# Table 3.4-6 Heat and Material Balances – Case 5

| | | 62 °F, 70% RH | | | | | 62 °F, 70% RH | | | | | 62 °F, 70% RH | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GTG Load: | | 100% | | | | | 75% | | | | | 50% | | | | |
| Duct Burner Status: | | Off | | | | | Off | | | | | Off | | | | |
| Fogger Status: | | On | | | | | Off | | | | | Off | | | | |
| Stream No | Description | Flow, kpph Per Train | Flow, kpph Plant Total | Temp. °F | Pressure psia | Enthalpy Btu/lbm | Flow, kpph Per Train | Flow, kpph Plant Total | Temp. °F | Pressure psia | Enthalpy Btu/lbm | Flow, kpph Per Train | Flow, kpph Plant Total | Temp. °F | Pressure psia | Enthalpy Btu/lbm |
| C1 | Condensate from Condenser | — | 1,095 | 94 | 295 | 63 | — | 921 | 89 | 253 | 58 | — | 797 | 85 | 256 | 54 |
| C2 | Condensate to HRSG Boundary Limit | 593 | — | 98 | 291 | 67 | 499 | — | 93 | 249 | 62 | 431 | — | 90 | 252 | 58 |
| C3 | FW from LP Drum to HP/IP FW Pump | 547 | — | 314 | 82 | 284 | 465 | — | 299 | 66 | 1,180 | 404 | — | 288 | 56 | 258 |
| C4 | HP FW Pump Discharge | 472 | — | 317 | 1,445 | 289 | 407 | — | 302 | 2,169 | 276 | 357 | — | 291 | 1,644 | 264 |
| C5 | IP FW Pump Bleed | 75 | — | 314 | 455 | 285 | 57 | — | 299 | 627 | 270 | 47 | — | 288 | 513 | 259 |
| C6 | Hot IP FW to Fuel Gas Preheater | 46 | — | 431 | 387 | 409 | 39 | — | 417 | 328 | 394 | 32 | — | 405 | 286 | 381 |
| C7 | Cold IP FW from Fuel Gas Preheater | 46 | — | 145 | 316 | 114 | 39 | — | 145 | 274 | 114 | 32 | — | 145 | 277 | 114 |
| C8 | Demin Water Makeup Into Condenser | — | 19 | 60 | 30 | 28 | — | 16 | 60 | 30 | 28 | — | 14 | 60 | 30 | 28 |
| G1 | Gas Turbine Inlet Air | 3,487 | — | 62 | 14 | — | 2,769 | — | 62 | 14 | — | 2,306 | — | 62 | 14 | — |
| G2 | Gas Turbine Exhaust | 3,569 | — | 1,117 | 15 | — | 2,832 | — | 1,166 | 15 | — | 2,356 | — | 1,200 | 15 | — |
| G3 | After HRSG Duct Burners | 3,569 | — | 1,054 | 15 | — | 2,832 | — | 1,065 | 15 | — | 2,356 | — | 1,062 | 15 | — |
| G4 | HRSG Stack Exit | 3,569 | — | 196 | 14 | — | 2,832 | — | 179 | 14 | — | 2,356 | — | 169 | 14 | — |
| F1 | Cold Natural Gas Fuel to Plant | — | 156 | 60 | 564 | — | — | 125 | 60 | 564 | — | — | 100 | 60 | 564 | — |
| F2 | Cold Natural Gas Fuel to Each GTG | 78 | — | 60 | 564 | — | 63 | — | 60 | 564 | — | 50 | — | 60 | 564 | — |
| F3 | Hot Natural Gas Fuel to Gas Turbine | 78 | — | 365 | 514 | — | 63 | — | 365 | 514 | — | 50 | — | 365 | 514 | — |
| F4 | Cold NG Fuel to HRSG Duct Burners | 0 | 0 | 60 | 564 | — | 0 | 0 | 60 | 564 | — | 0 | 0 | 60 | 564 | — |
| S1 | HRSG HP Superheater Exit | 426 | 853 | 1,044 | 1,459 | 1,518 | 369 | 737 | 1,054 | 1,270 | 1,530 | 325 | 649 | 1,054 | 1,121 | 1,534 |
| S2 | HRSG Hot RH Exit | 497 | 994 | 1,035 | 343 | 1,544 | 423 | 846 | 1,048 | 294 | 1,552 | 369 | 737 | 1,048 | 256 | 1,553 |
| S3 | HRSG IP Superheater Exit | 75 | 150 | 582 | 367 | 1,299 | 57 | 115 | 567 | 315 | 1,295 | 47 | 94 | 553 | 275 | 1,291 |
| S4 | HRSG LP Superheater Exit | 38 | 76 | 575 | 78 | 1,319 | 27 | 53 | 561 | 64 | 1,313 | 20 | 41 | 547 | 54 | 1,307 |
| S5 | Cold RH to HRSG from STG | — | 844 | 690 | 367 | 1,359 | — | 730 | 698 | 315 | 1,366 | — | 643 | 697 | 275 | 1,368 |
| S6 | Mixed RH Steam Into HRSG Reheater | 497 | — | 673 | 361 | 1,351 | 422 | — | 680 | 309 | 1,357 | 368 | — | 679 | 270 | 1,359 |
| S7 | HP STG Throttle Steam | — | 853 | 1,039 | 1,403 | 1,517 | — | 737 | 1,050 | 1,221 | 1,529 | — | 649 | 1,050 | 1,078 | 1,533 |
| S8 | STG HP Exhaust as Cold Reheat | — | 844 | 690 | 378 | 1,359 | — | 730 | 698 | 324 | 1,366 | — | 643 | 697 | 284 | 1,368 |
| S9 | Hot Reheat Steam Into STG | — | 994 | 1,032 | 327 | 1,543 | — | 846 | 1,045 | 280 | 1,551 | — | 737 | 1,045 | 244 | 1,552 |
| S10 | LP Superheated Steam Into STG | — | 76 | 571 | 69 | 1,317 | — | 53 | 558 | 59 | 1,312 | — | 41 | 544 | 51 | 1,305 |
| S11 | STG LP Exhaust Steam to Condenser | — | 1,076 | 94 | 1 | 1,102 | — | 905 | 89 | 1 | 1,100 | — | 783 | 85 | 1 | 1,098 |
| W1 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W2 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W3 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W4 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W5 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W6 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W7 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| W8 | Hot Closed Loop CW | — | 1,443 | 91 | 9 | 59 | — | 1,128 | 90 | 9 | 58 | — | 843 | 88 | 9 | 56 |
| W9 | Not Used | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

