Q. Please describe why Hydro made no efforts to replace FD fan motors at the Holyrood Plant and confirm a “run to failure” approach was followed by Hydro.

A. A "run to failure" approach was not followed by Hydro with respect to the FD fan motors at the Holyrood Thermal Generating Station.

Consistent with the 2010/2011 AMEC condition assessment, Hydro continued its maintenance program on the Unit 3 FD fan motors, including required inspections of these assets.

Condition of the motors for Unit 3 did not support full replacement of the motors as noted by 2010/2011 AMEC condition assessment at pages 10-112 and 10-113, attached as PR-PUB-NLH-143 Attachment 1.

10.2.6.6 Risk Assessment

The risk assessment associated with the Unit 3 FD fans (and system), both from a technological perspective and a safety perspective, is illustrated below in Table 10-54.

TABLE 10-54 RISK ASSESSMENT – UNIT 3 FD FANS (AND SYSTEM)

BU # 1	Asset # 2	Asset # 3	Asset # 4	Asset # 5	Asset # 6	Unit	Asset 2/3	Asset 3/4	Description	Component	Risk Assess #	Appendix #	Major Issues	Remaining Life Years (Insufficient Info - Inspection Required Within (x) Years)	Remaining Life Comments	TECHNO_ECO RISK ASSESS MODEL			SAFETY RISK ASSESS MODEL			Possible Failure Event	Mitigation
																Likeli-hood	Conse-quence	Risk Level	Likeli-hood	Conse-quence	Safety Risk		
1296	8193	8336	8387	0	0	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER AIR SYSTEM		103		See detail below.										
1296	8193	8336	8387	8426	0	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER AIR SUPPLY (A/H TO	N/A	104		See detail below.										
1296	8193	8336	8387	8426	8429	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER AIR SUPPLY SEAL AIR	Scanner & Seal Air	105	19	Mechanical fatigue, corrosion, ops error.	10	None	1	A	Low	1	A	Low	Worst case - short duration shutdown for repair.	Current inspection and maintain.
1296	8193	8336	8387	8426	8432	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER SCANNER AIR SYSTEM	Scanner & Seal Air	106	19	Mechanical fatigue, corrosion, ops error.	10	None	1	A	Low	1	A	Low	Worst case - short duration shutdown for repair.	Current inspection and maintain.
1296	8193	8336	8387	8433	0	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER WINDBOX	N/A	107		Not addressed.	10	None								
1296	8193	8336	8387	8782	0	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER F.D. FAN SYSTEM	N/A	108		See detail below.	10	None								
1296	8193	8336	8387	8782	8392	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER F.D. FAN EAST	Unit #3 LP FD Fan	109	19	Mechanical fatigue, corrosion, ops error.	10	None	1	B	Low	1	B	Low	Derate by 50% for short period. Consider spare motor.	Current inspection and maintain.
1296	8193	8336	8387	8782	8393	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER F.D. FAN WEST	Unit #3 LP FD Fan	110	19	Mechanical fatigue, corrosion, ops error.	10	None	1	B	Low	1	B	Low	Derate by 50% for short period. Consider spare motor.	Spare and current inspection and maintain.
1296	8193	8336	8387	8782	8392	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER F.D. FAN EAST	4 kV Forced Draft Fan Motor	111	25	Electrical fault, mechanical fatigue, ops error.	(5)	None	2	C	Medium	2	C	Medium	Loss 60% of 1 unit generation and damages.	Spare and current inspection and maintain.
1296	8193	8336	8387	8782	8393	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER F.D. FAN WEST	4 kV Forced Draft Fan Motor	112	25	Electrical fault, mechanical fatigue, ops error.	(5)	None	2	C	Medium	2	C	Medium	Loss 60% of 1 unit generation and damages.	Current inspection and maintain.
1296	8193	8336	8387	8787	0	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER STEAM AIR HEATER		113		Not addressed.		None								
