

April 21, 2014

Steven DiMauro, Quality Systems Manager
C&D Technologies, Inc.
1400 Union Meeting Road
Blue Bell, PA 19422-0858

SUBJECT: NUCLEAR REGULATORY COMMISSION INSPECTION OF C&D
TECHNOLOGIES, INC. REPORT NO. 99901385/2014-201 AND NOTICE OF
NONCONFORMANCE

Dear Mr. DiMauro:

On March 3 to March 7, 2014, the U.S. Nuclear Regulatory Commission (NRC) conducted an inspection at the C&D Technologies, Inc. (C&D) facility in Blue Bell, PA. The purpose of the limited-scope inspection was to assess C&D's compliance with the provisions of selected portions of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

This inspection specifically evaluated C&D's design, qualification, and commercial-grade dedication activities associated with safety-related batteries supplied to U.S. operating reactor plants. In addition, it assessed the corrective actions taken to close previously identified violations and nonconformances identified in inspection report 99901385/2009-201, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093020260). The enclosed report presents the results of this inspection. This NRC inspection report does not constitute NRC endorsement of your overall quality assurance (QA) or 10 CFR Part 21 programs.

Based on the results of this inspection, the NRC inspectors found that the implementation of your QA program did not meet certain regulatory requirements imposed on you by NRC licensees in the area of design control, and specifically equipment qualification, and implementation of your nonconformance and corrective action programs. Specifically, C&D failed to show how the seismic requirement to test aged cells was met by type testing or analysis for LCR-21 batteries. Additionally, C&D failed to adequately demonstrate that original type testing performed for K-line batteries envelop current customer qualification requirements. Furthermore, C&D failed to implement adequate nonconformance and corrective action programs. The specific findings and references to the pertinent requirements are identified in the enclosure to this letter.

Please provide a written statement or explanation within 30 days from the date of this letter in accordance with the instructions specified in the enclosed Notice of Nonconformance. Where applicable, please assess the effect of these deficiencies on the quality of previous shipped product. We will consider extending the response time if you show good cause for us to do so. It is important to note that the NRC inspection team performed a limited review of C&D's Part 21

and QA programs. Many of the deficiencies identified may also affect other areas of your QA and Part 21 programs that the NRC inspection team did not review. Specifically, this inspection only sampled the LCR-21 and K-line batteries, and identified qualification deficiencies with both samples. Therefore, C&D should extend its review, where applicable, beyond the specific examples identified by the inspection team and apply corrective actions as appropriate, including ensuring appropriate analysis and documentation to show how batteries are qualified in accordance with customer purchase order requirements for all safety-related battery types. In its response to the nonconformances, C&D should document the areas for which it extended its review beyond the specific examples of the deficiencies identified by the inspection team, the extent of its review, the additional findings, and the corrective actions implemented.

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

Sincerely,

/RA/

Richard A. Rasmussen, Chief
Electrical Vendor Inspection Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors

Docket No.: 99901385

Enclosures:

1. Notice of Nonconformance
2. Inspection Report 99901385/2014-201
and attachment

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

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Richard A. Rasmussen, Chief
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and attachment

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NOTICE OF NONCONFORMANCE

C&D Technologies, Inc.
Blue Bell, PA

Docket No.: 99901385
Inspection Report No.: 99901385/2014-201

Based on the results of a U.S. Nuclear Regulatory Commission (NRC) inspection conducted at the C&D Technologies, Inc. (C&D) facility in Blue Bell, PA, on March 3–7, 2014, certain activities were not conducted in accordance with NRC requirements which were contractually imposed on C&D by NRC licensees:

- A. Criterion III, "Design Control," of Appendix B to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 states, in part, that "Where a test program is used to verify the adequacy of a specific design feature in lieu of other verifying or checking processes, it shall include suitable qualifications testing of a prototype unit under the most adverse design conditions."

Section 8.2, "Aging Procedure," states, in part, that naturally aged cells [operated cells] may be used for qualification testing or accelerated aging of the entire cell [by procedure].

Contrary to the above, C&D failed to provide documentation to show that the LCR-21 batteries on customer order 2393760 were qualified under the most adverse conditions in accordance with purchase order (PO) specification IEEE 535-1979. Specifically, C&D referenced a previous type testing report to bound battery qualification for this customer order; however, the referenced qualification report was not performed in accordance with IEEE 535-1979 with respect to properly aging the batteries to provide assurance that the batteries are capable of performing before, during, and after a seismic event.

This issue has been identified as Nonconformance 99901385/2014-201-02.

- B. Criterion III, "Design Control," of Appendix B to 10 CFR Part 50 states, in part, that, measures should be established to assure that "...appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled. Measures shall also 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, C&D failed to take measures to review for suitability that ensures that original type testing performed for K-line batteries envelop customer qualification requirements.

C&D's failure to adequately demonstrate that original type testing performed for K-line batteries envelop current customer qualification requirements is documented by the following examples:

- PO 00472405 from Exelon (Braidwood Station and Byron Station) required batteries to be qualified to IEEE 535-2006, IEEE 344-2004, and IEEE 450-2002. C&D created a qualification report to show how batteries supplied by PO 00472405 were bounded by the original K-line batteries type testing that was performed in 1977, that utilized IEEE 535 draft version 8, IEEE 344-1975, and IEEE 450-1975. However, C&D failed to provide any documentation to show

how the differences between the IEEE versions required by the PO and original K-type testing were evaluated and/or dispositioned with the customer within the qualification report.

- C&D failed to provide documentation to show a qualification report existed for PO 00501212, Revision 3, to Exelon (Clinton Power Station). Specifically, C&D failed to provide documentation to show that batteries supplied via this PO are qualified and bounded to the original type testing document.

These examples have been identified as Nonconformance 99901385/2014-201-03.

- C. Criterion XVI, "Corrective Action," of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," states that "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management."

BB-QOP 8.5.2, Corrective Action, dated May 11, 2011, states, in part, that the purpose of this procedure is to define the corrective action requirements to assure that measures are established to assure that conditions adverse to quality are promptly identified and corrected.

Contrary to the above, as of March 3, 2014, C&D failed to assure conditions adverse to quality are identified and corrected.

C&D's corrective action program failure is documented by the following examples:

- The NRC inspection team found that the corrective actions (CA) generated to address previous violations and nonconformances identified in NRC inspection report 99901385/2009-201 were insufficient to correct the identified problems. Specifically,
 - C&D CA report 09-049 and 09-050 were initiated to resolve violations 99901385/2009-201-01 and 99901385/2009-201-02. Violation 99901385/2009-201-01 was cited for an inadequate procedure due to the failure to adequately prescribe the process to perform an evaluation and meet timeliness requirements as specified in Part 21. The first example of Violation 99901385/2009-201-02 was cited due to the failure to perform an evaluation within the time requirements specified in Part 21. The second example of Violation 99901385/2009-201-02 was cited due to failure to perform an evaluation. During this inspection, the NRC inspectors found: multiple examples where 10 CFR Part 21 evaluations were not being completed for deviations; that C&D did not file an interim report in accordance with Part 21 timelines; and, misuse of Part 21 terms within the Part 21 procedure. Based on these examples, the NRC inspectors found CA reports 09-049 and 09-050 inadequate to correct the deficiencies identified in

violations 99901385/2009-201-01 and 99901385/2009-201-02; therefore, these violations are still open.

