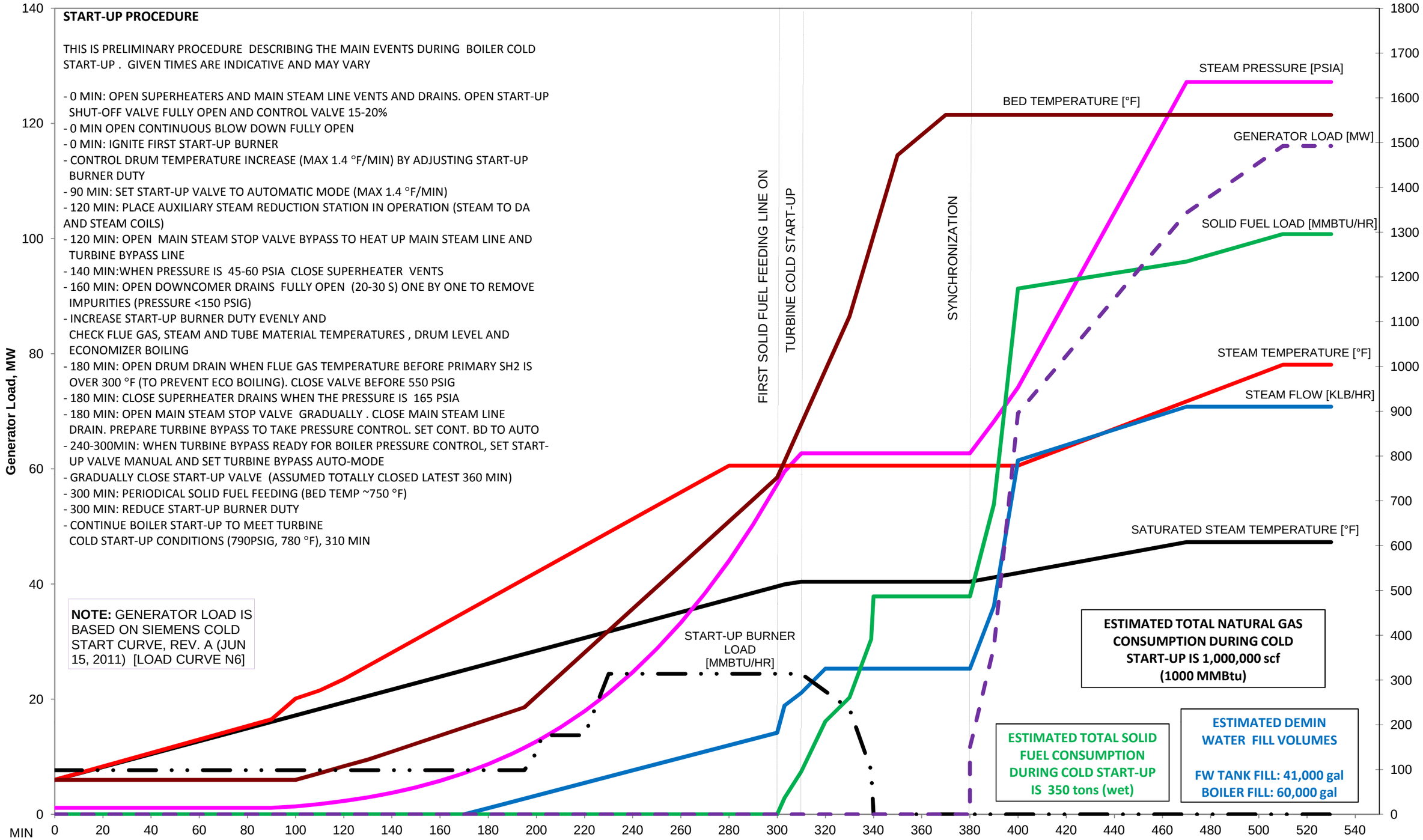
METSO
POWER

GAINESVILLE

# PRELIMINARY COLD START-UP CURVE




**START-UP PROCEDURE**

THIS IS PRELIMINARY PROCEDURE DESCRIBING THE MAIN EVENTS DURING BOILER COLD START-UP . GIVEN TIMES ARE INDICATIVE AND MAY VARY

- 0 MIN: OPEN SUPERHEATERS AND MAIN STEAM LINE VENTS AND DRAINS. OPEN START-UP SHUT-OFF VALVE FULLY OPEN AND CONTROL VALVE 15-20%
- 0 MIN OPEN CONTINUOUS BLOW DOWN FULLY OPEN
- 0 MIN: IGNITE FIRST START-UP BURNER
- CONTROL DRUM TEMPERATURE INCREASE (MAX 1.4 °F/MIN) BY ADJUSTING START-UP BURNER DUTY
- 90 MIN: SET START-UP VALVE TO AUTOMATIC MODE (MAX 1.4 °F/MIN)
- 120 MIN: PLACE AUXILIARY STEAM REDUCTION STATION IN OPERATION (STEAM TO DA AND STEAM COILS)
- 120 MIN: OPEN MAIN STEAM STOP VALVE BYPASS TO HEAT UP MAIN STEAM LINE AND TURBINE BYPASS LINE
- 140 MIN:WHEN PRESSURE IS 45-60 PSIA CLOSE SUPERHEATER VENTS
- 160 MIN: OPEN DOWNCOMER DRAINS FULLY OPEN (20-30 S) ONE BY ONE TO REMOVE IMPURITIES (PRESSURE <150 PSIG)
- INCREASE START-UP BURNER DUTY EVENLY AND CHECK FLUE GAS, STEAM AND TUBE MATERIAL TEMPERATURES , DRUM LEVEL AND ECONOMIZER BOILING
- 180 MIN: OPEN DRUM DRAIN WHEN FLUE GAS TEMPERATURE BEFORE PRIMARY SH2 IS OVER 300 °F (TO PREVENT ECO BOILING). CLOSE VALVE BEFORE 550 PSIG
- 180 MIN: CLOSE SUPERHEATER DRAINS WHEN THE PRESSURE IS 165 PSIA
- 180 MIN: OPEN MAIN STEAM STOP VALVE GRADUALLY . CLOSE MAIN STEAM LINE DRAIN. PREPARE TURBINE BYPASS TO TAKE PRESSURE CONTROL. SET CONT. BD TO AUTO
- 240-300MIN: WHEN TURBINE BYPASS READY FOR BOILER PRESSURE CONTROL, SET START-UP VALVE MANUAL AND SET TURBINE BYPASS AUTO-MODE
- GRADUALLY CLOSE START-UP VALVE (ASSUMED TOTALLY CLOSED LATEST 360 MIN)
- 300 MIN: PERIODICAL SOLID FUEL FEEDING (BED TEMP ~750 °F)
- 300 MIN: REDUCE START-UP BURNER DUTY
- CONTINUE BOILER START-UP TO MEET TURBINE COLD START-UP CONDITIONS (790PSIG, 780 °F), 310 MIN

**NOTE:** GENERATOR LOAD IS BASED ON SIEMENS COLD START CURVE, REV. A (JUN 15, 2011) [LOAD CURVE N6]

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