## COST EVALUATION INFORMATION

| | | |
|---|---|---|
| UNIT LIFE (for each) | | 35 years |
| CAPACITY RATING (each unit) | | 800 MW net |
| NET UNIT HEAT RATE | | 9600 Btu/Kwhr |
| CAPACITY FACTOR | | 83 % |
| Equilavent Availability | 89 % | |
| Forced Outage Rate | 2 % | |
| Load Factor (gross) | 95 % | |
| FUEL COSTS | | 1.45 $/MBtu |

| | |
|---|---|
| Boiler Efficiency | 89.4 % |
| Change in O/S Burner Temp versus change in Boiler Efficiency | 100 F/ 1/2 % |

Date of Commercial Service

| | |
|---|---|
| Unit 1 | 5/10/86 |
| Unit 2 | 7/1/87 |

BWFP 1010-6

## A — FUEL AS FIRED

| | | | |
|---|---|---|---|
| SAMPLES | | | |
| ANALYSIS | | | |
| COAL — SOURCE — MINE | | | |
| CLASS | | | |
| GROUP | | | |
| SEAM | | | |
| DISTRICT | | | |
| COUNTY | | | |
| STATE | | | UTAH |
| SIZE | | 1-5/8"x0 | -5/8"x0 |
| GRINDABILITY | | 55 | 48 |
| SURFACE MOISTURE, % | | | |
| ASH SOFT. TEMP., F (REDUCING) | | 2350 | 2215(H-W) |
| PROXIMATE ANALYSIS — MOISTURE, TOTAL | | 18.8 | 8.3 |
| VOLATILE MATTER | | 35.5 | 37.1 |
| FIXED CARBON | | 37.9 | 40.6 |
| ASH | | 7.8 | 14.0 |
| TOTAL | | 100.0 | 100.0 |

| ULTIMATE ANALYSIS — FUEL B.B. | PULV. DES WT. | RANGE PC WT. | COAL "F" WT. | PERF. COAL WT. |
|---|---|---|---|---|
| ASH | | 8.0-16.0 | 7.81 | 14.00 |
| S | | 0.4- 0.7 | 0.93 | 0.55 |
| $H_2$ | | 4.3- 4.9 | 4.13 | 4.56 |
| C | | 58.5-64.5 | 55.60 | 61.45 |
| $CH_4$ | | | | |
| $C_2H_6$ | | | | |
| $C_3H_8$ | | | | |
| $C_4H_{10}$ | | | | |
| $C_5H_{12}$ | | | | |
| $C_6H_{14}$ | | | | |
| CO | | 0-0.04 | 0.04 | 0.02 |
| $CO_2$ | | | | |
| $SO_2$ | | | | |
| $H_2O$ | 12.0 | 7.4-9.3 | 18.80 | 8.30 |
| $N_2$ | | 1.0-1.5 | 0.86 | 1.20 |
| $O_2$ | | 9.3-10.5 | 11.83 | 9.92 |
| TOTAL | 43 GRIND | | 100.00 | 100.00 |
| BTU/LB | 10,700 | 9,500 to 2,100 | 9,962 | 11,010 |
| BTU/CU FT AT 60F 30 IN. HG | | | | |

