Jefferson Lab
Thomas Jefferson National Accelerator Facility

Notable Event Report
(See ES&H Manual Chapter 5200 Appendix T1 Event Investigation and Causal Analysis for Instructions)

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Notable Event Report

Title of Event			
Event Title:	Electrical Spark and Power Loss Caused by Leak During Magnet Power Supply Cooling System Flush		
Date and Time of Occurrence:	1/3/2017 ~ 6:30am	**Notable Event Number:**	ENG-17-0103
Event Location:	North Access – Building #67	**Date Notable Event Report is Due*:**	2/2/2017

*The Notable Event Report is due to the ESH&Q Reporting Officer with 30 days of the Initial Fact Finding Meeting unless an extension is requested.

Summary of Event and / or Injuries, including Initial Fact Finding Meeting information: determine the chain of events and timeline. Use attachment as necessary.

Summary

On January 3, 2017 at approximately 0645, a power failure occurred in the North Access Building (NAB) as a result of a leak from a flexible hose fitting during an acid flushing activity. The task in progress was preventive maintenance for magnet power supplies in the building, specifically, flushing of a citric acid descaling solution through the water cooling piping for a magnet power supply that was located approximately five feet from a 480-volt switchboard that controlled power to the parts of the NAB and several other utilities (cooling water to the End Station Refrigerator (ESR)) remote to the NAB.

Event Timeline

Early December 2016, the Engineering-Installation group completed maintenance repair to an acid flush system pump cart, including replacement of hose fittings. This was in preparation of flushing the Low Conductivity Water (LCW) system associated with the DC power supplies in the North and South Access buildings (NAB and SAB). The flushing compound was a dilute citric acid (CITRO-CLEEN / Ammonium Citrate, Dibasic, CAS No. 3012-65-5, pH 5.0). A work plan (ATLis # 16949) was written for the acid flushing task. The ATLis indicated the task as having a pre-mitigated risk code of "3", indicating a need for a Task Hazard Analysis (THA) and Operational Safety Procedure (OSP), both of which were attached to the ATLis entry. In addition, the ATLis entry listed personal protective equipment (PPE) requirements as safety glasses with side shields, gloves (Nitrile, Neoprene, and Rubber), face shield, and chemical hazard protection specified in ES&H Manual Chapter 6610, T5. The ATLis was reviewed by ESH&Q and approved by the Accelerator Operability Manager on 11/29/16.

On the first day back from the Christmas break, January 3, 2017, at 0400, the trained and qualified technician (TECH1) began the acid flushing process. TECH1 allowed the citric acid to warm up (140-160 degrees) in the system. At approximately 0630, TECH1 connected the acid flush system pump cart flexible supply hoses to the supply connection (above the DC power supply and at an elevation adjacent to the nearby NA-2 electrical panel) and the return hose to the piping located near the base of the power supply. Shortly thereafter TECH1 started the flushing process. Approximate 10-15 minutes later, TECH1 noticed that the fluid (citric acid) was leaking from one of the hose connections to the power supply cooling piping. He turned off the acid flow pump and attempted to repair the leaking connection, which continued to leak acid in the vicinity. At that time, the technician's back was to the NA-2 electrical panel. TECH1 noticed what appeared to be a "spark/flash" that "flew over his head". At that time, the power for part of the building failed. He immediately exited the area and notified the lead technician (TECH2) for the task.

Because the accelerator was not running, there was no 24-hour crew chief on site. The On-Call Crew Chief lived some distance away. Therefore, a qualified crew chief, who happened to be at his desk located in the adjacent building when then outage occurred, assumed Acting Crew Chief (ACC) responsibility. The ACC responded to the NAB to investigate and was

Summary of Event and / or Injuries, including Initial Fact Finding Meeting information: determine the chain of events and timeline. Use attachment as necessary.

briefed by TECH1 and TECH2. The ACC called Facilities Management & Logistics (FM&L) to report the outage. The call was forwarded to the Guard Post automatically since it was prior to regular business hours. The ACC reported the power outage and requested that a guard notify FM&L. The guard reported being busy and stated they would notify FM&L "in a minute". Since this was the first workday of the new calendar year, and the first day back from Christmas break, a large number of staff passing through the guard post to access the accelerator site had to be rejected because their Radiation Work Permit training had expired. This created a jam at the Guard Post. The ACC decided to report to the Guard Post to assist with making proper notifications. This left the scene at NA-2 panel in NAB uncontrolled. It should be noted that the ACC did not see evidence of overt damage at NA-2. Guard procedure requires notification of the Facilities Management and Logistics Electrical Engineer (FMENG) or his backup if there is a power outage. This was not done. By the time the ACC arrived at the Guard Post, the guard had been able to contact the FM&L Shop personnel who replied that someone would come to investigate. It is not clear who answered the call in the shop.