1296	8193	8336	8387	8787	8404	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER STEAM AIR HEATER EAST	Unit #3 Steam Preheat Coils	114	19	Corrosion, erosion, mechanical distortion.	10	None	1	A	Low	1	A	Low	Short term shutdown for repairs, derated or run at increased impact.	Current inspection and maintain.
1296	8193	8336	8387	8787	8405	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER STEAM AIR HEATER WEST	Unit #3 Steam Preheat Coils	115	19	Corrosion, erosion, mechanical distortion.	10	None	1	A	Low	1	A	Low	Short term shutdown for repairs, derated or run at increased impact.	Current inspection and maintain.
1296	8193	8336	8387	8788	0	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER MAIN AIR HEATER	APH Ductwork – Gas & Air	116	19	Corrosion, erosion thinning.	10	None	2	A	Low	2	A	Low	Short duration shutdown for repair/patch.	Current inspection and maintain.
1296	8193	8336	8387	8788	8410	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER MAIN AIR HEATER EAST	Unit #3 APH	117	19	Corrosion, mechanical failure.	10	None	1	B	Low	1	B	Low	50% shutdown for maintenance and repairs.	Current inspection and maintain.
1296	8193	8336	8387	8788	8411	3	BOILER PLANT	BOILER AIR SYSTEM	BOILER MAIN AIR HEATER WEST	Unit #3 APH	118	19	Corrosion, mechanical failure.	10	None	1	B	Low	1	B	Low	50% shutdown for maintenance and repairs.	Current inspection and maintain.
1296	8193	8336	8437	0	0	3	BOILER PLANT	BOILER GAS SYSTEM	BOILER GAS SYSTEM	N/A	119	19,20	Leaks into powerhouse.	10	None	3	B	Medium	3	B	Medium	Overpressure.	Maintenance, inspection.
1296	8193	8336	8437	8438	0	3	BOILER PLANT	BOILER GAS SYSTEM	BOILER GAS PASSES	N/A	120	19,20	Leaks into powerhouse.	10	None	3	B	Medium	3	B	Medium	Duct split/corrosion.	Maintenance, inspection.
1296	8193	8336	8437	8452	0	3	BOILER PLANT	BOILER GAS SYSTEM	BOILER SOOTBLOWING SYSTEM	N/A	121		Mechanical failure.	10	None	2	B	Low	2	B	Low	Steam leak. Tube erosion.	Current inspection and maintain.
1296	8193	8336	8460	0	0	3	BOILER PLANT	BOILER FUEL FIRING SYSTEM	BOILER FUEL FIRING SYSTEM	Fuel Feed System	122	19	Mechanical fatigue, corrosion, ops error.	10	None	1	A	Low	1	C	Low	Derate for short period.	Current inspection and maintain.
1296	8193	8336	8460	8461	0	3	BOILER PLANT	BOILER FUEL FIRING SYSTEM	BOILER HEAVY OIL SYSTEM	N/A	123	19	Mechanical fatigue, corrosion, ops error.	10	None	1	A	Low	1	C	Low	Derate for short period. Safety.	Current inspection and maintain.
1296	8193	8336	8460	8484	0	3	BOILER PLANT	BOILER FUEL FIRING SYSTEM	BOILER LIGHT OIL SYSTEM	N/A	124	19	Mechanical fatigue, corrosion, ops error.	10	None	1	A	Low	1	C	Low	Derate for short period. Safety.	Current inspection and maintain.
1296	8193	8336	8503	0	0	3	BOILER PLANT	BOILER AUXILIARY STEAM AND CONDENSATE	BOILER AUXILIARY STEAM AND CONDENSATE	N/A	125		Mechanical failure.	(5)	None	3	A	Low	3	B	Medium	Steam leak.	Current inspection and maintain.
1296	8193	8336	8337	0	0	3	BOILER PLANT	BOILER STRUCTURE	BOILER STRUCTURE	N/A	129	17	Mechanical failure.	20	None	1	D	Medium	1	D	Low	Structure collapse.	Maintain and inspect.

10.2.6.7 Life Cycle Curve and Remaining Life

The life cycle curve for the system is illustrated below. One curve is required to represent the all elements given all is original equipment. The life curves are plots of current and projected operating hours (generation mode only) on the y-axis versus calendar year on the x-axis. The figure has several vertical lines representing differing representative nominal age limits. It also has several horizontal lines that represent a range of practical equipment equivalent base loaded operating hour life limits. The risk area boxes provide an indication of the timing of potential issues either from an age or equivalent operating hours view.

