COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

DUKE ENERGY KENTUCKY, INC.	)	
	)	
	)	CASE NO. 2016-00349
ALLEGED FAILURE TO COMPLY WITH KRS 278.042	)	
	)	

ORDER

Duke Energy Kentucky, Inc. ("Duke Kentucky"), a Kentucky corporation, engages in, among other things, the distribution of electricity to the public for compensation and is a utility subject to Commission jurisdiction.

KRS 278.042 requires the Commission to ensure that each electric utility constructs and maintains its plant and facilities in accordance with accepted engineering practices as set forth in the Commission's administrative regulations and orders and the most recent edition of the National Electrical Safety Code ("NESC").

KRS 278.030 requires every utility to furnish adequate, efficient and reasonable service. KRS 278.260 permits the Commission, upon its own motion, to investigate any act or practice of a utility that affects or is related to the service of a utility. KRS 278.280(1) further permits the Commission, after conducting such investigation and finding that a practice is unreasonable, unsafe, improper, or inadequate, to determine the reasonable, safe, proper, or adequate practice or methods to be observed and to fix the same by Order.

Pursuant to KRS 278.280(2), which directs the Commission to prescribe rules and regulations for the performance of service by utilities, the Commission has

promulgated Administrative Regulation 807 KAR 5:006, Section 25, which requires all utilities to adopt and execute a safety program appropriate to the size and type of its operations, and establish, among other things, a safety manual with written guidelines for safe working practices and procedures to be followed by employees. As part of the investigation into the subject incident, Duke Kentucky provided to the Commission its safety program manual ("Duke Kentucky Safety Manual").

Commission Staff completed an Accident Investigation Staff Report ("Staff Report"), attached hereto as the Appendix, on November 23, 2015. The Staff Report alleges that on April 3, 2015, a three-person substation repair crew responded to a fault on Circuit 45 at the Duke Energy Northern Kentucky University Substation located on the campus of Northern Kentucky University, Highland Heights, Kentucky. Two Duke Kentucky transmission electricians, Senior Maintenance Electrician Nathan Trapp ("Trapp") and Maintenance Electrician Kyle Leninger ("Leninger") (collectively, "Injured Employees"), sustained burn injuries while performing repairs on a four-cubicle 13.2-kiloVolt ("kV") switchgear. The Injured Employees were reportedly attempting to remove a fiberboard barrier from an adjacent energized Circuit 44 switchgear cubicle to use as a replacement for a burned fiberboard barrier in the de-energized and grounded Circuit 45 switchgear cubicle they were tasked to repair. The Injured Employees incorrectly assumed the Circuit 44 switchgear was de-energized and failed to isolate, test for voltage, and ground Circuit 44. Trapp reportedly reached inside the Circuit 44 switchgear cubicle, causing an arc to occur and resulting in burn injuries to both employees.

Trapp received significant burns to his hand, wrist, and arm and second-degree burns to his face and neck. Leninger sustained first-and second-degree burns to his face, neck, and arm. Both employees were taken to University Hospital in Cincinnati, Ohio, for medical treatment. Leninger was released the following day. Trapp was transferred to Ohio State University Wexner Medical Center in Columbus, Ohio, and released on April 13, 2015.[1]

According to Duke Kentucky, the incident occurred at approximately 4:29 p.m. on April 3, 2015, and was discovered by the utility minutes thereafter. Duke Kentucky notified Commission Staff of the incident at approximately 6:21 p.m. the same day and investigated the incident on April 7, 2015. Thereafter, Commission Staff prepared the Staff Report, which found that Duke Kentucky did not meet certain requirements of the NESC, and of the Duke Kentucky Safety Manual.[2]

Based on Commission Staff's investigation of the incident as set forth in the Staff Report and the information provided by Duke Kentucky in its Incident Investigation Report ("Duke Kentucky Investigation Report"), Attachment C to the Staff Report, Commission Staff alleges that Duke Kentucky has violated provisions of the NESC, the Duke Kentucky Safety Manual, and KRS 278.042, which requires an electric utility to construct and maintain its plant and facilities in accordance with accepted engineering practices as set forth in the Commission's administrative regulations and orders and in the most recent edition of the NESC. The alleged violations are listed below:

[1] The Staff Report lists Trapp's release date as April 4, 2015. Duke's Incident Investigation Report, attached to the Staff Report as Attachment C, clarifies that Trapp's release date was April 13, 2015.

[2] Staff Report, page 4.

1. NESC, Part 4, Section 42, Rule 420.D – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – General Rules for Employees – General – Energized or Unknown Conditions – Employees shall consider electric supply equipment and lines to be energized, unless they are positively known to be de-energized. Before starting work, employees shall perform preliminary inspections or tests to determine existing conditions. Operating voltages of equipment and lines should be known before working on or in the vicinity of energized parts.

2. NESC, Part 4, Section 42, Rule 420.H-I – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – General Rules for Employees – General – Tools and protective equipment. Employees shall use the personal protective equipment, the protective devices, and the special tools provided for their work. Before starting work, these devices and tools shall be carefully inspected to make sure that they are in good condition. Clothing – 1. Employees shall wear clothing suitable for the assigned task and the work environment. 2. When employees will be exposed to an electric arc, clothing or a clothing system shall be worn in accordance with Rule 410A3.

3. NESC, Part 4, Section 42, Rule 421.A.1-2 – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – General Operating Routines – Duties of a first-level supervisor or person in charge. This individual shall adopt such precautions as are within the individual's authority to prevent accidents; see that safety rules and operating procedures are observed by the employees under the direction of this individual.

4. NESC, Part 4, Section 42, Rule 421.A.6 – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – General Rules for Employees – General Operating Routines – Duties of a First-level Supervisor or Person in Charge. This individual shall conduct a job briefing with the employees involved before beginning each job. A job briefing should include at least the following items: work procedures, personal protective equipment requirements, energy source controls, hazards associated with the job, and special precautions.

5. NESC, Part 4, Section 42, Rule 421.B.2 – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – General Operating Routines – Area protection – Areas accessible to employees only. When working in one section where there is a multiplicity of such sections, such as one panel of a switchboard, one compartment of several, or one portion of a substation, employees shall mark the work area conspicuously and place barriers to prevent accidental contact with energized parts in that section or adjacent sections.

6. NESC, Part 4, Section 44, Rule 441.A.1 and 3 – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – Additional Rules for Supply Employees – Energized Conductors or Parts – Minimum Approach Distance to Energized Lines or Parts – General. Employees shall not approach or bring any conductive object within the minimum approach distance listed in Table 441-1 or Table 441-4 or distance as determined by an engineering analysis to exposed parts unless one of the following is met: a. The line or part is de-energized and grounded per Rule 444D; b. The employee is insulated from the energized line or part. Electrical protective equipment insulated for the voltage involved, such as tools, rubber gloves, or rubber gloves with sleeves, shall be considered effective insulation for the employee from the energized line or part being worked on.

7. NESC Part 4, Section 44, Rule 442.A-C – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – Additional Rules for Supply Employees – Switching Control Procedures – Designated Person. A designated person shall: 1) Keep informed of operating conditions affecting the safe and reliable operation of the system. 2. Maintain a suitable record showing operating changes in such conditions. 3. Issue or deny authorization for switching, as required, for safe and reliable operation. Specific work – Authorization from the designated person shall be secured before work is begun on or in the vicinity of station equipment, transmission, or interconnected feeder circuits and where circuits are to be de-energized at stations. The designated person shall be notified when such work ceases [see rule for exceptions]; Operations at stations – Qualified employees shall obtain authorization from the designated person before switching sections of circuits. In the absence of specific operations schedules, employees

shall secure authorization from the designated person before opening, and closing supply circuits or portions thereof or starting and stopping equipment affecting system operation at stations [see rule for exceptions].

8. NESC, Part 4, Section 44, Rule 443.A and G – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – Additional Rules for Supply Employees – Work on Energized Lines and Equipment – General Requirements. When working on energized lines and equipment, one of the following safeguards shall be applied: a. insulate employee from energized parts. b. isolate or insulate the employee from ground and grounded structures, and potentials other than the one being worked on; Switchgear – Switchgear shall be de-energized and grounded per Rule 444D prior to performing work involving removal of protective barriers unless other suitable means are provided for employee protection. The personnel safety features in switchgear shall be replaced after work is completed.

9. NESC, Part 4, Section 44, Rule 444.A-E – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – Additional Rules for Supply Employees – De-energizing Equipment or Lines to Protect Employees – Application of Rule. 1. When employees must depend on others to operate switches or otherwise de-energize circuits on which they are to work, or must secure special authorization before they operate such switches themselves, the precautionary measures that follow shall be taken in the order given before work is begun. 2. If the employee under whose direction a section of circuit is disconnected is in sole charge of the section and of the means of disconnection, those portions of the following measures that pertain to dealing with the designated person may be omitted. 3. Records shall be kept on all contractual utility interactive systems on any electric supply lines. When these lines are de-energized according to Rule 444C, the utility interactive system shall be visibly disconnected from the lines; Employee's Request – The employee in charge of the work shall apply to the designated person to have the particular section of equipment or lines de-energized, identifying it by position, letter, color, number, or other means; Operating Switches, Disconnector, and Tagging – The designated person shall direct the operation of all switches and disconnectors through which electric energy may be supplied

to the particular section of equipment and lines to be de-energized, and shall direct that such switches and disconnectors be rendered inoperable and tagged. If switches that are controlled automatically or remotely or both can be rendered inoperable, they shall be tagged at the switch location. If it is impractical to render such switches and disconnectors inoperable, then these remotely controlled switches shall also be tagged at all points of control. A record shall be made when placing the tag, giving the time of disconnection, the name of the person making the disconnection, the name of the employee who requested the disconnection, and the name or title or both, of the designated person; Employee's Protective Grounds – When all designated switches and disconnectors have been operated, rendered inoperable where practical, and tagged in accordance with Rule 444C, and the employee has been given permission to work by the designated person, the employee in charge should immediately proceed to make the employee's own protective grounds or verify that adequate grounds have been applied (see Rule 445) on the disconnected lines or equipment. During the testing for potential and/or application of grounds, distances not less than those shown in Table 441-1, as applicable, shall be maintained. Temporary protective grounds shall be placed at such locations and arranged in such a manner that affected employees are protected from hazardous differences in electrical potential (see rule for Note). The distance in Table 441-1, as applicable, shall be maintained from ungrounded conductors at the work location. Where the making of a ground is impractical, or the conditions resulting therefrom are more hazardous than working on the lines or equipment without grounding, the ground may be omitted by special permission of the designated person [see rule for Exception]; Proceeding with work – 1. After the equipment or lines have been de-energized and grounded per Rule 444D, the employee in charge, and those under the direction of the employee in charge, may proceed with the work on the de-energized parts. Equipment may be re-energized for testing purposes only under the supervision of the employee in charge and subject to authorization of the designated person. 2. Each additional employee in charge desiring the same equipment or lines to be de-energized and grounded per Rule 444D for the protection of that person, or the persons under direction, shall follow these procedures to secure similar protection.

10. NESC, Part 4, Section 44, Rule 445.A – Work Rules for the Operation of Electric Supply and Communications Lines and Equipment – Additional Rules for Supply Employees – Protective Grounds. Extreme caution shall be exercised that the proper sequence of installing and removing protective grounds is followed. A. Installing grounds – When installing protective grounds on a previously energized part, the following sequence and precautionary measures shall be observed [see rule for Exception]. 1. Current-carrying capacity of grounds – The grounding device shall be of such size as to carry the induced current and anticipated fault current that could flow at the point of grounding for the time necessary to clear the line. 2. Initial connections – Before grounding any previously energized part, the employee shall first securely connect one end of the grounding device to an effective ground. Grounding switches may be employed to connect the equipment or lines being grounded to the actual ground connections. 3. Test for voltage – The previously energized parts that are to be grounded shall be tested for voltage except where previously installed grounds are clearly in evidence. The employee shall keep every part of the body at the required distance by using insulating handles or proper length or other suitable devices. 4. Completing grounds – a. If the part shows no voltage, the grounding may be complete, b. if voltage is present, the sources shall be determined to ensure that presence of this voltage does not prohibit completion of the grounding, c. after the initial connections are made to ground, the grounding device shall next be brought into contact with the previously energized part using insulating handles or other suitable devices and securely clamped or otherwise secured thereto. Where bundled conductor lines are being grounded, grounding of each subconductor should be made. Only then may the employee come within the distances from the previously energized parts specified in Rule 441A or proceed to work upon the parts as upon a grounded part.

11. Duke Kentucky Safety Manual – General. Job briefings are an important tool for planning safe and efficient work. The crew must discuss each job to identify all hazards and develop plans to put barriers in place to mitigate those hazards. This document describes work methods for the job briefings required for each and every job in accordance with Occupational Safety and Health Administration (OSHA) 29 CFR 1910.269 and 1926.952. Each day or work shift starts with a Take 10 Daily Briefing. Every job requires an initial job

assessment and hazard analysis, job briefing and post-job briefing. This includes storm response and service restoration jobs. Documenting Job Briefings – The EIC or DCM must ensure that documented job briefings are completed for the following work activities: When there is any change in job condition that could affect worker safety. This job briefing must take place any time the work changes from the original plan or any crew member call an "all stop" due to an unexpected change.

12. Duke Kentucky Safety Manual – General – Minimum Approach Distances. Qualified workers must observe the MADs listed in Table 1. To be qualified, workers must complete formalized training and have a valid Documentation of Employee Training for OSHA 29 CFR 1910.269(a)(2)(vii) 1910.269 on record. Qualified workers have closer MADs than unqualified personnel. [Nominal Voltage, Minimum Approach Distance, Phase-to-Phase, 5.1 to 15.0 kV, 2 ft. 2 in.]. Workers' Responsibilities – Workers must not approach or bring any conductive object closer to exposed energized parts than the MAD. Workers must maintain the MAD unless all of the following conditions are met: Workers are wearing approved rubber gloves rated for the voltage involved (and rubber sleeve, if required for the jurisdiction); workers have positive control of the energized parts; conductive objects that are at different potentials from the conductor or equipment being worked are covered with properly rated protective equipment.

13. Duke Kentucky Safety Manual – General Electrical Safety – General – General Electrical Safety Work Methods. Workers must observe the following work methods for electrical safety: Before starting work, determine the operating voltage of lines and equipment and the source of the voltage. Consider all existing lines and equipment energized, including conductors on the ground, until they have been tested for voltage with an approved test device, tagged as required according to switching and tagging procedures and then grounded.

14. Duke Kentucky Safety Manual – Rubber Gloves and Rubber Sleeves – General – Rubber Glove and Rubber Sleeve Ratings. Class 2 or greater rubber gloves with leather glove protectors must be worn when working on or within the MAD of energized conductor or equipment up to 17 kV phase

to-ground. Some business units require using Class 2 rubber sleeves in addition to Class 2 rubber gloves.

15. Duke Kentucky Safety Manual – Grounding Distribution Lines – General Requirements. Lines and equipment must be considered energized until they have been isolated from all voltage sources by means of visible open points, tested for voltage with an approved voltage detector and properly grounded.

Based on its review of the Staff Report and the Duke Kentucky Investigation Report, and being otherwise sufficiently advised, the Commission finds that *prima facie* evidence exists that Duke Kentucky has failed to comply with KRS 278.042, the most recent edition of NESC and the Duke Kentucky Safety Manual. The Commission further finds that a formal investigation into the incident that is the subject matter of the Staff Report should be conducted and that this investigation should also examine the adequacy, safety, and reasonableness of Duke Kentucky's practices related to the construction, installation and repair of electric facilities.

The Commission, on its own motion, HEREBY ORDERS that:

1. Duke Kentucky shall submit to the Commission a written response to the allegations contained in the Staff Report within 20 days of the date of this Order.

2. Duke Kentucky shall appear on December 8, 2016, at 9:00 a.m., Eastern Standard Time, in Hearing Room 1 of the Commission's offices at 211 Sower Boulevard, Frankfort, Kentucky, for the purpose of presenting evidence concerning the alleged violations of KRS 278.042, the most recent edition of NESC, and the Duke Kentucky Safety Manual and showing cause why it should not be subject to the penalties prescribed in KRS 278.990(1) for these alleged violations.

3. The December 8, 2016 hearing shall be recorded by videotape only.

4. The Staff Report attached hereto as an Appendix to this Order is made a part of the record in this case.

5. At the scheduled hearing in this matter, Duke Kentucky shall also present evidence on the adequacy, safety, and reasonableness of its practices related to the construction, installation, and repair of electric facilities as they relate to the facts of this case and whether such practices require revision as related to this incident.

6. Any request for an informal conference with Commission Staff to discuss the issues in this case shall be set forth in writing and filed with the Commission within 20 days of the date of this Order.

By the Commission

ENTERED
OCT 11 2016
KENTUCKY PUBLIC
SERVICE COMMISSION

ATTEST:

Executive Director

APPENDIX

APPENDIX TO AN ORDER OF THE KENTUCKY PUBLIC SERVICE COMMISSION IN CASE NO. 2016-00349 DATED OCT 11 2016

Steven L. Beshear
Governor

Leonard K. Peters
Secretary
Energy and Environment Cabinet

Commonwealth of Kentucky
Public Service Commission
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James W. Gardner
Chairman

Daniel E. Logsdon Jr.
Vice Chairman

Accident Investigation Staff Report

Report Date:	November 23, 2015
Accident Date:	April 3, 2015
Utility:	Duke Energy (Duke)
Accident Location:	Duke Energy Substation on the Northern Kentucky University Campus, Kenton/Campbell Drive, Highland Heights, Campbell County, Kentucky
Victims:	Senior Maintenance Electrician - Nathan Trapp Maintenance Electrician A – Kyle Leininger
Reported By:	Ryan Vehr – Duke Safety Department
Utility Discovered:	Approximately 4:32 pm, April 3, 2015
PSC Notified by phone call:	Approximately 6:21 pm, April 3, 2015 – Jeff Moore's cell phone; 6:22 pm, April 3, 2015 – Steve Kingsolver's cell phone. Mr. Kingsolver returned call to Ryan Vehr at 8:49 pm on April 3, 2015
PSC On-Site Investigation:	Approximately 9:00 am, April 7, 2015
PSC Investigator:	Scott Morris
Summary Report Received:	
(By e-mail):	April 10, 2015
(By mail):	April 13, 2015
Additional Information Received: (By e-mail):	May 22, 2015
(By mail):	June 1, 2015

Duke Work Standards Manual (Utility Safety Manual)	(Duke Safety Manual on Engineering shared drive)
Received: (By mail):	August 31, 2015
Utility Accident Report Received:	October 10, 2015

Information From:

Name:	**Position:**	**Employer:**

Jeffery T. Dierker – Manager Environmental, Health & Safety Midwest Field Support

Jim Connell – Supervisor Substation Ops & Maintenance Hartwell Transmission Maintenance

Ryan Vehr – Duke Safety Department

This investigator did not observe the site immediately after the incident occurred; an on-site investigation was performed four days after the accident took place. The accident description is based upon information and photographs obtained from Duke.

See the utility summary report, additional information, and the utility accident report attached to this report for additional information about this accident. (Attachments A, B, C).

Accident Description:

This accident occurred on April 3, 2015 at approximately 4:29 pm at the Duke Energy Northern Kentucky University Substation located on the campus of Northern Kentucky University, Highland Heights, Kentucky. The two victims in this accident are Duke Transmission electricians, Senior Maintenance Electrician Nathan Trapp, and Maintenance Electrician A Kyle Leninger, and both sustained burn injuries while performing repairs on a 4-cubicle 13.2 KV switchgear. The two injured employees were part of a three person substation repair crew responding to a fault on Circuit 45 at the substation. The victims were reportedly attempting to remove a fiberboard barrier from the energized Circuit 44 switchgear cubicle, and use this part to replace a burned fiberboard barrier in the de-energized and grounded Circuit 45 switchgear cubicle that they were tasked to repair. The employees incorrectly believed the Circuit 44 switchgear was de-energized, and failed to isolate, test for voltage and ground. Senior Maintenance Electrician Nathan Trapp reportedly reached inside of the Circuit 44 switchgear cubicle causing an arc to occur, resulting in burn injuries to both victims. Senior Maintenance Electrician Nathan Trapp received significant burns to his hand, wrist and arm and 2nd degree burns to his face and neck. Maintenance Electrician A Kyle Leninger sustained 1st and 2nd degree burns to his face, neck and arm. The 3rd member of the three man substation repair crew, Substation Maintenance Trainee, was reportedly returning to the switchgear after putting tools away on the Substation Maintenance truck, when he saw the flash, and noticed that the Senior Maintenance

Electrician and Maintenance Electrician A were both on the ground. Another five member crew from Network Services were reportedly onsite at their truck, and did not witness the flash but heard it. The Network Services Crew and the Substation Maintenance Trainee reportedly responded immediately to begin first aid using burn kits from their vehicles, and contact 911. EMS arrived on scene in approximately 15 minutes and transported the injured employees to University Hospital in Cincinnati, Ohio. Mr. Leininger was treated and released from the Hospital the following day. Mr. Trapp was transferred to Ohio State University Wexner Medical Center in Columbus, Ohio, and released on April 4, 2015.