When the FMENG arrived at the NAB around 7:35 am, the ACC had not yet returned from the Guard Post. The FMENG observed minor smoke marks at the voltage testing plug on the NA-2 panel. The FMEENG was informed by TECH 1 and TECH 2 that there was a power outage and that TECH 1 had observed sparks in the rack above the power supplies. The FMENG decided that the FM&L electricians were needed to lock out the panel, and clean and repair the panel. The FMENG discussed this with TECH1 and TECH 2. About this time, the TECH1 and TECH2 told the FMENG that the Central Helium Liquifier (CHL) was down due to the power outage. The FMENG operated under a general rule of thumb is that the CHL needs to be back up and running as soon as possible to minimize cost. Based on the information from TECH1 and TECH, and the perceived need to quickly restore power to the CHL, the FMENG then decided he would reset NA-2 panel and isolate the outgoing breakers, turn on the switchboard and turn the breakers within the switchboard back on one at time. This process decision was based loosely on a 1991 memo which outlines the parameters whereby MCC Operators were allowed to reset breakers.

The FMENG donned appropriate PPE, turned off the breakers on the NA-2 panel (the FMENG is trained for this task), and then left the NAB to check the main circuit breaker (MCB) located outdoors. The FMENG determined that the MCB tripped and turned it off. The EMENG did not evaluate the indicator flags on the MCB to help identify why it had tripped. At this point the scene inside the NAB was left uncontrolled. While the FMENG was outside the NAB, the ACC and a DC Power technician (DCP) reported to the NAB, unaware that the FMENG had reported to the scene. The ACC and the DCP were standing approximately three feet away from the NA-2 panel and were engaged in a discussion on what systems were fed by NA-2 when the FMENG switched the MCB back on. The ACC and DCP observed visible flash from the area of a metering device at the top of the switchboard, which coincided with the location the EMENG previously identified minor smoke discoloration. The FMENG was unaware that there were 2 people in the vicinity of the panel as he was trying to reset the breaker. The ACC assigned TECH3 to guard the area.

After the power was restored the FMENG returned to the NAB to check the status and to begin restoring the branch circuits. Upon learning of the flash, the FMENG returned to the MCB and turned it off. The FMENG contacted the FM&L electricians and requested that they respond to the scene. After reporting to the NAB, the FM&L electricians secured (LO/TO) the power and opened the switchboard. The electricians proceeded to inspect the interior of the switchboard. During the inspection, they noted that the wiring to the metering device for the switchboard had shorted, and overheated. The metering device was disconnected from electrical service. They observed liquid moisture within the top half 1/3 of the switchboard (meter/instrumentation compartment). The fluid was cleaned up. After an all clear was given by the electricians, FMENG re-energized the switchboard (~ 0930-1000) and all its branch circuits.

The Reporting Officer was notified at approximately 0830. Upon the completion of the fact-finding meeting, the investigation team visited the NAB. It was difficult to recreate the event at the scene as the liquid and markings from the flash had been removed from the panel.

Causal Analysis: (Use attachment as necessary)

Root Cause:

Event #1: Electrical Panel Short and Subsequent Power Outage

Direct Cause: The direct cause of this event was dilute acid spray causing the short and power outage.

Root Cause: Lack of supervision enforcement/oversight

In planning for this activity, there were already established Task Hazard Analysis (THA) and OSP. The THA did not recognize the potential for a hose leak or recognize that negative consequences could come from a leak, however, the OSP instructed the worker to check for leaks. There is no evidence that this occurred in accordance with the OSP. On a side note, when the IH reported to the scene to help plan the cleanup there was no evidence of PPE or an eye wash in the vicinity as required by the OSP. The TECH1 had read and signed the OSP, but it was not available at the worksite as required by ESH Manual Chapter 3310T1. There was no evidence that supervision provided oversight or enforcement of the OSP.