COAL "F" WILL NOT EXCEED 50% BY WT. OF A COAL MIXTURE

* NOT INCLUDING VALVES & STATIC HEAD
▲ AT PULVERIZER INLET
** INCLUDES (-1.5 INCHES WG) FOR STACK EFFECT

UTILITY BOILER PERFORMANCE SUMMARY

BY RJK APPL. DATE 12/2/81

BABCOCK & WILCOX

P23-310-0-150

## B — PREDICTED PERFORMANCE

| | | | | | |
|---|---|---|---|---|---|
| STEAM LEAVING SH, M LB/HR | 3965 | 3965 | 6100 | 6100 | 6600 |
| STEAM LEAVING RH, M LB/HR | 3250 | 3250 | 5000 | 5000 | 5500 |
| AUX. STEAM M LB/HR | 0 | 450 | 0 | 450 | 0 |
| TYPE OF FUEL | PERF. COAL | PERF. COAL | PERF. COAL | PERF. COAL | PERF. COAL |
| LOAD CONDITION | 65% | 65% | 100% | 100% | MCR |
| EXCESS ASH LEAVING FURN., % | 23 | 23 | 17 | 17 | 17 |
| NO. OF BURNERS IN OPERATION | 42 | 42 | 42 | 42 | 42 |
| HEAT. AVAIL., MMB/HR (FUEL & HEATED AIR) | 5494 | 5908 | 7968 | 8374 | 8500 |
| TOTAL INPUT, MMB/HR (FUEL & HT. CREDITS) | 5261 | 5662 | 7563 | 7940 | 8049 |
| HEAT CREDITS, MMB/HR | 6.1 | 6.5 | 7.6 | 7.8 | 7.9 |
| FUEL INPUT MMB/HR | 5255 | 5655 | 7555 | 7932 | 8040 |
| QUANTITY, M LB/HR — FUEL (MCFH-NAT. GAS) | 477.3 | 513.6 | 686.2 | 720.4 | 730.2 |
| FLUE GAS ENTERING AIR HTRS. | 5274 | 5611 | 7241 | 7600 | 7703 |
| AIR TO BURNING EQUIPMENT | 4762 | 5064 | 6538 | 6862 | 6954 |
| AIR HEATER LEAKAGE | 367 | 378 | 477 | 498 | 505 |
| PRESSURE, PSIG — STEAM AT SH OUTLET | 2440 | 2440 | 2515 | 2515 | 2640 |
| STEAM AT RH OUTLET | 350 | 350 | 539 | 539 | 590 |
| STEAM AT RH INLET | | | | | |
| PRESSURE DROP — REHEATER 1 | 16 | 16 | 25 | 28 | 28 |
| REHEATER 2 | | | | | |
| ECONOMIZER ▲ | 11 | 13 | 25 | 29 | 29 |
| DRUM TO SH OUTLET | 68 | 73 | 160 | 172 | 182 |
| TEMPERATURE, F — STEAM — LEAVING SUPERHEATER | 1005 | 1005 | 1005 | 1005 | 1005 |
| LEAVING REHEATER 1 | 1005 | 1005 | 1005 | 1005 | 1005 |
| ENTERING REHEATER 1 | 580 | 580 | 620 | 620 | 630 |
| LEAVING REHEATER 2 | | | | | |
| ENTERING REHEATER 2 | | | | | |
| GAS — LEAVING ECONOMIZER | 686 | 675 | 725 | 730 | 740 |
| LEAVING AH (INCL. LKG) P/S | 312/276 | 311/277 | 311/286 | 311/289 | 311/294 |
| LEAVING AH (INCL. LKG) P/S | 280/267 | 280/268 | 280/276 | 280/279 | 280/280 |
| WATER ENTERING ECONOMIZER | 490 | 490 | 543 | 543 | 555 |
| AIR — ENTERING UNIT PRI/SEC | 74/62 | 74/63 | 77/64 | 78/65 | 78/65 |
| LEAVING AIR HEATER P ▲/SEC | 355/618 | 375/624 | 412/635 | 418/636 | 420/645 |
| RESISTANCE, IN. OF WATER — GAS — FURNACE & CONVECTION BANKS | 2.2 | 1.9 | 2.7 | 3.3 | 3.1 |
| FLUES TO AH OUTLET | 0.9 | 1.0 | 1.4 | 1.5 | 1.5 |
| AIR HEATER | 2.1 | 2.3 | 3.8 | 4.1 | 4.2 |
| TOT. FROM FURNACE TO AH OUTLET | 5.2 | 5.2 | 7.9 | 8.9 | 8.8 |
| AIR — FULL BURNERS & WINDBOX ** | -0.3 | 0.0 | 1.1 | 1.4 | 1.4 |
| DUCTS & FLOW METER | 1.0 | 1.2 | 2.1 | 2.3 | 2.3 |
| AIR HEATER | 1.1 | 1.2 | 2.0 | 2.3 | 2.3 |
| TOT. FROM AH INLET TO FURN. | 1.8 | 2.2 | 5.2 | 6.0 | 6.0 |
| HEAT LOSS-EFF., % — DRY GAS | 4.92 | 4.84 | 4.84 | 4.86 | 4.98 |
| $H_2$ & $H_2O$ IN FUEL | 5.14 | 5.14 | 5.15 | 5.15 | 5.16 |
| MOISTURE IN AIR | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| UNBURNED COMBUSTIBLE | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| RADIATION | 0.24 | 0.22 | 0.17 | 0.16 | 0.15 |
| UNACC. FOR & MFRS. MARGIN | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| TOTAL HEAT LOSS | 11.57 | 11.47 | 11.43 | 11.44 | 11.56 |
| *GROSS EFFICIENCY OF UNIT, % | 88.43 | 88.53 | 88.57 | 88.56 | 88.44 |
| HEAT CREDITS ADJUSTMENT, % | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| NET EFFICIENCY A.S.M.E. PTC-4.1, % | 88.44 | 88.54 | 88.58 | 88.57 | 88.45 |
| FUEL EFFICIENCY, % (OUTPUT/FUEL INPUT) | 88.55 | 88.65 | 88.67 | 88.66 | 88.54 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PULVERIZERS — NO. IN USE PER BOILER | 4 | 7 | 5 | 7 | 6 | 7 | 6 | 7 | 6 | 7 |
| TOTAL POWER, KW HR/TON MOTOR OUTPUT | | | | | | | | | | |
| % THRU 200 U.S.S. SIEVE | 71 | 76 | 72 | 75 | 71 | 73 | 71 | 72 | 70 | 72 |

PREDICTED PERFORMANCE IS BASED ON COMBUSTION AIR ENTERING UNIT WITH .0067 LB MOISTURE/LB DRY AIR, ON 25.18 IN. HG. BAROMETRIC PRESSURE, ON CONDITIONS & EQUIPMENT GIVEN ON THIS SUMMARY SHEET & ON ARRANGEMENT SHOWN ON DRAWING