The NESC describes among the duties of a first-level supervisor or person in charge, is to see that the safety rules and operating procedures are observed by the employees under the direction of this individual. The Duke Safety Manual and the National Electrical Safety Code (NESC) state that job briefings should be conducted with the employees involved before beginning each job. Duke provided a copy of the job briefing held for the work to be performed on the de-energized and grounded Circuit 45 switchgear cubicle, addressing work procedures, PPE requirements, energy source controls, and hazards associated with the job, and special precautions. The job briefing did not describe any work to be performed on or in the energized Circuit 44 switchgear cubicle. This job change increased the risk and affected the safety of the employees, and according to the Duke Safety Manual, would have required an additional job briefing to be conducted to address the changes to the scope of work to be performed.

The utility reported that the victims were wearing appropriate personal protective equipment (PPE) required for working on the de-energized and grounded switchgear Circuit 45 cubicle, including hard hat, safety glasses, electrical hazard shoes, fire resistant pants and shirts with a protective arc rating of 4.2 cal/cm^2. According to the Duke Incident Investigation Report, that based on the injuries sustained by the victims, that there was no indication that gloves were worn. The PPE required for working on the inside of the energized switchgear Circuit 44 cubicle would be significantly greater than what is required for working inside of a de-energized and grounded switchgear cubicle. The Duke Incident Investigation Report states that working on the inside of the energized switchgear cubicle 44 is not an acceptable work practice; therefore there is not appropriate PPE identified for this job. However, since work was attempted to be performed on the energized switchgear 44 cubicle without first obtaining isolation, testing for voltage, and grounding, then at a minimum, rubber gloves and rubber sleeves would have been required according to the Duke Safety Manual and the NESC.

The NESC gives guidance on area protection in areas accessible to employees only, when working in one section where there is a multiplicity of such sections, such as one panel of a switchboard, one compartment of several, or one portion of a substation, employees shall mark the work area conspicuously and place barriers to prevent accidental contact with energized parts in that section or adjacent sections. The energized Circuit 44 cubicle did not appear to have been marked or barriers placed around it at the time the PSC investigation was performed.

The NESC states that employees shall consider electric supply equipment and lines to be energized, unless they are positively known to be de-energized. Before starting work, employees shall perform preliminary inspections or tests to determine existing conditions. Operating voltages of equipment and lines should be known before working on or in the vicinity of energized parts. Testing to determine the operating voltage of the energized Circuit 44 switchgear cubicle before work began on that cubicle apparently was not performed, and the operating voltage was not known. According to the information in the Duke Incident Investigation Report, the Senior Maintenance Electrician incorrectly assumed the Circuit 44 cubicle was de-energized, decided to skip isolation and reached into the cubicle.

The NESC gives guidance for the proper switching control procedures in 442., A., B., C., De-energizing lines and equipment to protect employees in 444., A.-E, and installing protective grounds in 445, A.

NESC rules for work on energized lines and equipment state that one of the following safeguards shall be applied; insulate employee from energized parts, or isolate or insulate the employee from ground and grounded structures, and potentials other than the one being worked on. The NESC requires that switchgear shall be de-energized and grounded prior to performing work involving removal of protective barriers, such as the fiberboard barrier in the energized switchgear 44 cubicle. The Duke Safety Manual requires that before working on an energized switchgear cubicle of this voltage, 13.2KV, they are to be de-energized and grounded. These rules were apparently not followed.

The NESC and The Duke Safety Manual lists that the minimum approach distance (MAD) required for the energized 13.2 KV circuit 44 switchgear cubicle is 2 feet, 2 inches. The MAD was apparently not maintained when contact was made by the Senior Maintenance Electrician, resulting in an electrical arc flash and burn injuries to the victims.

Findings:

It appears that Duke did not meet the following requirement set forth in the 2012 edition of the National Electrical Safety Code (NESC) and the Duke Safety Manual.

RELEVANT CODES, STATUTES, REGULATIONS, OR SAFETY MANUAL ISSUES THAT ARE PERTINENT TO THE INVESTIGATION

278.042 Service adequacy and safety standards for electric utilities National Electrical Safety Code

(1) For the purposes of the section, "NESC" means the National Electrical Safety Code as published by the Institute of Electrical and Electronics Engineers, Inc.
(2) Except as otherwise provided by law, the commission shall, in enforcing service adequacy and safety standards for electric utilities, ensure that each electric utility constructs and maintains its plant and facilities in accordance with accepted engineering

practices as set forth in the commission's administrative regulations and orders and in the most recent edition of the NESC.

Effective: June 24, 2003

History: Created 2003 Ky. Acts Ch. 84, sec. 1, Effective June 24, 2003

2012 National Electrical Safety Code:

See 2012 NESC Code to view each rule in its entirety.

1.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 42. General Rules for employees

420. General

D. Energized or unknown conditions

Employees shall consider electric supply equipment and lines to be energized, unless they are positively known to be de-energized. Before starting work, employees shall perform preliminary inspections or tests to determine existing conditions. Operating voltages of equipment and lines should be known before working on or in the vicinity of energized parts.

2.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 42. General rules for employees

420. General

H. Tools and protective equipment

Employees shall use the personal protective equipment, the protective devices, and the special tools provided for their work. Before starting work, these devices and tools shall be carefully inspected to make sure that they are in good condition.

I. Clothing

1. Employees shall wear clothing suitable for the assigned task and the work environment.
2. When employees will be exposed to an electric arc, clothing or a clothing system shall be worn in accordance with Rule 410A3.

3.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

421. General operating routines

A. Duties of a first-level supervisor or person in charge
This individual shall:

1. Adopt such precautions as are within the individual's authority to prevent accidents.

2. See that safety rules and operating procedures are observed by the employees under the direction of this individual.

4.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

421. General operating routines

A. Duties of a first-level supervisor or person in charge
This individual shall:

6. Conduct a job briefing with the employees involved before beginning each job. A job briefing should include at least the following items: work procedures, personal protective equipment requirements, energy source controls, hazards associated with the job, and special precautions.

5.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

421. General operating routines

B. Area protection

2. Areas accessible to employees only

b. When working in one section where there is a multiplicity of such sections, such as one panel of a switchboard, one compartment of several, or one portion of a substation, employees shall mark the work area conspicuously and place barriers to prevent accidental contact with energized parts in that section or adjacent sections.

6.
National Electrical Safety Code

Part 4.

Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 44. Additional rules for supply employees

441: Energized conductors or parts

A. Minimum approach distance to energized lines or parts

1. General
Employees shall not approach or bring any conductive object within the minimum approach distance listed in Table 441-1 or Table 441-4 or distances as determined by an engineering analysis to exposed parts unless one of the following is met:

a. The line or part is de-energized and grounded per Rule 444D.

b. The employee is insulated from the energized line or part. Electrical protective equipment insulated for the voltage involved, such as tools, rubber gloves, or rubber gloves with sleeves, shall be considered effective insulation for the employee from the energized line or part being worked on.

c. The energized line or part is insulated from the employee and from any other line or part at a different voltage.

3. Precautions for approach-Voltages from 301 V to 72.5 KV

At voltages from 301 V to 72.5 KV, employees shall be protected from phase-to-phase and phase-to-ground differences in voltage. See Table 441-1 for the minimum approach distances to live line parts.

Table 441-1-AC live work minimum approach distance lists:

Voltage in kilovolts phase-to phase	Distance to employee Phase-to-ground
0.751 to 15	2 feet-2 inches

7.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 44. Additional rules for supply employees

442. Switching control procedures

A. Designated person

A designated person shall:

1. Keep informed of operating conditions affecting the safe and reliable operation of the system.

2. Maintain a suitable record showing operating changes in such conditions.

3. Issue or deny authorization for switching, as required, for safe and reliable operation.

B. Specific work

Authorization from the designated person shall be secured before work is begun on or in the vicinity of station equipment, transmission, or interconnected feeder circuits and where circuits are to be de-energized at stations. The designated person shall be notified when such work ceases.

EXCEPTION 1: In an emergency, to protect life or property, or when communication with the designated person is difficult because of storms or other causes, any qualified employee may make repairs on or in the vicinity of the equipment or lines covered by this rule without special authorization if the qualified employee can clear the promptly with available help in compliance with the remaining rules. The designated person shall thereafter be notified as soon as possible of the action taken.

EXCEPTION 2: Suspension of normal rule or rules under disaster conditions: Where catastrophic service disruptions occur (e.g., earthquake, hurricane) and where multiple

employer crews may be imported to assist in service restorations, the normal use of Rule 442 procedures may be suspended provided that:

(a) Each individual involved in system repairs in informed of the suspension of normal rules.
(b) Employees are required to observe all requirements of Rules 443 and 444, including protection designated from step and touch potentials.

(c) Equipment used to de-energize or re-energize circuits at designated points of control (e.g., station breakers).

(d) Tagging requirements under Rule 444C, for this EXCEPTION, shall include, and may be limited to, designated points of control.

C. Operations at stations

Qualified employees shall obtain authorization from the designated person before switching sections of circuits.

In the absence of specific operating schedules, employees shall secure authorization from the designated person before opening and closing supply circuits or portions thereof or starting and stopping equipment affecting system operation at stations.

EXCEPTION 1: Sections of distribution circuits are excepted if the designated person is notified as soon as possible after the action is taken.

EXCEPTION 2: In and emergency, to protect life or property, any qualified employee may open circuits and stop moving equipment without special authorization if, in the judgment of the qualified employee, this action will promote safety, but the designated person shall be notified as soon as possible of such action, with reasons therefore.

8.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 44. Additional rules for supply employees

443. Work on energized lines and equipment

A. General requirements

1. When working on energized lines and equipment, one of the following safeguards shall be applied:

    a. Insulate employee from energized parts.

    b. Isolate or insulate the employee from ground and grounded structures, and potentials other than the one being worked on.

G. Switchgear

Switchgear shall be de-energized and grounded per Rule 444D prior to performing work involving removal of protective barriers unless other suitable means are provided for employee protection. The personnel safety features in switchgear shall be replaced after work is completed.

9.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 44. Additional rules for supply employees

444. De-energizing equipment or lines to protect employees

A. Application of rule

1. When employees must depend on others to operate switches or otherwise de-energize circuits on which they are to work, or must secure special authorization before they operate such switches themselves, the precautionary measures that follow shall be taken in the order given before work is begun.

2. If the employee under whose direction a section of a circuit is disconnected is in sole charge of the section and of the means of disconnection, those portions of the following measures that pertain to dealing with the designated person may be omitted.

3. Records shall be kept on all contractual utility interactive systems on any electric supply lines. When these lines are de-energized according to Rule 444C, the utility interactive system shall be visibly disconnected from the lines.

B. Employee's request

The employee in charge of the work shall apply to the designated person to have the particular section of equipment or lines de-energized, identifying it by position, letter, color, number, or other means.

C. Operating switches, disconnectors, and tagging

The designated person shall direct the operation of all switches and disconnectors through which electric energy may be supplied to the particular section of equipment and lines to be de-energized, and shall direct that such switches and disconnectors be rendered inoperable and tagged. If switches that are controlled automatically or remotely or both can be rendered inoperable, they shall be tagged at the switch location. If it is impractical to render such switches and disconnectors inoperable, then these remotely controlled switches shall also be tagged at all points of control. A record shall be make when placing the tag, giving the time of disconnection, the name of the person making the disconnection, the name of the employee who requested the disconnection, and the name or title or both, of the designated person.

D. Employee's protective grounds

When all designated switches and disconnectors have been operated, rendered inoperable where practical, and tagged in accordance with Rule 444C, and the employee has been given permission to work by the designated person, the employee in charge should immediately proceed to make the employee's own protective grounds or verify that adequate grounds have been applied (see Rule 445) on the disconnected

lines or equipment. During the testing for potential and/or application of grounds, distances not less than those shown in Table 441-1, as applicable, shall be maintained.

Temporary protective grounds shall be placed at such locations and arranged in such a manner that affected employees are protected from hazardous differences in electrical potential.

NOTE: Hazardous touch and step potentials may exist around grounded equipment, or between separately grounded systems. Additional measures for worker protection may include barriers, insulation, work practices, isolation or grounding mats.

The distance in Table 441-1, as applicable, shall be maintained from ungrounded conductors at the work location. Where the making of a ground is impractical, or the conditions resulting therefrom are more hazardous than working on the lines or equipment without grounding, the ground may be omitted by special permission of the designated person.

EXCEPTION: Alternative work methods such as isolation of equipment, lines, and conductors from all sources including voltages may be employed when the employer has assured worker protection from hazardous differences in electrical potential.

E. Proceeding with work

1. After the equipment or lines have been de-energized and grounded per Rule 444D, the employee in charge, and those under the direction of the employee in charge, may proceed with the work on the de-energized parts.

   Equipment may be re-energized for testing purposes only under the supervision of the employee in charge and subject to authorization by the designated person.

2. Each additional employee in charge desiring the same equipment or lines to be de-energized and grounded per Rule 444D for the protection of that person, or the persons under direction, shall follow these procedures to secure similar protection.

10.
National Electrical Safety Code

Part 4.
Work Rules for the Operation of Electric Supply and Communications Lines and Equipment

Section 44. Additional rules for supply employees

445. Protective grounds

Extreme caution shall be exercised that the proper sequence of installing and removing protective grounds is followed.

A. Installing grounds

When installing protective grounds on a previously energized part, the following sequence and precautionary measures shall be observed.

EXCEPTION: In certain situations, such as when grounding conductors are supported on some high-voltage towers, it may be appropriate to perform the voltage test before bringing the grounding device into the work area.

1. Current-carrying capacity of grounds

   The grounding device shall be of such size as to carry the induced current and anticipated fault current that could flow at the point of grounding for the time necessary to clear the line.

   NOTE: Refer to ASTM F-855 (B24) for specifications for protective grounding equipment.

2. Initial connections

   Before grounding any previously energized part, the employee shall first securely connect one end of the grounding device to an effective ground. Grounding switches may be employed to connect the equipment or lines being grounded to the actual ground connections.

3. Test for voltage

   The previously energized parts that are to be grounded shall be tested for voltage except where previously installed grounds are clearly in evidence. The employee shall keep every part of the body at the required distance by using insulating handles or proper length or other suitable devices.

4. Completing grounds

   a. If the part shows no voltage, the grounding may be completed.

   b. If voltage is present, the source shall be determined to ensure that presence of this voltage does not prohibit completion of the grounding.

   c. After the initial connections are made to ground, the grounding device shall next be brought into contact with the previously energized part using insulating handles or other suitable devices and securely clamped or otherwise secured thereto. Where bundled conductor lines are being grounded, grounding of each subconductor should be made. Only then may the employee come within the distances from the previously energized parts specified in Rule 441A or proceed to work upon the parts as upon a grounded part.

807 KAR 5:006. General Rules

RELATES TO: FRS 65.810, 74, 96.934, 220.510, 278, 49 C.F.R. Part 192 U.S.C. 60105
STATUTORY AUTHORITY: KRS 278.230, 278.280(2), 49 C.F.R 192
NECESSITY, FUNCTION, AND CONFORMITY: KRS 278.230(3) requires every utility to file with the commission reports, schedules, and other information that the commission requires. KRS 278.280(2) requires the commission to promulgate an administrative regulation for the performance of a service or the furnishing of a commodity by a utility. This administrative regulation establishes requirements that apply to electric, gas, water, sewage, and telephone utilities.

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807 KAR 5:006 General Rules
Section 25: Safety Program

Section 25: Safety Program: Each utility shall adopt and execute a safety program, appropriate to the size and type of its operations. At a minimum, the safety program shall:

(1) Establish a safety manual with written guidelines for safe working practices and procedures to be followed by utility employees.
(2) Instruct employees in safe methods of performing their work. For electric utilities, this is to include the standards established in 807 KAR 5:041, Section 3.
(3) Instruct employees who, in the course of their work, are subject to the hazard of electrical shock, asphyxiation or drowning, in accepted methods of artificial respiration.

Duke Safety Manual
(April 3, 2015 Accident) (Victims: Trapp, Leininger)
See Duke Safety Manual to view each rule in its entirety.

1.
Duke Safety Manual

GENERAL

Job briefings are an important tool for planning safe and efficient work. The crew must discuss each job to identify all hazards and develop plans to put barriers in place to mitigate those hazards. This document describes work methods for the job briefings required for each and every job in accordance with Occupational Safety and Health Administration (OSHA) 29 CFR 1910.269 and 1926.952.

Each day or work shift starts with a Take 10 Daily Briefing. Every job requires an initial job assessment and hazard analysis, job briefing and post-job briefing. This includes storm response and service restoration jobs.

Documenting Job Briefings

The EIC or DCM must ensure that documented job briefings are completed for the following work activities:

When there is any change in job conditions that could affect worker safety.

This job briefing must take place any time the work changes from the original plan or any crew member call an "all stop" due to an unexpected change. An example of such a change is finding a broken tie wire on an insulator that was not identified during the original job briefing.

2.
Duke Safety Manual

GENERAL

MINIMUM APPROACH DISTANCES

Qualified workers must observe the MADs listed in Table 1. To be qualified, workers must complete formalized training and have a valid Documentation of Employee Training for OSHA 29 CFR 1910.269(a) (2) (vii) 1910.269 on record. Qualified workers have closer MADs than unqualified personnel.

Table 1 the lists MADs for qualified workers for various voltages and exposures.

Nominal Voltage, Phase-to-Phase	Minimum Approach Distance
5.1 to 15.0kV	2 ft 2 in.

WORKERS' RESPONSIBILITIES

Workers must not approach or bring any conductive object closer to exposed energized parts than the MAD. Workers must maintain the MAD unless all of the following conditions are met:

Workers are wearing approved rubber gloves rated for the voltage involved (and rubber sleeve, if required for the jurisdiction).

Workers have positive control of the energized parts.

Conductive objects that are at different potentials from the conductor or equipment being worked are covered with properly rated protective equipment.

3.
Duke Safety Manual

GENERAL ELECTRICAL SAFETY

GENERAL

This document describes general electrical safety work methods for electrical work tasks.

GENERAL ELECTRICAL SAFETY WORK METHODS

Workers must observe the following work methods for electrical safety:

Before starting work, determine the operating voltage of lines and equipment and the source of the voltage. Consider all existing lines and equipment energized, including conductors on the ground, until they have been tested for voltage with an approved test device, tagged as required according to switching and tagging procedures and then grounded.

4.
Duke Safety Manual

RUBBER GLOVES AND RUBBER SLEEVES

GENERAL

This document describes work methods for using rubber gloves and rubber sleeves. Bell cuff-style rubber gloves are the Company standard.

NOTE: In this work method, the phrase "within the MAD" means working within reach or extended reach of the minimum approach distance (MAD) of energized conductors or parts.

RUBBER GLOVE AND RUBBER SLEEVE RATINGS

Class 2 or greater rubber gloves with leather glove protectors must be worn when working on or within the MAD of energized conductor or equipment up to 17kV phase to-ground. Some business units require using Class 2 rubber sleeves in addition to Class 2 rubber gloves.

5.
Duke Safety Manual

GROUNDING DISTRIBUTION LINES

PURPOSE

This document describes work methods for installing personal protective grounds to safely work de-energized lines and equipment.

SCOPE

Although this work method describes grounding for isolated lines and equipment, it does not include isolation/clearance or switching and tagging procedures (refer to the Switching and Tagging Manual).

You must refer to, understand and adhere to manufacturer safety guidelines for all tools and equipment.

GENERAL REQUIREMENTS

Lines and equipment must be considered energized until they have been isolated from all voltage sources by means of visible open points, tested for voltage with an approved voltage detector and properly grounded.

Investigated By:	Name:	Company:
	Scott Morris	KPSC

Signed: Scott Morris

Date: 11-23-15

Attachments:

A. Utility Summary Report

B. Additional Information

C. Utility Accident Report

D. KPSC Notification

Attachment A

Utility Summary Report

DUKE ENERGY.

139 East Fourth Street, M/C EM740
Cincinnati, OH 45202
Telephone: (513) 287-1234
Facsimile: (513) 287-3499

Jeffery T. Dierker
H&S Manager
E-mail: Jeff.Dierker@duke-energy.com

VIA EMAIL (Jeff.DeRouen@ky.gov) AND ORDINARY MAIL

April 10th, 2015

Mr. Jeff DeRouen
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
P.O. Box 615
Frankfort, KY 40602-0615

Re: Electrical Flash - Northern Kentucky University Substation, Highland Heights, Kentucky

Dear Mr. DeRouen,

We left a message on Jeff Moore's cell phone at 6:21 p.m. and Steve Kingsolver's cell phone at 6:22 p.m. on April 3rd to inform them of an electrical flash which involved two employees from Duke Energy.