Event #2 - Second Panel Short

Direct Cause: Breaker reset caused panel short

Root Cause: Shifting of priorities allowed schedule to take precedence over initial decision not to reenergize panel prior to maintenance

The FMENG initially determined that the FM&L electricians would need to investigate and effect repairs. Power would not be restored until they gave the all clear. This decision was made on the basis of observed evidence (smoke marks on the panel). After being informed that ESR was down due to the power outage, and told that the flash was overhead, FMENG reacted to perceived schedule pressure and decided to isolate all the outgoing circuits, turn the NA-2 panel back on, and turn on the breakers one at a time. This was done without communication with the ACC or CRYO, consideration of the hazard presented by the acid spray, or controlling the scene. The mindset of the FMENG to get the ESR (CHL) back to full power as soon as possible became the main objective which overrode the initial electrical failure investigation. In fact, the ESR had already gone into shutdown mode due to the power outage, and a quick reset of electrical power would not recover operation any sooner. The next critical point in time for the ESR after emergency shutdown is 4-5 hours after which the ESR (CHL) would start losing/venting off helium.

Contributing Causes:
(List as many as apply.)

Event #1

1) OSP hazard assessment is less than adequate.
   The OSP hazard mitigation is not specific for the task of acid flushing. The generalized Task Hazard Analysis (THA) does not list the potential hazard of a leak near electrical equipment; thus no mitigations were put in place.
2) OSP mitigation process not fully understood.
   When a pressure system piping or component fails, the OSP "mitigation engineering" is to 1) stop the filling, 2) relieve pressure, and 3) fix leak. In this incident the pump was turned off (1) and then the leak attended to (3); the pressure was not relieved (2). During interviews TECH1 and TECH2 were not sure the pump carts had a mechanism to relieve pressure.
3) Design/Location of hose connections less than adequate.
   The hose connection was above the panel. This allowed the leaking fluid to spray directly onto the panel.

Causal Analysis: (Use attachment as necessary)

Event #2

1) Planning for the emergent work was less than adequate.
   Once the decision was made not to wait for the electricians, the FMENG did not assure that the building was secure. As a result, two individuals were near the NA-2 when the MCB was reenergized and were exposed to potential harm.
2) Communications were less than adequate
   In a number of instances, proper communications could have prevented this event. If the ACC had not perceived that the guard was not able to call FM&L, the ACC would have remained at the NAB and been present when the FMENG arrived. Notification by the guard was not made to the FMENG per procedure, but rather to the FM&L fire protection technician. The ACC and the FMENG were not aware of the decisions and actions the other had taken. If the FMENG had communicated the decision to ACC to reset the MCB, or if the FMENG was aware that the ACC was going to go back into the NAB, the need to control the scene may have been recognized.
3) Hazard recognition was less than adequate
   The FMENG did not recognize the impact of the acid spray on the NA-2 panel. The witness statement of seeing a 'big spark' and the visible smoke marks on the switchboard were indicators that a failure had occurred. This failure was not fully understood before the attempt to reset the MCB.
4) Breaker reset process is ambiguous
   The process followed to reset the breaker, was based upon a 1991 memo from Plant Engineering (currently FM&L) to Accelerator Division (MCC Crew Chief), which outlined the parameters whereby MCC Operators were allowed to reset breakers. This memo has never been memorialized into policy, such as the ES&H Manual. Further, the memo does not describe controlling the area to keep unqualified employees safe from any potential hazards. Additionally, the MCB trip indicator was not recognized until sometime after the event when post event pictures were taken. The trip indicator revealed that the breaker trip was due to a short circuit and not an overload or a ground-fault. Although the configuration of the trip indicators is requested; there is no further direction given as the next path forward.
5) Scene preservation less than adequate. Scene preservation aids in the investigation process. The FM&L electricians were allowed to clean and affect repairs of the NA-2 panel without considerations of the investigative process. At a minimum, photos of the equipment and surrounding affected area should have been taken prior to making repairs.
6) Opportunity for Improvement: Although not a contributing cause, Design/wiring interface of the instrumentation compartment and the switchboard was less than adequate. It appears that there is no separate isolation control except for securing the entire switchboard. Lack of drawings contributes to the lack of knowledge on the design interface of the metering compartment and the switchboard bus.

