

1 **Q. Re: HRD - Install Operator Training Simulator (Tab 5)**

2 At page 14, reference is made to a conversation with a representative from
3 Intermountain Power, a coal fired plant in Utah, that had an OTS in operation since
4 2005. It is stated that Intermountain realized a reduction of approximately 50
5 percent of unit trips caused by operators. Please provide the basis for concluding
6 that the experiences in Utah are applicable to Newfoundland and Labrador, and
7 that the equipment is similar to that in Holyrood. Please provide the trips caused by
8 operators at the Holyrood plant over the past ten years, the duration of same and
9 the steps to rectify.

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12 **A.** The basis for concluding that the experiences in Utah are applicable to
13 Newfoundland and Labrador can be considered in two parts: Operations Staffing
14 similarities; and Station Equipment similarities.

15 Operator Staffing:

- 16 - The training program at Utah (Intermountain) consists of four levels, the same
17 as Holyrood with the last year of training being the most advanced level to be
18 successfully completed before one attains fully trained status;
19 - Both utilities have only one thermal plant in their fleet;
20 - Both plants have similar 12 hour shift rotation; and
21 - The education for hire is similar; typically a technical diploma.

22 Station Equipment:

- 23 - Similar major equipment: Babcock & Wilcox boilers, GE turbines;
24 - The process is similar except Intermountain burns coal and Holyrood burns No.
25 6 heavy fuel oil. Steam drum, turbines, generators, feed pumps, fans, heaters
26 are all similar equipment;

- 1 - Both plants have centralized control rooms where the Operations staff monitors
2 and controls all major station equipment; and
3 - The control room layouts are very similar in that the operator consoles are
4 identical for like units.

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6 List of trips caused by operators over the past ten years:

YEAR	TRIP DETAILS			REASON	REMEDIAL ACTION
	<u>UNIT</u>	<u>DATE</u>	<u>TIME</u>		
2001	HRD #1	Nov. 14	08:24	North hydraulic pump was unable to maintain sufficient pressure. The South (standby) pump was not able to bring pressure back to normal to maintain system pressure.	Same for all events: -Training -Review Incident -Group discussion -Share the learning
2002	HRD #1	Mar. 14	21:16	Fuel temperature brought below trip setting.	
	HRD #3	Sept. 3	14:48	Boiler drum level controls failed due to level transmitter leak.	
	HRD #3	Nov. 27	03:04	Boiler tube leak	
2004	HRD #1	Oct. 7	12:30	Unit tripped during commissioning of a new control system. The problem caused a low drum level alarm that tripped the unit.	
2005	HRD #3	Sept. 30	N/A	Trip during transferring between redundant fuel oil pumps.	

2006	HRD #3	Apr. 12	N/A	Trip during testing on governor. The unit was generating 70 MW of the total system 759 MW at the time of the trip. Low Freq: 58.45 Hz	
2007	HRD #3	Nov.26	N/A	High drum level. HRD Unit #3 was generating 133 MW at the time of the trip. Low freq: 58.38 Hz	
	HRD #1	Dec 28	N/A	Failure of a lube oil pump. HRD Unit #1 was generating 120 MW at the time of the trip. Low freq: 58.44 Hz	
2009	HRD #1	Mar. 5	N/A	High drum level in the boiler. The plant was generating 90 MW of the total system 1022 MW at the time of the trip. Low Freq: 58.56 Hz	
	HRD #3	Dec. 6	N/A	High drum level in the boiler. The plant was generating 56 MW of the total system 1112 MW at the time of the trip. Low Freq: 58.75 Hz	

- 1 In addition, there were a number of other equipment related underfrequency load
- 2 shedding trips that may have been avoided had the operator practiced responding
- 3 to such situations in advance in order to improve his/her reaction with the correct

- 1 and immediate response. The following summarizes such events for the period
- 2 2001 to 2010.

YEAR	TRIP DETAILS			REASON	FUTURE REMEDIAL ACTION
	<u>UNIT</u>	<u>DATE</u>	<u>TIME</u>		
2001	HRD #1	Jan. 5	08:50	Intercept valve problem	Same for all events: Provide simulation and practice response.
	HRD #2	Oct. 15	11:25	Broken water pipe cause short in controls	
	HRD #1	Dec. 1	08:58	Hydraulic pressure problem	
2002	HRD #1	Jan. 14	11:50	Transducer for boiler steam pressure failed	
	HRD #3	Jan. 29	14:02	Loss of atomizing steam	
	HRD #1	Mar. 27	22:17	Equipment failure within electro-hydraulic controls.	
	HRD #3	Sept. 5	05:17	Boiler drum level controls failed due to faulty temperature sensor	
	HRD #3	Sept. 26	14:16	Boiler tube leak	
2003	HRD #2 & HRD #3	Jan.30	10:55	During the process of restoring loads from the HWD and OPD stations, both stations tripped. HRD Units 2 and 3 tripped in response to these conditions.	
2004	HRD #3	Apr. 13	20:37	Unit tripped due to a low fuel oil temperature alarm. Investigation found that a failed fuel oil thermocouple was to blame.	
	HRD #1	Dec. 21	15:53	Unit 1 tripped as a result of low airflow when the Unit 2	

				operator gained control of unit one through a software bug. At the time, Unit 2 was in the process of coming online.	
2006	HRD #2	Jan. 6	N/A	Boiler tube leak. The unit was generating 110 MW of the total system 977 MW at the time of the trip. Low Freq: 58.57 Hz	
	HRD #1	Dec. 15	N/A	Malfunction in the fuel oil controls system. The unit was generating 50 MW at the time of the trip. Low Freq: 58.8 Hz	
2007	HRD #1	June. 19	N/A	Station Service problem. HRD Unit #1 was generating 49 MW at the time of the trip. Low freq: 58.78 Hz	
	HRD #3	Oct. 12	N/A	Fuel control problem. HRD Unit #3 was generating at 77 MW at the time of the trip. Low freq: 58.68 Hz	
2008	HRD #3	Jan. 1	N/A	A downed phase wire fell across the unit transformer. The plant was generating 70 MW of the total system 892 MW at the time of the trip. Low Freq: 58.80 Hz	
	HRD #3	Feb. 14	N/A	Water in control cabinet of UST3 caused unit lockout. The plant was generating 145 MW of	

				the total system 1018 MW at the time of the trip. Low Freq: 58.50 Hz	
2009	HRD #2	Nov. 6	N/A	Broken linkage on feed water valve in the boiler. The plant was generating 97.5 MW of the total system 974 MW at the time of the trip. Low Freq: 58.33 Hz	
2010	HRD #3	Dec. 30	N/A	Cooling water flow issues. This removed approximately 70 MW of generation from the system. Total system load was 1059 MW. Low Freq: 58.7 Hz	

- 1 It should be noted that many of the operators directly involved in these events have
- 2 retired or transferred, so an exhaustive and detailed review of every incident was
- 3 not completed.