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July 18, 2014

VIA FACSIMILE
Nuclear Regulatory Commission
Operations Center
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VIA REGULAR MAIL
Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555-001

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

Subject: Final Report –10CFR Part 21 Evaluation regarding cracking in KCR-13 Standby Battery Jars

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 October 22, 2013 C&D Technologies, Inc. ("C&D") was informed by Entergy Nuclear Northeast that a KCR-13 battery installed at the Indian Point Nuclear Energy Center (IPEC) had developed a small crack in the polycarbonate jar material. The jar is a safety related component with the primary function of containing electrolyte. The battery was removed from service and sent by IPEC to Lucius Pitkin, Inc. (LPI) of New York, NY, for analysis.

As C&D did not have access to the components of the allegedly defective battery, and a report had not yet been issued by Lucius Pitkin, C&D filed the requisite interim reports until receiving the analysis report from LPI. This letter serves as C&D Technologies' final analysis of the issue. It should be noted that no additional physical evaluation was performed by C&D and therefore this evaluation is based solely on the report provided by LPI.

The conclusions of the LPI report are as follows:

1. The cracked jar and cover that required removal of the cell were not directly related to the deformation of the post bushing from corrosion and did not appear to be a result of the radial stresses that the corrosion products would have created due to the volumetric increases.
2. The crack initiation site occurred at the lip of the jar in an area of the jar cover seal, where the MMA adhesive is used.
3. The crack surface showed indications of both environmental stress cracking (ESC) and fatigue failure.
4. Chemical analysis of materials near the crack initiation area did not reveal any trace of the stress cracking agent.

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Conclusions

While the images do show indications of ESC and fatigue, the lack of chemical evidence of the actual agent makes it difficult to determine the source of the material. Polycarbonate (the container material) has known stress cracking agents for example esters, aliphatic hydrocarbons, aromatic hydrocarbons, halogenated hydrocarbons, ketones, etc. and the C&D Installation and Operation Manual clearly states that the only approved materials for contact with the jar and cover (other than materials used in the construction of the battery) for cleaning purposes is water and sodium bicarbonate (soda ash). If one of the previously mentioned materials came into contact with the jar, it could have caused the ESC that was observed.

The standing recommendation to system operators is to limit any chemical that can come into contact with the battery to only approved materials. In the event that an unapproved material contacts the battery, the unit should be cleaned and observed for any subsequent damage caused by the agent.

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

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

KCR-13 Batteries, manufactured in 2005, 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.
1400 Union Meeting Road
Blue Bell, PA 19422-0858
- (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**

The cracked jar which has been evaluated by an external lab does not indicate a potential defect which could create a substantial safety hazard
- (v) The date on which the information of such defect or failure to comply was obtained**

October 22, 2013
- (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.**

KCR-13 batteries used at Nuclear Plants in 1E applications made in 2005

Utility	Plant Name	Battery Model	Qty of Batteries
Entergy	Indian Point	KCR-13 NUC	72
Xcel Energy	Monticello	KCR-13 NUC	62

(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.

Co-Current Actions underway to complete the evaluation:

a) None. Evaluation complete.

(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 possibility containing the alleged defect have been notified of the filing of this final report with recommendations that they examine their batteries for any signs of 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,



Christian Rheault
President and Chief Executive Officer
C&D Technologies, Inc.

Attachment – C&D Letter to Users of KCR-13 batteries entitled "Final Report – KCR-13 Cracked Jar", dated 7/18/14

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



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July 18, 2014

To: Entergy Operations, Inc.
P.O. Box 31995
Jackson, MS 39286-1995
Attn: Manager, Operating Experience/CAA
M-ECH-25

Monticello Nuclear Generating Plant
2807 W. County Road 75
Monticello, MN 55362-9637

Ref: Final Report – KCR-13 Cracked Jar

Dear Sir/Madam:

C&D Technologies, Inc. ("C&D") is filing a final report with the NRC for an incident that occurred with a safety related product at Indian Point Energy Center.

As related in previous communications, on October 22, 2013 Entergy Nuclear Northeast informed C&D that a KCR-13 battery installed at the Indian Point Nuclear Energy Center had developed a small crack in the polycarbonate jar material. The immediate response by Entergy was to replace the affected battery with an on-site spare. This battery was not returned to C&D for analysis, but was rather sent by Entergy to Lucius Pitkin, Inc. (LPI), of New York, NY for analysis. Representatives from C&D and ESA Consulting Engineers were present at Lucius Pitkin for the initial teardown of the affected battery. C&D has received and reviewed the report provided by LPI, and an evaluation has been performed by C&D engineering.

LPI's report reached the following conclusions:

1. The crack that developed in the jar was not related to cover radial stresses from the battery terminal, and was not connected to any cover crack. It was initiated in the jar lip itself in the jar/cover seal area.
2. The crack had evidence of both environmental stress cracking (ECS) and fatigue failure. ECS is a failure mechanism that requires an external chemical agent.
3. Chemical analysis of the materials near the crack initiation point did not reveal any traces of the stress cracking agent. This is not unusual as most stress cracking agents for polycarbonate are volatile materials that can evaporate with time

C&D Engineering reviewed the report and confirmed the indications of ECS and fatigue failure. As noted previously, the battery components were not available to C&D and the evaluation was based solely on the LPI report. With no evidence of the stress cracking agent remaining in the failure area no specific conclusions can be drawn as to the root cause of the crack.

Based on the report and subsequent analysis the following recommendations are made for users of KCR product:

1. Inspect battery cells for cracks in the clear polycarbonate jar material. Any batteries found with cracks should be replaced, and the cells returned to C&D for analysis. Requirements for visual inspection are described in the C&D I&O manual for flooded products, available on the C&D website.

2. Review and enforce C&D recommendations for cleaning materials used on batteries. C&D's I/O manual specifically limits neutralization and cleaning materials to sodium bicarbonate and water. Use of any solvent or commercial cleaning compounds to clean polycarbonate jars is strictly prohibited.

Field History: As related in previous communications, the incidence of this failure mode in KCR polycarbonate jars is rare. C&D reviewed:

- Warranty claims for all KCR products (nuclear safety related and commercial) dating back to January 2000.
- Customer complaints for all customers, since the database was established in 2009.
- Sales records for nuclear safety related and for commercial KCR products since 1997

No claims or complaints have been made for cracked jars in any nuclear safety related KCR product using polycarbonate materials. Since 1997, C&D's sales records indicate 7,703 KCR cells of all sizes, and 1,373 KCR-13 cells have been produced for nuclear safety related applications. Approximately 60,000 cells have been produced for non-safety related applications. Of these units two batteries have been reported to have cracks in the field. With the Indian Point incident included, the failure rate for jar cracking for KCR-13 is 0.013% for nuclear safety related product, and 0.004% for KCR's in all applications.

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

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Best Regards,

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

cc: C. Rheault – President and CEO
D. Anderson – VP General Counsel
J. Miller – VP Operations
R. Malley – VP Quality and Process Engineering
J. Anderson – VP New Technology and Battery Design
L. Carson – Nuclear Product Manager
S. DiMauro – Quality Systems Manager