- C&D CA report 09-054 was initiated to resolve Nonconformance 99901385/2009-201-03 for C&D's failure to identify the root causes for quality problems and prevent their recurrence. C&D stated in their response to the NRC on November 30, 2009, (ADAMS Accession Number ML093360523) that "dedication activities were reviewed, specifically with regard to identifying equipment and calibration facilities. No other vendors who should be on the list, but are not, have been identified." However, the C&D Attica facility had not completed the extent of condition for calibration service providers using A2LA certificates; therefore, Nonconformance 99901385/2009-201-03 is still open.
- C&D CA report 09-51 was initiated to resolve Nonconformance 99901385/2009-201-04 for C&D's failure to provide an engineering justification for down-grading a battery cover's safety-related function. The CA report was closed on August 8, 2010; however, C&D was not able to provide an engineering change notice (ECN) for down-grading the battery cover's safety-related function. The inspectors found CA report 09-51 inadequate to correct this condition adverse to quality identified by the NRC in 2009. Nonconformance 99901385/2009-201-04 is still open.
- CA report 14-06 was initiated on January 8, 2014, when Nuclear Procurement Issues Committee (NUPIC) identified a failure to enter a customer complaint into the customer complaint database. Specifically, it dealt with a conformance/compliance incorrectly certified to IEEE 383-1974. The corrective action included a procedural change to the customer complaint procedure. Specifically, BI-WI-8.2.1-2, "Customer Complaints," Revision 7, now states, "the product manager has the latitude to determine those situations which may not warrant entry as a customer complaint...examples include documents that can be re-submitted to the customer within the same day due to typographical errors and other situations in which the customer is not delayed or inconvenienced by the issue." C&D responded to a NUPIC finding of not entering a condition adverse to quality into their CA process by allowing even greater latitude to enter items into their CA process. In addition, not entering situations in which the customer is not delayed or inconvenienced by the issue will bypasses C&D's corrective action process described in step 4.1 to determine corrective/preventative actions and to review corrective actions for effectiveness. In addition, if same day deficiencies are corrected and not entered into the customer complaint, corrective action, or Part 21 process, they will not be screened for Part 21 applicability. The inspectors found CA report 14-06 inadequate to correct this condition adverse to quality.

These have been identified as examples of Nonconformance 99901385/2014-201-04.

- D. Criterion XV, "Nonconforming Materials, Parts or Components," of Appendix B to 10 CFR Part 50 states, in part, that "Measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation...Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures."

AQOP 8.3, "Control of Nonconforming Product," states that, "This procedure applies to all discrepant material, purchased and/or manufactured, at the C&D Technologies Attica Facility, and includes the identification, containment, documentation, disposition, and handling of raw material, completed components or finished parts and assemblies which do not conform to the specifications, drawings or fitness-for-use-criteria...Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, are maintained as describe above and as referenced in AQOP-4.2.4 [Control of Records]."

BB-QOP-7.4.3, "Commercial Grade Dedication," step 4.1.9 states, in part, that, "[i]f some of the dedication test results are outside of acceptable ranges, the Leola lab manager or the site QC manager shall arrange for segregation of item inventory, report the nonconformance, submit the results to the Director of Engineering & Quality for disposition, and shall initiate corrective action with the supplier as appropriate."

Contrary to the above, as of March 3, 2014, C&D failed to review nonconforming items in accordance with documented procedures.

- C&D failed to accept a nonconforming condition for a critical characteristic, dimensions, for washer hardware in dedication plan 084/PH00907, in accordance with documented procedures. Specifically, the inspectors noted that the outer diameter for sample 5 to be minimally outside of tolerance. C&D accepted the critical characteristic as-is and failed to properly justify acceptance of the nonconforming condition in the dedication plan and enter this into their nonconformance process in accordance with AQOP-8.3, BB-QOP-7.4.3, and Criterion XV of Appendix B. C&D entered the issue into their corrective action program as CA report 14-8 dated March 6, 2014.
- C&D failed to accept a nonconforming condition for a critical characteristic, lot homogeneity, for battery containers in customer order 2393760, as required by Dedication Plan 077/PZ00651, Revision 12, dated February 22, 2011. Specifically, according to the sampling plan C&D utilized, 16 samples were needed to verify homogeneity for the lot size; however, C&D's documentation showed 2 of the 16 test samples to be from an unknown mold number. C&D accepted the critical characteristic and failed to properly justify acceptance of the nonconforming condition in the dedication plan and enter this into their nonconformance process in accordance with AQOP-8.3, BB-QOP-7.4.3, and Criterion XV of Appendix B.
- Material test laboratory report for work request no. 12-11-09-2 identified a nonconforming part, washers PH01340, lot E-17-1. An informal disposition was stamped on the report itself; however, C&D failed to enter this into their nonconformance process in accordance with AQOP-8.3 and Criterion XV of Appendix B.
- Material test laboratory report for work request no. 12-04-25-3 documents that PB00335 bolt, lot #37447, does not conform to the applicable C&D dedication plan requirements. The bolt exceeded the tensile strength requirement of 100-150 kilopounds per square inch (ksi) with a ksi of 155. An e-mail dispositioned that the bolts were okay to use via an engineering manager;

however, C&D failed to enter this nonconformance into their nonconformance process in accordance with AQOP-8.3, BB-QOP-7.4.3, and Criterion XV of Appendix B.

This issue has been identified as Nonconformance 99901385/2014-201-05.

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 Electrical Vendor Branch, Division of Construction Inspection and Operational Programs, Office of New Reactors, within 30 days of the date of the letter transmitting this notice of nonconformance. This reply should be clearly marked as a "Reply to a Notice of Nonconformance" and should include for each noncompliance: (1) the reason for the noncompliance, or if contested, the basis for disputing the noncompliance, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid noncompliance, and (4) the date when the corrective action will be completed. Where good cause is shown, the NRC will consider extending the response time.

Because your response will be made available electronically for public inspection in the NRC's Public Document Room or through the NRC's Agencywide Documents Access and Management System, which is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, 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. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request that such material be withheld, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If Safeguards Information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21, "Protection of Safeguards Information: Performance Requirements."

Dated this the 21st day of April 2014.

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

Docket No.: 99901385

Report No.: 99901385/2014-201

Vendor: C&D Technologies, Inc. (C&D)
1400 Union Meeting Road
Blue Bell, PA 19422-0858

Vendor Contact: Steven DiMauro, Quality Systems Manager
SDiMauro@cdtechno.com

Nuclear Industry Activity This location is C&D's world headquarters facility. This facility provides design control, qualification equivalency evaluations, and performs Part 21 evaluations for deviations identified in safety-related batteries supplied to U.S. operating reactor plants. This inspection will be the second at this C&D facility in Blue Bell, Pennsylvania and will focus on batteries being supplied to operating reactors, and specifically the LCR and KCR Lead-Calcium battery types.