| Performance Summary | Per Train | Plant Total | Per Train | Plant Total | Per Train | Plant Total |
|---|---|---|---|---|---|---|
| CTG Heat Input, NG [1,4] mm Btu/h, LHV | 1,581 | 6,323 | 1,270 | 5,080 | 1,016 | 4,064 |
| HRSG Duct Burners mm Btu/h, LHV | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Heat Consumption mm Btu/h, LHV | 1,581 | 6,323 | 1,270 | 5,080 | 1,016 | 4,064 |
| Gas Turbine Gross Output kW | 168,600 | 674,400 | 124,500 | 498,000 | 83,000 | 332,000 |
| Steam Turbine Gross Output kW | — | 374,928 | — | 321,954 | — | 280,504 |
| Gross Power Output kW | — | 1,049,328 | — | 819,954 | — | 612,504 |
| Auxiliary Power kW | — | 23,535 | — | 24,411 | — | 21,353 |
| Net Power kW | — | 1,025,793 | — | 795,543 | — | 591,151 |
| Net Plant Heat Rate Btu/kWh, LHV | — | 6,164 | — | 6,385 | — | 6,874 |
| Net Plant Heat Rate Btu/kWh, HHV | — | 6,835 | — | 7,081 | — | 7,623 |

Notes:

1. GTG data from or implied by GE-GTG.
2. HRSG data from GTMaster.
3. STG data from GTMaster.
4. Fuel gas LHV based on 20,248 BTU/lb.
5. The above heat and material balance is an estimate. All values are subject to change pending detailed design development.