On April 3rd, 2015, at approximately 11:41 a.m., a fault occurred on Circuit 45 at the Northern Kentucky University Substation. A Substation Maintenance Crew (consisting of a Senior Maintenance Electrician, a Maintenance Electrician A, and a Construction & Maintenance Trainee) arrived onsite around 12:30 p.m. to diagnose the problem. It was found that the load side underground cables coming out of the switchgear cabinet had faulted. A crew from Network Services was contacted to make the repairs on the cables. The Network Services crew arrived at approximately 1:00 p.m. and began repair of the underground cables. Repairs of the cables were completed at approximately 3:30 p.m. Network Services cleared off the isolation at approximately 4:00 p.m. but remained onsite to perform switching once the circuit was restored.

The Substation Maintenance Crew accepted isolation on Circuit 45 at 2:32 p.m. and proceeded with repair of the switchgear cabinet after Network Services had completed their repair of the underground cables. The plan was to take parts from one of the other cabinets on the switchgear to complete this repair. At 4:32 p.m. the Senior Maintenance Electrician and Maintenance Electrician A opened the cabinet immediately to the right of Circuit 45, labeled Circuit 44. This cabinet had no underground cables coming into it. Reportedly, the Senior Maintenance Electrician reached into the cabinet when the possible electrical contact and flash occurred.

The Network Services crew did not see the flash, but responded to the incident immediately. 911 was contacted and first aid was given to the two employees using burn kits from their vehicles. EMS arrived on scene in approximately 15 minutes and transported the injured employees to University Hospital in Cincinnati, OH.

The Senior Maintenance Electrician was diagnosed with significant burns to his hand, wrist and arm and received 2nd degree burns to his face and neck. He was later transferred to Ohio State University Wexner Medical Center in Columbus, Ohio, and currently remains hospitalized. The Maintenance Electrician A was diagnosed with 1st and 2nd degree burns to his face, neck, and arm and was released from the hospital the following day.

The investigation is ongoing, and the incident report will be provided upon completion. Attached below are a couple photos of the incident scene, with brief descriptions.

During your initial investigation, you asked for the following information

1. Copy of company safety manual (will be mailed)
2. Utility photographs of accident site (will be mailed on flash drive)
3. Copy of job briefing before work began at the accident site (see bate-stamps 43 to 46)
4. Facility map of area involved (see photo above)

You also requested information that is not currently available, but will be provided when possible:

1. Utility accident report
2. Last system inspection on facilities involved (substation reports-last 12 months)
3. Any recent work performed on facilities involved (any work performed-last 12 months)
4. Maintenance records on failed or affected equipment (maintenance work-last 12 months)
5. Copy of outage reports on facilities involved
6. System protective devices: Ratings and if operated
7. PPE required, PPE wearing. Photographs of PPE that employees were wearing
8. FR clothing required, FR clothing wearing,. Photographs of FR clothing employees were wearing
9. Written statements from victims and any witnesses (if available).
    a. The two injured employees are currently off work, and will be for some time. We intend to collect written statements upon their return, and they will be submitted once available.
    b. Although there were 6 additional employees on the scene at the time of the incident, no employees reportedly were witness to the cause of the flash.

If you have any questions or concerns, please do not hesitate to contact me at (513) 287-1234.

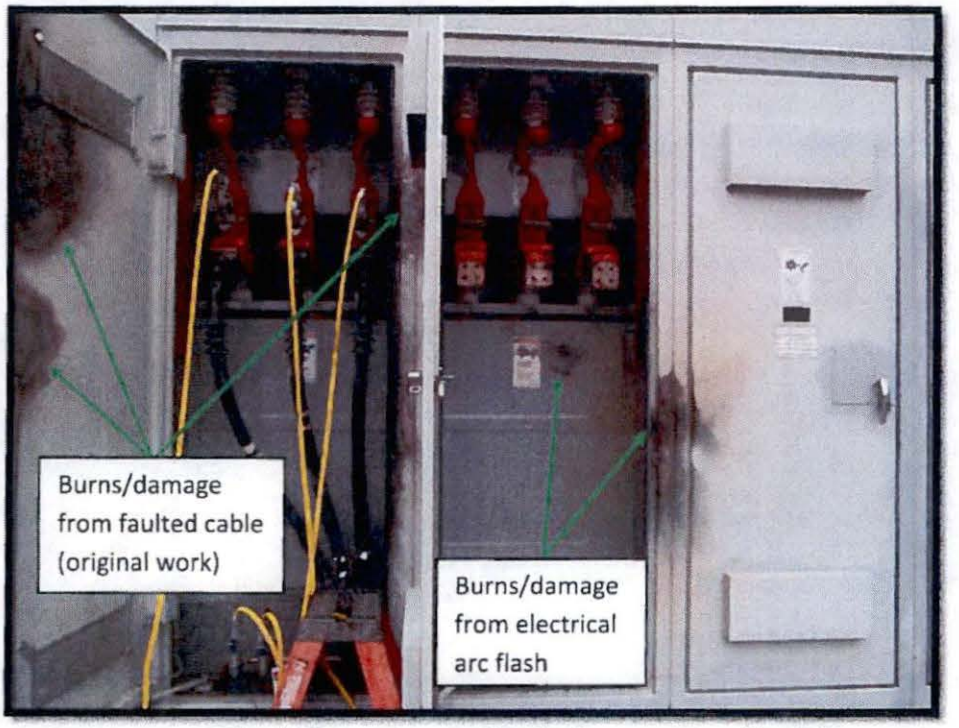
Sincerely,

Jeffery T. Dierker
Duke Energy Manager
H&S Midwest Field Support

cc: Ken Toebbe
Julie Ezell

Incident Location - Northern Kentucky University Substation, Highland Heights, Ky.

Photo of the Switchgear Cabinets



Attachment B

Additional Information

139 East Fourth Street, M/C EM740
Cincinnati, OH 45202
Telephone: (513) 287-1234
Facsimile: (513) 287-3499

Jeffery T. Dierker
H&S Manager
E-mail: Jeff.Dierker@duke-energy.com

VIA EMAIL (Jeff.DeRouen@ky.gov) AND ORDINARY MAIL

May 22nd, 2015

Mr. Jeff DeRouen
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
P.O. Box 615
Frankfort, KY 40602-0615

Re: Electrical Flash - Northern Kentucky University Substation, Highland Heights, Kentucky

Dear Mr. DeRouen,

During the initial investigation, the following information was requested but was not readily available. Please review the attached documentation, and let me know if you have any questions.

1. Utility accident report
    a. will be provided when available.
2. Last system inspection on facilities involved (substation reports-last 12 months)
    a. (see bate-stamps 47 to 51)
3. Any recent work performed on facilities involved (any work performed-last 12 months)
    a. (see bate-stamps 52 to 55)
4. Maintenance records on failed or affected equipment (maintenance work-last 12 months)
    a. (see bate-stamps 56 to 57)
5. Copy of outage reports on facilities involved
    a. (see bate-stamps 58 to 63)
6. System protective devices: Ratings and if operated
    a. (see bate-stamp 64)
7. PPE required, PPE wearing. Photographs of PPE that employees were wearing
    a. PPE required for the assigned task include: Hard hat, safety glasses, work gloves, EH safety shoes, FR pants and shirt.
    b. PPE worn include: Hard hat, safety glasses, work gloves*, EH safety shoes, FR pants and shirt.
        i. Based on the injuries, it is assumed that Nathan Trapp was not wearing work gloves at the time of the incident, and leather work gloves in the photo may not be Nathan's.
    c. (see bate-stamps 65 to 66)

8. FR clothing required, FR clothing wearing. Photographs of FR clothing employees were wearing.
    a. FR clothing required for the assigned task: FR pants and FR shirt.
    b. FR clothing worn include: FR pants and FR shirt.
    c. (see bate-stamps 65 to 66)

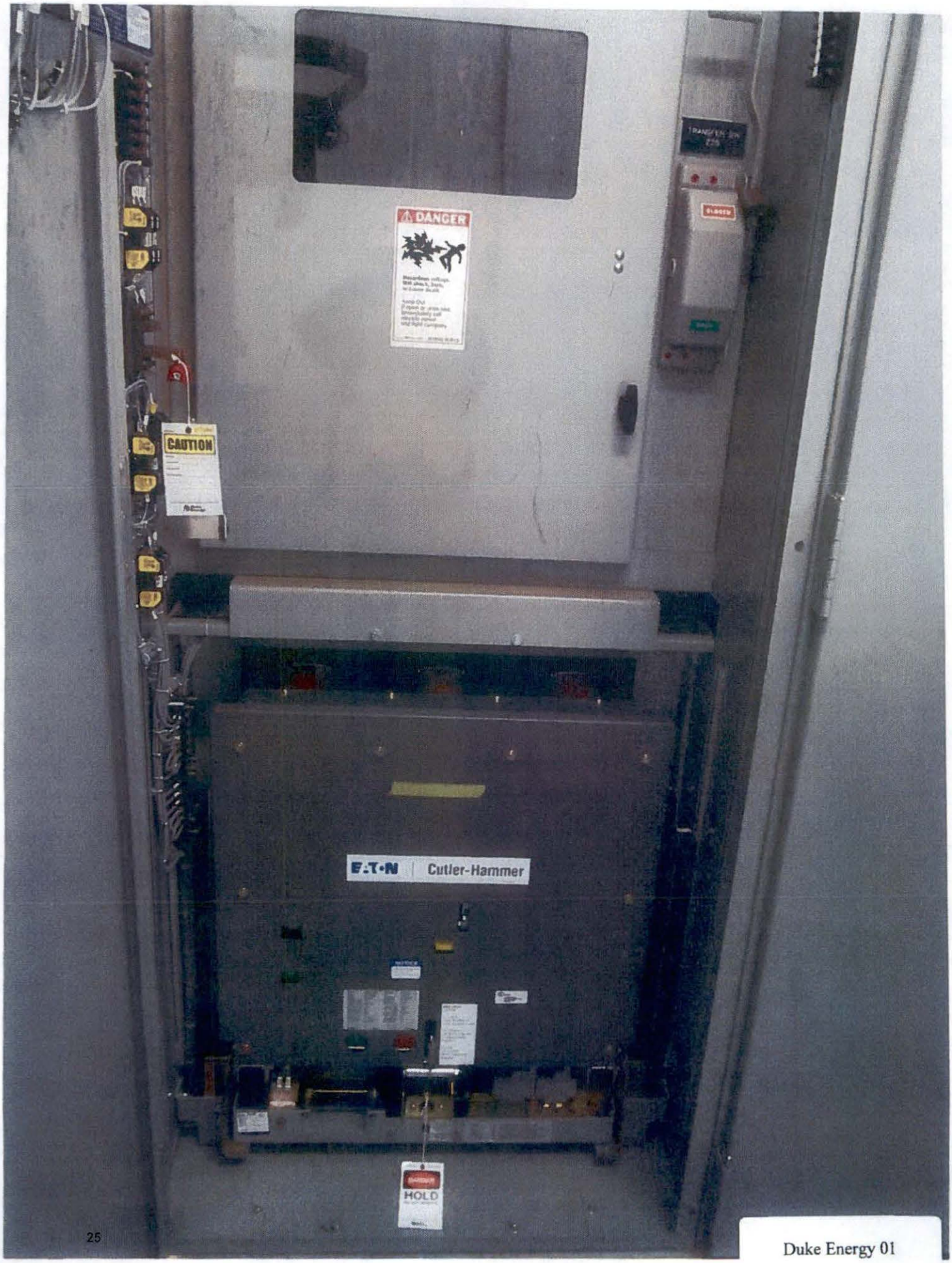
If you have any questions or concerns, please do not hesitate to contact me at (513) 287-1234.

Sincerely,

Jeffery T. Dierker

Jeffery T. Dierker
Duke Energy Manager
H&S Midwest Field Support

cc: Ken Toebbe
Julie Ezell



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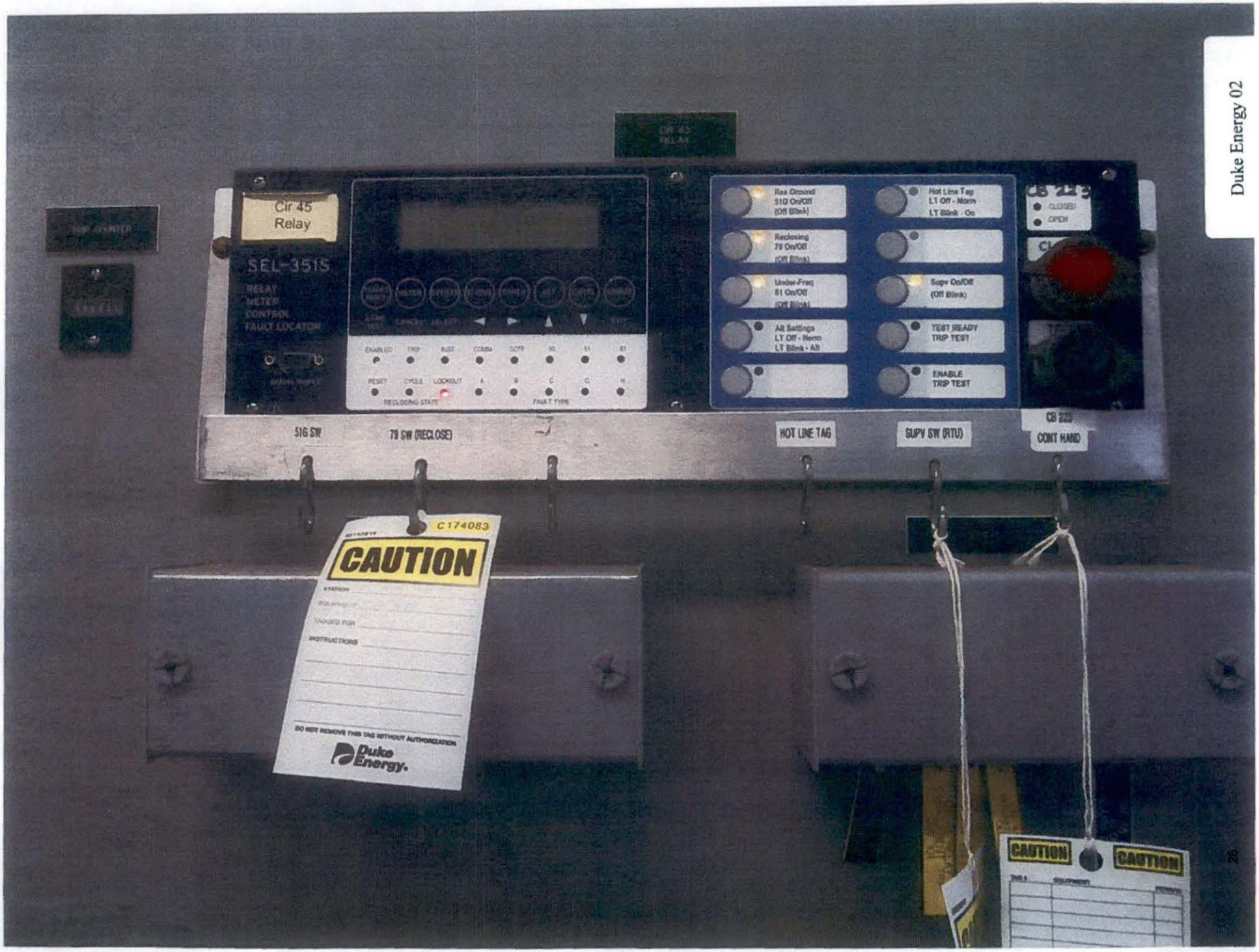
Cir 45
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Res Ground
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Reclosing
79 On/Off
Under-Freq
81 On/Off
Alt Settings
LT Off - Norm
LT Blink - Alt
Hot Line Tag
LT Off - Norm
LT Blink - On
Supv On/Off
(Off Blink)
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TRIP TEST
ENABLE
TRIP TEST
CLOSED
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51G SW
79 SW (RECLOSE)
HOT LINE TAG
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INSTRUCTIONS
DO NOT REMOVE THIS TAG WITHOUT AUTHORIZATION
Duke Energy.
CAUTION
CAUTION


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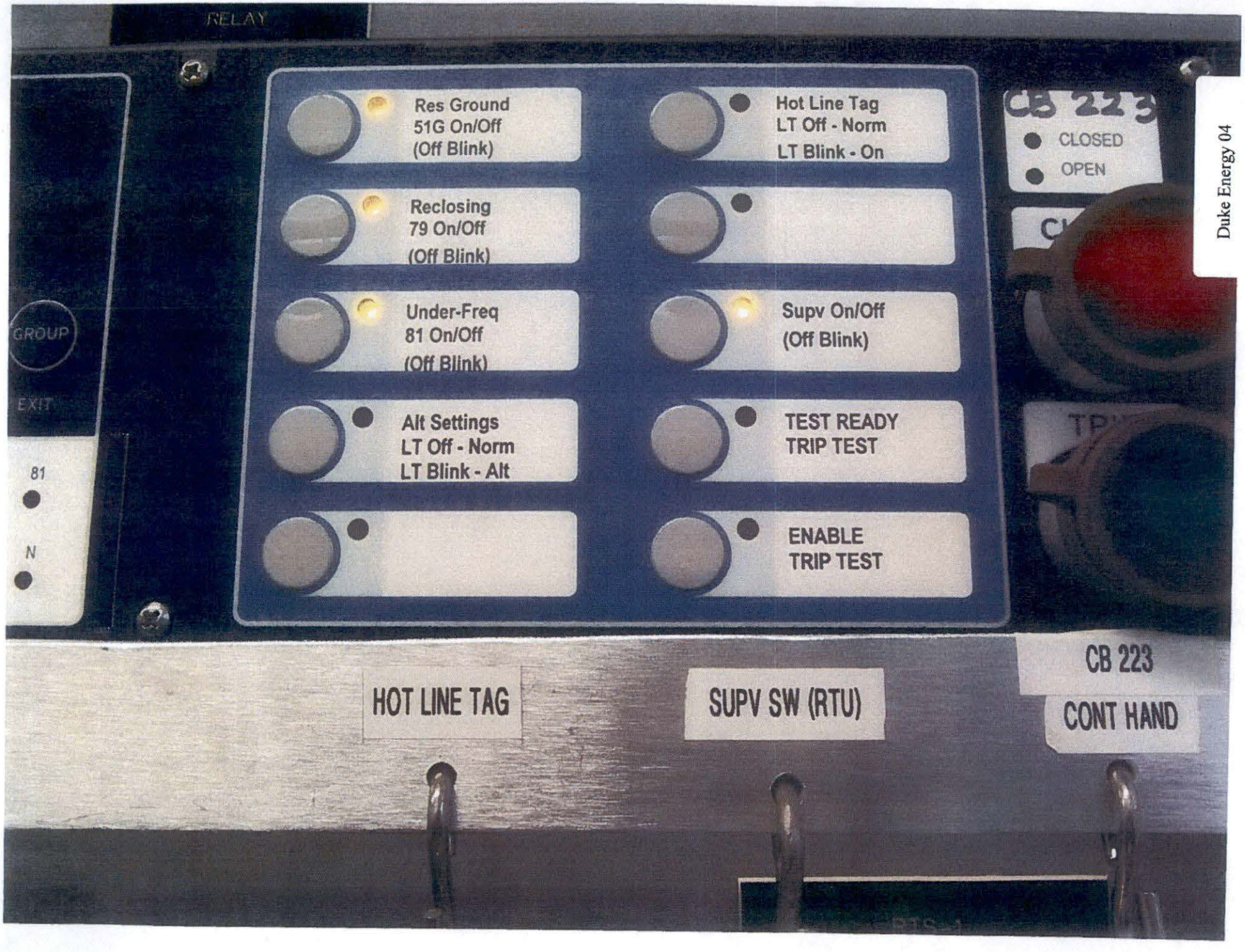