Inspection Dates: March 3-7, 2014

Inspection Team Leader: Stacy Smith, NRO/DCIP/EVIB

Inspectors: Eugene Huang, NRO/DCIP/EVIB
George Lipscomb, NRO/DCIP/EVIB
Frank Talbot, NRO/DCIP/QVIB

Approved by: Richard A. Rasmussen, Chief
Electrical Vendor Inspection Branch
Division of Construction Inspection
and Operational Programs
Office of New Reactors

EXECUTIVE SUMMARY

C&D Technologies, Inc.
99901385/2014-201

The U.S. Nuclear Regulatory Commission (NRC) conducted this vendor inspection to verify that C&D Technologies, Inc. (C&D) implemented an adequate quality assurance (QA) program that complies with the requirements of Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants," to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," and 10 CFR Part 21, "Reporting of Defects and Noncompliance."

This inspection specifically evaluated C&D's design, qualification, and commercial-grade dedication (CGD) activities associated with safety-related batteries supplied to U.S. operating reactor plants. The NRC inspection team reviewed the initial qualification of the safety-related batteries, design changes since the initial qualification, and CGD of parts that C&D procured from sub-vendors to manufacture the batteries. In addition, the inspection team reviewed C&D's nonconformance, corrective action, and 10 CFR Part 21 programs. Furthermore, the inspectors assessed the corrective actions taken to close previously identified violations and nonconformances identified in NRC inspection report 99901385/2009-201. The NRC conducted this inspection at the C&D facility in Blue Bell, PA.

The following regulations served as the bases for this NRC inspection:

- Appendix B to 10 CFR Part 50
- 10 CFR Part 21

Inspection procedures (IP) to be used include IP 43002, "Routine Inspections of Nuclear Vendors," IP 43004, "Inspection of Commercial-Grade Dedication Programs," and IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance."

The information below summarizes the results of this inspection.

10 CFR Part 21

The NRC inspection team concluded that the unanalyzed deviations involving misaligned separators, battery qualification, and lead slags / foreign material within the batteries, and C&D's failure to file an interim report in accordance with Part 21 timelines, are an unresolved item pending C&D's evaluation of these deviations discussed in Section 1.b of the report details (Unresolved Item (URI) 99901385/2014-201-01).

Design Control and Qualification

The NRC inspectors concluded that C&D has not established a program that adequately controls design in accordance with regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. The inspectors issued Nonconformance 99901385/2014-201-02 for C&D's failure to show that the LCR-21 batteries were qualified under the most adverse conditions in accordance with PO specification IEEE 535-1979. Additionally, the inspectors issued Nonconformance 99901385/2014-201-03 for C&D's failure to adequately demonstrate that original type testing performed for K-line batteries envelop current customer qualification requirements.

In addition, since nonconformances 99901385/2014-201-02 and 99901385/2014-201-03 represent departures from technical requirements in purchase orders, C&D is required to begin the process of determining whether these particular deviations could create a substantial hazard in accordance with 10 CFR Part 21 requirements.

Nonconformances and Corrective Actions

The NRC inspectors concluded that C&D has not implemented their programs to control nonconforming material, parts, or components and to identify and correct conditions adverse to quality in accordance with regulatory requirements in Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The inspectors issued Nonconformance 99901385/2014-201-04 for C&D's failure to assure conditions adverse to quality are identified and corrected. Additionally, the inspectors issued Nonconformance 99901385/2014-201-05 for C&D's failure to review nonconforming items in accordance with documented procedures.

Commercial-Grade Dedication

The NRC inspectors concluded that C&D has established a CGD program in accordance with regulatory requirements of Criterion III, "Design Control," Criterion IV, "Procurement Document Control," Criterion VII, "Control of Purchased Material, Equipment, and Services," and Criterion X, "Inspection," of Appendix B to 10 CFR Part 50; however, C&D failed to provide enough objective evidence for the inspectors to verify adequate implementation of the program. Specifically, the dedication plans reviewed by the NRC identified that C&D accepted critical characteristics that were outside of acceptable ranges, as documented in Nonconformance 99901385/2014-201-05, without justifying acceptance of the nonconforming conditions in accordance with documented procedures.

REPORT DETAILS

1. 10 CFR Part 21 Program

a. Inspection Scope

The inspectors reviewed C&D Technologies, Inc's (C&D) policies and implementing procedures that govern its Title 10 of the Code of Federal Regulations (10 CFR) Part 21 program to verify compliance with the requirements of 10 CFR Part 21. The inspectors also reviewed C&D's procedures that govern corrective actions and the control and correction of nonconforming items to verify an adequate link to the 10 CFR Part 21 process. C&D standard policy A-14, "Evaluation, Notification & Reporting Responsibilities in Accordance with USNRC 10 CFR 21 Regulations," establish the requirements for compliance with the requirements in 10 CFR Part 21. The inspectors reviewed C&D's 10 CFR Part 21 policy and procedures and related documentation, including Part 21 evaluation reports and corrective action (CA) reports, and interviewed QA staff members.

b. Observations and Findings

The team identified that in evaluation report number, 2012-12, for Entergy (Palisades Nuclear Power Plant), C&D failed to prepare and submit an interim report for an identified deviation potentially associated with a substantial safety hazard (SSH) that could not be completed within 60 days of discovery. C&D was notified of a deviation with misaligned separators on LCR-25 battery cells on February 16, 2012, entered a Part 21 evaluation on February 26, 2012, and closed the evaluation on March 5, 2012, documenting it was not a defect. However, on March 6, 2012, C&D informed the customer that they did not meet specifications regarding the amount that the separators overlap the edges of the plates and that a current path between two adjacent plates can develop leading to discharged cells. Specifically, C&D noted they could not determine the root cause, or if/when this issue would occur, until they received the batteries back from the customer. Based on this inspection, C&D reopened a Part 21 evaluation and submitted an interim report to the NRC to address this deficiency on March 28, 2014 (Agencywide Document Access and Management System (ADAMS) Accession Number ML14094A012).

In addition, C&D failed to evaluate deviations documented in the following customer complaints to identify defects and failures to comply associated with SSHs as soon as practicable:

- Customer Complaint (COMP)-2012-00163, dated August 31, 2012
 - Exelon (Clinton Power Station) informed C&D that lead flake/slag deposits were unacceptable and could become shortening risks. C&D marked this COMP as not requiring a Part 21 evaluation despite noting in the COMP that the lead rundowns present a risk in that they may cause shorts at some point if the lead rundowns and balled lead separate from the straps.

- COMP-2012-00007, dated January 10, 2012
 - South Carolina Electric & Gas (SCE&G) (Virgil C. Summer Nuclear Station) identified foreign material on a cell of a new battery that was suspected to be lead rundowns. C&D noted that lead rundown will not have an impact on performance at the current location, but the pieces could move and come into contact with two adjacent plates. C&D recommended that cell voltage be measures and visual inspections be conducted more frequently than normal and that the cell should be replaced at the next scheduled outage. C&D documented this COMP as not requiring a Part 21 evaluation in order to identify a reportable defect or failure to comply that could create a SSH, were this issue to remain uncorrected.
- COMP-2013-00040, dated February 7, 2013
 - XCEL Energy (Monticello Nuclear Generating Plant) identified foreign material in the top of a battery cell. C&D provided a replacement battery, but documented that this COMP as not requiring a Part 21 evaluation in order to identify a reportable defect or failure to comply that could create a SSH, were this issue to remain uncorrected.
- COMP-2013-00113, dated April 29, 2013
 - PSEG (Salem Nuclear Generating Station) identified high sediment for a KCR-21 battery. Salem performed regular maintenance to assure there were no shortening of affected cells, and the cell was replaced; however, this COMP was documented as not requiring a Part 21 evaluation in order to identify a reportable defect or failure to comply that could create a SSH, were this issue to remain uncorrected.