Extent of Condition Check		JLab CATS Number	Target Date	Action Owner
The Mechanical Installation group is the only group that performs acid flushing of power supplies.		N/A	1/3/2017	There are only two carts and both were being used at the same time in different locations. There are no other "fittings" on the cart to check when the leak occurred. The leak was at a fitting on the hose end of the flush cart required to adapt to the box supply being flushed. In other locations/situations no adapter is used and you connect the hose directly to the item being flushed /cleaned.
Does this event involve failed equipment?	Yes	Is there similar equipment in other areas?	Yes	Anthony DiPette – Installation/ Vacuum Group Leader

Corrective Action(s)	JLab CATS Number	Target Date	Action Owner
Discuss event and lessons learned with Engineering Division supervisors, emphasizing expectations for: 1) Complete and appropriate THA/OSP 2) Completing work in accordance with OSP 3) Supervisory verification in the field, especially for tasks with pre-mitigated risk code of 3 or 4 4) Consideration of scheduling Risk Code 3 or 4 tasks at times when response staff is limited or on the first day after a long break. Evidence of completion: Presentation and sign-in log used for discussions with supervisors	NE-2017-01-01-01	03/31/2017	Will Oren
Review and revise OSP (make improvements from lessons learned from the incident), including a task specific THA. Evidence of completion: Link to approved OSP	NE-2017-01-02-01	03/20/2017	Neil Wilson
Retrain on the new (revised) OSP; also include specific equipment and process/operational training. Evidence of completion: Signature Page of the OSP. **The signed OSP shall be attached to the equipment during use for easy reference. Evidence of completion: : Signature page of the OSP/attached to the OSP with all responsible parties signatures present	NE-2017-01-03-01	4/28/2017	Anthony DiPette

Corrective Action(s)	JLab CATS Number	Target Date	Action Owner
Modify the OSP to include consideration of hazards that could develop due to operation of the equipment in a specific location. Evidence of completion: Link to approved OSP	NE-2017-01-04-01	03/20/2017	Neil Wilson
Event #2 Discuss event and lessons learned with FM&L staff to reinforce safety over schedule, and need to plan emergent work. Evidence of completion: Power point Presentation and sign in sheet with signature addressing items in identified action	NE-2017-01-06-01	03/31/2017	Rusty Sprouse
QA Department to examine the last 3 years of Notable Events to determine incidence of balanced priorities as a casual factor. Evidence of completion: Results of the Trending analysis	NE-2017-01-06-02	04/3/2017	Steve Smith
Director's Safety Council will review the analysis and identify the path forward. Evidence of completion: Path forward	NE-2017-01-06-03	05/01/2017	Mary Logue
Develop a Tool Box Talk that incorporates the lessons learned from both events for lab-wide use. Evidence of completion: Copy of the tool box talk	NE-2017-01-08-01	04/03/2017	Steve Smith
Associate Directors/Division Managers will require department heads to share hold toolbox meetings to discuss lessons learned, such as priorities taking precedence over sound decisions, how lack of clear communication can cause events, and the importance of following procedures, especially when task involves a Risk Code of 3 or 4. Evidence of completion: Email with expectations to the department heads and responses back from the department heads to include a list of attendees.	NE-2017-01-08-02	05/01/2017	Mary Logue
Ensure that the planned FY17 Work Planning and Control Assessment focuses on hazard identification when planning work.	NE-2017-01-09-01	09/30/2017	Bruce Lenzer

Corrective Action(s)	JLab CATS Number	Target Date	Action Owner
Evidence of completion: Link to the final Assessment report			
Investigate the development of a switching procedure; for when a circuit is de-energized by the automatic operation of a circuit protective device. The procedure shall include the process of keeping individuals safe and accounted for during the switching evolution. Evidence of completion: Results of this investigation of switching procedure	NE-2017-01-10-01	05/01/2017	Todd Kujawa
Incorporate approved switching procedure into the ES&H Manual. Evidence of completion: Approved and posted procedure for switching	NE-2017-01-10-02	07/01/2017	Paul Powers/Electrical Safety Committee
Review approved procedure with appropriate personnel. Evidence of completion: Copy of the procedure and attendance sheet for those that reviewed the procedure	NE-2017-01-10-03	06/30/2017	Todd Kujawa/ Electrical Safety Committee
Distribute lessons learned through internal and DOE websites citing how important it is to safe the scene and equipment and then cordon off the area and report the event to your supervisor and to the Reporting Officer for evaluation. Evidence of completion: Copy of Lessons Learned addressing scene preservation and how vital it is for the purposes of investigations.	NE-2017-01-11-01	05/01/2017	Tina Johnson/Mary Jo
Distribute lessons learned to supervisors stating how important it is to safe the scene and equipment and then cordon off the area and report the event to your supervisor and to the Reporting Officer for evaluation. Evidence of completion: Copy of email to all supervisors	NE-2017-01-11-02	05/01/2017	Mary Logue
Effectiveness Review of all corrective actions identified during this investigation to ensure they have addressed the issues.	NE-2017-01-12-02	07/31/2018	Steve Smith