Duke Energy 04

Duke Energy 05

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Hot Line Tag
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CAUTION
STATION
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TAGGED FOR
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DO NOT REMOVE THIS TAG WITHOUT AUTHORIZATION
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DO NOT REMOVE THIS TAG WITHOUT AUTHORIZATION
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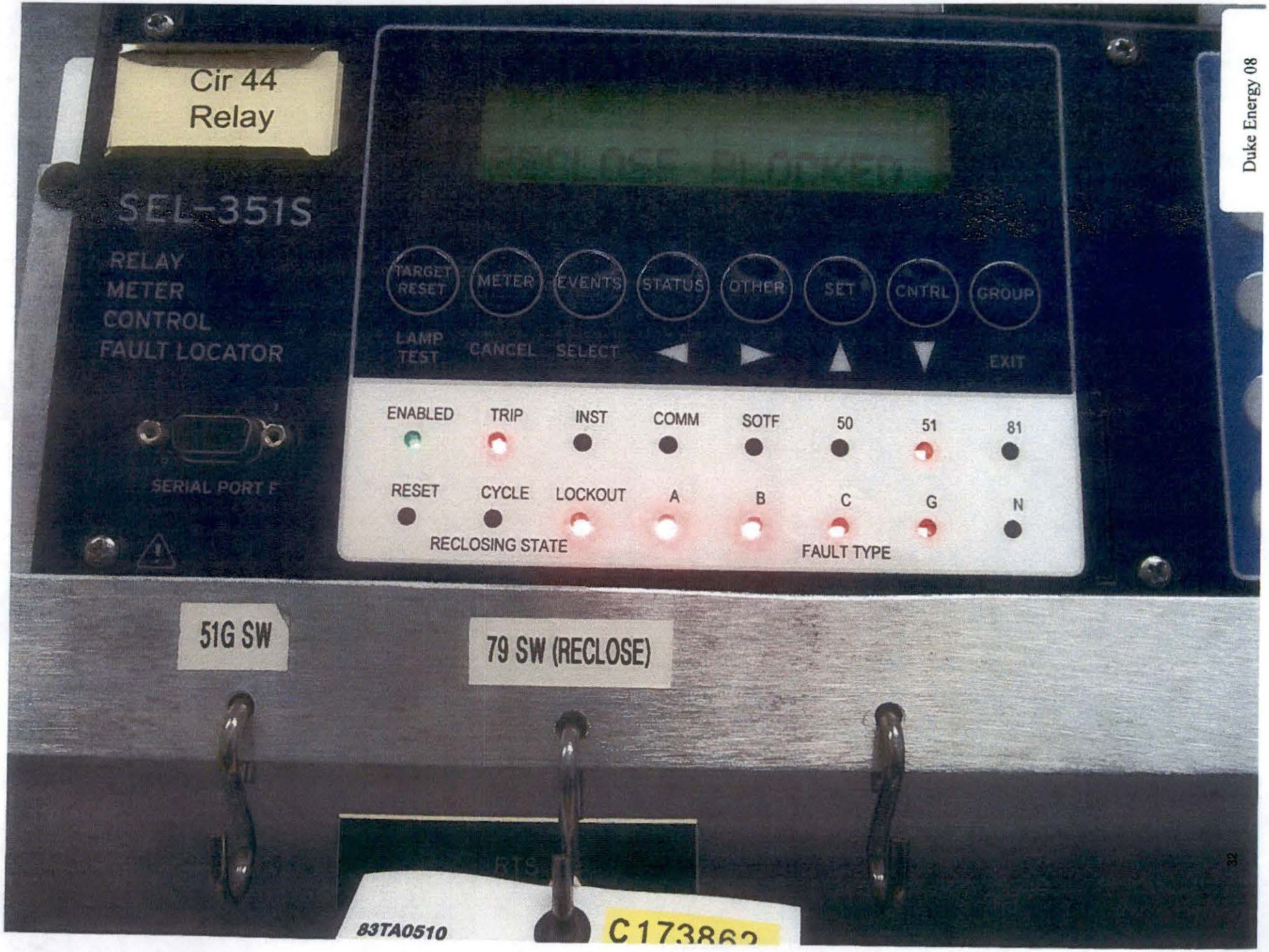
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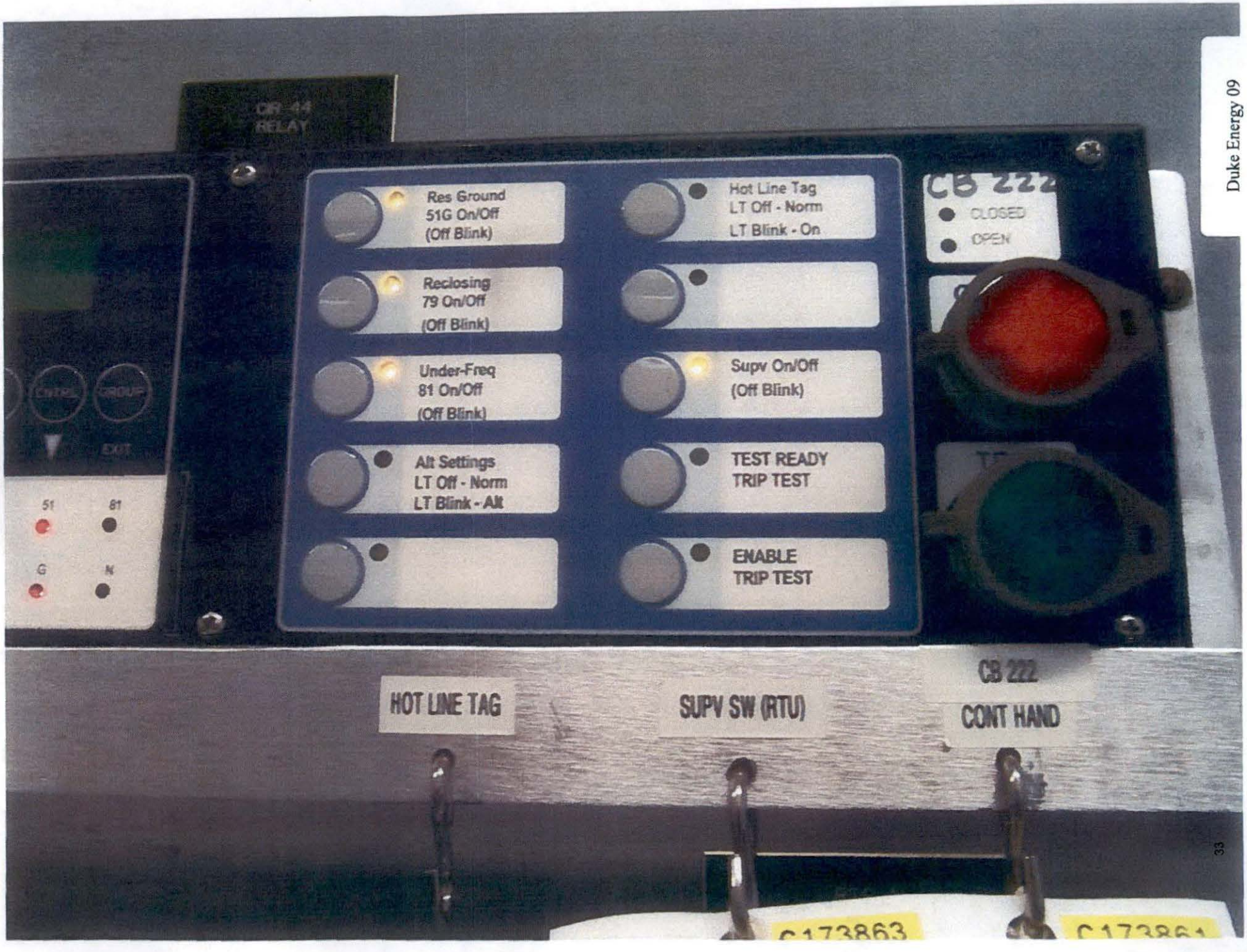
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Supv On/Off
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Alt Settings
LT Off - Norm
LT Blink - Alt
TEST READY
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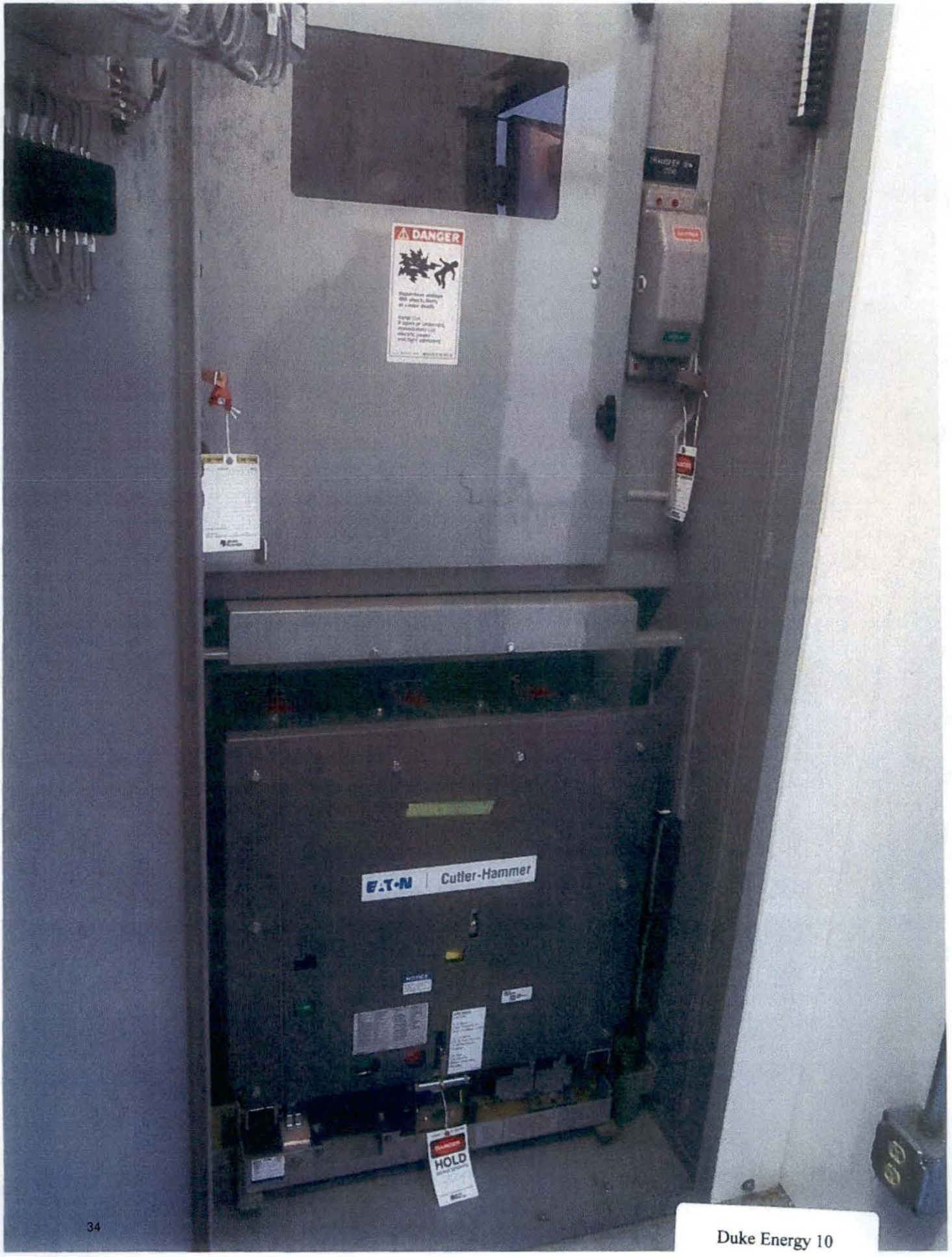

Duke Energy 10

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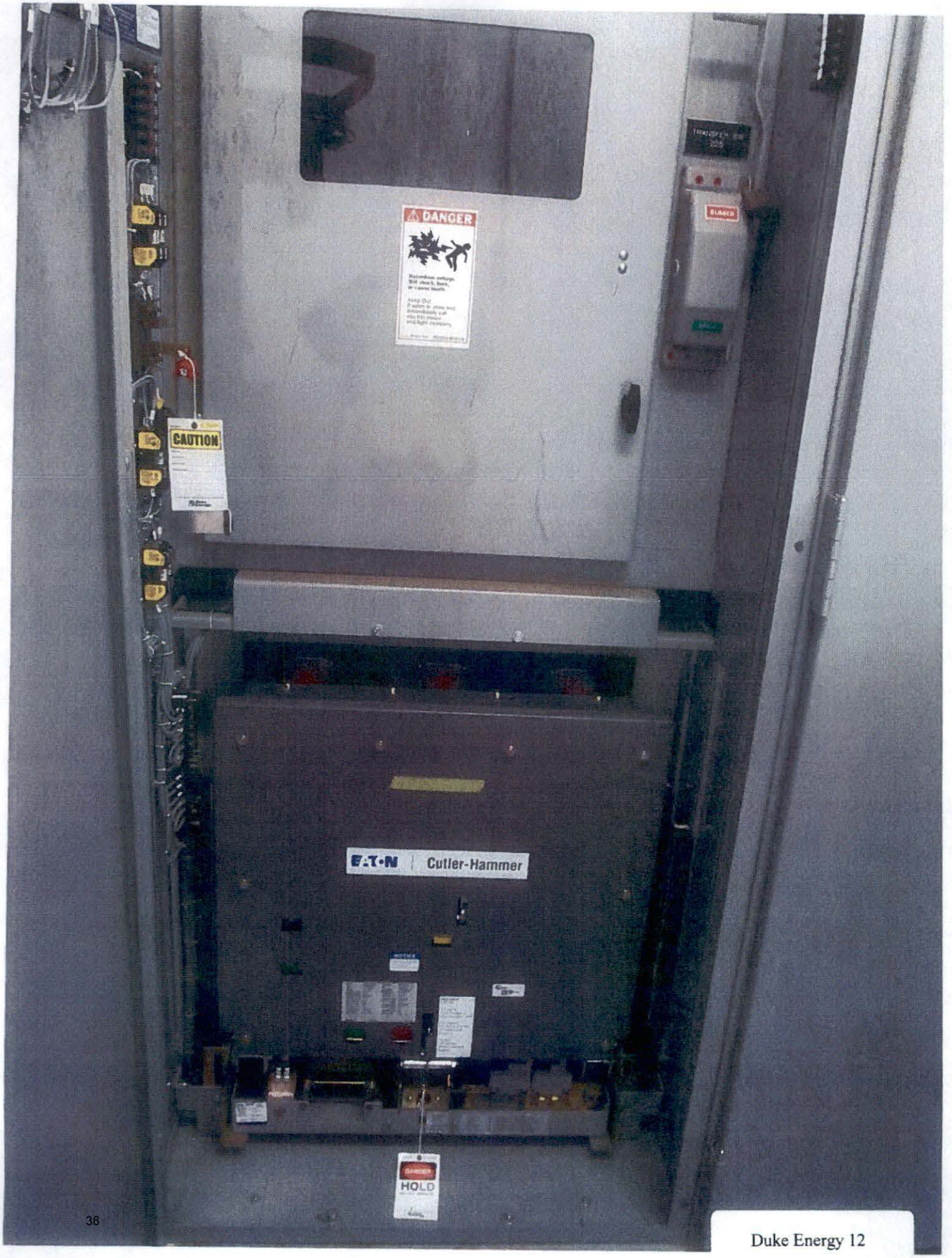


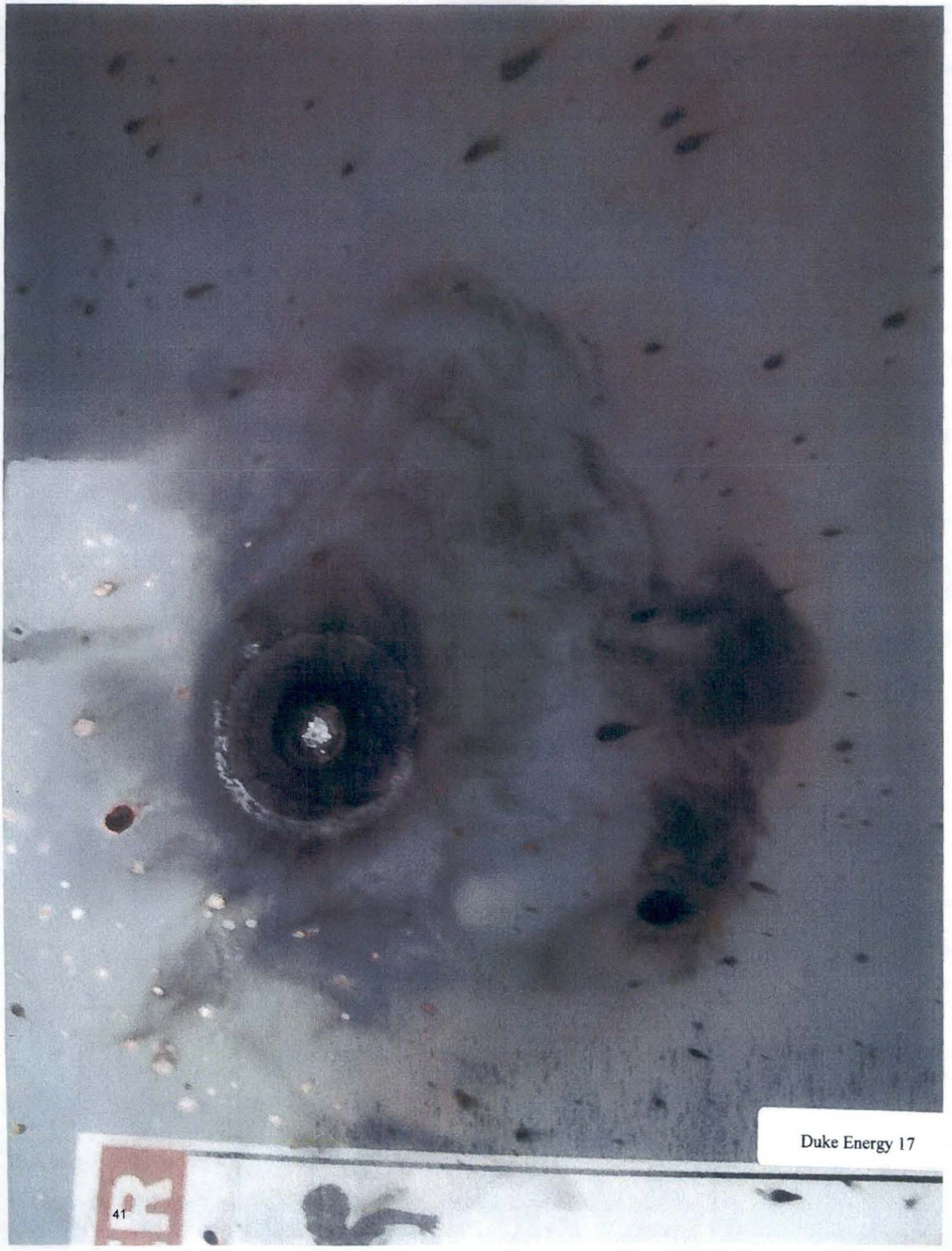
Duke Energy 12

Duke Energy 13

Duke Energy 14

Duke Energy 15

RR210 2/0 AWG



Duke Energy 17

Duke Energy 18

Duke Energy 19

Duke Energy 21

Duke Energy 22

EXIT

Duke Energy 24


CB 223
CIR 45

Cir 45
Relay
SEL-351S
79 SW (RECLOSE)
HOT LINE TAG
SUPV SW (RTU)
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CAUTION
C174083
Duke Energy.

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79 SW (RECLOSE)

Duke Energy 28

Duke Energy 29

Duke Energy 30

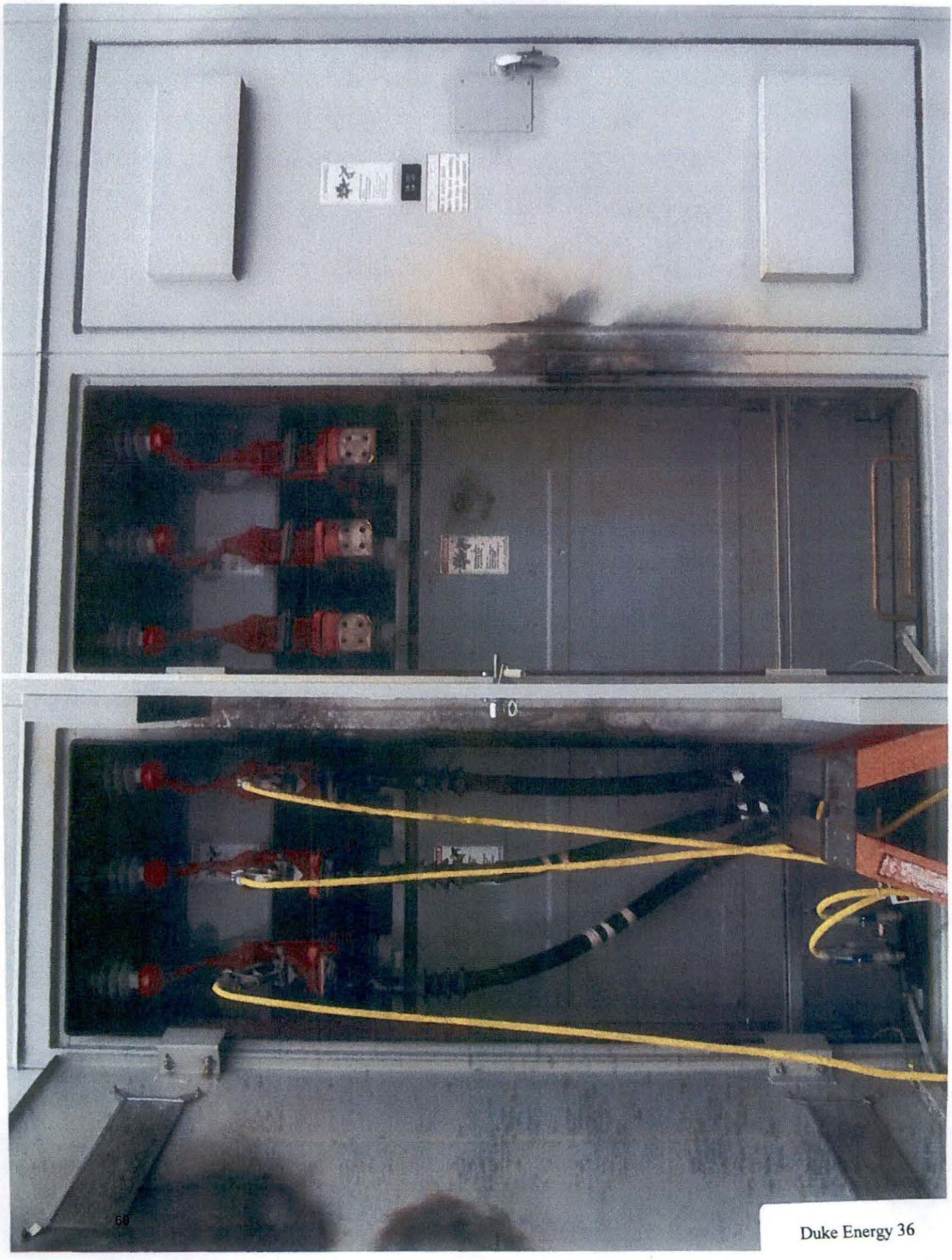
Duke Energy 31

Duke Energy 32

Duke Energy 33

Duke Energy 34

Duke Energy 35



Duke Energy 36

Duke Energy 37

DANGER
Hazardous voltage.
Will shock, burn,
or cause death.
Keep Out.
If open or unlocked,
immediately call
electric power
and light company.