Furthermore, the NRC inspectors identified additional departures from technical requirements included in procurement documents regarding battery qualification, documented in Section 2.b of this report, that were not identified as deviations nor evaluated to identify defects and failures to comply associated with SSHs; and specifically, if the batteries are qualified to perform their intended safety-function.

In addition, the inspectors identified misused terms in C&D's Part 21 procedure, A-14, such as, "Once the Discovery has been identified to the Safety Committee; the Director of Quality shall (within five days of discovery) in conjunction with the Director of Product Development assess if the defect requires engineering evaluation and if this evaluation can be completed within 60 days." This is in conflict with A-14's definition of defect, "A deviation in a basic component delivered to a purchaser for use in a facility or an activity subject to the regulations in 10 CFR Part 21 if, on the basis of an evaluation, the deviation could create a substantial safety hazard."

c. Conclusions

The NRC inspection team concluded that the unanalyzed deviations involving misaligned separators, battery qualification, and lead slags/foreign material within the

batteries, and C&D's failure to file an interim report in accordance with Part 21 timelines, are an unresolved item pending C&D's evaluation of these deviations discussed in Section 1.b of the report details (Unresolved Item (URI) 99901385/2014-201-01).

2. Design Control and Qualification

a. Inspection Scope

The inspectors reviewed C&D's policies and procedures for design control and battery qualification to verify compliance with Criterion III, "Design Control," and Criterion XI, "Test Control," of Appendix B to 10 CFR Part 50. The inspectors evaluated C&D's design change control process and procedures established in C&D's QA manual. Specifically, the inspectors reviewed two design changes to ensure that they were properly evaluated against components and parts used in the original type testing.

The inspectors reviewed L-line and K-line original type testing packages and the applicable IEEE standards that were used at the time and, in addition, a sample of qualification reports that used equivalency evaluations to ensure that batteries were qualified to the versions of the standards required in the customers' POs.

b. Observations and Findings

'L-line' Batteries

The inspectors reviewed Entergy PO 10358362 (Arkansas Nuclear One) for LCR-21 batteries with polycarbonate containers. PO 10358362 was for a replacement order that specified the original requirements in Arkansas Power and Light (AP&L) PO 01013. Arkansas Nuclear Unit 1, now operated by Entergy, was previously owned by AP&L. The AP&L PO required qualification in accordance with Nuclear Environmental Qualification Report QR2-07209, dated March 22, 1984, which specified, in addition to other requirements, Institute of Electrical and Electronics Engineers (IEEE) standard 535-1979, "IEEE Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations." QR2-07209 stated the basis for qualification was review and analysis of previous test data. Section 4.3, "Seismic," of QR2-07209 summarizes previous testing conducted prior to the issue of IEEE 535-1979 by Wyle Labs in 1976 that provided the previous test data for LC-21 qualification by analysis.

The 1976 seismic testing by Wyle Labs, as summarized in QR2-07209, included testing of many battery types, some of which had polycarbonate containers. The only batteries aged to the required 20-year qualified battery life were two 25-year naturally aged CT-1440 cells. However, the CT-1440s were opened, and the aged plates were removed from the original containers and placed in new plastic containers with plastic covers. Additionally, a new bottom plate support system, similar to that employed in cells produced at that time, was added to the cell. C&D did not provide justification for use of a partially aged cell in the seismic testing and there was no discussion in the qualification report that any other components except the plates were appropriately aged. This is not in accordance with IEEE 535-1979, which requires:

Section 8.2, "Aging Procedure," states, in part, that naturally aged cells [operated cells] may be used for qualification testing or accelerated aging of the entire cell [by procedure].

Section 5.1, "Type Testing," states a type test satisfies qualification only if the equipment to be tested is aged to an anticipated qualified life, subjected to all environmental influences known to affect performance, and operated under simulated conditions;

Section 8.3.1, "Cell Qualification by Test," requires cells to have completed aging and to be discharge tested to demonstrate capability of performance before, during, and after a seismic event; and,

The inspectors determined that C&D did not appropriately age the entire cell prior to seismic testing or provide justification for partial cell aging. Furthermore, QR2-07209 did not provide sufficient evidence and/or documentation to show how the IEEE 535-1979 seismic requirement to test aged cells was met by type testing in 1976 or by analysis associated with the 1984 AP&L PO.

C&D's failure to meet the qualification requirements of IEEE 535-1979, as required by Entergy PO 10358362 and AP&L PO 01013, is identified as Nonconformance 99901385/2014-201-02.

'K-line' Batteries

The NRC inspection team reviewed PO 00472405 from Exelon (Braidwood Station and Byron Station); this PO was for K-line breakers to be qualified per specification URS 17-6-001, Revision 0, which required IEEE 535-2006, IEEE 344-2004, and IEEE-450-2002. Qualification package QR-2360174-1 contained the engineering evaluation to show how the Exelon PO requirements were enveloped by the original type testing that was performed on K-line batteries. The NRC inspectors noted that the original type testing was dated, January 13, 1977, and utilized IEEE 535 draft version 8, IEEE 344-1975, and IEEE 450-1975. The NRC inspectors identified that there were notable technical differences between the older IEEE standards and the newer IEEE standards required in the PO. The inspectors determined that there was insufficient evidence and/or documentation in QR-2360174-1 to show that the newer IEEE requirements were bounded by the original type testing. C&D's failure to adequately demonstrate that original type testing performed envelops current customer qualification requirements is identified as the first example of Nonconformance 99901385/2014-201-03.

The NRC inspectors identified that C&D could not provide documentation of a qualification report for PO 00501212 from Exelon (Clinton Power Station) or any other equivalent documentation to demonstrate how batteries were qualified and/or bounded by the original type testing. The NRC inspectors identified that the original type testing utilized older IEEE revisions and no documentation existed to demonstrate that the current customer IEEE qualification requirements specified in the PO are met. This is another example of C&D's failure to adequately demonstrate that original type testing performed for K-line batteries envelop current customer qualification requirements. This issue has been identified as an additional example of Nonconformance 99901385/2014-201-03.

c. Conclusions

The NRC inspectors concluded that C&D has not established a program that adequately controls design in accordance with regulatory requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50. The inspectors issued Nonconformance 99901385/2014-201-02 for C&D's failure to show that the LCR-21 batteries were qualified under the most adverse conditions in accordance with PO specification IEEE 535-1979. Additionally, the inspectors issued Nonconformance 99901385/2014-201-03 for C&D's failure to adequately demonstrate that original type testing performed for K-line batteries envelop current customer qualification requirements.