## C — EQUIPMENT PER UNIT

| | | |
|---|---|---|
| TYPE | RADIANT | |
| SIZE | RBC | |
| | DESIGN PRESSURE (SH/RH) - 2975 PSIG/750 PSIG | |
| FURNACE — WATER COOLED SCREEN (CIRCUMFERENTIAL) | | |
| WATER COOLED (PROJECTED) | | 59,130 |
| SUPERHEATER (PERIPHERAL) 54" CENTERLINE | | 23,244 |
| SUPERHEATER (PERIPHERAL) 24" CENTERLINE | | 35,665 |
| SUPERHEATER (PROJECTED) | | 4,367 |
| TOTAL FURNACE HEATING SURFACE | | 122,406 |
| CONVECTION — SATURATED (CIRCUMFERENTIAL) | | 13,035 |
| SUPERHEATER (CIRCUMFERENTIAL) | | 279,082 |
| REHEATER 1 (CIRCUMFERENTIAL | | 300,263 |
| REHEATER 2 (CIRCUMFERENTIAL) | | |
| ECONOMIZER | | 99,902 |
| TOTAL CONVECTION HEATING SURFACE | | 692,282 |
| TOTAL FURN. & CONV. PRESSURE PART. HTG. SURF. | | 814,688 |
| PLAN PROJECTED FURNACE HEATING SURFACE — TO FACE OF PLATENS (24" CENTERLINE) | | 87,405 |
| TO FACE OF CONVECTION SURFACE (12" CENTERLINE) | | 125,510 |
| FURNACE VOLUME, CU FT | | 962,055 |
| AIR HEATER — TYPE REGENERATIVE-SECONDARY | NO. 2-33-1/2 VI-64 | |
| TOTAL HEATING SURFACE, SQ FT | | 1,047,800 |
| TYPE: REGENERATIVE-PRIMARY | NO. 2-24-1/2 VI-44 | |
| TOTAL HEATING SURFACE, SQ FT. | | 135,600 |
| FUEL BURNER — TYPE DUAL REGISTER | | |
| NO. 48 (6 BURNERS PER PULVERIZER) | | |
| PULVERIZER — TYPE MPS SIZE 89GR NO. 8 | | |
| CAPACITY OF 6 PULV. IS 6600 M LB STEAM/HR BASED ON 68 GRIND 11,010 BTU COAL AT 70 % THRU 200 U.S.S. SIEVE | | |
| FOR 113.3 M LB COAL/PULV.-HR AT 70 % THRU 200 U.S.S. SIEVE MER. GRIND IS 43. MAXIMUM TOTAL MOISTURE IS 12.8 % DURING | 465 F AIR | |
| 22% TOTAL MOISTURE COAL REQUIRES 540 F AIR. | | |
| STEAM TEMP. CONTROL — SUPERHEAT BY SPRAY ATTEMPERATION | | |
| REHEAT BY GAS BIASING | | |
| UNIT CONSTRUCTION FEATURES — MEMBRANE WALL | | |
| BALANCE DRAFT | | |
| INDOOR UNIT | | |
| "AS SOLD" ARRANGEMENT | | |

*CORRESPONDING TO AUG. METHOD PAR. 1.07 A.S.M.E. PTC-4.1

| REVISIONS — NO. | DESCRIPTION | BY | DATE |
|---|---|---|---|
| | | | |

INTERMOUNTAIN POWER PROJECT

Design

IP7_004293

INTERMOUNTAIN POWER PROJECT - RB-614
STEAM GENERATOR UNITS 1-4
PROJECT FILE 9255.62.3401
IPA CONTRACT 2010N

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SEP 7 1982
BLACK & VEATCH

SUBJECT Customer Information per Div. F1, Article 7 DATE 12-8-81 

Article 7.1(c)(1)

| | MCR PRESS PSIG | MCR TEMP °F | 100% P PSIG | 100% T °F | 75% P PSIG | 75% T °F | 50% P PSIG | 50% T °F | 25% P PSIG | 25% T °F |
|---|---|---|---|---|---|---|---|---|---|---|
| Economizer Inlet Header | 2880 | 554 | 2723 | 545 | 2600 | 512 | 2510 | 470 | 2458 | 405 |
| Economizer Intermediate Hdr. | 2866 | 571 | 2711 | 561 | 2590 | 526 | 2501 | 481 | 2450 | 438 |
| Economizer Outlet Header | 2841 | 574 | 2686 | 565 | 2567 | 529 | 2480 | 484 | 2430 | 443 |
| Steam Drum | 2822 | 687 | 2670 | 679 | 2558 | 671 | 2475 | 667 | 2428 | 665 |
| Furnace Lower Wall Hdrs. | 2879 | 667 | 2723 | 659 | 2608 | 656 | 2523 | 654 | 2472 | 651 |
| Furnace Upper Wall Hdrs. | 2827 | 687 | 2675 | 679 | 2562 | 671 | 2478 | 667 | 2430 | 665 |
| Primary SH Inlet Headers | 2791 | 695 | 2644 | 687 | 2544 | 683 | 2469 | 679 | 2426 | 674 |
| Primary SH Outlet Header | 2773 | 720 | 2628 | 720 | 2536 | 709 | 2464 | 692 | 2425 | 692 |
| Furn. Platen SH Inlet Hdr. | 2758 | 717 | 2615 | 706 | 2529 | 694 | 2461 | 692 | 2425 | 692 |
| Furn. Platen SH Outlet Hdr. | 2732 | 784 | 2592 | 777 | 2516 | 777 | 2455 | 782 | 2423 | 781 |
| Secondary SH Inlet Hdrs. | 2717 | 784 | 2579 | 777 | 2508 | 764 | 2452 | 775 | 2422 | 781 |
| Sec. SH Intermediate Manifolds | 2699 | 914 | 2563 | 912 | 2500 | 908 | 2448 | 919 | 2421 | 892 |
| Secondary SH Outlet Hdr. | 2645 | 1005 | 2515 | 1005 | 2473 | 1005 | 2436 | 1005 | 2418 | 950 |
| Reheat Inlet Header | 575 | 625 | 546 | 623 | 420 | 583 | 287 | 553 | 142 | 530 |
| Reheat Outlet Headers | 551 | 1005 | 524 | 1005 | 402 | 1005 | 275 | 975 | 142 | 850 |

