic trip function of MCCBs, there was no requirement to ensure that the test set to be used was capable of sensing the phase angle of the input voltage or current in order to time the shutting of its contacts and initiate current flow with the minimum asymmetrical current or "DC offset" which can introduce significant error into the test results. Not all of Spectrum's MCCB test sets had this capability.

In summary, the inspectors found that the generic test procedure deficiencies, as illustrated by the foregoing examples, taken collectively constituted nonconformances with respect to the QA requirements listed below:

Criterion III, "Design Control," of 10 CFR Part 50, Appendix B, requires, in part, that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. These measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Criterion V, "Instructions, Procedures, and Drawings," of 10 CFR Part 50, Appendix B, and Section 5.0 of Spectrum's QA Manual require that activities affecting quality be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances. They also require that instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria.

Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50, requires, in part, that all testing required to demonstrate that structures, systems, and components will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Test procedures shall include provisions for assuring that all prerequisites for the given test have been met, that adequate test instrumentation is available and used, and that the test is performed under suitable environmental conditions.

Contrary to the QA requirements cited above, as of February 5, 2004, some of Spectrum's generic test procedures lacked certain pertinent references, failed to specify appropriate measuring and test equipment, omitted certain pertinent tests, or lacked adequate specificity when prescribing certain test steps, test parameters or acceptance criteria. Accordingly, Nonconformance 99901119/2004-201-03 was identified in this area.

Finally, with regard to test procedure change control, the inspectors found that Spectrum's document control and change control process was sufficiently rigorous, for example, to the extent of controlling procedure changes in the GPs with lists of effective pages, such that it ensured adequate review and approval of all authorized changes. No discrepancies were identified in this area.

c. Conclusions

The discrepancies in Spectrum's generic test procedures taken collectively constitute a nonconformance with respect to Criterion V of 10 CFR Part 50, Appendix B. The procedural weaknesses need to be addressed in order to provide the required assurance of quality attainable only by all prescribed QA controls working together, in this case, not only proper training and qualification of personnel, but also that in conjunction with their use of adequate procedures and appropriate M&TE.

### **3.5 Traceability of Component Dedication & Qualification Library Specimens**

a. Inspection Scope

The NRC inspectors reviewed Spectrum's QA controls regarding dedication and qualification library specimens. The inspectors reviewed the pertinent procedures, examined selected specimens in the library (a locked storage room with open shelves), reviewed the associated records, and interviewed cognizant staff to verify consistent documented traceability of the specimens to the item-specific results of their inspections and tests in the associated records.

b. Observations and Findings

The inspectors found several components that were inadequately identified such that with multiple specimens in a test, the results could not be attributed to a particular specimen. For example, MCCB parts in a bag from Job No. 02P1240 were marked as Line Item 1, parts 7 of 8 and 8 of 8. There were tags in the bag marked seismic specimens 1 and 2, but they were not attached to the parts. Fortunately, in this case, Data Sheet 11, Page 1 of 7, associated seismic specimen No. 1 with part No. 7 and specimen 2 with part 8. However, in another case, Job 02P2030, the data sheet indicated that PO line item 7, piece or item nos. 8 and 9 of 15 were seismic specimens 10A and 10B, but upon examining the library specimens themselves, the inspector found that the parts had green stickers marked "seismic specimen", but no tags to uniquely identify them. Nevertheless, in the instances in question, all the test results were satisfactory and comparable; so that traceability of particular sets of results to a specific item was less important with regard to their use in comparison to production items for verification on one or more critical characteristics.

Criterion VIII, "Identification and Control of Materials, Parts, and Components," of Appendix B to 10 CFR Part 50, requires, in part, that measures be established for the identification and control of materials, parts, and components, including partially fabricated assemblies. These measures shall assure that identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of the item. Lack of adequate traceability of the specimens in question to their associated test results constitutes a nonconformance with respect to Criterion VIII, "Identification and Control of Material, Parts, and Components," of 10 CFR Part 50, Appendix B. Accordingly, Nonconformance 99901119/2004-201-04 was cited.

c. Conclusions

This nonconformance indicates the need for some improvement in Spectrum's dedication and qualification library specimen controls. Such improvement would be particularly important should Spectrum need to rely on the level of performance of a particular specimen among several with varying results that may not be marked or identified sufficiently to provide traceability to item-specific test or inspection results.

#### **4.0 MANAGEMENT MEETINGS AND PERSONNEL CONTACTED**

##### 4.1 Entrance and Exit Meetings:

In the entrance meeting on February 2, 2004, the NRC Inspectors discussed the scope of the inspection, outlined the areas to be inspected, and established interfaces with Spectrum's Vice President of Quality Assurance. In the exit meeting on February 6, 2004, the NRC Inspectors discussed the tentative findings and concerns with Spectrum's staff.

##### 4.2 Personnel Contacted:



W. Willis	VP-Quality	*
V. Esqueda	Administrative Assistant	**
D. Colliton	Inspection and Test Supervisor	**
A. Leach	Accountant	**
L. Guedko	Project Manager	**
R. Reynolds	Qualification Engineer	**
E. Helin	Inspector/Tester	**
H. Wolfe	Inspector/Tester	**
P. Slater-Hurd	Inspector/Tester	**
S. Alexander	NRC/NRR/DIPM	*
J. Petrosino	NRC/NRR/DIPM	*

\* Attended entrance and exit meeting.

\*\* Attended exit meeting only.