In addition, since nonconformances 99901385/2014-201-02 and 99901385/2014-201-03 represent departures from technical requirements in purchase orders, C&D is required to begin the process of determining whether these particular deviations could create a substantial hazard in accordance with 10 CFR Part 21 requirements.

3. Nonconformances and Corrective Actions

a. Inspection Scope

The inspectors reviewed C&D's policies and procedures governing the implementation of nonconforming components and corrective actions to verify compliance with Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The inspectors reviewed CA quality operating procedure (QOP) BB-QOP 8.5.2 to assure measures are established to ensure that conditions adverse to quality are promptly identified and corrected. The inspectors reviewed C&D's documented conditions adverse to quality such as customer complaints, deviations, and defective material and equipment. In addition, the inspectors conducted interviews of C&D's quality and engineering staff about the evaluation of nonconforming components and corrective actions and reviewed AQOP-8.3, "Control of Nonconforming Product," Revision K, dated December 13, 2013. In addition, the NRC inspection team verified adequate closure of corrective actions associated with the violations and nonconformances previously identified in NRC IR 99901385/2009-201.

b. Observations and Findings

The NRC inspection team observed that, through the limited sample reviewed, C&D's corrective action and nonconformance programs are populated by customer complaints, internal audits, and NRC and NUPIC findings. These programs, as discussed with C&D's QA management, are not being utilized by C&D staff to self-identify conditions adverse to quality or control nonconforming items as required by BB-QOP 8.5.2 and AQOP 8.3, and specifically, the regulatory requirements in Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50.

C&D uses BB-QOP 8.5.2, "Corrective Action", dated May 11, 2011, to govern their CA process. BB-QOP 8.5.2 states, in part, that the purpose of this procedure is to define the corrective action requirements to assure that measures are established to assure

that conditions adverse to quality are promptly identified and corrected. However, C&D's CA program failed to identify and correct conditions adverse to quality in the following:

- The NRC inspection team found that the CA reports generated to address previous violations and nonconformances identified in NRC IR 99901385/2009-201 were insufficient to correct the identified problems. Specifically,
 - C&D CA report 09-049 and 09-050 were initiated to resolve violations 99901385/2009-201-01 and 99901385/2009-201-02. Violation 99901385/2009-201-01 was cited for an inadequate procedure due to the failure to adequately prescribe the process to perform an evaluation and meet timeliness requirements as specified in Part 21. The first example of Violation 99901385/2009-201-02 was cited due to the failure to perform an evaluation within the time requirements specified in Part 21. The second example of Violation 99901385/2009-201-02 was cited due to failure to perform an evaluation. During this inspection, the NRC inspectors found: multiple examples where 10 CFR Part 21 evaluations were not being completed for deviations; that C&D did not file an interim report in accordance with Part 21 timelines; and, misuse of Part 21 terms within the Part 21 procedure. Based on these examples, the NRC inspectors found CA reports 09-049 and 09-050 inadequate to correct the deficiencies identified in violations 99901385/2009-201-01 and 99901385/2009-201-02; therefore, these violations are still open.
 - C&D CA report 09-054 was initiated to resolve Nonconformance 99901385/2009-201-03 for C&D's failure to identify the root causes for quality problems and prevent their recurrence. C&D stated in their response to the NRC on November 30, 2009, (ADAMS Accession Number ML093360523) that "dedication activities were reviewed, specifically with regard to identifying equipment and calibration facilities. No other vendors who should be on the list, but are not, have been identified." However, the C&D Attica facility had not completed the extent of condition for calibration service providers using A2LA certificates; therefore, Nonconformance 99901385/2009-201-03 is still open.
 - C&D CA report 09-51 was initiated to resolve Nonconformance 99901385/2009-201-04 for C&D's failure to provide an engineering justification for down-grading a battery cover's safety-related function. The CA report was closed on August 8, 2010; however C&D was not able to provide an engineering change notice (ECN) for down-grading the battery cover's safety-related function. The inspectors found CA report 09-51 inadequate to correct this condition adverse to quality identified by the NRC in 2009. Nonconformance 99901385/2009-201-04 is still open.
- CA report 14-06 was initiated on January 8, 2014, when Nuclear Procurement Issues Committee (NUPIC) identified a failure to enter a customer complaint into the customer complaint database. Specifically, it dealt with a conformance/compliance incorrectly certified to IEEE 383-1974. The corrective action included a procedural change to the customer complaint procedure. Specifically, BI-WI-8.2.1-2, "Customer Complaints," Revision 7, now states, "the product manager has the latitude to determine those situations which may not warrant entry as a customer

complaint...examples include documents that can be re-submitted to the customer within the same day due to typographical errors and other situations in which the customer is not delayed or inconvenienced by the issue.” C&D responded to a NUPIC finding of not entering a condition adverse to quality into their CA process by allowing even greater latitude to enter items into their CA process. In addition, not entering situations in which the customer is not delayed or inconvenienced by the issue will bypasses C&D’s corrective action process described in step 4.1 to determine corrective/preventative actions and to review corrective actions for effectiveness. In addition, if same day deficiencies are corrected and not entered into the customer complaint, corrective action, or Part 21 process, they will not be screened for Part 21 applicability. The inspectors found CA report 14-06 inadequate to correct this condition adverse to quality. Since the inspection, C&D has noted that they will revise the procedure to ensure that all identified concerns will be entered into their corrective action system.

These have been identified as examples of Nonconformance 99901385/2014-201-04.

C&D uses AQOP-8.3, “Control of Nonconforming Product,” to govern their nonconformance process. AQOP 8.3 states that, “This procedure applies to all discrepant material, purchased and/or manufactured, at the C&D Technologies Attica Facility, and includes the identification, containment, documentation, disposition, and handling of raw material, completed components or finished parts and assemblies which do not conform to the specifications, drawings or fitness-for-use-criteria...Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, are maintained as describe above and as referenced in AQOP-4.2.4 [Control of Records].”

BB-QOP-7.4.3, “Commercial Grade Dedication,” step 4.1.9 states, in part, that, “[i]f some of the dedication test results are outside of acceptable ranges, the Leola lab manager or the site QC manager shall arrange for segregation of item inventory, report the nonconformance, submit the results to the Director of Engineering & Quality for disposition, and shall initiate corrective action with the supplier as appropriate.”

C&D was not able to produce any nonconformance reports over the past five years for NRC review; however, the NRC inspection team identified the following nonconforming conditions through email or other notes in dedication plans. C&D failed to provide evidence to show if these conditions were entered into their nonconformance process:

- C&D failed to accept a nonconforming condition for a critical characteristic, dimensions, for washer hardware in dedication plan 084/PH00907, in accordance with documented procedures. Specifically, the inspectors noted that the outer diameter for sample 5 to be minimally outside of tolerance. C&D accepted the critical characteristic as-is and failed to properly justify acceptance of the nonconforming condition in the dedication plan and enter this into their nonconformance process in accordance with AQOP-8.3, BB-QOP-7.4.3, and Criterion XV of Appendix B. C&D entered the issue into their corrective action program as CA report 14-8 dated March 6, 2014.
- C&D failed to accept a nonconforming condition for a critical characteristic, lot homogeneity, for battery containers in customer order 2393760, as required by Dedication Plan 077/PZ00651, Revision 12, dated February 22, 2011. Specifically, according to the sampling plan C&D utilized, 16 samples were needed to verify

homogeneity for the lot size; however, C&D's documentation showed 2 of the 16 test samples to be from an unknown mold number. C&D accepted the critical characteristic and failed to properly justify acceptance of the nonconforming condition in the dedication plan and enter this into their nonconformance process in accordance with AQOP-8.3, BB-QOP-7.4.3, and Criterion XV of Appendix B.