Duke Energy 39

Duke Energy 40

Duke Energy 41

Duke Energy 42

SAFETYFirst

Job Briefing Form

DUKE ENERGY.

The Employee in Charge (EIC) or Designated Crew Member (DCM), along with all crew members on the job site, will hold a job briefing to review work procedures, hazards associated with the job, special precautions, energy source controls and personal protective equipment (PPE).

Steve Reis (EIC or DCM) | 4/3/15 (Date/Time) | 7236798 (Job, Work Request or Outage No.)

Job Location Address: Ky University Substation

Provide directions and landmarks for 911 response.

St Elizabeth (Nearest Medical Facility) | Travis Bach (Designated 911 Caller) | Steve Rust (Designated 911 Caller (Backup))

Work Procedures Involved

Brief Description of Job: Repair blown cable terminations
Assignment of Work Tasks:
Cover-Up Required:
Vehicle Placement:
Material Handling and Rigging:
Confined/enclosed space entry required? ☐Y ☒N If yes, is form completed? ☐Y ☐N Air test? ☐Y ☐N
Tool and Equipment Daily Inspection:
Other:

Hazards Associated with the Job

Identify hazards/risks (e.g., pathway, above, adjacent, energized components, pole/structure condition), barriers to mitigating/removing the hazards/risks and the person responsible for mitigating/removing the hazards/risks.

☐ ***Condition of Poles*** ☐ Conductors ☒ Switches ☐ Insulators
Minimum Approach Distances: Designated Critical Task Observer:
Potential Distractions: other workgroups / substation
Other:

Hazards: What can go Wrong?	Barriers in Place	Person Responsible

Special Precautions

Traffic Control Requirements:
Utility Locations: Public Safety Precautions:
Environmental Concerns/Chemicals:
Hot or Cold Weather Concerns:
Confined Space Precautions:
Excavation/Trench Hazards:
Other Work Groups in Area:

Energy Source Controls

Circuit/Feeder Ky University '45" **Nominal Voltage** 12470 Protective Device

Clearance/LOTO # Issued To: Time On: Time Off:

Block/HLT # Issued To: Time On: Time Off:

If the job cannot be performed safely, **STOP THE JOB** and ask for assistance!

SAFETYFirst

Job Briefing Form

DUKE ENERGY.

IPP/Backfeed Potential: / Presence of Hazardous Induced Voltages: /
System/PP Grounds Installed Location(s): CAH 2494 and CB 223 Time On: _____ Time Off: _____
Other: _____

Personal Protective Equipment

Check the box next to each type of PPE required for the job:

☑ Hard Hat	☑ Safety Glasses/Side Shields	☐ Safety Shoes	☑ Work Gloves
☑ Rubber Gloves	☐ Traffic Vest	☐ Fall Protection	☑ FR Clothing
☐ Hearing Protection	☐ Goggles/Face Shield	☑ Rubber Goods	☐ Other PPE (specify below)
☐ Chaps	☑ Grounds		
☑ PPE Tested/Works Properly			

Post-Job Briefing

All system/PP grounds removed?	☐Y ☐N ☐N/A	All clearance/LOTO tags removed?	☐Y ☐N ☐N/A
All switching Complete?	☐Y ☐N ☐N/A	System restored to normal?	☐Y ☐N ☐N/A
Redline changes made on prints?	☐Y ☐N ☐N/A	Tools/trash picked up around site?	☐Y ☐N ☐N/A
Equipment/material secured for travel?	☐Y ☐N ☐N/A	Did the job go as planned?	☐Y ☐N ☐N/A
Is follow-up needed?	☐Y ☐N ☐N/A	If so, who is responsible?	

What is the follow-up action? _____
Lessons Learned (additional details about the job that others should know):

Travel Plan (Discussion Points)

- Where is the next job?
- Who is driving each vehicle?
- What route will we take?
- Who is leading the way?
- How will we exit this job?
- Is there an open lot nearby for parking?
- Pole trailer circumstances (will the route require an escort)?
- Complete the CIRCLE FOR SAFETY!

All crew members have been involved in the pre-job briefing and understand the hazards identified and the safety precautions necessary to complete the job safely.

	Employee ID	Job Briefing (signature)	Post-Job Brief (initials)
EIC/DCM	19951		
Crew Member	283397		
Crew Member	243668		
Crew Member	278940		
Crew Member	326106	J RUST	
Crew Member			
Crew Member			
Crew Member			
Crew Member			

Additional/review job briefing(s) held before resuming work after the job was interrupted for any reason:

EIC/DCM	_____	Time	_____	Reason	_____
EIC/DCM	_____	Time	_____	Reason	_____
EIC/DCM	_____	Time	_____	Reason	_____
EIC/DCM	_____	Time	_____	Reason	_____

If the job cannot be performed safely, STOP THE JOB and ask for assistance!

Duke Energy

JOB BRIEFING – MIDWEST SUBSTATION OPERATIONS
"WHAT COULD POSSIBLY GO WRONG HERE?"

District/Job Location: NKU

Brief description of job: Cir 45 faulted

The Employee-in-Charge is required to conduct a job briefing at the beginning of work shifts, before the start of each job, when a job is interrupted, or when additional personnel are added to the job.

The job briefing must include these SIX (6) subjects. Please check each category when completed.

Work procedures involved	☑	Safe Pratices
Hazards associated with the job	☑	Static, heavy Rain
Special precautions	☑	Parts blown up
Energy source controls	☑	Isolation, tagging
Personal protective equipment	☑	Hardhat, gloves, Glass, FF, Rain gear
Driving /repositioning/backing	☑	wheel chocks

Do you need further discussion on?

- Tagging, isolation points, grounding Review Isolation
- Confined or enclosed space
- Disposal of hazardous materials
- Required documentation

Ask the question **"What could possibly go wrong here?"** (List below)

Slip, trip, fall, get wet & cold, shock, Death, cut fingers, wreck truck

(Continue on back if needed)

SAFETY ALWAYS!

- Wear your personal protective equipment
- Make safety a part of every job plan
- Look out for one another's safety
- Drive Safely – Wear your seatbelt

Crew member initials: SR JA TP SLPe JC KL SE

Job Briefing Conducted By: Nathan Tapp Date: 4/3/15

Substation Maintenance

Work Sheet / Job Briefing

Center	Date
S634	4/3/15

	Station(s)	Project Code	Activity	Oper. Unit	Tax Code	EMAX WORK ORDER #'s	St Hrs
(1)	Rochelle	P8018	I	V50N	CN		
(2)	NKU						
(3)							
(4)							
(5)							
(6)							

Workscope:

(1) Safety for CONTRACTORS - IF They don't show by 0900 call Ste.

(2) C.I. 45 faulted

(3)

(4)

(5)

(6)

Truck(s): 4608

Tag Person / Crew leader: NATHAN TRAPP

Crew:

Place Initials by each crew member's name to indicate review & understanding of Isolation, Tailgate session, Known Hazards

Received Isolation		Maint. Lockout / Tagout used	

Work Completed ?			Notes on work performed
(1)	YES	(NO)	SAFETY MTG FOR CONTRACTORS ON TB 2
(2)	YES	NO	
(3)	YES	NO	
(4)	YES	NO	
(5)	YES	NO	
(6)	YES	NO	

Tag cleared

Y	N
N/A	

All grounds removed? YES ☐ NO ☒ N/A ☐

Why Not:

DUKE ENERGY.

Station Log Book Updated YES NO

Back of sheet used for Addition Information

Signed:

DON'T FORGET JOB BRIEFING FORM

COMPLETE & TURN IN THE DAILY

Host: http://entdukerpt.duke-energy.com/reportserver

Power Delivery
MX Condition Monitoring
Sorted by: Transformer, Breaker

Report Last Refreshed on:
04/07/2015 10:50

Transformer Reads for KENTUCKY UNIVERSITY, STATION 287.00 Inspection Dates 04/01/2014 - 04/30/2015

TB 4 W/LTC	04/15/2014	2:14PM	-6	-2	-12	47,592									0.00%
TB 4 W/LTC	05/21/2014	1:42PM	-5	15	-14	47,773									0.00%
TB 4 W/LTC	06/18/2014	3:12PM	-6	-2	-11	47,834									0.00%
TB 4 W/LTC	07/17/2014	2:31PM	-5	-2	-8	47,895									0.00%
TB 4 W/LTC	08/17/2014	1:49PM	-4	0	-10	47,966									0.00%
TB 4 W/LTC	09/18/2014	12:50PM	-5	3	-9	48,073									0.00%
TB 4 W/LTC	10/18/2014	1:41PM	-7	-3	-12	48,117									0.00%
TB 4 W/LTC	11/18/2014	2:29PM	-8	-1	-11	48,202									0.00%
TB 4 W/LTC	12/18/2014	2:27PM	-10	-2	-11	48,254									0.00%
TB 4 W/LTC	01/17/2015	11:47AM	-6	0	-12	48,338									0.00%
TB 4 W/LTC	02/17/2015	1:11PM	-4	-3	-10	48,396									0.00%
TB 4 W/LTC	03/17/2015	5:51PM	-8	1	-13	48,708									0.00%
VR 2	04/15/2014	2:16PM	-2	0	-4	2,566	-1	-4	2,566	-2	-2	-4	1,718		0.00%
VR 2	05/21/2014	1:46PM	1	1	-5	2,658	1	-6	2,658	-1	1	-5	1,785		0.00%
VR 2	06/18/2014	3:13PM	2	2	-3	2,796	1	-4	2,796	2	2	-4	1,891		0.00%
VR 2	07/17/2014	2:34PM	0	4	-1	2,930	3	-3	2,930	0	4	-1	1,990		0.00%
VR 2	08/17/2014	1:51PM	0	4	-2	3,058	2	-3	3,058	0	2	-2	2,115		0.00%
VR 2	09/18/2014	12:53PM	2	6	-1	3,231	6	-2	3,231	1	6	-2	2,284		0.00%
VR 2	10/18/2014	1:44PM	0	3	-1	3,347	3	-1	3,347	-2	2	-3	2,410		0.00%
VR 2	11/18/2014	2:31PM	1	2	-2	3,416	1	-3	3,416	0	1	-3	2,477		0.00%
VR 2	12/18/2014	2:29PM	1	2	-2	3,468	2	-3	3,468	-1	0	-4	2,520		0.00%

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Power Delivery
MX Condition Monitoring
Sorted by: Transformer, Breaker

Report Last Refreshed on:

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Eqpmt	Date	Time	Voltage PH1	Voltage PH2	Voltage PH3	Volt Reg Tap Changer Phase 1 Fnd	Phase 1 R	Phase 1 L	Phase 1 Cntr	Volt Reg Tap Changer Phase 2 Fnd	Phase 2 R	Phase 2 L	Phase 2 Cntr	Volt Reg Tap Changer Phase 3 Fnd	Phase 3 R	Phase 3 L	Phase 3 Cntr	kW	Phase In Bal Percent
VR 2	**01/17/2015**	**11:49AM**				1	4	-2	3,514		4	-3	3,514	0	1	-3	2,551		0.00%
VR 2	**02/17/2015**	**1:19PM**				-1	2	-3	3,555		2	-3	3,555	-1	1	-4	2,582		0.00%
VR 2	**03/17/2015**	**5:53PM**				0	3	-1	3,591		3	-3	3,591	-2	1	-3	2,615		0.00%
VR2	04/15/2014	2:15PM				-3				-3									0.00%
VR2	05/21/2014	1:46PM				-1				-1									0.00%
VR2	06/18/2014	3:13PM				1				1									0.00%
VR2	07/17/2014	2:33PM				-1				-1									0.00%
VR2	08/17/2014	1:51PM				-1				-1									0.00%
VR2	09/18/2014	12:52PM				2				2									0.00%
VR2	10/18/2014	1:43PM				-1				-1									0.00%
VR2	11/18/2014	2:31PM				1				1									0.00%
VR2	12/18/2014	2:29PM				-1				-1									0.00%
VR2	01/17/2015	11:49AM				1				1									0.00%
VR2	02/17/2015	1:13PM				0				0									0.00%
VR2	03/17/2015	5:53PM				-2				-2									0.00%

Note: Bold Red font rows are phase imbalance>3%

Note: Bold Rows are spot read dates

Breaker Reads for KENTUCKY UNIVERSITY, STATION 287.00 Inspection Dates 04/01/2014-04/30/2015

Eqpmnt	Date	Time	Loading Max	Loading Present Loading	Indicating Amps PH1	Indicating Amps PH2	Indicating Amps PH3	Peak Amps PH1	Peak Amps PH2	Peak Amps PH3	CB Rec Counter PH1	CB Rec Counter PH2	CB Rec Counter PH3	Relays Since Service PH1	Relays Since Service PH2	Relays Since Service PH3
CB 241 CIR 41	04/15/2014	2:14PM		0.00%	32.00	80.00	144.00	160.00	160.00	176.00	99,910					
CB 241 CIR 41	05/21/2014	1:43PM		0.00%	160.00	160.00	176.00	192.00	192.00	208.00	99,916					
CB 241 CIR 41	06/18/2014	3:12PM		0.00%	192.00	192.00	192.00	192.00	192.00	192.00	916					
CB 241 CIR 41	07/17/2014	2:31PM		0.00%	160.00	160.00	160.00	208.00	208.00	224.00	99,916					
CB 241 CIR 41	08/17/2014	1:49PM		0.00%	128.00	112.00	144.00	192.00	240.00	192.00	99,916					

Power Delivery
MX Condition Monitoring
Sorted by: Transformer, Breaker

CB 241 CIR 41	09/18/2014	12:50PM	0.00%	160.00	160.00	160.00	224.00	224.00	224.00	916
CB 241 CIR 41	10/18/2014	1:41PM	0.00%	32.00	32.00	128.00	208.00	192.00	224.00	916
CB 241 CIR 41	11/18/2014	2:29PM	0.00%	16.00	80.00	160.00	176.00	176.00	184.00	916
CB 241 CIR 41	12/18/2014	2:27PM	0.00%	16.00	32.00	128.00	160.00	160.00	192.00	916
CB 241 CIR 41	01/17/2015	11:47AM	0.00%	16.00	16.00	32.00	48.00	80.00	160.00	99,916
CB 241 CIR 41	02/17/2015	1:11PM	0.00%	16.00	32.00	128.00	16.00	32.00	128.00	99,916
CB 241 CIR 41	03/17/2015	5:51PM	0.00%	80.00	80.00	80.00	160.00	160.00	160.00	99,916
CB 243 CIR 42	04/15/2014	2:14PM	0.00%	144.00	64.00	112.00	208.00	208.00	208.00	602
CB 243 CIR 42	05/21/2014	1:43PM	0.00%	144.00	16.00	128.00	208.00	224.00	224.00	612
CB 243 CIR 42	06/18/2014	3:12PM	0.00%	208.00	160.00	192.00	256.00	192.00	224.00	612
CB 243 CIR 42	07/17/2014	2:32PM	0.00%	160.00	80.00	96.00	272.00	192.00	224.00	612
CB 243 CIR 42	08/17/2014	1:49PM	0.00%	176.00	64.00	96.00	192.00	184.00	208.00	612
CB 243 CIR 42	09/18/2014	12:50PM	0.00%	160.00	80.00	80.00	272.00	192.00	224.00	612
CB 243 CIR 42	10/18/2014	1:41PM	0.00%	128.00	32.00	80.00	416.00	432.00	416.00	612
CB 243 CIR 42	11/18/2014	2:29PM	0.00%	200.00	176.00	192.00	216.00	176.00	216.00	612
CB 243 CIR 42	12/18/2014	2:28PM	0.00%	208.00	224.00	192.00	256.00	264.00	256.00	612
CB 243 CIR 42	01/17/2015	11:47AM	0.00%	192.00	160.00	128.00	288.00	288.00	272.00	612
CB 243 CIR 42	02/17/2015	1:11PM	0.00%	240.00	208.00	176.00	288.00	288.00	272.00	612
CB 243 CIR 42	03/17/2015	5:52PM	0.00%	160.00	160.00	128.00	288.00	304.00	272.00	612
VCB 221 CBI 43	04/15/2014	2:16PM	0.00%	0.00	0.00	0.00			263.00	
VCB 221 CBI 43	05/21/2014	1:47PM	0.00%	0.00	0.00	0.00			301.00	
VCB 221 CBI 43	06/18/2014	3:13PM	0.00%	0.00	0.00	0.00			356.00	
VCB 221 CBI 43	07/17/2014	2:35PM	0.00%	0.00	0.00	0.00			367.00	
VCB 221 CBI 43	08/17/2014	1:52PM	0.00%	0.00	0.00	0.00			366.00	
VCB 221 CBI 43	09/18/2014	12:54PM	0.00%	0.00	0.00	0.00			381.00	
VCB 221 CBI 43	10/18/2014	1:44PM	0.00%	0.00	0.00	0.00			294.00	
VCB 221 CBI 43	11/18/2014	2:32PM	0.00%	0.00	0.00	0.00			281.00	
VCB 221 CBI 43	12/18/2014	2:30PM	0.00%	0.00	0.00	0.00			281.00	
VCB 221 CBI 43	01/17/2015	11:50AM	0.00%	0.00	0.00	0.00			317.00	

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Power Delivery
MX Condition Monitoring
Sorted by: Transformer, Breaker

Report Last Refreshed on:

04/07/2015 10:50

Equipment	Date	Time	Loading Max	Percent Loading	Indicating Amps PH1	PH2	PH3	Peak Amps PH1	PH2	PH3	CB Recl Counter PH1	PH2	PH3	Relays Since Service Ph1	PH2	PH3
VCB 221 CBI 43	02/17/2015	1:15PM		0.00%	0.00	0.00	0.00			276.00						
VCB 221 CBI 43	03/17/2015	5:54PM		0.00%	0.00	0.00	0.00			308.00						
VCB 221 CIR 43	04/15/2014	2:16PM		0.00%	187.00	203.00	218.00	221.00	247.00		65					
VCB 221 CIR 43	05/21/2014	1:47PM		0.00%	228.00	259.00	255.00	261.00	291.00		65					
VCB 221 CIR 43	06/18/2014	3:13PM		0.00%	246.00	289.00	289.00	292.00	339.00		65					
VCB 221 CIR 43	07/17/2014	2:35PM		0.00%	215.00	228.00	241.00	299.00	348.00		65					
VCB 221 CIR 43	08/17/2014	1:52PM		0.00%	155.00	177.00	196.00	295.00	347.00		65					
VCB 221 CIR 43	09/18/2014	12:54PM		0.00%	214.00	222.00	232.00	312.00	356.00		65					
VCB 221 CIR 43	10/18/2014	1:45PM		0.00%	131.00	140.00	155.00	273.00	287.00		65					
VCB 221 CIR 43	11/18/2014	2:32PM		0.00%	202.00	215.00	244.00	251.00	251.00		65					
VCB 221 CIR 43	12/18/2014	2:30PM		0.00%	194.00	201.00	235.00	251.00	251.00		65					
VCB 221 CIR 43	01/17/2015	11:50AM		0.00%	132.00	152.00	173.00	251.00	251.00		65					
VCB 221 CIR 43	02/17/2015	1:15PM		0.00%	187.00	206.00	255.00	215.00	225.00		65					
VCB 221 CIR 43	03/17/2015	5:54PM		0.00%	175.00	180.00	194.00	214.00	237.00		65					
VCB 222 CIR 44	04/15/2014	2:17PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	05/21/2014	1:48PM		0.00%	77.00	97.00	250.00	94.00	108.00	266.00	45					
VCB 222 CIR 44	06/18/2014	3:13PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	07/17/2014	2:35PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	08/17/2014	1:52PM		0.00%	0.07	0.05	0.24	0.90	0.12	0.27	45					
VCB 222 CIR 44	09/18/2014	12:55PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	10/18/2014	1:45PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	11/18/2014	2:32PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	12/18/2014	2:30PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	01/17/2015	11:50AM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	02/17/2015	1:15PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 222 CIR 44	03/17/2015	5:54PM		0.00%	0.00	0.00	0.00	0.00	0.00	0.00	45					
VCB 223 CIR 45	04/15/2014	2:17PM		0.00%	105.00	112.00	105.00	277.00	304.00	279.00	48					
VCB 223 CIR 45	05/21/2014	1:48PM		0.00%	117.00	120.00	112.00	200.00	202.00	188.00	48					
VCB 223 CIR 45	06/18/2014	3:14PM		0.00%	149.00	150.00	144.00	151.00	154.00	148.00	48					

