Q. Please provide a copy of causal analysis reports regarding human performance that affected plant operations for 2016-2018.

A. Please see attached causal analysis reports regarding human related forced outages that occurred in the period from January 2016 to December 2018.

- Bay d'Espoir Generating Station (September 16, 2017):
  - When returning Bay d'Espoir Unit 7 to service following a planned outage, an error occurred during synchronization; and
  - An internal investigation was completed by Hydro Production staff. The report is included in PUB-NLH-007, Attachment 1.
- Bishop's Falls Plant (March 28, 2018):
  - While checking isolation points for an upcoming planned outage on Bishop's Falls Unit 5, the Operator inadvertently activated a mechanical trip latch that resulted in a trip of the unit; and
  - Investigation was completed by Hydro Production staff and reports are included in PUB-NLH-007, Attachment 2.
- Holyrood Unit 2 Boiler Opacity Excursion (October 28, 2017):
  - The Control Panel Operator Operated Opacity between 58–62% for ~80 minutes; and

- An Internal Investigation (TapRoot) was completed by Holyrood Thermal Generation Staff. Please refer to PUB-NLH-006, Attachment 18.

- Holyrood Unit 1 Fuel Oil Spill (June 16, 2018):

  - Pressure Gauge "let-go" on the discharge of the Primary Pump; and

  - An Internal Investigation (TapRoot) was completed by Holyrood Thermal Generation Staff. Please refer to PUB-NLH-006, Attachment 21.

- Holyrood Unit 2 Fuel Oil Spill (September 13, 2018):

  - Pressure Gauge "let-go" on the discharge of the Primary Pump; and

  - An Internal Investigation (TapRoot) was completed by Holyrood Thermal Generation Staff.

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location:	Bay d'Espoir	Unit No:	1	Business Unit:	1293	Outage No.:	2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

Investigation Assigned to: Alvin Crant

Date of Event: 2017/09/16 **Date of Investigation:** 2017/09/16

Parent Work Order Number: **Status of Investigation:** In Progress

Alvin Crant	
Signature of Investigator	Signature of Approver

Detailed Description of Event:

Unit # 7 was being returned to service from annual pm 6 inspection on Friday Sept 15 and there was an isswue with an exciter trip alarm and lockout. Investigation and testing at the time did not reveal anything that may havve caused the alarms and considering that everyone had worked along day all work was suspended for the day. On Saturday Sept 16th the troubleshhoting continued and did not reveal any mayor issue into the previous exciter trip alarm and was attributed to the testing sequence was the cause. The unit was given several start and stop commands from PH # 2 and all attempts were successful. In the final start to release the unit and synchronize the unit was started and a breaker close command was given and operator did not see any response on the scope. The operator placed 25mt in moniotr and the scope need le began to spin but there was no response on the lights that pulses were being given. The operator placed 25m in on and gave breaker another close command thinking he wasonly giving it a command to start the synchronizer and the breaker closed in out of phase. This caused a UFLS event truipping off Bde unite 1 & 3

BASIC / ROOT CAUSES:

1. Basic/Root Cause Category: PF - LACK OF SKILL

Basic or Root Cause: Infrequent performance

Explanation:

The practice of synchronizing unit seven from PH # 2 is not readily practiced.

2. Basic/Root Cause Category: PROCEDURES

Basic or Root Cause: No Procedure

Explanation:

There are no procedures for synchronizing of unit trainig during apprenticeship.

3. Basic/Root Cause Category: TRAINING

Basic or Root Cause: Task Not Properly Analyzed

Explanation:

The task of starting this unit from PH # 2 need to be analayzed with procedures develepled for different scenarios.