- Material test laboratory report for work request no. 12-11-09-2 identified a nonconforming part, washers PH01340, lot E-17-1. An informal disposition was stamped on the report itself; however, C&D failed to enter this into their nonconformance process in accordance with AQOP-8.3 and Criterion XV of Appendix B.
- Material test laboratory report for work request no. 12-04-25-3 documents that PB00335 bolt, lot #37447, does not conform to the applicable C&D dedication plan requirements. The bolt exceeded the tensile strength requirement of 100-150 kilopounds per square inch (ksi) with a ksi of 155. An e-mail dispositioned that the bolts were okay to use via an engineering manager; however, C&D failed to enter this nonconformance into their nonconformance process in accordance with AQOP-8.3, BB-QOP-7.4.3, and Criterion XV of Appendix B.

These have been identified as examples of Nonconformance 99901385/2014-201-05.

c. Conclusions

The NRC inspectors concluded that C&D has not implemented their programs to control nonconforming material, parts, or components and to identify and correct conditions adverse to quality in accordance with regulatory requirements in Criterion XV, "Nonconforming Materials, Parts, or Components," and Criterion XVI, "Corrective Action," of Appendix B to 10 CFR Part 50. The inspectors issued Nonconformance 99901385/2014-201-04 for C&D's failure to assure conditions adverse to quality are identified and corrected. Additionally, the inspectors issued Nonconformance 99901385/2014-201-05 for C&D's failure to review nonconforming items in accordance with documented procedures.

4. Commercial-Grade Dedication

a. Inspection Scope

The NRC inspectors reviewed C&D's policies and procedures governing the implementation of its CGD program to verify compliance with the regulatory requirements of Criterion III, "Design Control," Criterion IV, "Procurement Document Control," Criterion VII, "Control of Purchased Material, Equipment, and Services," and Criterion X, "Inspection," of Appendix B to 10 CFR Part 50. The inspectors evaluated CGD control procedure BB-QOP 7.4.3, "Commercial Grade Dedication," related CGD documentation, and interviewed the Nuclear Product Manager and C&D staff members.

The inspectors evaluated C&D's CGD procedure implementation for a sample of dedicated items associated with Entergy orders for LCR-21 and KCR-21 Class 1E batteries. The inspectors evaluated the dedication plan, the criteria for the selection of critical characteristics, the basis for sample size, and the selection of acceptance methods to verify effective implementation of C&D's dedication process.

b. Observations and Findings

The NRC inspection team noted that, in the sampled dedication plans, C&D failed to accept nonconforming conditions associated with critical characteristics in accordance with their CGD and nonconformance processes. BB-QOP-7.4.3, "Commercial Grade Dedication," step 4.1.9 states, in part, that, "[i]f some of the dedication test results are outside of acceptable ranges, the Leola lab manager or the site QC manager shall arrange for segregation of item inventory, report the nonconformance, submit the results to the Director of Engineering & Quality for disposition, and shall initiate corrective action with the supplier as appropriate." However, the NRC identified that C&D failed to follow BB-QOP-7.4.3, step 4.1.9, for disposition and acceptance of nonconforming conditions identified in dedication plans for washer hardware, battery containers, and bolts, as cited in Nonconformance 99901385/2014-201-05 and documented in Section 3.b of this report. Specifically, C&D failed to document the disposition to accept conditions that were outside of the acceptable ranges required to verify that critical characteristic.

However, since the critical characteristic acceptance would not have been challenged by the minimally out of tolerance conditions in the examples noted, this has been identified as a deficiency in the identification and documentation of nonconforming items, and specifically, as a failure to review and accept a nonconforming condition in accordance with documented procedures.

c. Conclusions

The NRC inspectors concluded that C&D has established a CGD program in accordance with regulatory requirements of Criterion III, "Design Control," Criterion IV, "Procurement Document Control," Criterion VII, "Control of Purchased Material, Equipment, and Services," and Criterion X, "Inspection," of Appendix B to 10 CFR Part 50; however, C&D failed to provide enough objective evidence for the inspectors to verify adequate implementation of the program. Specifically, the dedication plans reviewed by the NRC identified that C&D accepted critical characteristics that were outside of acceptable ranges, as documented in Nonconformance 99901385/2014-201-05, without justifying acceptance of the nonconforming conditions in accordance with documented procedures.

5. Entrance and Exit Meetings

On March 3, 2014, the NRC inspection team presented the inspection scope during an entrance meeting with C&D personnel including Mr. Steve DiMauro, QA Manager, of C&D. On March 7, 2014, the inspectors presented the inspection results during an exit meeting with Mr. DiMauro and C&D personnel.

ATTACHMENT

1. PERSONS CONTACTED AND NRC STAFF INVOLVED:

| Name | Title | Affiliation | Entrance | Exit | Interviewed |
|---------------------|---|-------------|----------|------|-------------|
| Lisa Smith | Quality Systems Coordinator | C&D | X | X | X |
| Steve DiMauro | Quality Systems Manager | C&D | X | X | X |
| Jeff Rankin | Atica Facility Quality Manager | C&D | X | X | X |
| Larry A. Carson | Nuclear Product Manger | C&D | X | X | X |
| Robert F. Malley | Quality and Process Engineering | C&D | X | X | X |
| Jon Anderson | VP of New Technology and Battery Design | C&D | X | X | X |
| Drew D. Heimer | Director Product Development | C&D | | X | X |
| Manu Kanjirathunkal | Applications Engineer | C&D | X | X | X |
| Randy Clair | Manager of Materials Test Lab | C&D | X | X | X |
| Stacy Smith | Reactor Operations Engineer | NRC | X | X | |
| Eugene Huang | Reactor Operations Engineer | NRC | X | X | |
| George Lipscomb | Electrical Engineer | NRC | X | X | |
| Frank Talbot | Reactor Operations Engineer | NRC | X | X | |

2. INSPECTION PROCEDURES USED:

IP 43002, "Routine Inspections of Nuclear Vendors"

IP 43004, "Inspection of Commercial-Grade Dedication Programs"

IP 36100, "Inspection of 10 CFR Part 21 and Programs for Reporting Defects and Noncompliance"

3. ITEMS OPENED, CLOSED, AND DISCUSSED:

| Item Number | Status | Type | Description |
|----------------------|--------|------|-----------------|
| 99901385/2009-201-01 | Open | NOV | Part 21 |
| 99901385/2009-201-02 | Open | NOV | Part 21 |
| 99901385/2009-201-03 | Open | NON | Criterion XVI |
| 99901385/2009-201-04 | Open | NON | Criterion III |
| 99901385/2009-201-05 | Open | NON | Criterion V |
| 99901385/2009-201-06 | Closed | NON | Criterion XVIII |

| | | | |
|----------------------|------|-----|---------------|
| 99901385/2014-201-01 | Open | URI | Part 21 |
| 99901385/2014-201-02 | Open | NON | Criterion III |
| 99901385/2014-201-03 | Open | NON | Criterion III |
| 99901385/2014-201-04 | Open | NON | Criterion XVI |
| 99901385/2014-201-05 | Open | NON | Criterion XV |