Article 7.1(c)(2)

| | MCR | 100% | 75% | 50% | 25% |
|---|---|---|---|---|---|
| First Stage Attemperator Data | | | | | |
| (Lb/Hr) Total Expected Flow | 43608 | 183359 | 161831 | 0.0 | 0.0 |
| " " Design " | 653453 | 616547 | 462909 | 222656 | 84201 |
| (psi) Expected Nozzle Δ P | 1.0 | 11.1 | 8.2 | 0.0 | 0.0 |
| " Design " " | 77.7 | 66.6 | 38.6 | 8.7 | 1.2 |
| Second Stage Attemp. Data | | | | | |
| (Lb/Hr) Total Expected Flow | 0.0 | 0.0 | 49581 | 18374 | 0.0 |
| " " Design " | 248392 | 384586 | 456107 | 230490 | 23301 |
| (psi) Expected Nozzle Δ P | 0.0 | 0.0 | 1.2 | 1.0 | 0.0 |
| " Design " " | 24.4 | 57.7 | 81.4 | 20.0 | [illegible].0 |
| Reheat Attemperator Data | | | | | |
| (Lb/Hr) Total Design Flow | 207480 | 197000 | 151600 | 103200 | 45480 |
| (psi) Design Nozzle Δ P | 88.8 | 81.0 | 47.3 | 21.6 | 4.3 |
| (°F) Spray Water Temp. | 343 | 342 | 325 | 302 | 265 |

Art 7.1 a, c

| Gas Pressure (in. $H_2O$) | MCR | 100% | 75% | 50% | 25% |
|---|---|---|---|---|---|
| Leaving Furnace | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 |
| Ent. Sec. SH S.L. = 24" | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 |
| Ent. SSH Out. S.L. = 12" | -0.21 | -0.20 | -0.17 | -0.14 | -0.11 |
| Ent. RH Outlet Bank | -0.32 | -0.30 | -0.23 | -0.17 | -0.12 |
| Ent. RH Pend. Bank | -0.49 | -0.47 | -0.35 | -0.23 | -0.14 |
| Ent. Horiz. RH (4) | -0.72 | -0.64 | -0.46 | -0.29 | -0.16 |
| Ent. Horiz. RH (3) | -1.10 | -1.02 | -0.93 | -0.63 | -0.27 |
| Ent. Horiz. RH (2) | -1.30 | -1.23 | -1.19 | -0.85 | -0.33 |
| Ent. Horiz. RH (1) | -1.58 | -1.52 | -1.56 | -1.15 | -0.42 |
| Ent. Pri. SSH Outlet Bank | -0.61 | -0.55 | -0.40 | -0.23 | -0.15 |
| Ent. Horiz. PSH (3) | -0.72 | -0.64 | -0.43 | -0.24 | -0.17 |
| Ent. Horiz. PSH (2) | -0.88 | -0.77 | -0.47 | -0.25 | -0.19 |
| Ent. Horiz. PSH (1) | -1.09 | -0.93 | -0.53 | -0.26 | -0.21 |
| Ent. Econ. Bank (2) | -1.27 | -1.07 | -0.58 | -0.27 | -0.23 |
| Ent. Econ. Bank (1) | -1.38 | -1.16 | -0.61 | -0.28 | -0.24 |
| Econ. Hopper Press. | -2.07 | -2.01 | -2.11 | -1.62 | -0.56 |
| Press. Ent. Pri. AH* | -4.20 | -4.07 | -3.86 | -3.15 | -1.54 |
| Press. Ent. Sec. AH* | -3.71 | -3.64 | -3.52 | -2.94 | -1.45 |
| Press. Lvg. Pri. AH | -6.05 | -5.77 | -5.26 | -4.10 | -2.09 |
| Press. Lvg. Sec. AH | -7.81 | -7.44 | -6.12 | -4.44 | -2.00 |

*Including stack effect

THIS INFORMATION IS SUBMITTED FOR THE PURCHASER'S CONVENIENCE AND THE PERFORMANCE INDICATED THEREON SHALL NOT BE OFFERED BY THE COMPANY OR CONSTRUED BY THE PURCHASER AS A PROPOSAL OR CONTRACT OBLIGATION (DWG. JN-120881-1-0)