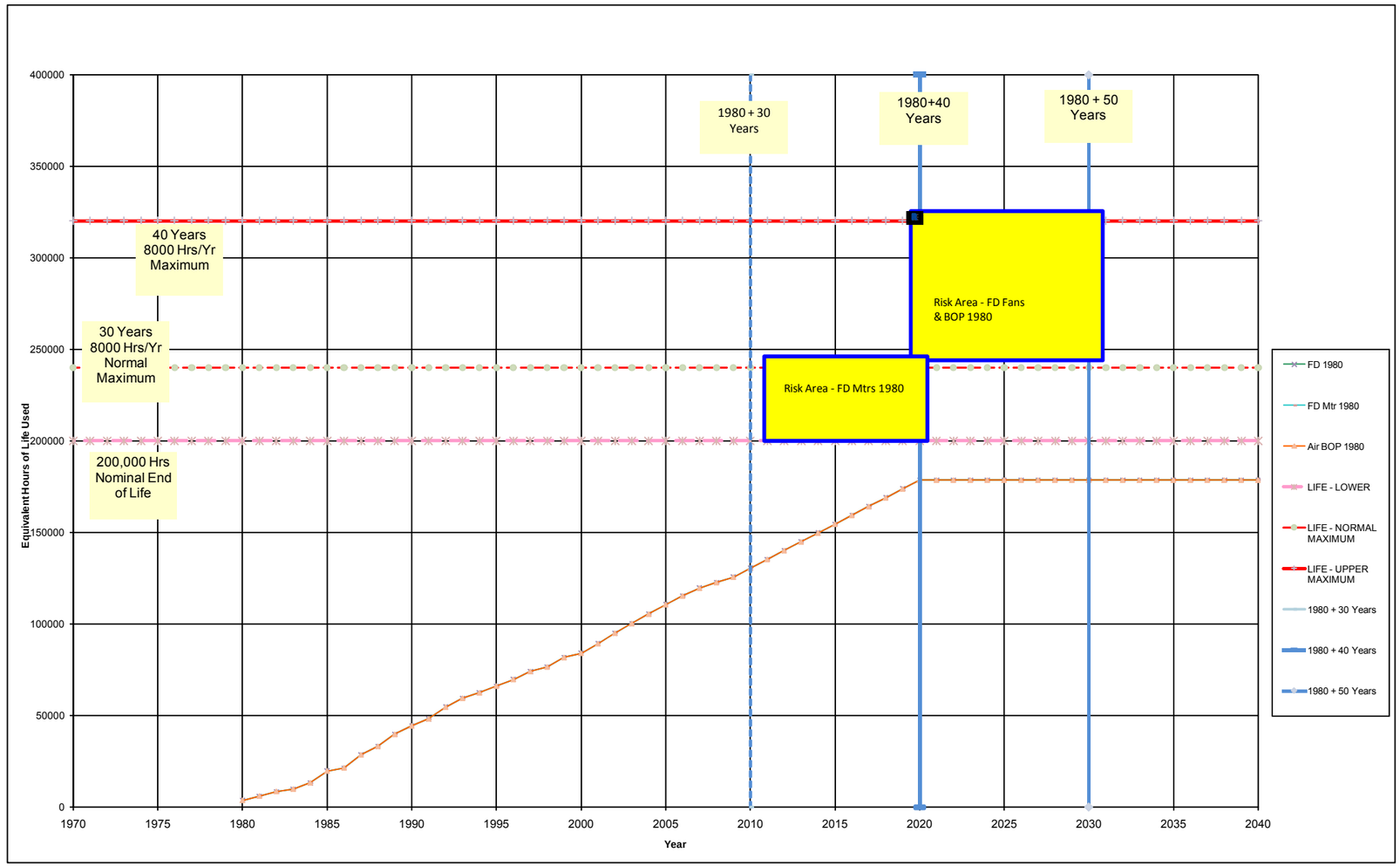

FIGURE 10-22 LIFE CYCLE CURVE – UNIT 3 FD FANS (AND SYSTEM)

The curves indicate that the remaining life (RL) of the Unit 3 FD fans (and system) are likely able to meet or exceed the desired life (DL) 2020 end date for generation. The age of the large 4 kV motors makes them a logical cost-effective candidate for sparing to ensure reliability, although plant testing/monitoring programs are effectively monitoring their status.