5. **DOCUMENTS REVIEWED:**

Procedures

- BB-QOP 8.5.2, "Corrective Action Requests (CAR)," Revision 4, dated February 27, 2014
- AQOP-8.3, "Control of Nonconforming Product," Revision K, dated December 13, 2013
- C&D Technologies Quality Operating Procedure (QOP) BB-QOP-7.4.3, Commercial Grade Dedication, Revision 3, dated June 21, 2012
- C&D Technologies Standard Policy and Procedure (SPP) A-14, "Comercial Grade Dedication," Revision 10, dated June 30, 2009
- C&D Technologies Corrective/Preventive Action (CPA) 09-49, NRC Inspection at C&D Blue Bell, dated October 7, 2009, date parts B-D due, November 19, 2009
- C&D QAP BB-WI-7.4.3-1, "Nuclear Dedication Requirements," dated September 3, 2009
- C&D Technologies Inspection Procedure (IP) 396.5, Nuclear Dedication Procedure, dated January 1998
- C&D Work Instruction BB-WI-8.2.1-2,
- C&D Technologies QOP BB-WI 8.2.2-2, Customer Complaints, Revision 7, dated February 19, 2014
- C&D Technologies Inc., Attica Facility, AQOP-4.2.3, "Control of Documents," Revision H, dated December 8, 2009
- C&D Technologies Inc., Attica Facility, AQOP-7.4-1, "Related Manufacture, Procurement and Dedication," Revision H, dated July 23, 2012
- C&D Technologies Inc., Attica Facility, AQOP -8.5-2, "Corrective Action," Revision G, dated May 16, 2011
- BB-QOP 7.3.7a, "Engineering Change Control," Revision 0, October 21, 2005
- BB-QOP 7.4.3, "Commercial Grade Dedication," Revision 3, June 21, 2012

Commercial Grade Dedication Documents

- C&D Dedication Plan 084/PH00907, "Rack Hardware," Revision 4, November 23, 2011
- C&D Dedication Plan 084/PH00907, "Rack Hardware," Revision 1, October 5, 2009
- C&D Dedication Plan 077/PZ00651, "Polycarbonate Container," Revision 12, February 22, 2011
- C&D Dedication Plan 268/PK02450, "intercell connector," Revision 2, dated January 21, 2011
- C&D Dedication Plan 059-ra02181, "cable assembly," Revision 1
- C&D Dedication Plan 059-ra02180, "cable assembly," Revision 4
- C&D Dedication Plan 084/ph01430e, "5/16-18 thread, 17.25 inch tie rod for seismic racks," Revision 3

Material and Laboratory Reports

- Laboratory Testing, Inc. (LTI) Certified Test Report CDT001-09-10-30855-1 for PH907P (Washer), October 23, 2009
- LTI Certified Test Report CDT001-12-10-39531-1 for PZ00651 Battery Container, November 9, 2012
- IMR Test Labs Test Report 201210144 for PZ00651 Container (Lot No. LXPB8R), October 29, 2012
- Material Test Laboratory Report (MTR) 02-5932, "1E Hardware: PH00907P, Lot 0910157/025932, for Entergy PO 10250122 (C&D order 2320808), October 23, 2009
- MTR for 1E flame arrestors, dated December 9, 2010
- MTR for 1E copper parts, dated February 7, 2011
- MTR for 1E cable assemblies, dated October 8, 2009
- MTR for 1E cable assemblies, dated January 7, 2011
- MTR 1E copper parts: PK02532 & PK02663 inter-cell connectors, lot#1310243/026696, dated October 31, 2013
- MTR 1E copper parts: PT00448 terminal plate assembly, lot#1207182/026544," dated July 24, 2012
- MTR RE02090 battery spacers, lot #1212033/026601, dated December 6, 2012
- MTR 1E cable assemblies, RA02181-35, dated February 24, 2011
- MTR 1E cable assemblies, RA02181-40, dated January 26, 2011

Drawings

- J10403, "Lock Washer," Revision 5, January 24, 2011
- J10403, "Lock Washer," Revision 3, July 9, 1965
- K5629, "Outline of LA, LC-13 thru 25 Batteries," Revision 1, March 9, 1982
- M16141, "Jar Inspection Dimensions Nuclear," Revision 9, May 15, 2010
- M6284, "Containers 'L' Series," Revision 8, September 6, 1983
- M07803, "Application of Logos & Danger Legends, 'L' Containers," Revision 11, January 28, 2013
- M09489, "Crimped lugs for stationary battery applications," Revision 08
- M09558, "Crimped cable assemblies," Revision 5
- M06488, "connector 2, 4, & 6," Revision 66
- K08093, "Date, Mat'l & lot stamps molded parts", Revision 5
- J18147, "tie rods for seismic racks," Revision 11

Engineering Change Notices (ECN) and Engineering Change Requests (ECR)

- ECN 13464, K series covers Jar to cover interferences, dated January 19, 2013
- ECR B11-0109, dated January 10, 2012
- ECN 13280, dated June 22, 2012
- ECN 13205, dated April 10, 2012

Corrective Action Reports

- CA # 13-03, "CAR from Supplier Audit," dated February 15, 2013
- CA # RS-1037-13-05, "Post and Strap Modification," dated February 26, 2013
- CA# RS-1037-13-07, "Calibration," dated March 28, 2013

- CA# RS-1037-13-12, "Nonconforming Material," dated September 2013
- CA# 13-17, "Jar Crack," dated November 7, 2013
- CA#14-01, "Attica Surveillance Audit," dated January 8, 2014
- COMP-2012-00032, Palisades spacer issues, identified February 16, 2012
- CAR-09-049, C&D CAR Response to NOV-99901385/2009201-01 (Open)
- CAR-09-050, C&D CAR Response to NOV-99901385/2009201-02 (Open)
- CAR-09-054, C&D CAR Response to NON-99901385/2009201-03 (Open, C&D Attica still evaluating extent of condition of problems with using A2LA commercial grade calibration services.)
- CAR-09-051, C&D CAR Response to NON-99901385/2009201-04 (Open, ECR/ECN drafted but not approved by C&D management)
- CAR-09-055, C&D CAR Response to NON-99901385/2009201-05 (Open, BB-WI-8.2.1-2 has been revised to address operating experience related customer complaints; however, this procedure requirement for evaluating operating experience has not been implemented.)
- CAR-09-053, C&D CAR Response to NON-99901385/2009201-06 (Inspector proposed Closing NON-06)
- CAR-14-05, Rev 1, NUPIC Finding #1, C&D Planned Closure Date: March 31, 2014 (Open)
- CAR14-06, Rev 1, NUPIC Finding #2, C&D Planned Closure Date, March 31, 2014 (Open)
- CAR14-07, Rev 1, NUPIC Finding #3, C&D Planned Closure Date, March 31, 2014 (Closed)
- CAR14-08, Rev 1, NUPIC Finding #4, C&D Planned Closure Date, March 31, 2014 (Open)
- CAR14-09, Rev 1, NUPIC Finding #5, C&D Planned Closure Date, March 31, 2014 (Open)
- CAR14-10, Rev 1, NUPIC Finding #6, Dedication Plan for Dedication A2LA Calibration Service Providers, Date Issued: January 13, 2014, Date Closed: February 13, 2014 (Closed)
- CAR 14-11, Rev 1, NUPIC Finding #7, C&D Planned Closure Date, March 31, 2014 (Open)
- C&D Technologies I-Sight Case Record COMP-2011-00120, Florida Power and Light, (Complaint: Dedication Plans not approved by FP&L prior to shipping)
- C&D Technologies I-Sight Case Record COMP-2012-00151, Florida Power and Light, (Complaint: Cracked Jars)
- C&D Technologies I-Sight Case Record COMP-2013-00193, D.C. Cook Nuclear Station, (Complaint: Product going to nuclear plant was ordered, built and shipped without withdrawal tubes. This had previously happened in February 11 on Order 2354503 which was also ordered without withdrawal tubes: the withdrawal tubes are used to test the specific gravity (12.15) of the battery electrolyte)