6-10078

IP7_004294

GO 1032-1
(For dimensioning see Form GO 1032F)

BABCOCK & WILCOX

INTERMOUNTAIN POWER PROJECT - RB-614
STEAM GENERATOR UNITS 1-4
PROJECT FILE 9255.62.3401
IPA CONTRACT 2010N

SUBJECT Customer Information per Div. F1 Article 7 DATE 12-8-81 PAGE 2 OF 3

Article 7.1(c)(4) & (5)

| ALL TEMPERATURES - HVT (°F) | MCR | 100% | 75% | 50% | 25% |
|---|---|---|---|---|---|
| Gas Temp. Entering Platens | 2471 | 2440 | 2327 | 2080 | 1662 |
| Gas Temp. Leaving Platens | 2108 | 2076 | 1963 | 1739 | 1375 |
| " " Ent. SSH $S_\perp$ = 24" | 2108 | 2076 | 1963 | 1739 | 1375 |
| " " Lvg. SSH $S_\perp$ = 24" | 1830 | 1804 | 1690 | 1500 | 1203 |
| " " Ent. SSH $S_\perp$ = 12" | 1750 | 1776 | 1660 | 1475 | 1184 |
| " " Lvg. SSH $S_\perp$ = 12" | 1640 | 1615 | 1520 | 1351 | 1104 |
| " " Ent. RH Outlet Bank | 1615 | 1588 | 1488 | 1335 | 1085 |
| " " Lvg. RH Outlet Bank | 1470 | 1449 | 1360 | 1231 | 996 |
| " " Ent. RH Intermed. Pendant | 1460 | 1435 | 1350 | 1220 | 988 |
| " " Lvg. RH Intermed. Pend. Bank | 1365 | 1340 | 1270 | 1147 | 926 |
| " " Ent. Horiz. RH Bank (4) | 1305 | 1285 | 1214 | 1093 | 886 |
| " " Ent. Horiz. RH Bank (3) | 1104 | 1094 | 1055 | 975 | 764 |
| " " Ent. Horiz. RH Bank (2) | 988 | 962 | 958 | 899 | 701 |
| " " Ent. Horiz. RH Bank (1) | 862 | 860 | 844 | 802 | 635 |
| " " Ent. Pri. SH Outlet Bank | 1285 | 1269 | 1191 | 1062 | 877 |
| " " Lvg. Pri. SH Outlet Bank | 1230 | 1211 | 1119 | 978 | 845 |
| " " Ent. Horiz. Pri.SH Bank (3) | 1190 | 1167 | 1063 | 910 | 815 |
| " " Ent. Horiz. Pri.SH Bank (2) | 1055 | 1034 | 938 | 808 | 768 |
| " " Ent. Horiz. Pri.SH Bank (1) | 920 | 903 | 826 | 736 | 724 |
| " " Ent. Econ. Bank (2) | 842 | 827 | 764 | 694 | 693 |
| " " Ent. Econ. Bank (1) | 765 | 751 | 686 | 603 | 598 |
| " " Ent. Airheaters | 744 | 736 | 707 | 675 | 567 |

| | MCR | 100% | 75% | 50% | 25% |
|---|---|---|---|---|---|
| Flue Gas Temperature Lvg AH's (uncor/corr) | | | | | |
| Pri AH | 313/279 | 312/280 | 316/281 | 323/280 | 335/280 |
| Sec AH | 295/285 | 292/282 | 273/263 | 253/243 | 222/210 |
| Gas CFM Lvg. AH's at T corrected | | | | | |
| Total Air Pri AH | 414437 | 400069 | 355460 | 288912 | 219685 |
| Sec AH | 2566844 | 2433861 | 1900740 | 1344646 | 730180 |
| Gas Flow Eng. AH's (MLB/HR) Pri AH | 962.0 | 924.0 | 817.0 | 646.0 | 463.5 |
| " Sec AH | 6588.2 | 6285.5 | 5054.9 | 3665.1 | 2024.8 |
| Gas Flow Lvg. AH's (MLB/HR) Pri AH | 1132.2 | 1093.0 | 971.0 | 793.0 | 601.5 |
| Sec AH | 6918.2 | 6600.5 | 5307.9 | 3881.1 | 2218.9 |
| Gas Distribution through horiz. convection pass (%) RH/PSH | 41/59 | 44/56 | 60/40 | 75/25 | 38/62 |
| Excess Air - % | | | | | |
| leaving furnace | 16 | 16 | 19.5 | 27 | 50 |
| leaving econ. | 17 | 17 | 20.5 | 28 | 51 |
| *leaving airheaters | 26 | 26 | 29.5 | 37 | 74 |

Article 7.1(c)(
Article 7.1(c)(
Article 7.1(c)(7 a & b
Article 7.1(c)(8
Article 7.1(c)(9 a b c

*Primary & Secondary Airheaters Combined

RECEIVED FOR DISTRIBUTION SEP 7 1982 BLACK & VEATCH

THIS INFORMATION IS SUBMITTED FOR THE PURCHASER'S CONVENIENCE AND THE PERFORMANCE INDICATED THEREON SHALL NOT BE OFFERED BY THE COMPANY OR CONSTRUED BY THE PURCHASER AS A PROPOSAL OR CONTRACT OBLIGATION.

