

# **C&D TECHNOLOGIES, INC.**

**P o w e r   S o l u t i o n s**

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Phone: (215) 619-7849  
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October 18, 2016

VIA ELECTRONIC DELIVERY  
Nuclear Regulatory Commission  
Operations Center  
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VIA REGULAR MAIL  
Document Control Desk  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001

VIA OVERNIGHT DELIVERY  
US Nuclear Regulatory Commission  
11555 Rockville Pike  
Rockville, MD 20852-2746

Subject: 10CFR Part 21 Evaluation Regarding Terminal Welding Failure in 3DCU-9 batteries

The purpose of this letter is to provide the NRC a report in general conformity to the requirements of 10CFR Part 21.21 (a)(2).

On August 8, 2016 a user of commercial grade (non-Class 1E) 3DCU-5 batteries notified C&D of an issue with two units that exhibited high on-charge voltage and sulfated positive plates. C&D issued a Return Material Authorization to the customer, and the batteries were returned and analyzed. On September 13, 2016 C&D's laboratory issued a report showing that the batteries had failed welds between the terminal posts and the external battery terminals. This weld has the function of carrying current between the battery energy storage elements and the customer load. Failure of the welds could interrupt the current flow to customer loads during discharge.

Although the batteries were not sold or used in a nuclear safety related application, C&D conducted an extent of condition analysis to determine whether this condition could exist in DCU products sold into safety related products. Although no similar reports have been made from users of Class 1E DCU batteries, based on the results of this analysis, there is a risk that this condition may exist in safety related products.

Accordingly, C&D is submitting this report to the NRC and notifying C&D's customers that use DCU batteries of this report.

IE19  
NRK

Required information per 10CFR Part 21.21(d)(4) follows:

**(i) Name and Address of the individual or individuals informing the Commission.**

Armand Lauzon Jr. (or Designee)  
President and Chief Executive Officer  
C&D Technologies, Inc.  
1400 Union Meeting Road  
Blue Bell, PA 19422-0858

**(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.**

DCU Batteries, manufactured in from April 2010 to August 2016. The battery manufacturing date is on the label.

**(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.**

C&D Technologies, Inc.  
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**(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.**

Batteries containing the failed welds Units containing failed welds may not discharge properly when required.

**(v) The date on which the information of such defect or failure to comply was obtained.**

September 13, 2016

**(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of these components in use at, supplied for, being supplied for, or may be supplied for, manufactured or being manufactured for one or more facilities or activities subject to the regulations in this Part.**

DCU batteries used at Nuclear Plants in 1E applications, with shipment dates of April 2010 to August 2016.

Utility	Plant Name	Battery Model	Units Shipped
Energy Northwest	Columbia	3DCU-09	44
Exelon	Nine Mile	3DCU-09	16
Talen Energy	Susquehanna	3DCU-07	16
Entergy	Grand Gulf	3DCU-09	24
Exelon	Limerick	3DCU-09	1

***(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.***

C&D has implemented a discharge test to detect and eliminate any improperly made welds prior to shipment to end users. We have also performed additional training and qualification work with employees responsible for terminal welding on DCU products. These actions were implemented prior to shipment of Class 1E nuclear products in September 2016, and now are completed.

***(viii) Any advice related to the defect or failure to comply about the facility, activity, or basic component that has been, is being, or will be given to purchasers or licensees.***

U.S. Licensees using batteries possibly containing the potential defect are being notified of the filing of this report with recommendations that they examine their batteries for any signs of similar problems. See attached notification letter.

***(ix) In the case of an early site permit, the entities to whom an early site permit was transferred.***

Not applicable

If you have any questions or wish to discuss this matter or this report, please contact:

Robert Malley  
VP Quality and Process Engineering  
bmalley@cdtechno.com  
(215) 619-7830

Sincerely,



Armand Lauzon Jr.  
Chairman, CEO & President  
C&D Technologies, Inc.

Attachment – C&D Letter to Users of DCU Batteries dated October 18, 2016

Cc: D. Anderson  
R. Malley  
J. Anderson  
S. DiMauro  
D. Heimer  
L. Carson

# **C&D TECHNOLOGIES, INC.**

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**P o w e r   S o l u t i o n s**

1400 Union Meeting Road  
Blue Bell, PA 19422  
Phone: (215) 775-1314  
Fax: (215) 619-7887

October 18, 2016

Customer Name and Address

Ref: DCU

Dear Sir/Madam:

C&D Technologies, Inc. ("C&D") is filing a report with the NRC for a possible risk with terminal connections in DCU batteries shipped from April 2010-August 2016.

**Background:**

On August 8, 2016 a user of commercial grade (non-Class 1E) 3DCU-5 batteries notified C&D of an issue with two units that exhibited high on-charge voltage and sulfated positive plates. The units had been shipped in June 2016. C&D issued a Return Material Authorization to the customer, and the batteries were returned and analyzed. On September 13, 2016 C&D's laboratory issued a report showing that the batteries had failed welds between the terminal posts and the external battery terminals. The weld failed at the interface of the terminal post and external terminal, due to lack of fusion in the area during manual welding. This weld has the function of carrying current between the battery energy storage elements and the customer load. Failure of the welds could interrupt the current flow to customer loads during discharge.

Although the batteries were not sold or used in a nuclear safety related application, C&D conducted an extent of condition analysis to determine whether this condition could exist in DCU products sold into safety related products. No similar reports have been made from users of Class 1E DCU batteries, however, based on the results of the EOC analysis, there is a risk that this condition may exist in safety related products.

**Recommendations:** C&D recommends that operators of DCU batteries perform inspection and testing of the products. Products that have previously passed these inspections and tests (as recommended in C&D Interim Report dated May 2010 do not require additional testing or inspection) The inspection and tests can take the following forms:

1. **Visual Inspection (On-Line):** Closely inspect the terminals of the batteries for indication of a suspect battery. Signs of welding problems can include misalignment or tilting of the terminals or intercell connections or any indication of a break in the weld.
2. **Voltage Readings:** Any voltage readings outside of the upper and lower specification limits in the Installation and Operation Manual may indicate a possible problem that requires further investigation. Extremely high or low readings (>2.50V/cell or less than 2.00 V/cell) warrant immediate replacement.
3. **Ohmic Readings (On-Line):** If ohmic baseline readings have been previously established for your batteries a change of 50% or greater indicates that the battery should be replaced. If ohmic readings have not been done to date, variation of more than three standard deviations from average may indicate further testing is required.

DCU Terminal Welding  
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4. Load Test (Off-Line): Load testing per duty cycle will detect internal connections with high resistance. Modified load tests using portable equipment will also aid in detection of issues. Please contact C&D for additional information, including interpretation of duty cycle testing.

**Corrective Actions:** In September 2016 C&D has enhanced qualification requirements and instituted a high rate discharge as a final measure prior to shipment to capture any welding non-conformances.

**Further Reporting:** No further reporting is anticipated.

**C&D Contacts:** Further information on this issue can be obtained from:

Larry Carson – Nuclear Product Manager  
Office Phone 215-775-1314  
Email: lcarson@cdtechno.com

Robert Malley – VP Quality and Process Engineering  
Office Phone 215-619-7830  
Email bmalley@cdtechno.com

Best Regards,



Larry A. Carson  
Nuclear Product Manager  
C&D Technologies, Inc.

cc: A. Lauzon – President and CEO  
D. Anderson – VP General Counsel  
R. Malley – VP Quality and Process Engineering  
J. Anderson – CTO  
D. Heimer – Director Product Development  
L. Carson – Nuclear Product Manager  
S. DiMauro – Quality Systems Manager