Corrective Action(s)	JLab CATS Number	Target Date	Action Owner
Evidence of completion: Results of the effectiveness review			
Opportunity for Improvement: Investigate the need to keep the metering components active. If determined that these devices will remain intact, then use sound engineering to evaluate the current design and interface between the switchboard bus and the power connection to the metering compartment and update the drawings if necessary. Evidence of completion: Results of the evaluation/ updated drawings if needed	NE-2017-01-12-01	05/01/2017	Todd Kujawa

Lessons Learned (Confer with Lessons Learned Coordinator) (Use attachment as necessary)	Lessons Learned Number
Best practice not followed when energizing a pressure system after maintenance work has been done: "Caution shall be exercised when energizing a system following maintenance work. The system shall be energized by personnel trained in the safe operation of the system. The integrity of all disassembled components shall be considered untested until an informal in-service leak test is performed." [Pressure and Vacuum Systems Safety Supplement Part 8: Operation and Maintenance]	992
Jefferson Lab investigates 'events' in order to implement corrective and preventive actions to avoid recurrence. To ensure an adequate investigation is performed, after assuring equipment is in a safe condition and hazards are mitigated, the affected area/equipment must be preserved. This may include cordoning off the area and taking preliminary photographs so that sufficient data is collected to ensure an accurate casual analysis is done.	992

Witness Accounts: (Use attachments as necessary. Box will expand as necessary)

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

Attached are post event photos and one other photo taken prior to repairs/modifications taking place.

Figure #:

1) Power supplies being acid flushed (left) – Switchboard NA2 (right).
2) Blue hose connection point for acid flush machine (in ceiling)-red hose connection point at floor level beyond flow meter (see figure one); blue hose connection was the one discovered to be leaking.
3) Fittings where leak was discovered.
4) SKM snapshot of switchboard NA2 arc flash analysis (1.1 cal/cm^2 incident energy and a 17 inch arc flash boundary).
5) Switchboard after 2nd flash - ***No picture taken after 1st flash.***
6) Switchboard after repair was made to the instrumentation/metering compartment. Yellow circle around the General Electric test block, type PK-2, is where the short circuit is assumed to have taken place when the acid spray reached the live contacts on the test block. The type PK-2 test blocks are used to test switchboard mounted instruments, meters, and relays when in an electric circuit or by the use of a separate source of power. They are back connected and their contacts have live-line contact.
7) Emergency lighting present in the North Access building during the power outage; looking back at the switchboard location.
8) Outside Main Circuit Breaker (MCB) that feeds switchboard NA2 (breaker that tripped off).