DWG. JN-120881-2-0

6-10079

IP7_004295

SUBJECT Customer Information per Div. F1 Article 7 DATE 12-8-81 PAGE 3 of 3

| | | MCR | 100% | 75% | 50% | 25% |
|---|---|---|---|---|---|---|
| rticle .1(c)(10) a b | MLB/HR Air: Tot.Air Ent. Pri. AH | 1066.100 | 1006.100 | 833.7 | 623.7 | 393.5 |
| | Tot.Air Ent. Sec. AH | 5788.694 | 5498.660 | 4449.569 | 3263.112 | 1911.132 |
| | Tot.Air Lvg. Pri. AH | 896.1 | 837.1 | 679.7 | 476.7 | 255.5 |
| | Tot.Air Lvg. Sec. AH | 5458.694 | 5183.660 | 4196.569 | 3047.112 | 1717.132 |
| rticle .1(c)(11) | Air Ent. Pri.AH @ 80° - CFM | 282516 | 267287 | 222876 | 167152 | 105786 |
| | Total Air | | | | | |
| | Air Ent. Sec.AH @ 80° - CFM | 1431737 | 1363668 | 1112392 | 822304 | 488294 |
| rticle .1(c)(12) a b. | Air Temp. Ent. Pri. AH | 78 | 77 | 75 | 75 | 75 |
| | " " Ent. Sec. AH | 65 | 64 | 63 | 62 | 88 |
| | Air Temp. Lvg. Pri. AH | 580 | 582 | 584 | 590 | 533 |
| | " " Lvg. Sec. AH | 651 | 647 | 628 | 611 | 525 |
| rticle .1(c)(13) a secondary b air system c d | Air Pressure - (inches $H_2O$) | | | | | |
| | loss through air htr pri/sec | 1.25/2.2 | 1.10/2.0 | 0.75/1.35 | 0.40/0.80 | 0.15/0.30 |
| | loss through duct work | 1.55 | 1.38 | 1.13 | 0.58 | 0.39 |
| | required at bnr. windbox | 3.16 | 2.83 | 2.60 | 1.93 | 3.85 |
| | total required at AH inlet* | 5.64 | 4.94 | 3.82 | 2.07 | 3.34 |
| Article 7.1(c)(14) | Heat Absorbed by Boiler % | 88.41 | 88.44 | 88.43 | 88.68 | 88.61 |
| rticle .1(c)(15) a thru g | Heat Loss % Due to: | | | | | |
| | $H_2O$ from combustion of hydrogen & moisture in fuel | 5.17 | 5.16 | 5.15 | 5.10 | 5.06 |
| | Theoretical dry gas | 4.28 | 4.24 | 4.16 | 3.68 | 3.12 |
| | Excess air & moisture @ air heater outlet (uncorrected) | 0.78 | 0.78 | 0.84 | 1.02 | 1.36 |
| | Moisture in theoretical air | 0.01 | 0.01 | 0.01 | 0.02 | 0.04 |
| | Radiation loss | 0.15 | 0.17 | 0.21 | 0.30 | 0.61 |
| | Unburned carbon | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| | Unacct. for & Manuf. margin | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

| | MCR | 100% | 75% | 50% | 25% |
|---|---|---|---|---|---|
| Gas Velocity - fps | | | | | |
| Ent. Sec. SH $S_L$ = 24" | 39 | 36.8 | 28.6 | 19.0 | 9.2 |
| Ent. Sec. SH $S_L$ = 12" | 42.4 | 39.9 | 30.8 | 20.6 | 10.2 |
| Ent. Pendant RH | 49.6 | 46.7 | 36.1 | 24.3 | 12.3 |
| Ent. Horiz. RH | 49.9 | 50.1 | 53.8 | 46.3 | 12.0 |
| Ent. Horiz. SH | 37.3 | 33.6 | 18.3 | 7.7 | 10.4 |
| Coal Consumption LB/HR | 717790 | 685200 | 542240 | 375300 | 182900 |

Article 7.1(c)(10) a b c

Article 7.1(c)(11)

*Including stack effect

THIS INFORMATION IS SUBMITTED FOR THE PURCHASER'S CONVENIENCE AND THE PERFORMANCE INDICATED THEREON SHALL NOT BE OFFERED BY THE COMPANY OR CONSTRUED BY THE PURCHASER AS A PROPOSAL OR CONTRACT OBLIGATION.