Audits

- C&D Audit Plan of Daramic, Lead Auditor: Jeff Rankin, Commercial Grade Survey, June 18, 2010
- C&D Technologies, External Supplier Audit Checklist, Audit Scope, Commercial Grade Surveillance, dated June 18, 2010
- PM Fasteners, "Audit Plan – Commercial Grade Survey," September 4, 2013

- PM Fasteners, "External Supplier Audit Checklist," September 4, 2013
- Mack Molding, "Audit Plan – Commercial Grade Survey," April 12, 2013
- Mack Molding, "External Supplier Audit Checklist," April 25, 2013
- Mack Molding, "C&D Quality System Audit Results," May 13, 2013
- Testing/calibration laboratory supplier audit checklist for laboratory testing inc., dated July 12, 2012
- Survey 004, "commercial grade survey report for storm copper components," dated September 3, 2009

Procurement Documents

- C&D BB-WI 7.4.1-a-1, Placement of a Purchase Order"
- Entergy PO 10358362 (C&D order 2393760) for LCR21 Batteries and Accessories, Revision 3, January 14, 2013
- PO 054550 to Laboratory Testing Inc. for CGD Services, Revision 0, October 11, 2012
- PM Fasteners, Inc. Packing Slip for C&D PO 015530 for Lock Washers, Revision 0, October 7, 2009
- PM Fasteners, Inc. Certification Letter for C&D PO 015530 for Lock Washers, Revision 0, October 7, 2009
- PO 4500649873 from PSEG to C&D for KCR-21 batteries, dated October 22, 2011
- PO 00472405 Exelon Braidwood to C&D, dated September 29, 2011
- PO 00501212 Exelon Clinton to C&D, dated October 1, 2013

Qualification Documents

- Nuclear Environmental Qualification Report QR2-07209, "Arkansas Power & Light Purchase Order No. 01013," March 22, 1984
- Bill of Material (BOM), "CW16618-PTL, 001LCR 21 Nuclear Application," undated (current in system)
- Material Specification P-20, "Polycarbonate Battery Containers ECR B06-0041," Revision 14, January 8, 2013
- IEEE 535-1979, "IEEE Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations," September 21, 1979
- Report no. 43291-1, "seismic simulation test report for eight battery cells contained in a type K battery pack," dated June 24, 1976
- Report no. 44466-1, "seismic simulation test report on a two-step battery rack and three kc-9, two kc-13, two kc-17, and three kc-21 battery cells," dated march 12, 1979
- Report no. 46661-1, "seismic simulation test report for one LC type battery rack loaded with twelve LC-33 batteries and one KC type battery rack loaded with twenty-eight KCC-11 batteries," dated March 17, 1983
- CDT-001-10-02-03501-1, "certified test report for customer P.O. 018961-01," dated February 4, 2010
- Laboratory report VL-765-1, VL-761-1, 1947, battery section on IEEE 323 qualification, dated May 12, 1977
- Laboratory report VL-77-016, battery section on IEEE 323 qualification, dated June 8, 1979

- Laboratory report VL-765-1, VL-761-1, 1947, battery section on IEEE 323 qualification, January 13, 1977
- QR-2360174-1, "Qualification report of 125 volt dc porv ups batteries and racks for Exelon generation company, LLC Braidwood and Byron steam generator PORB ups project," dated November 15, 2011

Miscellaneous Documents

- Email to Entergy, "C&D Model LCR-25 Cells with Misaligned Seperators," dated March 6, 2012.
- C&D email, "Non dedicated jars – RS-776-009-002 & 003," dated September 11, 2009
- C&D Failure Mode and Effects Analysis (FMEA) Table for Batteries included the following for the Battery Cover (Failure Mode: Polymer out of specification or wrong material, molded in defect, incorrect dimensions (Failure Effect: Cover Crack)
- C&D Technologies Inspection Approved Vendor List
- IMR Test Labs provided a Test Report which contained the following related to the battery container jar: (a) Sample Spectroscopy of Jar material: Polycarbonate material, tensile strength and ultimate flexural stress, Accredited Nadcap Material Test Laboratory, CMTR CDT001-12-10-39531-1, dated November 9, 2012, Battery Containers, C&D Orders for Entergy-Arkansas 1 Nuclear (62 EACH - LCR21NUC)
- Capacity discharge test report for KCR-21, dated October 10, 2011
- 268/pk02532, "Intercell connector," Revision 7
- 084/re02090, "Spacer for battery rack," Revision 3
- 059-ra02181, "Cable assembly," Revision 5
- RS-1476, "standby battery vented cell installation and operating instructions,"
- URS specification 17-6-001 for static uninterruptible power supply system at Braidwood and Byron, Revision 0

6. ACRONYMS USED:

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|-------|--|
| ADAMS | Agencywide Documents Access and Management System |
| BOM | bill of material |
| C&D | C&D Technologies, Inc. |
| CA | corrective action |
| CGD | commercial grade dedication |
| CFR | <i>Code of Federal Regulations</i> |
| COMP | customer complaint |
| DCIP | Division of Construction Inspection and Operational Programs |
| ECN | engineering change notice |
| ECR | engineering change request |
| EVIB | Electrical Vendor Inspection Branch |
| IEEE | Institute of Electrical and Electronics Engineers |
| IP | inspection procedure |
| IR | inspection report |
| ksi | kilopounds per square inch |
| NON | Notice of Nonconformance |
| NRC | (U.S.) Nuclear Regulatory Commission |
| NRO | Office of New Reactors |

| | |
|-------|--|
| NUPIC | Nuclear Procurement Issues Committee |
| PO | purchase order |
| QA | quality assurance |
| QOP | quality operating procedure |
| QVIB | quality assurance vendor inspection branch |
| SSH | substantial safety hazard |
| URI | unresolved item |
| U.S. | United States (of America) |