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Power Delivery
MX Condition Monitoring
Sorted by: Transformer, Breaker

Report Last Refreshed on:
04/07/2015 10:50

Equipment	Date	Time	Loading Max	Percent Loading	Indicating Amps PH1	PH2	PH3	Peak Amps PH1	PH2	PH3	Counter PH1	PH2	PH3	Sample Counter PH1	PH2	PH3
VCB 223 CIR 45	07/17/2014	2:36PM		0.00%	125.00	129.00	121.00	155.00	158.00	148.00	48					
VCB 223 CIR 45	08/17/2014	1:53PM		0.00%	124.00	132.00	122.00	152.00	157.00	147.00	48					
VCB 223 CIR 45	09/18/2014	12:55PM		0.00%	144.00	148.00	138.00	181.00	185.00	175.00	48					
VCB 223 CIR 45	10/18/2014	1:45PM		0.00%	108.00	113.00	105.00	173.00	178.00	167.00	48					
VCB 223 CIR 45	11/18/2014	2:33PM		0.00%	131.00	136.00	125.00	165.00	171.00	157.00	48					
VCB 223 CIR 45	12/18/2014	2:30PM		0.00%	111.00	117.00	107.00	166.00	171.00	157.00	48					
VCB 223 CIR 45	01/17/2015	11:51AM		0.00%	106.00	111.00	103.00	166.00	171.00	157.00	48					
VCB 223 CIR 45	02/17/2015	1:16PM		0.00%	124.00	131.00	118.00	147.00	151.00	139.00	48					
VCB 223 CIR 45	03/17/2015	5:55PM		0.00%	110.00	114.00	101.00	145.00	148.00	137.00	48					

Note: Bold Red font rows are = or > than Percent Load selected for report

Note: Bold Rows are spot read dates

Note: Percent Loading is calculated using Maximum Indicating Amps / Loading Max Value

Show Report Criteria

Work Order	Description	Status	Target Start	Target Finish
4691525	(FUNCTIONAL TEST) VCB 223 CIR 45 KENTUCKY U NIVERSITY SUB ID# 187	CLOSE	5/21/14 12:00 AM	5/21/14 1:30 AM
4691525-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	CLOSE	5/21/14 12:00 AM	5/21/14 1:30 AM
4914573	(BATTERY AND CHARGER SERVICE) BAT KENTUCK Y UNIVERSITY SUB ID# 287	CLOSE	4/15/14 12:00 AM	4/15/14 12:00 AM
4914573-1	BATTERY AND BATTERY CHARGER SERVICE	CLOSE	4/15/14 12:00 AM	4/15/14 12:00 AM
4918684	(DGA SAMPLE MAIN TANK) TRF TB 2 KENTUCKY U NIVERSITY SUB ID# 287	CLOSE	4/16/14 12:00 AM	4/16/14 1:00 AM
4918684-1	OBTAIN DGA + MOISTURE SAMPLE FROM TRANSF ORMER MAIN TANK	CLOSE	4/16/14 12:00 AM	4/16/14 1:00 AM
5430682	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	5/1/14 12:00 AM	5/1/14 1:38 AM
5430682-1	INSPECT STATION AND TAKE READINGS	CLOSE	5/1/14 12:00 AM	5/1/14 1:38 AM
5433419	FILTER- AIR BLOCK HVC VENTILATION FILTERS NORTHERN KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	7/22/14 12:00 AM	7/22/14 12:30 AM
5433419-1	REMOVE AIR BLOCK AND REPLACE AIR FILTER	CLOSE	7/22/14 12:00 AM	7/22/14 12:30 AM
5433795	(DGA SAMPLE MAIN TANK) TRF TB 4 KENTUCKY U NIVERSITY SUB ID# 287	CLOSE	7/17/14 12:00 AM	7/17/14 1:00 AM
5433795-1	OBTAIN DGA + MOISTURE SAMPLE FROM TRANSF ORMER MAIN TANK	CLOSE	7/17/14 12:00 AM	7/17/14 1:00 AM
5607599	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	6/1/14 12:00 AM	6/1/14 1:38 AM
5607599-1	INSPECT STATION AND TAKE READINGS	CLOSE	6/1/14 12:00 AM	6/1/14 1:38 AM
5610359	(INFRARED SCAN) KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	8/6/14 12:00 AM	8/6/14 3:00 AM
5610359-1	INFRARED STATION INSPECTION	CLOSE	8/6/14 12:00 AM	8/6/14 3:00 AM
5611670	(DGA SAMPLE LTC) TRF TB 4 KENTUCKY UNIVERSI TY SUB ID# 287	CLOSE	8/10/14 12:00 AM	8/10/14 1:00 AM
5611670-1	OBTAIN DGA + MOISTURE SAMPLE FROM LTC	CLOSE	8/10/14 12:00 AM	8/10/14 1:00 AM
5786240	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	7/1/14 12:00 AM	7/1/14 1:38 AM
5786240-1	INSPECT STATION AND TAKE READINGS	CLOSE	7/1/14 12:00 AM	7/1/14 1:38 AM
5983316	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	8/1/14 12:00 AM	8/1/14 1:38 AM
5983316-1	INSPECT STATION AND TAKE READINGS	CLOSE	8/1/14 12:00 AM	8/1/14 1:38 AM
6076580	SPOT READ*******KY. UN. 287 DUSK TO DAWN L IGHT IN REAR OF STATION IS STAYING ON IN DAY TIME********	CLOSE	8/17/14 1:46 PM	8/17/14 1:46 PM
6076580-1	replace photocell	CLOSE	8/17/14 1:46 PM	8/17/14 1:46 PM
6163346	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	CLOSE	9/1/14 12:00 AM	9/1/14 1:38 AM
6163346-1	INSPECT STATION AND TAKE READINGS	CLOSE	9/1/14 12:00 AM	9/1/14 1:38 AM
6345627	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	COMP	10/1/14 12:00 AM	10/1/14 1:38 AM
6345627-1	INSPECT STATION AND TAKE READINGS	COMP	10/1/14 12:00 AM	10/1/14 1:38 AM
6348541	(DGA SAMPLE LTC) TRF TB 4 KENTUCKY UNIVERSI TY SUB ID# 287	COMP	12/4/14 12:00 AM	12/4/14 1:00 AM

6348541-1	OBTAIN DGA + MOISTURE SAMPLE FROM LTC	COMP	12/4/14 12:00 AM	12/4/14 1:00 AM
6495137	(WINTER CHECK) KENTUCKY UNIVERSITY SUB ID# 287	COMP	10/24/14 12:00 AM	11/30/14 12:00 AM
6495137-1	PERFORM ANNUAL WINTER INSPECTION	COMP	10/24/14 12:00 AM	11/30/14 12:00 AM
6556834	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	COMP	11/1/14 12:00 AM	11/1/14 1:38 AM
6556834-1	INSPECT STATION AND TAKE READINGS	COMP	11/1/14 12:00 AM	11/1/14 1:38 AM
6665625	Kentucky U TRF TB 4 NIT PRES LTC IS NEGITIVE -1	COMP	11/18/14 2:29 PM	11/18/14 2:29 PM
6665625-1	ADD/REPLACE NITROGEN GAS	COMP	11/18/14 2:29 PM	11/18/14 2:29 PM
6720870	(BATTERY AND CHARGER SERVICE) BAT KENTUCKY UNIVERSITY SUB ID# 287	CAN	2/4/15 12:00 AM	2/4/15 12:00 AM
6720870-1	BATTERY AND BATTERY CHARGER SERVICE	CAN	2/4/15 12:00 AM	2/4/15 12:00 AM
6726350	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	COMP	12/1/14 12:00 AM	12/1/14 1:38 AM
6726350-1	INSPECT STATION AND TAKE READINGS	COMP	12/1/14 12:00 AM	12/1/14 1:38 AM
6731021	(FUNCTIONAL TEST) ACB CB 241 KENTUCKY UNIVERSITY SUB ID# 287	CAN	5/16/15 12:00 AM	5/16/15 1:30 AM
6731021-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	CAN	5/16/15 12:00 AM	5/16/15 1:30 AM
6731029	(FUNCTIONAL TEST) ACB CB243 KENTUCKY UNIVERSITY SUB ID# 287	CAN	5/16/15 12:00 AM	5/16/15 1:30 AM
6731029-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	CAN	5/16/15 12:00 AM	5/16/15 1:30 AM
6732593	(FUNCTIONAL TEST) VCB 221 CIR 43 KENTUCKY UNIVERSITY SUB ID# 287	CAN	9/3/15 12:00 AM	9/3/15 1:30 AM
6732593-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	CAN	9/3/15 12:00 AM	9/3/15 1:30 AM
6732611	(FUNCTIONAL TEST) VCB 222 CIR 44 KENTUCKY UNIVERSITY SUB ID# 187	CAN	9/3/15 12:00 AM	9/3/15 1:30 AM
6732611-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	CAN	9/3/15 12:00 AM	9/3/15 1:30 AM
6732629	(FUNCTIONAL TEST) VCB 223 CIR 45 KENTUCKY UNIVERSITY SUB ID# 187	CAN	9/3/15 12:00 AM	9/3/15 1:30 AM
6732629-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	CAN	9/3/15 12:00 AM	9/3/15 1:30 AM
6767204	287 KY UNIV. TB4 LTC NITRO. -.5 VACUUM.	COMP	12/4/14 9:33 PM	12/4/14 9:33 PM
6767204-1	Change Nitrogen	COMP	12/4/14 9:33 PM	12/4/14 9:33 PM
6875791	Kentucky University - TB 4 check fan contactor and fan operation	COMP	12/18/14 12:00 AM	12/31/14 12:00 AM
6875791-1	Kentucky University	COMP	12/18/14 12:00 AM	12/31/14 12:00 AM
6934544	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	CAN	1/1/15 8:00 AM	1/1/15 9:38 AM
6934544-1	INSPECT STATION AND TAKE READINGS	CAN	1/1/15 8:00 AM	1/1/15 9:38 AM
6938724	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	COMP	1/1/15 8:00 AM	1/1/15 9:38 AM
6938724-1	INSPECT STATION AND TAKE READINGS	COMP	1/1/15 8:00 AM	1/1/15 9:38 AM
6939266	(BATTERY/CHARGER PM) BAT KENTUCKY UNIVERSITY SUB ID# 287	COMP	2/4/15 8:00 AM	2/4/15 8:00 AM
6939266-1	BATTERY AND BATTERY CHARGER SERVICE	COMP	2/4/15 8:00 AM	2/4/15 8:00 AM

7000183	(FUNCTIONAL TEST) ACB CB 241 KENTUCKY UNIVERSITY SUB ID# 287	WAPPR	12/31/15 8:00 AM	12/31/15 10:00 AM
7000183-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	WAPPR	12/31/15 8:00 AM	12/31/15 10:00 AM
7000185	(FUNCTIONAL TEST) ACB CB243 KENTUCKY UNIVERSITY SUB ID# 287	WAPPR	12/31/15 8:00 AM	12/31/15 10:00 AM
7000185-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	WAPPR	12/31/15 8:00 AM	12/31/15 10:00 AM
7001123	(FUNCTIONAL TEST) VCB 221 CIR 43 KENTUCKY UNIVERSITY SUB ID# 287	COMP	12/31/15 8:00 AM	12/31/15 9:30 AM
7001123-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	COMP	12/31/15 8:00 AM	12/31/15 9:30 AM
7001125	(FUNCTIONAL TEST) VCB 222 CIR 44 KENTUCKY UNIVERSITY SUB ID# 187	COMP	12/31/15 8:00 AM	12/31/15 9:30 AM
7001125-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	COMP	12/31/15 8:00 AM	12/31/15 9:30 AM
7001127	(FUNCTIONAL TEST) VCB 223 CIR 45 KENTUCKY UNIVERSITY SUB ID# 187	COMP	12/31/15 8:00 AM	12/31/15 9:30 AM
7001127-1	PERFORM CIRCUIT BREAKER FUNCTIONAL TEST	COMP	12/31/15 8:00 AM	12/31/15 9:30 AM
7056036	287 KENTUCKY UNIV. V.R.2 PHASE C LOW LIQUID LEVEL.	APPR	1/17/15 2:34 PM	1/17/15 2:34 PM
7056036-1	CHECK / ADD TO OIL LEVEL	APPR	1/17/15 2:34 PM	1/17/15 2:34 PM
7150377	(DGA SAMPLE LTC) TRF TB 4 KENTUCKY UNIVERSITY SUB ID# 287	WAPPR	4/21/15 8:00 AM	4/21/15 9:00 AM
7150377-1	OBTAIN DGA + MOISTURE SAMPLE FROM LTC	WAPPR	4/21/15 8:00 AM	4/21/15 9:00 AM
7150481	(DGA SAMPLE MAIN TANK) TRF TB 2 KENTUCKY UNIVERSITY SUB ID# 287	WAPPR	4/16/15 8:00 AM	4/16/15 9:00 AM
7150481-1	OBTAIN DGA + MOISTURE SAMPLE FROM TRANSFORMER MAIN TANK	WAPPR	4/16/15 8:00 AM	4/16/15 9:00 AM
7152190	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	COMP	2/2/15 8:00 AM	2/2/15 9:38 AM
7152190-1	INSPECT STATION AND TAKE READINGS	COMP	2/2/15 8:00 AM	2/2/15 9:38 AM
7164504	KY Univ Bus 4 Swgr and CB Repl, P7405	APPR	9/17/15 12:00 AM	12/31/15 12:00 AM
7317898	FILTER- AIR BLOCK HVC VENTILATION FILTERS NORTHERN KENTUCKY UNIVERSITY SUB ID# 287	INPRG	5/22/15 12:00 AM	5/22/15 12:30 AM
7317898-1	REMOVE AIR BLOCK AND REPLACE AIR FILTER	INPRG	5/22/15 12:00 AM	5/22/15 12:30 AM
7318160	(DGA SAMPLE MAIN TANK) TRF TB 4 KENTUCKY UNIVERSITY SUB ID# 287	WAPPR	5/13/15 8:00 AM	5/13/15 9:00 AM
7318160-1	OBTAIN DGA + MOISTURE SAMPLE FROM TRANSFORMER MAIN TANK	WAPPR	5/13/15 8:00 AM	5/13/15 9:00 AM
7319410	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	COMP	3/2/15 8:00 AM	3/2/15 9:38 AM
7319410-1	INSPECT STATION AND TAKE READINGS	COMP	3/2/15 8:00 AM	3/2/15 9:38 AM
7497801	(VISUAL INSPECTION) KENTUCKY UNIVERSITY SUB ID# 287	APPR	4/1/15 8:00 AM	4/1/15 9:38 AM
7497801-1	INSPECT STATION AND TAKE READINGS	APPR	4/1/15 8:00 AM	4/1/15 9:38 AM
7502426	(INFRARED SCAN) KENTUCKY UNIVERSITY SUB ID# 287	WAPPR	6/15/15 8:00 AM	6/15/15 11:00 AM
7502426-1	INFRARED STATION INSPECTION	WAPPR	6/15/15 8:00 AM	6/15/15 11:00 AM

7519740	4/3/15 Kentucky University Cir 45 cable fault	APPR	4/3/15 12:00 AM	4/4/15 12:00 AM
7519740-1	Grooound and repair circuit with underground	APPR	4/3/15 12:00 AM	4/4/15 12:00 AM

MAXIMO #						Non-Scheduled		District	SMQ	Region	EAST				
STATION:	Kentucky university					Scheduled	X								
SUB. STATION I.D. NO.	287														
CIRCUIT BREAKER NO.	222			CIRCUIT NO.	44			MECHANISM TYPE - HYDRAULIC							
TYPE:	am13.8-500-74							Manual		Pneudraulic		Solenoid			
Oil		Vacuum	X	Air		SF 6		Motor	X	Pneumatic		Spring	X		
TANK		Pole 1		Pole 2		Pole 3		MECHANISM DATA							
		Found	Left	Found	Left	Found	Left	Closing Dashpot							
Oil Level / Gas Pressure								Trip Latch Wipe							
Color (A-Light, B-Dark, C-Carbon)								Prop. Clearance							
Dielectric KV								Trip Latch Clearance							
Oil Filtered								Solenoid Plunger Clearance							
Bushings	Oil Level							Armature Clearance	Main Valve						
	Porcelain/Comp								Aux. Valve						
Condition of Contacts, % Left	Main							Lubrication			NEW				
	Interrupt							# of Stored Operations			0				
	Arcing							Pump up Time	O to Normal						
Contact Penetration								Auxiliary Relays							
Ductor Readings <60		18		21		25		Auxiliary Switches							
Interrupter Grids/Arc Chutes								Precharge Pressure							
Interrupter Readings (Ohms)								Heaters & Thermostats							
Closing Dashpot								Air / Oil - Compressor:	Condition			Oil Changed			
Opening Dashpot								Pressure Switches	Gov. Open			Closed			
Opening spring Comp.									Alarm Open			Closed			
Toggle Stop									Cut-out Open			Closed			
Lift Rod Stop									Seal-in Open			Closed			
Lift Rod, Guides, Pins, Etc.								Gas / Oil - Compressor:	Condition			Oil Changed			
Puffers - Type AM CBs								Pressure Switches	Gov. Open			Closed			
Electrical Connections									Alarm Open			Closed			
Vacuum Bottles		NEW		NEW		NEW			Cut-out Open			Closed			
Arc Zone									Seal-in Open			Closed			
Item	Desired	Found	Left	Found	Left	Found	Left	Operations Counter		Found	3.00		12.00		
Stroke								CIRCUIT BREAKER DATA							
Wipe / GAP								Make			CUTTLER HAMMER				
Velocity								Bkr Serial #			91100211				
Part	1.8-2.7	2.13		2.12		2.12		Rated kV			15kv				
Make	2.7-3.6	3.17		3.17		3.19		Rated Amps.			1200				
O.T. Close								Int. Rating			62KA				
O.T. Open								Mech Serial #							
Rebound								Mech Type							
Reclose	8.4-9.9	9.16		9.16		9.19		CB Inst. Book #							
Trip Free		2.32		2.3		2.3		CB Parts Bul. #							
Minimum Trip	(T1)			(T2)				Gal. of Oil/Tank							

HIPOT 27 KV 1 MIN CHECK ALL INTERLOCKS ALL OK, E-Gap is within specs, Emblical Cord is has a broken piece on it and you have to hold it on the CB while timing!!!