Figure 1

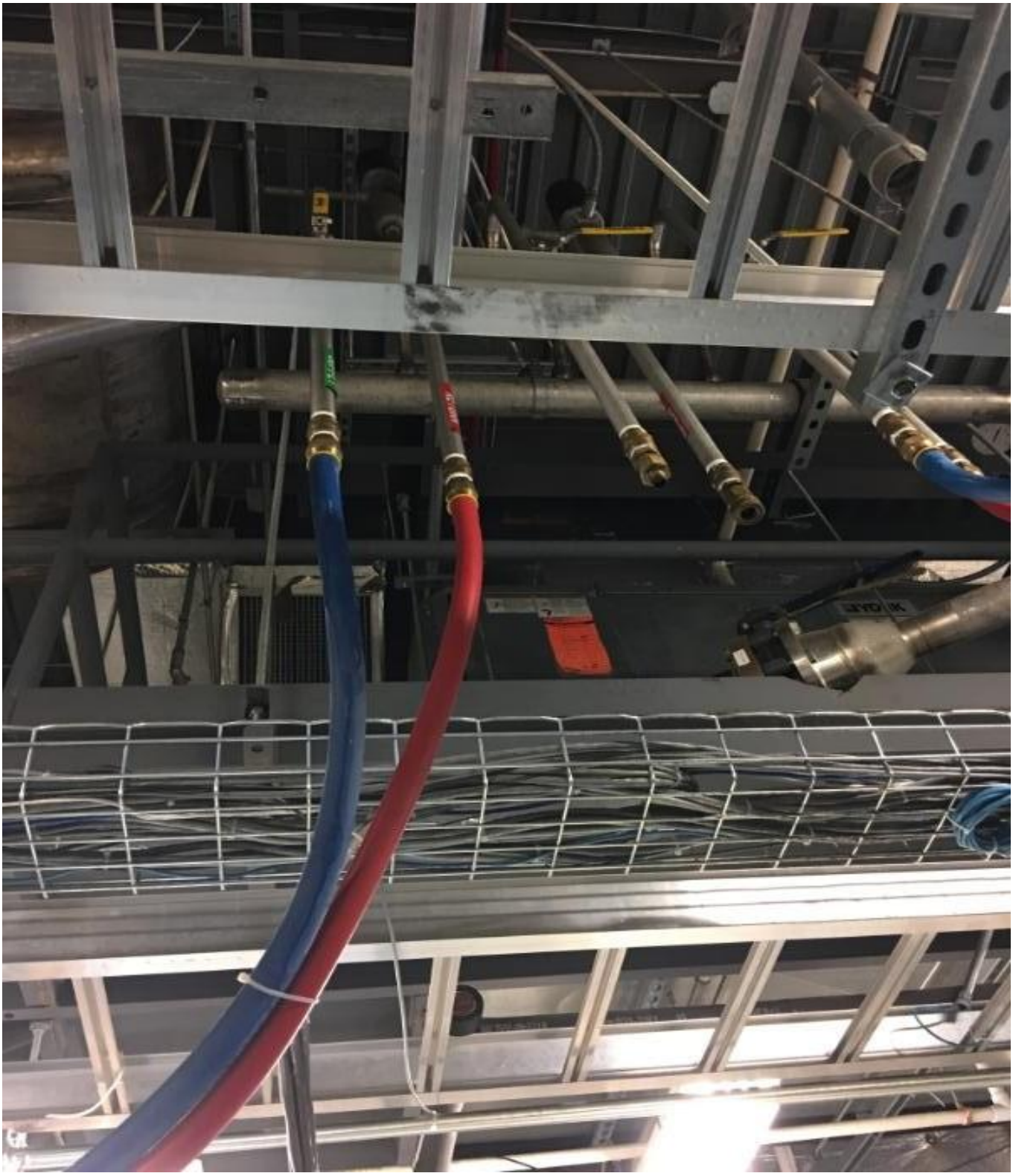
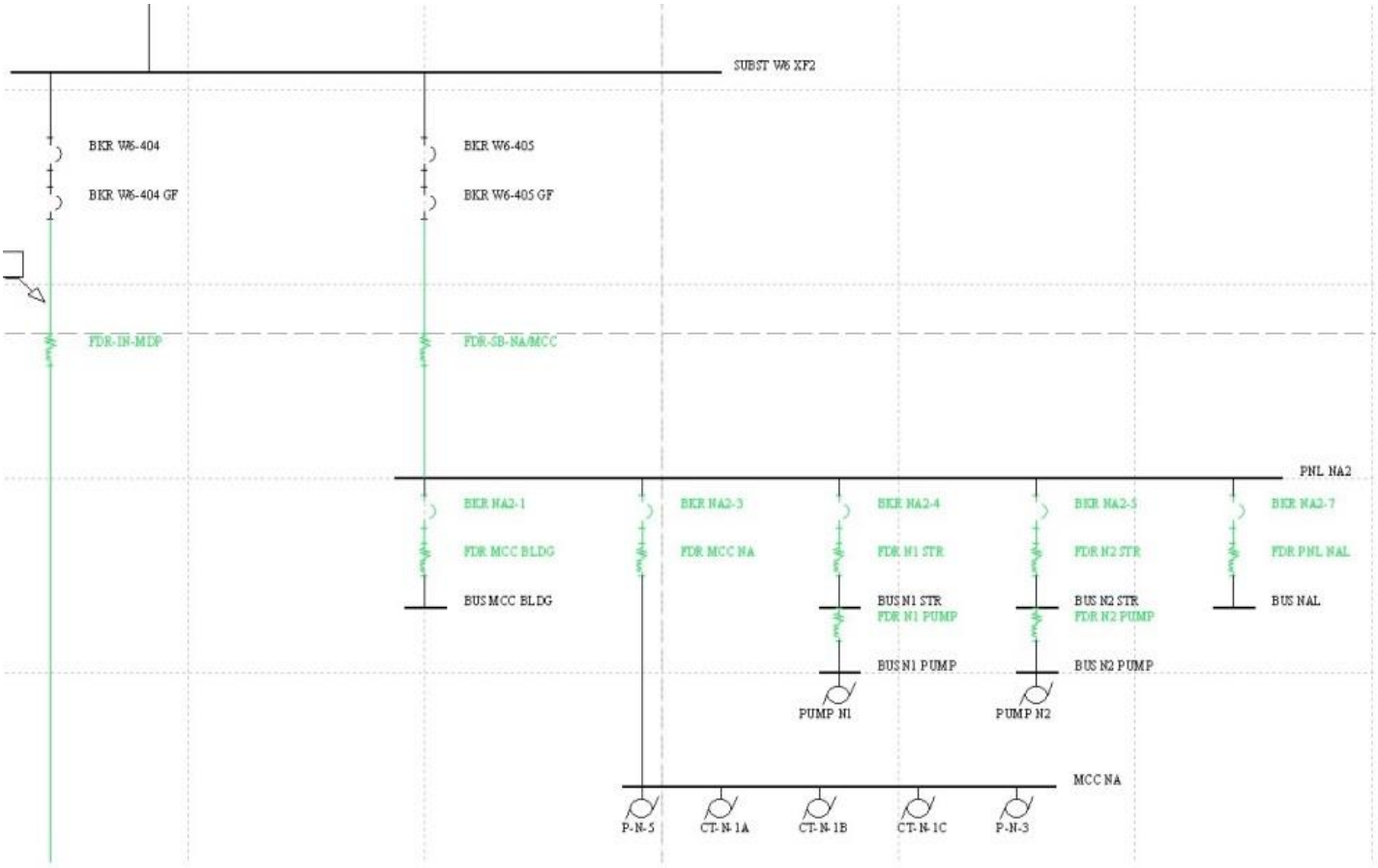


