

Mankato Energy Center Start profile for winter months

No Auxiliary Boiler						With Auxiliary Boiler					
Hot						Hot					
Hour	CT Gas	AXB Gas	CT %load	STG % load		Hour	CT Gas	AXB Gas	CT %load	STG % load	
1	1200	0	60	0		1	1200	0	60	0	
2	1450	0	60	35	AGC Available	2	1450	0	60	35	AGC Available
Fuel	2650	0		Total Fuel	2650	Fuel	2650	0		Total Fuel	2650
Warm						Warm					
Hour	CT Gas	AXB Gas	CT %load	STG % load		Hour	CT Gas	AXB Gas	CT %load	STG % load	
1	1000	0	30	0		1	0	70	0	0	
1.55	1450	0	60	0		2	1000	70	30	0	
2	1450	0	60	0		2.55	1450	70	60	0	
3	1450	0	60	10		3	1450	5	60	10	
4	1450	0	60	35	AGC Available	4	1450	5	60	35	AGC Available
Fuel	6800	0		Total Fuel	6800	Fuel	5350	220		Total Fuel	5570
Cold						Cold					
Hour	CT Gas	AXB Gas	CT %load	STG % load		Hour	CT Gas	AXB Gas	CT %load	STG % load	
1	1000	0	30	0		1	0	70	0	0	
2	1000	0	30	0		2	0	70	0	0	
3.05	1450	0	60	0		3	1000	70	30	0	
4	1450	0	60	0		4	1000	70	30	0	
5	1450	0	60	10		5.05	1450	5	60	10	
6	1450	0	60	20		6	1450	5	60	20	
6.5	675	0	60	35	AGC Available	6.5	675	5	60	35	AGC Available
Fuel	8475	0		Total Fuel	8475	Fuel	5575	295		Total Fuel	5870

Hot = Steam turbine offline less than 8 hours - CT in compliance within 60 minutes

Warm = Steam turbine offline between 8 and 48 hours - CT in compliance within 95 minutes

Cold = Steam turbine offline more than 48 hours - CT in compliance within 185 minutes

Fuel is based on 20 degrees F ambient and in the units of MMBTU

Summary:

Total fuel to AGC in MMBTU

	W/O AXB	W/AXB
Hot	2650	2650
Warm	6800	5570
Cold	8475	5870

Above "Assume starts" is based on a plant dispatch of 3 time a week.

CO	Nox	CO lbs saved	Nox saved	\		
		869.8144752	79.30856585	LMEC Aux Boiler	320 mmbtu/hr	lb/mmbtu

1133.861 85.4747472
1122.725 85.4825451
1111.589 85.490343
1100.453 85.4981408
1089.317 85.5059387
1078.18 85.5137366
1067.044 85.5215344
1055.908 85.5293323
1044.772 85.5371302
1033.636 85.544928
1022.5 85.5527259
1011.364 85.5605238
1000.228 85.5683216
989.0917 85.5761195
977.9556 85.5839174
966.8195 85.5917152
955.6834 85.5995131
944.5473 85.607311
933.4112 85.6151088
922.2751 85.6229067
911.139 85.6307046
900.0029 85.6385024
888.8668 85.6463003
877.7307 85.6540982
866.5946 85.6618961
850.5137 85.0004765
834.4328 84.339057
818.3519 83.6776374
802.271 83.0162179
786.1901 82.3547984
770.1092 81.6933788
754.0282 81.0319593
737.9473 80.3705398
721.8664 79.7091202
705.7855 79.0477007
689.7046 78.3862812
673.6237 77.7248616
657.5428 77.0634421
641.4619 76.4020225
625.381 75.740603
609.3 75.0791835
593.2191 74.4177639
577.1382 73.7563444
561.0573 73.0949249

544.9764 72.4335053
528.8955 71.7720858
512.8146 71.1106663
496.7337 70.4492467
480.6528 69.7878272
464.5718 69.1264076
448.4909 68.4649881
432.41 67.8035686
416.3291 67.142149
400.2482 66.4807295
384.1673 65.81931
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382.5264 65.1373014
380.8854 64.4552928
379.2445 63.7732842
377.6036 63.0912756
375.9627 62.409267
374.3218 61.7272583
372.6809 61.0452497
371.0399 60.3632411
369.399 59.6812325
367.7581 58.9992239
366.1172 58.3172153
364.4763 57.6352067
362.8354 56.9531981
361.1944 56.2711895
359.5535 55.5891809
357.9126 54.9071723
356.2717 54.2251637
354.6308 53.5431551
352.9899 52.8611465
351.3489 52.1791379

104377.7 9517.0279

869.8145 79.3085658