CB Removed from Station #

Inspected/Serviced by: Rice & Searp

Date May 9, 2013

Supervisor J. Froehle

Date May 9, 2013

MAXIMO # | Non-Scheduled | | District SMQ | Region EAST

STATION: Kentucky university | Scheduled | X

SUB. STATION I.D. NO. 287

CIRCUIT BREAKER NO. 223 | CIRCUIT NO. 45 | MECHANISM TYPE - HYDRAULIC

TYPE: am13.8-500-74

Oil [ ] Vacuum [X] Air [ ] SF 6 [ ]

Manual [ ] Pneudraulic [ ] Solenoid [ ]

Motor [X] Pneumatic [ ] Spring [X]

TANK	Pole 1		Pole 2		Pole 3	
	Found	Left	Found	Left	Found	Left
Oil Level / Gas Pressure						
Color (A-Light, B-Dark, C-Carbon)						
Dielectric KV						
Oil Filtered						
Bushings – Oil Level						
Bushings – Porcelain/Comp						
Condition of Contacts, % Left – Main						
Condition of Contacts, % Left – Interrupt						
Condition of Contacts, % Left – Arcing						
Contact Penetration						
Ductor Readings <60		23		21		21
Interrupter Grids/Arc Chutes						
Interrupter Readings (Ohms)						
Closing Dashpot						
Opening Dashpot						
Opening spring Comp.						
Toggle Stop						
Lift Rod Stop						
Lift Rod. Guides, Pins, Etc.						
Puffers - Type AM CBs						
Electrical Connections						
Vacuum Bottles	NEW		NEW		NEW	

Arc Zone							
Item	Desired	Found	Left	Found	Left	Found	Left
Stroke							
Wipe / GAP							
Velocity							
Part	1.8-2.7		2.26		2.26		2.24
Make	2.7-3.6		3.22		3.24		3.23
O.T. Close							
O.T. Open							
Rebound							
Reclose	8.4-9.9		9.37		9.4		9.38
Trip Free			2.45		2.44		2.42
Minimum Trip	(T1)			(T2)			

MECHANISM DATA

Closing Dashpot				
Trip Latch Wipe				
Prop. Clearance				
Trip Latch Clearance				
Solenoid Plunger Clearance				
Armature Clearance	Main Valve			
	Aux. Valve			
Lubrication		NEW		
# of Stored Operations		0		
Pump up Time	O to Normal			
Auxiliary Relays				
Auxiliary Switches				
Precharge Pressure				
Heaters & Thermostats				
Air / Oil - Compressor:	Condition		Oil Changed	
Pressure Switches	Gov. Open		Closed	
	Alarm Open		Closed	
	Cut-out Open		Closed	
	Seal-in Open		Closed	
Gas / Oil - Compressor:	Condition		Oil Changed	
Pressure Switches	Gov. Open		Closed	
	Alarm Open		Closed	
	Cut-out Open		Closed	
	Seal-in Open		Closed	
Operations Counter	Found	50.00		54.00

CIRCUIT BREAKER DATA

Make	CUTTLER HAMMER
Bkr Serial #	91102671
Rated kV	15kv
Rated Amps.	1200
Int. Rating	62KA
Mech Serial #	
Mech Type	
CB Inst. Book #	
CB Parts Bul. #	
Gal. of Oil/Tank	

LUBED MECH HI POT AT 27 KV FOR 1 MINUTE

CB Removed from Station [ ]

Inspected/Serviced by: BEZOLD HARTIG Date May 21, 2013

Supervisor FROEHLE Date May 21, 2013

DUKE ENERGY Trans- MW P1

Duke Energy Corporation
INTERRUPTION REPORT

Status: **ENGINEER REVIEW** ID Number: **2015-0420-MWOH**
Actual Out: **04/03/2015 11:41:00** Actual In: **Time Zone:** EST/EDT (AUTO)

DOMS #	Restoredate	Line / Station / Equipment	KV
7236798		**KY Univ**	

DOMS Remarks: **CB223 L/O, STATION SWITCH GEAR DAMAGED, OP TP3832 T#13740, CL SW43511, ALL**

Weather: Manual Op.: ☐ Customer Count: **0**
System in Trouble: **00 Substation** Cause: **20 Equipment failure**
Action: **56 Sectionalized/Restored Service**

Console: **DISTRIBUTION,123** District:

Time	Comments

Station	Device	Date/Time Closed	Opr No	Auto Reclose	Relay Target	Additional Relay Information
Kentucky University	**CB 223**		**2**		**51-A,B,G**	

System Protection Event Description:

Suspected Equipment Malfuctions:

Comments:

Delivery	Time On	Cause	Damage	Delivery Caused	Min.	Cust. Out	Comments
					Total:		

Date/Time Created	Date/Time Closed	Event Follow-up Comments

Corrective Action

Complete Date/time

System Protection

Control System - Relay

Substation Maintenance

Line

Vegetation

KY Univ CB 223 - CIR 45

Creation date: **04/03/2015 1415** Followup date: Complete date:

DUKE ENERGY Trans- MW P1

Duke Energy Corporation
INTERRUPTION REPORT

Status: **ENGINEER REVIEW** ID Number: **2015-0420-MWOH**
Actual Out: **04/03/2015 11:41:00** Actual In: **Time Zone:** EST/EDT (AUTO)

Operating Conditions	Circuit 1	Circuit 2
287 CB 223 LOCKED OUT	KYUNI 45	
CLOSE D/S 43511	KYUNI 45	MARSH 41

Station	Tag List		Circuit ID	Tag #	Tag On	Tag Off
	TP D/S 3832		KYUNI 45	H 13740		

Notes / Remarks:

Issued Date/Time	Tag Person	CTR TAG Released Date/Time	Comments

KY Univ CB 223 - CIR 45

Creation date: **04/03/2015 1415** Followup date: Complete date:

DUKE ENERGY Trans-MW P1

SWITCHING PROGRAM FORM

Line/Equipment: KY Univ

Outage Type:

Start Date: 04/03/2015 1141

ID Number: 2015-0420-MWOH

Step ID.	Station	Step Description	Circuit 1	Circuit 2	Date/Time
		CONTACT DISPATCH FOR READBACK AND AUTHORIZATION BEFORE PROCEEDING WITH ANY SWITCHING STEP!!	*FIELD*		
		DOMS EVENT 7236721			
	287	**CB 223 LOCKED OUT**	**KYUNI 45**		
		OPEN TP D/S 3832 & TAG# 13740	**KYUNI 45**		
		CLOSE D/S 43511	**KYUNI 45**	**MARSH 41**	

End of Remove Steps

KY Univ CB 223 - CIR 45

Creation date: **04/03/2015 1415** Followup date: Complete date:

DUKE ENERGY Trans- MW P1

SWITCHING PROGRAM FORM

Line/Equipment: KY Univ

Outage Type:

Start Date: 04/03/2015 1141

ID Number: 2015-0420-MWOH

Step ID.	Station	Step Description	Circuit 1	Circuit 2	Date/Time
		CONTACT DISPATCH FOR READBACK AND AUTHORIZATION BEFORE PROCEEDING WITH ANY SWITCHING STEP!!	*FIELD*		
	TO TCC	NOTIFY TCC			
	358	HC MARSHALL CIR 41 VR (NO RTU)	123V		
	287	HC KY UNIV VR2	123V		
	287	CLOSE CB 223	KYUNI 45		
	FROM TCC	NOTIFY DCC			
		PHASE TP D/S 43511, IF OKAY			
		CLOSE TP D/S 3832 & REM TAG# 13740	KYUNI 45		
		OPEN D/S 43511	KYUNI 45	MARSH 41	
	TO TCC	NOTIFY TCC			
	287	CLOSE 79 ON CB 223	KYUNI 45		
	287	AUTO KY UNIV VR2			
	358	AUTO MARSHALL CIR 41 VR (NO RTU)			
	FROM TCC	NOTIFY DCC			
	Note	NO LVM ENEABLED CIRCUITS AFFECTED			
		COMPLETE REQUEST IN DEETS			

KY Univ CB 223 - CIR 45

Creation date: **04/03/2015 1415** Followup date: Complete date:

DUKE ENERGY Trans- MW P1

SWITCHING PROGRAM FORM

Line/Equipment: **KY Univ** Outage Type:

Start Date: **04/03/2015 1141** ID Number: **2015-0420-MWOH**

Step ID.	Station	Step Description	Circuit 1	Circuit 2	Date/Time

End of Return Steps

KY Univ CB 223 - CIR 45

Creation date: **04/03/2015 1415** Followup date: Complete date:

T & D OPERATIONS

TAG LIST AND SWITCHING INSTRUCTIONS

Duke Energy.

Circuit or Equipment @287 KY Univ. Cir. 44 CB222 & Transfer Bus 2

TAG LIST		TAG #	TAG PLACED	TAG REMOVED
@287 CB222 Cont. Hand.	C	173861	D.S.S.	
79	C	173862	✓	
RTU	C	173863	✓	
Cont. 8 sw.	C	173864	✓	
Racked Out D/S	H	164688	✓	
Transfer D/S 224 Locked Op.	H	164689	✓	
" D/S 226 " "	H	164690	✓	
Grds @ stirrups	H	164691	✓	

*GROUNDED

TAG PERSON	ISSUED	RELEASED	TAG PERSON	ISSUED	RELEASED
Connell					

TAGGING COMPLETE	040315@1915	ALL EQUIPMENT BACK TO NORMAL	

NOTES: S.O: Scheich

SWITCHING INSTRUCTIONS

TIM

To Iso:

@287 ✓CB222 Op., Op. 79, RTU, 8 & Rack out D/S

- ✓Transfer D/S 224 & 226 Op. & locked

Tag J. Connell

- Tick. & Grd @ stirrups & add to Connells tags.

The time in the relay is off by one hour six minutes 36 seconds (1:06:36). The time of the event in the relay was 15:22:22. 15:22:22 + 1:06:36 = 16:28:58. The accident occurred at 4:28:58.

CIRCUIT 44 Date: 04/06/15 Time: 08:02:40.241
KY UNIVERSITY

#	DATE	TIME	EVENT	LOCAT	CURR	FREQ	GRP	SHOT	TARGETS
1	04/03/15	16:34:45.617	ER	$$$$$$$	1	60.03	1	2	11000010 00111110
2	04/03/15	15:22:25.267	ER	$$$$$$$	1	59.99	1	1	11000010 01011110
3	04/03/15	15:22:23.149	ABC	0.12	6247	59.89	1	0	11000010 01011110
4	04/03/15	15:22:22.949	ABC T	-0.01	6662	59.99	1	0	11000010 01011110
5	02/20/14	12:05:33.949	ER	$$$$$$$	1	59.99	1	2	10000000 00100000


PATIENTS BELONGINGS BAG

Attachment C

Utility Accident Report

139 East Fourth Street. M/C EM740
Cincinnati, OH 45202
Telephone: (513) 287-1234
Facsimile: (513) 287-3499

Jeffery T. Dierker
H&S Manager
E-mail: Jeff.Dierker@duke-energy.com

VIA EMAIL (ScottA.Morris@ky.gov)

October 9th, 2015

Mr. Scott Morris
Kentucky Public Service Commission
211 Sower Boulevard
P.O. Box 615
Frankfort, KY 40602-0615

Re: Electrical Flash - Northern Kentucky University Substation, Highland Heights, Kentucky

Dear Mr. Morris,

During your investigation of the electrical flash that occurred at the Northern Kentucky University Substation in Highland Heights, Kentucky, you requested a copy of the utility accident report. Our investigation has now been completed, and the final investigation report is attached. Please review and let me know if you have any questions.

Attachments:

1. Copy of utility accident report (see bate-stamps 726 to 738)

If you have any questions or concerns, please do not hesitate to contact me at (513) 287-1234.

Sincerely,

Jeffery T. Dierker
Duke Energy Manager
H&S Midwest Field Support

cc: Julie Ezell

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Incident Investigation Report
Switchgear Arc Flash and Two Electricians Burned
Northern Kentucky University, April 3rd, 2015

Executive Summary

On Friday, April 3rd at 16:29, two Duke Energy transmission electricians were burned while performing repairs on a 4-cubicle 13.2 KV switchgear. Crews had been called out in response to a fault on Kentucky University, (KU) Circuit 45. Repairs had been completed to the conductors; however, a burned fiberboard barrier still needed to be replaced. A decision was made to use the fiberboard from the adjacent cubicle for the repair. The two electricians opened the adjacent cubicle they incorrectly believed was de-energized and failed to isolate, test for voltage and ground. When one electrician reached into the cubicle an arc flash occurred and both electricians were burned. The Senior Maintenance Electrician received 2nd degree burns to his face, neck, chest and wrist and 3rd degree burns to his right forearm. The Maintenance Electrician A received 2nd degree burns to his right wrist, face and neck. The electricians were transported by two ambulances to University Hospital in Cincinnati, Ohio. The Senior Maintenance Electrician was transferred to the Ohio State University Hospital burn unit in Columbus, Ohio and was hospitalized until April 13th, 2015. The Maintenance Electrician A was released on Saturday, April 4th.

Incident Narrative

During the day on April 3rd, a cable fault was recorded on Cir. 45 at the campus of Northern Kentucky University (NKU) in Highland Heights, Kentucky. The System Operations Center (SOC) contacted the Distribution Control Center (DCC) to investigate the lock out of Cir. 45 depicted in Photo 1 & 2, pg. 3. The single line diagram is provided in Figure 1, pg. 4. The DCC contacted a Troubleman to patrol the overhead circuit. The Troubleman did not find an abnormal situation on the overhead circuit.

Simultaneously, a NKU maintenance person contacted a Duke Energy Transmission C&M Supervisor who then contacted the SOC to determine the nature of the failure. The SOC confirmed the circuit breaker was open and locked out on Kentucky University (KU) Cir. 45. The Transmission C&M Supervisor contacted a Senior Maintenance Electrician to respond to the site and investigate the outage. The Senior Maintenance Electrician investigated the KU substation and found the door blown open on Cir. 45. The Senior Maintenance Electrician contacted the SOC to report the nature of the failure at the substation. He then called his Transmission C&M Supervisor to mobilize Network Services for cable repairs. The SOC contacted the DCC to inquire about options for load restoration of Cir. 45. The DCC instructed the Troubleman to perform switching to restore service that was previously served by Cir. 45. The DCC contacted the SOC to report that the load on the overhead line had been restored.

Network Services personnel arrived at the KU Substation and conducted a Job Briefing with the Senior Maintenance Electrician, see Attachment A and B, pgs. 10 and 11. Review of job briefings and single-line diagrams will be discussed in greater detail in the Investigation Results section of this report.

The SOC contacted a Mobile Operator to perform isolation switching on Cir. 45 at KU Substation; subsequently, Network Services and the Mobile Operator proceeded to isolate Cir. 45.

While switching was performed, the Transmission C&M Supervisor and the Senior Maintenance Electrician discussed a preliminary work plan and parts needed. In particular, they discussed the need to replace a burnt fiberboard barrier on the right side of the cubicle for Cir. 45 depicted in Photo 3, pg. 12. The Transmission C&M Supervisor stated his intention to find parts at the Queensgate Headquarters and if parts were unavailable possibly using the fiberboard barrier from the adjacent cubicle (Cir. 44). The initial work plan involved a crew of 5 Network Services personnel to perform the cable repairs and a crew of 3 Substation Maintenance personnel to repair the switchgear cubicle.

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The SOC ordered grounds to be installed to complete the isolation of Circuit 45. Then, permission was granted to Network Services and Substation Maintenance to proceed with repairs. Network Services performed cable repairs, released isolation and remained on site to restore the circuit once the switchgear repairs were completed by Substation Maintenance.

While cable repairs were ongoing, the Maintenance Electrician A and Trainee C&M from Substation Maintenance retrieved parts from their Transmission C&M Supervisor at Queensgate (except the fiberboard barrier) and proceeded to the site. Substation Maintenance worked on Cir. 45: bolted the connections, taped bare parts and cleaned the cubicle for Cir. 45. The fiberboard barrier still needed to be replaced. The Transmission C&M Supervisor called the Maintenance Electrician A to check progress on the job. During this conversation, the Transmission C&M Supervisor emphasized the need to test the adjacent cubicle for voltage before removing the fiberboard barrier from Cir. 44, see Photo 4, pg. 12 shows labeling on Cir. 44 cubicle.

Work at Cir. 45 was coming to completion and the Trainee C&M began cleaning up. He gathered tools and returned them to the bins on the Substation Maintenance truck. When he turned to go back to the switchgear, he witnessed a 'huge flash' at the switchgear. When the Senior Maintenance Electrician opened the cubicle, stepped up to the cubicle, then reached inside the cubicle an arc flash occurred. Photos of the employees' clothing are depicted in Photos 7 & 8, pg. 13. The Trainee C&M saw the flash and stated the Senior Maintenance Electrician and Maintenance Electrician A were both on the ground. The five Network Services personnel were at their truck but none witnessed the flash, they only heard it. The Trainee C&M and Network Services personnel immediately proceeded to the injured electricians to begin first aid. One of the Network Services personnel called 911 to report the injuries. The SOC recorded the event at 16:29 and made multiple attempts to contact personnel at the site. When the SOC finally made contact with a Network Services cable splicer at 16:35, he stated the ambulance, the fire department and police were on the scene.

Photo 1. KU Substation initial cable fault on Cir. 45

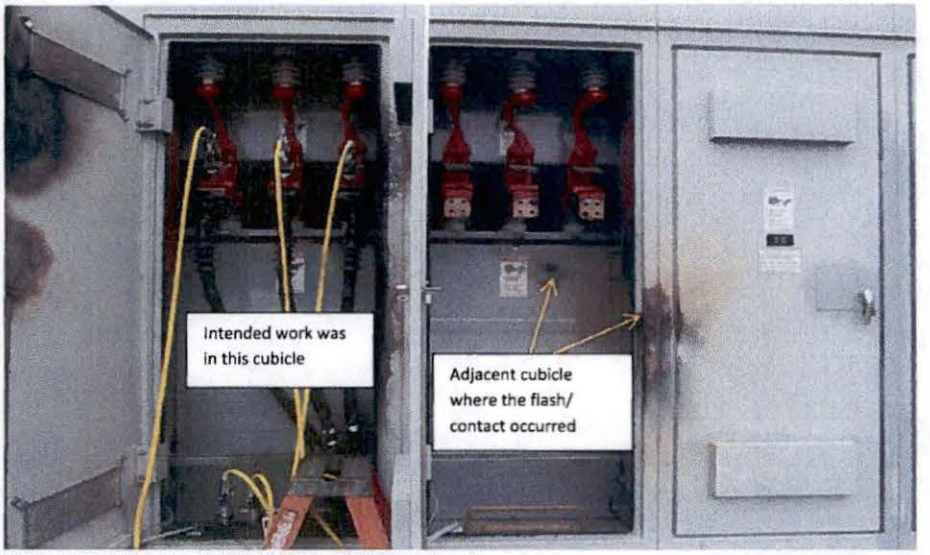

Photo 2. KU Substation Circuits Cir. 45, Cir. 44 and Cir. 43.

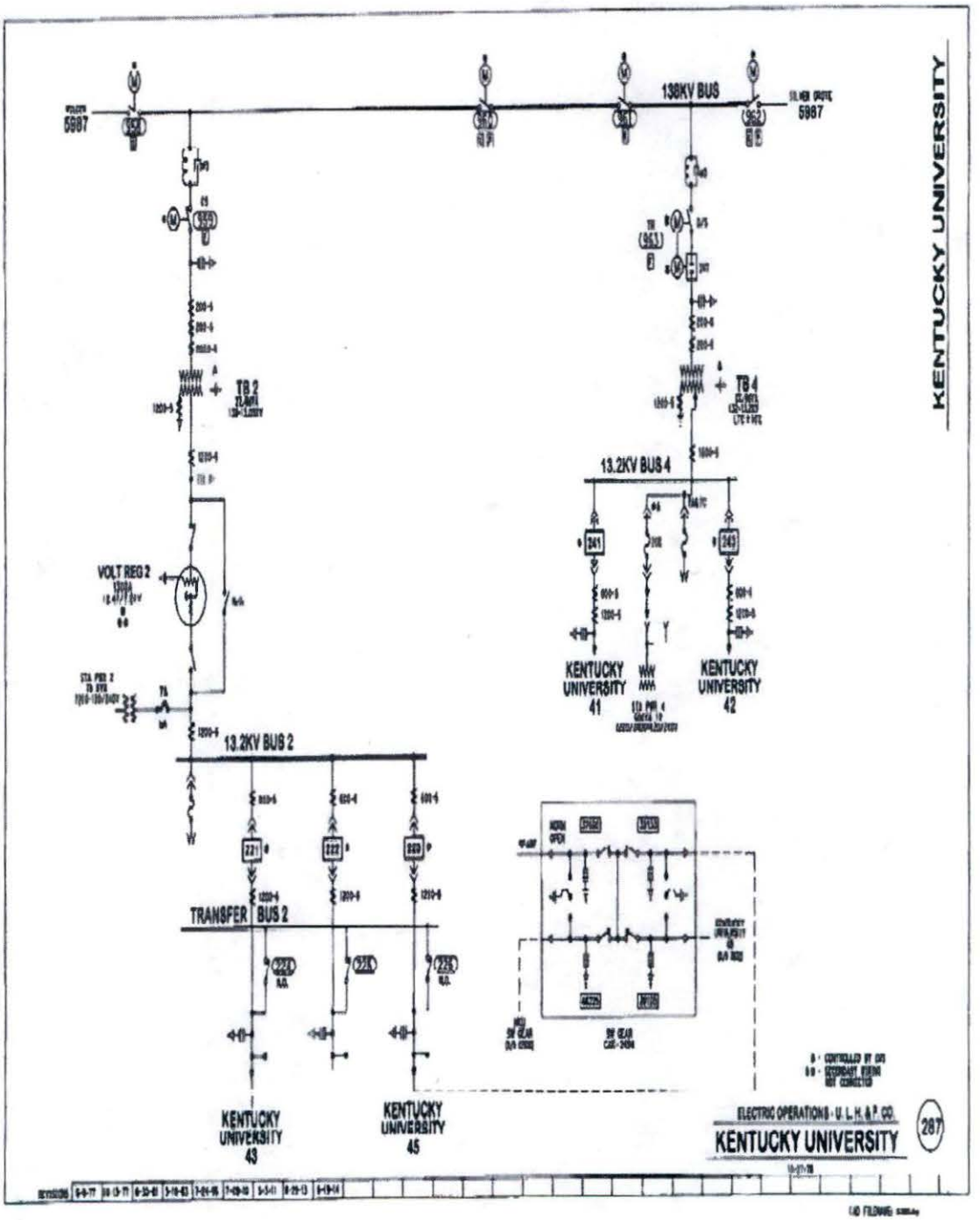

Figure 1. The single line diagram of KU substation showing Cir. 43 and Cir. 45

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Timeline of Event
April 3, 2015 day shift