DWG. JN-120881-3-0

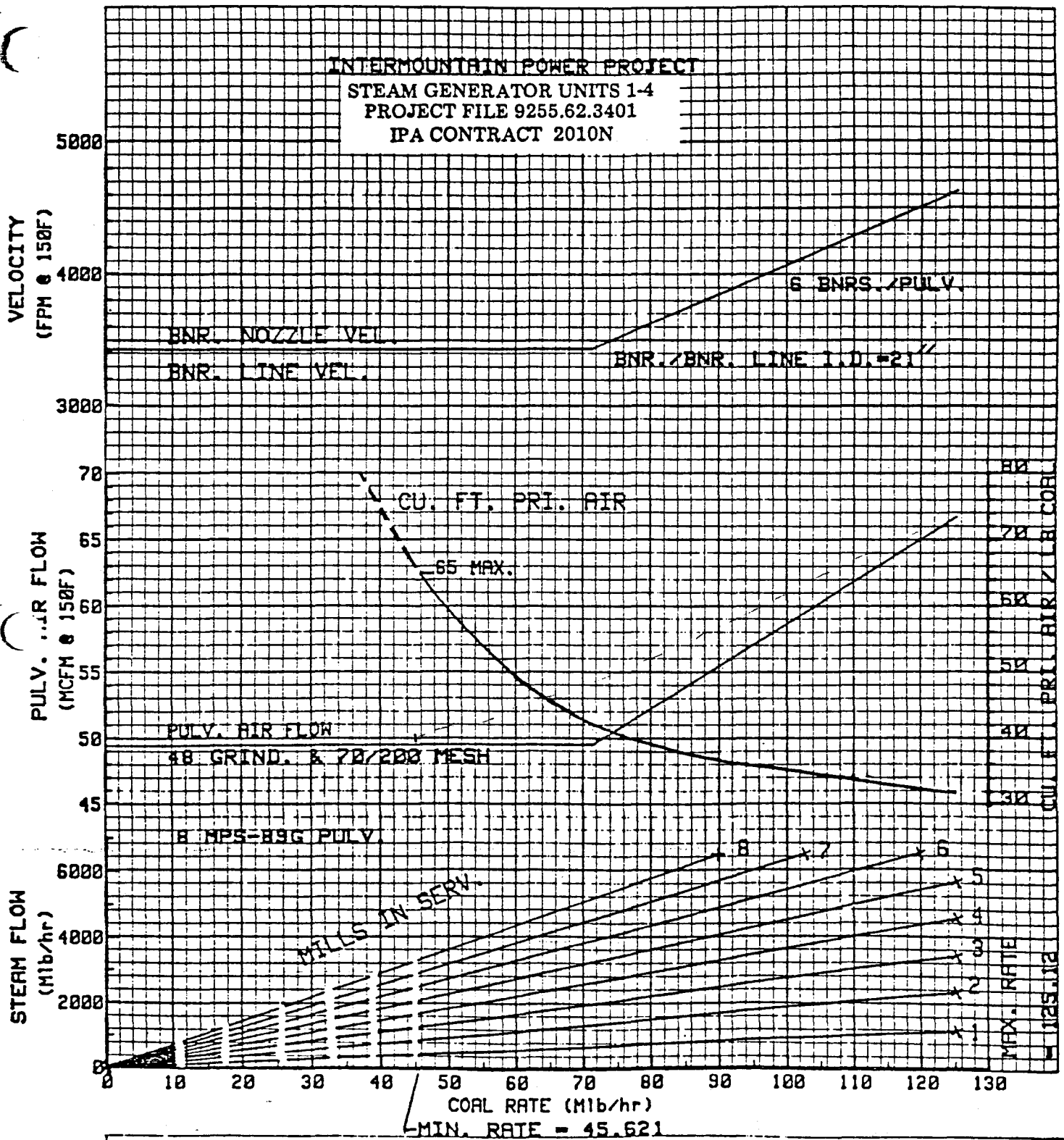
RECEIVED FOR DISTRIBUTION SEP 9 1982 BLACK & VEATCH

6-10080

IP7_004296

Babcock & Wilcox

CONTRACT INFORMATION SHEET




THESE CURVES ARE SUBMITTED FOR THE PURCHASER'S CONVENIENCE AND THE PERFORMANCE INDICATED THEREON SHALL NOT BE OFFERED BY THE COMPANY OR CONSTRUED BY THE PURCHASER AS A PROPOSAL OR CONTRACT OBLIGATION

| DRAWN BY | DATE | APPROVED BY | DATE | A.O. |
|---|---|---|---|---|
| J. NEIDERT | 2-1-82 | RBW | 2-5-82 | |

| REL. NO. AND DATE | CONTRACT NO | FILE NO. |
|---|---|---|
| 1 9-8-82 | 334-0614 | RB-614 |

TITLE – PULVERIZER-BURNER COORDINATION CURVES - COAL (B) (Design coal)