Figure 2

Figure 3



	Bus Name	Protective Device Name	Bus kV	Bus Bolted Fault (kA)	Prot Dev Bolted Fault (kA)	Prot Dev Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time/Tol (sec.)	Ground	Equip Type	Gap (mm)	Arc Flash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE Level / Notes (*N)	Label #
1	BUS MCC BLDG	BKR NA2-1	0.48	15.24	15.24	9.40	0.015	0.000	Yes	PNL	25	9	18	0.42	(*N20)	# 0092
2																
3	BUS N1 PUMP	BKR W6-405 (BKR NA2-4)	0.48	25.65	21.51	12.30	0.025	0.000	Yes	PNL	25	16	18	0.99	(*N5) (*N20)	# 0094
4																
5	BUS N1 STR	BKR W6-405 (BKR NA2-4)	0.48	26.51	22.28	12.67	0.025	0.000	Yes	PNL	25	16	18	1.0	(*N5) (*N20)	# 0095
6																
7	BUS N2 PUMP	BKR W6-405 (BKR NA2-5)	0.48	24.84	20.80	11.94	0.025	0.000	Yes	PNL	25	16	18	0.97	(*N5) (*N20)	# 0096
8																
9	BUS N2 STR	BKR W6-405 (BKR NA2-5)	0.48	25.65	21.51	12.30	0.025	0.000	Yes	PNL	25	16	18	0.99	(*N5) (*N20)	# 0097
10																
11	BUS NAL	BKR NA2-7	0.48	23.65	23.65	13.68	0.015	0.000	Yes	PNL	25	11	18	0.57	(*N20)	# 0098
12																
13	MCC NA	BKR W6-405 (BKR NA2-3)	0.48	25.48	21.33	12.20	0.025	0.000	Yes	PNL	25	16	18	0.98	(*N5) (*N20)	# 0465
14																
15	PNL NA2	BKR NA2-3	0.48	28.94	1.74	0.98	0.002	0.000	Yes	PNL	25	4	18	0.09	(*N20)	
16	PNL NA2	BKR NA2-4	0.48	28.94	1.40	0.78	0.002	0.000	Yes	PNL	25	4	18	0.09	(*N20)	
17	PNL NA2	BKR NA2-5	0.48	28.94	1.39	0.78	0.002	0.000	Yes	PNL	25	4	18	0.09	(*N20)	
18	PNL NA2	BKR W6-405	0.48	28.94	24.43	13.72	0.025	0.000	Yes	PNL	25	17	18	1.1	(*N20)	# 0638
19																
20	SUBST W6 XF2	BKR W6-405	0.48	30.41	4.49	2.50	0.002	0.000	Yes	PNL	25	4	18	0.10	(*N20)	
21	SUBST W6 XF2	PFD-W6	0.48	30.41	25.93	12.29	0.363	0.000	Yes	PNL	25	79	18	14	(*N3) (*N20)	# 0730
22																