7:00 – Senior Maintenance Electrician assigned job at Rochelle
11:41 – Fault occurred at KU Substation, Circuit 45
11:42 – SOC contacted DCC to investigate Lockout of Cir. 45 at KU Substation
11:43 – DCC contacted a Troubleman to patrol the overhead circuit.
11:45 – NKU maintenance person contacted Transmission C&M Supervisor to determine nature of fault.
12:08 – Transmission C&M Supervisor contacted SOC to inquire about KU Cir. 45 Lockout
12:09 – SOC confirmed Cir. 45 was open and lockout
12:10 – Transmission C&M Supervisor went to Rochelle to look at job and called Senior Maintenance Electrician to respond to KU Substation
12:20 – Senior Maintenance Electrician arrived at KU substation
12:28 – Senior Maintenance Electrician investigated the substation and found the door blown open on KU Cir. 45.
12:30 – Senior Maintenance Electrician contacted SOC to give information on condition of Cir. 45 that the door was blown open.
12:39 – Senior Maintenance Electrician contacts SOC to give more information on Cir. 45
12:41 – Senior Maintenance Electrician contacts Transmission C&M Supervisor to mobilize Network Services
12:55 – SOC contacts DCC to inquire about restoration of load on Cir 45.
12:56 – DCC instructed Troubleman to perform switching to restore service previously served by Cir. 45
13:00 – Network Services arrives on site at KU substation
13:10 – Senior Maintenance Electrician and Network Services conduct job briefing -reviewed isolation and single line drawing
13:18 – SOC dispatched Mobile Operator to KU Substation to perform isolation
13:21 – DCC contacts SOC to report that load on the overhead line had been restored
13:22 – Transmission C&M Supervisor arrives at KU Substation and signs on job brief
13:25 – Transmission C&M Supervisor and Senior Maintenance Electrician. discuss parts needed and replacement of the burnt fiberboard and taking it out of Cir. 44
13:27 – Transmission C&M Supervisor told Senior Maintenance Electrician to make sure he checks for voltage
13:30 – Mobile Operator signs on job brief at KU Substation
13:35 – SOC gave switching orders to Mobile Operator to begin isolating Cir. 45 CB 223
13:53 – Mobile Operator contacts SOC to report back that switching orders have been completed and receive orders to switch on transfer Disconnect 226
13:58 – Mobile Operator contacts SOC to report back that switching on Transfer Disconnect 226 completed
14:02 – Senior Maintenance Electrician contacts the SOC to receive isolation on Cir. 45. SOC notifies Senior Maintenance Electrician that isolation not completed yet. Requested to obtain single line and review.
14:06 – Network Services receives switching orders for Disconnect 39133 from the SOC.
14:16 – Network Services contacts SOC to report back that switching and grounding on Disconnect 39133 completed.
14:18 – Mobile Operator receives orders to install stirrup grounds on Cir. 45.
14:30 – Mobile Operator contacts SOC to report back that Stirrup grounds installed on Cir. 45.
14:32 – Senior Maintenance Electrician contacts SOC and receives isolation for Cir. 45.
14:42 – Network Services Cable Splicer A contacts SOC and receives isolation on Cir. 45
14:46 – Transmission C&M Supervisor find parts at Queensgate met Maintenance Electrician A and Trainee C&M to give parts to repair bus bar, the fiberboard was not available
15:00 – Maintenance Electrician A and Trainee C&M arrived on site
15:19 – Transmission C&M Supervisor contacts SOC to report on job plan for Cir 45. SOC notifies that Main bus is energized.

15:20 – Maintenance Electrician A and Trainee C&M have pre job brief with Senior Maintenance Electrician
15:30 – Fault repairs on Cir. 45 had been completed by Network Services and Sub. Maintenance with the exception of the fiberboard.
15:30 – Transmission C&M Supervisor talked to Maintenance Electrician A to check on job and emphasized checking voltage on Cir. 44 before removing the fiberboard
15:57 – Network Services contacted SOC and released isolation on Cir. 45 and remained on site to switch on Disconnect 39133 if necessary.
16:25 – Trainee C&M began cleaning up and took tools back to truck
16:29 – Senior Maintenance Electrician opened panel door of Cir. 44, stepped closer to panel and placed his arm inside the cubicle, resulting in an arc flash.
16:29 – Kentucky University CB 222 tripped and reclosed.
16:29 – Senior Maintenance Electrician and Maintenance Electrician A were both on ground.
16:30 – Employees on site called 911 for emergency response and started first aid.
16:31 – SOC attempts to contact employees at KU substation - no answer
16: 31 – Trainee C&M called Transmission C&M Supervisor to inform him of what happened
16:32 – SOC contacts DCC to obtain Cable splicer A phone number.
16:34 – SOC attempts to contact Transmission C&M Supervisor with no answer
16:35 – SOC contacts field crew at KU substation and is informed of flash and injuries. Notified that Emergency crews on site.
16:35 – Central Campbell Ambulance arrives on scene.
16:36 – SOC contacts Transmission C&M Supervisor to notify of injuries, Transmission C&M Supervisor knows and is in route.
16:37 – Central Campbell Fire Department arrives on scene
16:46 – Additional Ambulance from Fort Thomas arrived on the scene.
16:50 – First Ambulance leaves scene with Senior Maintenance Electrician en route to University Hospital
16:53 – Second Ambulance departed KU substation en route to University Hospital.

Investigation Findings

Work practices and Procedures

The investigation team determined that work practices were violated: isolation, grounding, minimum approach distances, job briefing, personal protective equipment. The performers were taking a shortcut and did not understand the cubicle they were working in (Cir. 44) was energized. The necessity of getting parts out of the cubicle had been discussed with the Transmission C&M Supervisor, but he told them to 'check for voltage.' The correct instruction would have been 'make sure you get isolation.' The Senior Maintenance Electrician incorrectly assumed the cubicle was de-energized, decided to skip isolation and reached into the cubicle. Work practices that were violated included the following:

General Electrical Safety (#2.3, updated 4/1/2015)
The performers did not use the general safety practices before beginning work on Cir. 44.

Isolation (Midwest System Operations Switching & Tagging Manual, 3/21/2013)
The Senior Maintenance Electrician did not request isolation on Cir. 44 prior to performing work.

Grounding (Personal Grounding for Substations, #4.3, updated 4/1/2015)
The performers could not install protective grounds because he did not have isolation.

Minimum Approach Distances (MAD, #2.2, updated 4/1/2015)
The performers did not maintain MAD. The MAD for this voltage is 2'2".

Job Briefing (Job Briefings, #1.5, updated 4/1/2015)
A change-of-scope job briefing was not performed for Circuit 44.

Personal Protective Equipment (Rubber Gloves & Rubber Sleeves, #3.3, updated 4/1/2015)
Rubber gloves were not worn inside the MAD.

Three part communication was not used in discussions with the Transmission C&M Supervisor and the employees. There were missed opportunities to review available information, conduct an additional job briefing, use STAR, and other HP tools.

Work Planning and Switchgear Configuration

Work planning for an emergent event cannot be performed until the equipment at the scene is fully assessed. The company expectation is that all potential work in the job scope be included in a job briefing. If the job scope changes, another job briefing is required. When the job scope changed, a thorough review of the single line drawing and the station configuration was not performed. The decision to remove parts from circuit 44 expanded the job scope and should have triggered an additional review. During the initial job briefing, all personnel should have discussed the status of all breakers in the switchgear.

It is common on the Ohio/Kentucky system to have a breaker that is open and racked out (de-energized) where there is no feeder cable and transfer bus for the circuit. This was an uncommon situation because the switchgear had a transfer bus that was energized by the breaker associated with future Cir. 44. The Mobile Operator determined that CB222 was closed with no load and energized to the transfer bus by looking at the single line diagram and mentioned this to the Senior Maintenance Electrician; however, he did not respond and it is unknown if he heard what the Mobile Operator stated. In addition, the spade ends were uncovered even though they were energized; this was a possibly misleading indication the cubicle was de-energized. Never the less, all equipment must be properly isolated, tested and grounded before work begins.

Qualifications / Crew experience

All of the electricians were qualified to perform the work they had been assigned per the Duke Energy qualification scheme. The Senior Maintenance Electrician had 7 ½ years of experience with Duke Energy. The Maintenance Electrician A had nearly 4 years of experience with Duke Energy.

Inventory / Materials

Lack of locally available parts lead to the expansion of work scope to get a fiberboard barrier from another cubicle. The Transmission C&M Supervisor checked another headquarters building, but no fiberboard barrier could be located. The board has been replaced as of April 9th, 2015. Based on discussions with Midwest personnel, this is not an uncommon practice to scavenge parts from other equipment or have difficulty locating spare parts.

Personal Protective Equipment (PPE)

The team believes that proper PPE was used up to the time the electricians moved to Cir. 44. Based on the injuries, there is no indication the Senior Maintenance Electrician was wearing any gloves, leather or rubber, when he attempted to remove the fiberboard barrier from Cir. 44. There is not appropriate PPE for working inside the cubicle while it is energized because it is not an acceptable work practice.

Time Pressure / Work Distraction

Self-imposed time pressure may have contributed to this incident. The work was occurring on overtime (after 3:30 pm) on the Friday before a holiday weekend, which in itself could have contributed to work distraction. Because the Senior Maintenance Electrician and Maintenance Electrician A are not available for interview the degree of contribution to this incident cannot be determined. The weather was intermittent rain and may have caused the crew to hurry to complete the work. The Senior Maintenance Electrician and Trainee C&M had another job to go to after the work at KU Substation. In addition, the Network Services personnel were waiting for them to finish before they could restore the feeder to the normal configuration.

Electrical Fault

The incident initiated a phase A to phase B fault that migrated into a three phase to ground fault. The fault current of approximately 6200 amperes was cleared automatically by tripping CB222. CB222 automatically reclosed and remained closed until opened by the Transmission C&M Supervisor when he arrived.

Equipment labeling

The team reviewed the labelling of the switchgear and determined the cubicles were labelled both inside and outside the cubicle door as high voltage. However, the single line diagram does not match field markings because Cir. 44 is not identified. The circuit breaker relay, the inside panel door and on the outside of the cubicle door are all labelled as Cir. 44.

Human Performance Factors

ERROR PRECURSORS:

- **Weather** - Overcast and intermittent light rain.
- **Time Pressure** - Self-imposed - Maintenance Electrician A could only work until 17:30 also Senior Maintenance Electrician And Trainee C&M had another job to do after this job was completed.
- **Imprecise Communication** – Not sure if Cir. 44 was energized or needed to be isolated.
- **Complacency/Overconfidence** – The Senior Maintenance Electrician did not request isolation, test or understand the importance of isolating Cir. 44.
- **Changes/Departure from routine** – Did not have all materials (fiberboard) to complete the job on isolated Cir. 45 cable failure.
- **Work-arounds** - Needing to take parts from existing cubicle on site to use in cubicle so Cir. 45 could be restored to normal - NOTE: There was no time pressure to restore Cir. 45.
- **Inaccurate Risk Perception** – Senior Maintenance Electrician thought Cir. 44 cubicle was de-energized, he did not understand the risk of entering Cir. 44 cubicle without it being isolated and grounded.
- **Assumptions** - Transmission C&M Supervisor, Senior Maintenance Electrician, and Maintenance Electrician A made decisions with assumption and limited use of the available information. Inaccurate mental model.

FLAWED DEFENSES:

- **Pre-job brief** – Ineffective pre-job brief - Once the scope of the work had changed and a decision was made to retrieve a fiber board from cubicle Cir. 44, another pre-job brief should have been held and the changes to the job added to the pre-job brief.
- **Procedure Use and Adherence** – Procedures not adhered to included General Electric Safety Practices, Switching & Tagging, Grounding, Minimum Approach Distance, Pre-job brief, and Personal Protective Equipment (PPE).
- **2-Minute Drill** – Situational Awareness-Once crew changed work location to the adjacent cubicle they should have performed a 2-Minute Drill and verified what was needed to complete the task safely.
- **STAR** – Each crew member should have performed a self-check to avoid error traps such as; complacency, inattention and distractions. A self-check would have provided them the ability to recognize what PPE was needed along with following the proper work procedures (i.e requesting isolation, voltage checks, grounding).
- **3-Part Communication** – Face to Face 3-part communication would have allowed the Senior Maintenance Electrician and the Maintenance Electrician A to communicate the steps of entering the new adjacent work location to communicate, acknowledge and then confirm the steps to be taken before anyone would have stated the task.
- **Peer Check** – All duke employees on the job site should have peer checked one another during critical task.
- **Concurrent Verification** – Senior Maintenance Electrician should have performed a self-check while Maintenance Electrician A independently performed a self-check and then mutually agreed on the actions to be taken. Use Concurrent Verification when performing critical task and or

tasks that could result in adverse consequences. This technique is used to mitigate personnel injuries, outage, equipment damage or reliability/operational issues.

- **QVV** – Qualify, Validate and Verify is having a questioning attitude towards the work task being performed, especially when the wok is governed by procedures or directed by someone else.
- **Stop When Unsure** – Call "timeout" on work task whenever there is any doubt in the work being performed. Contact Transmission C&M Supervisor/SME or Authority in charge to obtain the most accurate information before continuing work. This was not done at the KU Substation.

Root causes

1. **Risk Acceptance and Hazard Recognition:** The Substation team failed to recognize the circuit was energized and accepted the risk of skipping isolation, testing for voltage and grounding. ABS Root Code Path: 1-3-12-94-110-115
2. **Company Standard and Policies, and Administrative Controls Issue**: Work practices and procedures not used listed on page 5. ABS Root Code Path 1-3-12-207-230
3. **Ineffective Oversight and Supervision Issue:** Ineffective job plan for emergent work. Lack of focus on higher risk tasks and associated work procedures . ABS Root Code Path 1-2-12-185-187-188

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M-8169 R1

Duke Energy. JOB BRIEFING – MIDWEST SUBSTATION OPERATIONS
"WHAT COULD POSSIBLY GO WRONG HERE?"

District/Job Location: NKU

Brief description of job: Cir 45 faulted

The Employee-in-Charge is required to conduct a job briefing at the beginning of work shifts, before the start of each job, when a job is interrupted, or when additional personnel are added to the job.

The job briefing must include these SIX (6) subjects. Please check each category when completed.

Work procedures involved	☑ Safe pratices
Hazards associated with the job	☑ Static, heavy Rain
Special precautions	☑ Parts blown up
Energy source controls	☑ Isolation, tagging
Personal protective equipment	☑ Hardhat, gloves, glass, FR, Rain gear
Driving /repositioning/backing	☑ wheel chocks

Do you need further discussion on?

- Tagging, isolation points, grounding Review Isolation
- Confined or enclosed space
- Disposal of hazardous materials
- Required documentation

Ask the question **"What could possibly go wrong here?"** (List below)

slip, trip, fall, get wet & cold, shock, Death, cut fingers, wreck truck

(Continue on back if needed)

SAFETY ALWAYS!

- Wear your personal protective equipment
- Make safety a part of every job plan
- Look out for one another's safety
- Drive Safely – Wear your seatbelt

Crew member initials: SR JM TP SLPL JC KL SE

Job Briefing Conducted By: Nathan Tapp Date: 4/3/15

Attachment A. Job Briefing conducted at KU Substation 4/3/2015

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Substation Maintenance Work Sheet / Job Briefing		Center S634			Date 4/3/15	
Station(s)	Project Code	Activity	Oper. Unit	Tax Code	EMAX WORK ORDER #'s	St Hrs
(1) Rochelle	P8018	I	V50N	CN		
(2) NKU						
(3)						
(4)						
(5)						
(6)						

Workscope:

(1) Safety for contractors - if they don't show by 10AM call Ale.
(2) C.F. 45 faulted
(3)
(4)
(5)
(6)

Truck(s): 4608

Tag Person / Crew leader: NATHAN TOADD

Crew:

Place Initials by each crew member's name to indicate review & understanding of Isolation, Tailgate session, Known Hazards

Received Isolation | Maint. Lockout / Tagout used

Work Completed ?		Notes on work performed
(1) YES	NO	SAFETY MAN FOR CONTRACTORS ON TB2
(2) YES	NO	
(3) YES	NO	
(4) YES	NO	
(5) YES	NO	
(6) YES	NO	

Tag cleared Y N N/A

All grounds removed? YES ☐ NO ☒ N/A ☐

Why Not:

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Station Log Book Updated ~~YES~~ NO

Back of sheet used for Addition Information

Signed:

DON'T FORGET JOB BRIEFING FORM

COMPLETE & TURN IN THE DAILY

Attachment B. Other side of Job Briefing form – Work sheet conducted at KU Substation 4/3/2015

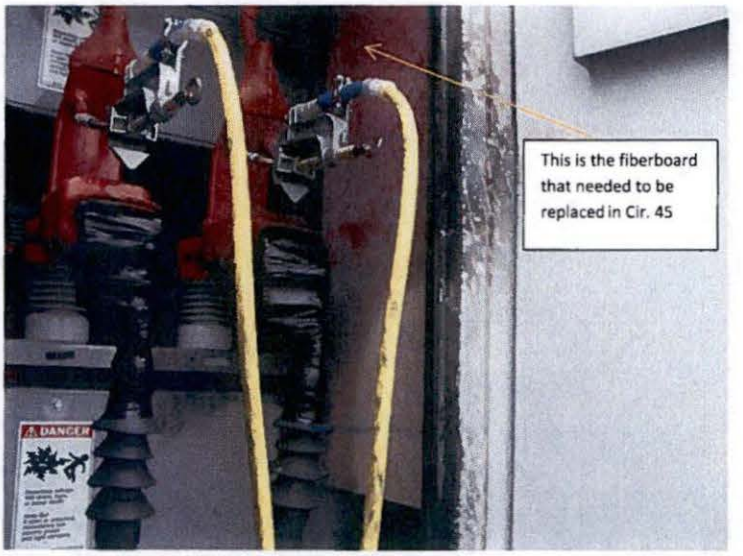

Photo 3. Inside cubicle KU45 shows, taped spades, grounds and fiberboard that needed to be replaced.

Photo 4. This is the labeling outside of cubicle KU 44/CB222.

Photo 7. Maintenance Electrician A's clothes. Note burns to right side of body.

Photo 8. Senior Maintenance Electrician's clothes. Note burns and tears to left side of body.

Attachment D

KPSC Notification

Morris, Scott A (PSC)

From: Kingsolver, Steve (PSC)
Sent: Friday, April 03, 2015 10:04 PM
To: Gorjian, Fereydoon (PSC); Moore, Jeffrey C (PSC); Shupp, John (PSC); Morris, Scott A (PSC); Kingsolver, Steve (PSC); Johnson, Jeff A (PSC); Rice, James D (PSC); Willard, Kyle (PSC)
Subject: Duke Energy Employee Contact Accident

PSC Notified By: Ryan Vehr. Duke Safety

PSC Notification Time / Date:
6:22 PM / 4-3-15
(Voice Message)
(Returned call to Vehr at 8:49PM / 4-3-15)

Accident Location:
N. Ky. University Campus inside a
Duke Energy Substation.
Highland Heights, Ky
Campbell County

Time / Date of Accident:
Between 4 and 5PM / 4-3-15

2 Duke Energy employees were injured
during this accident:

Victim 1: Kyle Leininger - 2nd Degree flash burns to face and hands.

Victim 2: Nathan Trapp - 3rd Degree contact burns to hands.

Both victims were taken to the hospital.

Description of Accident:
The 2 injured employees were working in a Duke Energy Substation when victim Trapp made contact with a jumper on the load side of a 12 kV substation breaker. Victim Leininger received flash burns from the contact by Victim Trapp. It was reported that the reclosing device on this breaker was engaged at the time of this accident.

The information in this reporting is preliminay and could change in the Utility Summary Report and PSC investigation.

I am on vacation next week so I set an onsite investigation for Monday 4-13-15 at 10AM after receipt of the Utility Summary Report. If an onsite investigation is needed before then, the contact information for Duke Safety is listed below.

Jeff Dierker: Cell: 513-543-8440
Ryan Vehr: Cell: 513-324-5188

I will be using B1790 for this investigation unless told different

*Duke Energy Kentucky, Inc.
139 East Fourth Street
Cincinnati, OH 45202

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Cincinnati, OH 45202