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location:	Bay d'Espoir	Unit No:	1	Business Unit:	1293	Outage No.:	2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location: Bay d'Espoir | Unit No: 1 | Business Unit: 1293 | Outage No.: 2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

BASIC / ROOT CAUSES Cont'd:

4. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

5. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

6. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

7. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

8. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location:	Bay d'Espoir	Unit No:	1	Business Unit:	1293	Outage No.:	2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location:	Bay d'Espoir	Unit No:	1	Business Unit:	1293	Outage No.:	2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

BASIC / ROOT CAUSES Cont'd:

9. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

10. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

11. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

12. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

13. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location:	Bay d'Espoir	Unit No:	1	Business Unit:	1293	Outage No.:	2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location: Bay d'Espoir **Unit No:** 1 **Business Unit:** 1293 **Outage No.:** 2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

BASIC / ROOT CAUSES Cont'd:

14. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

15. Basic/Root Cause Category:

Basic or Root Cause:

Explanation:

REMEDIAL ACTIONS:

	Action	Work Order	Responsible	Target Completion	Comp ?
1.	Conduct stand-down with Operations staff regarding event.		A. Crant	2017/09/22	Yes
2.	Determine if a procedure is required for synchronizing Unit 7 through power house 2.		A. Crant.	2017/10/13	Yes
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					

Newfoundland & Labrador Hydro
HYDRO GENERATION

EQUIPMENT INVESTIGATION REPORT

HELP

Standing Instruction No. 62
Forced Outage Reporting & Investigation

Location:	Bay d'Espoir	Unit No:	1	Business Unit:	1293	Outage No.:	2017-17

Equipment Name: Bay d'Espoir Unit 1

Brief Description of Event:

Trip of unit has a result of a UFSL event caused by accidental closing of breaker B10B11

18.					
19.					

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EXPLOITS GENERATION
FORCED OUTAGE REPORT

FORCED OUTAGE DATA:

Unit #: BF5

Start Time & Date	End Date / Time	Duration	Outage / Derating Type	
14:59 03/28/18	15:09 03/28/18	10 min.	**X**	Sudden Forced Outage [1]
				Immediately Deferrable Forced Outage [2]
				Deferrable Forced Outage [3]
				Starting –Failure Outage [4]
				Forced Derating [5]

SUMMARY

Operator was in the process of checking isolation points for an upcoming planned outage on Unit BF5 and inadvertently activated the 52-G5 mechanical trip latch (racking interlock) causing the breaker to open and the unit to trip.

INVESTIGATION

After checking two isolation points in 52-G5 cubicle, the operator had been explaining the racking procedure for this breaker to two operator apprentices. This type breaker has a hinged cover in front the racking bolt. The hinged cover has to be pushed in before a cranking mechanism can be placed on the racking bolt. While the breaker is racked on the bus and in the closed position, the racking bolt hinged cover is set in physical contact with the breaker's mechanical trip latch. This type of interlock is common in many switchgear installations and is designed to prevent racking breakers under load. The operator was apparently unaware of the breaker racking interlock and, in attempting to show the apprentices where the cranking mechanism is placed, touched the racking bolt hinged cover and activated 52-G5 breaker trip latch - 52-G5 tripped open and BF5 came offline. No injuries or equipment damage resulted. The unit was brought to a complete stop and put back online within ten minutes. SWOP #2018002550 has been entered as a near miss.

[1] Sudden Forced Outage: the occurrence of a component failure or other condition which results in the unit being automatically or manually tripped.
[2] Immediately Deferrable Forced Outage: the occurrence of a component failure or other condition which requires that the unit be removed from service within 10 minutes.
[3] Deferrable Forced Outage: the occurrence of a component failure or other condition which requires that the unit be removed from service from10 minutes up to and including the very next weekend.
[4] Starting –Failure Outage: the unsuccessful attempt to bring a unit from a shutdown state to synchronism with the electric system within a specified time interval. The specified time interval may be different for individual units and should allow a reasonable time for the unit to pick up load.
[5] A reduction of generating unit capacity in excess of 2 % of its Maximum Continuous Rating resulting from a component failure or other condition which requires that the generating unit be de-rated at once or as soon as possible up to and including the very next weekend.

REMEDIAL ACTIONS

Refer to SWOP #2018002550

CONCLUSION

While loss of production was minimal, this near miss incident raised a number of concerns around arc flash awareness and equipment familiarity. One of six remedial actions remains to be completed.