Figure 4


HIGH VOLTAGE BENEATH COVER
AUTHORIZED PERSONNEL ONLY
PANEL NA2
PANEL MCC BLDG
480V

Figure 5


HIGH VOLTAGE BENEATH COVER
AUTHORIZED PERSONNEL ONLY
WARNING
Arc Flash and Shock Hazard
Appropriate PPE Required
Failure to comply with NFPA 70E
requirements can result
in serious injury or death.
PANEL NA2
PANEL MCC BLDG
480V
MOTOR CONTROL CENTER
67-LCWP-4
PANEL NAL
67-LCWP-2
WARNING
Arc Flash and Shock Hazard
Appropriate PPE Required
WARNING
Arc Flash and Shock Hazard
Appropriate PPE Required
Failure to comply with NFPA 70E
requirements can result
in serious injury or death.
DO NOT OPERATE
THIS DEVICE

Figure 6

Figure 7

Records, Documents, Pictures, and Other References: (Copy and paste, use attachments or document links as necessary)

Figure 8

Emergency Notifications Made (Subsequent to the Event):	Date	Time
Fire, Rescue & Emergency Medical: (9-911)	NA	NA
Guard Post: x5822; 269-5822	1/3/2017	~ 7:00am
Occupational Medicine 269-7539	NA	NA
ESH&Q Reporting Officer: 876-1750	1/3/2017	~ 8:30am
Crew Chief 630-7050: *(No Beam Running so Crew Chief but not present in MCC)*	1/3/2017	~ 6:45am
Industrial Hygiene: 269-7863:	NA	NA
Other: *(Facilities Electrical)*	1/3/2017	~ 7:50am

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Notable Event Report

Industrial Hygiene: 269-7863:	NA	NA
Other: *(Facilities Electrical)*	1/3/2017	~ 7:50am

Confirmation Review Distribution: Investigation Team Members Affected Division Managers ESH&Q Reporting Officer	It is asked that you review and provide comments to this document to the Lead Investigator (denoted on Page 1) within ____ days. Your comments will be reviewed and incorporated as appropriate. Thank you for your consideration in this matter.

Investigation Team Confirmation:
The below signees, confirm to the best of their knowledge, that the information presented in this document is accurate and complete.

Role	Print	Signature	Date
Lead Investigator	Todd Kujawa		2/22/17
Reporting Mngr.	Tina Johnson		2/22/17
Team Member	Scott Conley		2/22/17
Team Member	Ed Douberly		2/23/17

Acceptance/Acknowledgement of Facts

	Print	Signature	Date:
Associate Director/ Department Manger	Will Oren (ENG)		2/27/17
	Rusty Sprouse (FML)		23 Feb 17

Upon confirmation submit document to the ES&H Reporting Officer for completion and distribution.

Documentation of Findings: (To be Completed by ESH&Q Reporting Officer)

Notable Event Number:	ENG-17-0103
CATS Number:	NE-2017-01
Lessons Learned Number:	992
ORPS Number:	SC--TJSO-JSA-TJNAF-2017-0001
NTS Number:	N/A
CAIRS Entry:	N/A
DOE Cause Code:	A4B4C12, A5B2C08, A5B2C05,A1B5C02, A3B3C05, A4B3C01, A5B3C01, A5B4C01, A3B3C01, A2B4C04, A5B2C05
ISM Code:	Develop and Implement Hazard Controls, Analyze Hazards