CIS– 101.05

IP7_004297

BOILER PERFORMANCE TESTING

-typical results-

| | | | CONTRACT SUMMARY SHEET | TEST 2 CORRECTED FOR CONTR. CONDITIONS | TEST 2 WITH TEST CONDITIONS |
|---|---|---|---|---|---|
| Fuel | | | CONTRACT | CONTRACT | TEST |
| Air Temp Ent AH | PRI/SEC | F | 77/ 64 | 77/ 64 | 95/ 75 |
| Air Temp Lvg AH | PRI/SEC | F | 582/ 647 | 0/ 0 | 451/ 656 |
| Air Flow Lvg AH (1) | PRI/SEC | MLB/HR | 1335/5184 | 1436/5057 | 1436/5315 |
| AH Air By-Pass Flow | | MLB/HR | 497.8 | 479.3 | 479.3 |
| Mill Inlet Temp | | F | 397.2 | 0.0 | 333.1 |
| Ave Air Temp Ent AH | | F | 66.7 | 66.9 | 79.2 |
| Gas Temp Lvg Econ | | F | 736.0 | 729.1 | 729.1 |
| Gas Temp Ent AH | PRI/SEC | F | 736/ 736 | 715/ 729 | 715/ 729 |
| Gas Temp Lvg AH (Incl Lkg) | PRI/SEC | F | 279/ 282 | -/ - | 299/ 281 |
| Gas Temp Lvg AH (Excl Lkg) | PRI/SEC | F | 313/ 295 | 338/ 280 | 348/ 287 |
| Gas Flow Ent AH | PRI/SEC | MLB/HR | 924/6286 | 861/6326 | 861/6593 |
| Ave Gas Temp Lvg AH (Excl Lkg) | | F | 294.7 | 286.5 | 294.1 |
| Excess Air Lvg Econ | | % | 17.0 | 17.0 | 17.5 |
| Excess Air Ent Pri AH | | % | --- | 17.0 | 15.0 |
| Excess Air Ent Sec AH | | % | --- | 17.0 | 17.5 |
| Excess Air Lvg Sec AH | | % | --- | --- | 21.1 |
| Excess Air Lvg Pri AH | | % | --- | --- | 46.7 |
| Excess Air to Burners | | % | 15.0 | 15.0 | 15.5 |
| Sec AH Leakage | | MLB/HR | 422 | --- | 184 |
| Pri AH Leakage | | MLB/HR | 0 | --- | 219 |
| Moisture In Air | | LB/LB DA | .0067 | .0067 | .0082 |
| Dry Gas Wt Lvg Econ | | LB/LB Fuel | --- | 10.003 | 11.071 |
| Dry Air Wt to Burners | | LB/LB Fuel | --- | 9.475 | 10.506 |
| Wet Gas Wt Lvg Econ | | LB/LB Fuel | --- | 10.558 | 11.695 |
| Losses | | % | | | |
| Dry Gas | | | 4.84 | 4.79 | 4.69 |
| H2O in Fuel | | | (2) 5.15 | .87 | .76 |
| H2 in Fuel | | | --- | 4.27 | 4.30 |
| Moisture in Air | | | .07 | .06 | .07 |
| Unburned Combustible | | | .20 | .06 | .06 |
| Radiation | | | .17 | .17 | .20 |
| Unaccounted | | | (3) 1.00 | .50 | .50 |
| Summation of Losses | | | 11.43 | 10.72 | 10.58 |
| Efficiency | | % | 88.57 | 89.28 | 89.42 |
| Unit Output | | MKB | 6691.5 | 6691.5 | 6934.1 |
| Fuel Input | | MKB | 7555.0 | 7495.0 | 7754.5 |
| Fuel Rate | | MLB/HR | 686.2 | 680.7 | 637.3 |

(1) Includes By-Pass Flow (2) Includes H2 in Fuel Loss
(3) Includes Manufacturer's Margin of .5 %

TEST 2 : 6Nov89 : 1450-1700 : 873 MW : A MILL OUT OF SERVICE JDR-020190

# PROPOSED SCHEDULED MAINTENANCE FOR INTERMOUNTAIN GENERATING STATION

| YEAR | PLANT | UNIT | START MONTH AND DAY | DURATION IN WEEKS | MAINTENANCE SCHEDULED |
|---|---|---|---|---|---|
| 1990 | INTERMOUNTAIN | 1 | MARCH 26 | 1 | SEMI-ANNUAL |
| 1990 | INTERMOUNTAIN | 2 | APRIL 9 | 1 | SEMI-ANNUAL |
| 1990 | INTERMOUNTAIN | 1 | OCTOBER 8 | 1 | SEMI-ANNUAL |
| 1990 | INTERMOUNTAIN | 2 | OCTOBER 29 | 1 | SEMI-ANNUAL |
| 1991 | INTERMOUNTAIN | 1 | MARCH 11 | 1 | SEMI-ANNUAL |
| 1991 | INTERMOUNTAIN | 2 | MARCH 25 | 4 | SECTIONALIZED MAINTENANCE |
| 1991 | INTERMOUNTAIN | 1 | OCTOBER 28 | 4 | SECTIONALIZED MAINTENANCE |
| 1991 | INTERMOUNTAIN | 2 | DECEMBER 2 | 1 | SEMI-ANNUAL |
| 1992 | INTERMOUNTAIN | 1 | MARCH 9 | 1 | SEMI-ANNUAL |
| 1992 | INTERMOUNTAIN | 2 | MARCH 23 | 4 | SECTIONALIZED MAINTENANCE |
| 1992 | INTERMOUNTAIN | 1 | NOVEMBER 2 | 4 | SECTIONALIZED MAINTENANCE |
| 1992 | INTERMOUNTAIN | 2 | DECEMBER 7 | 1 | SEMI-ANNUAL |
| 1993 | INTERMOUNTAIN | 1 | MARCH 8 | 1 | SEMI-ANNUAL |
| 1993 | INTERMOUNTAIN | 2 | MARCH 22 | 4 | SECTIONALIZED MAINTENANCE |
| 1993 | INTERMOUNTAIN | 1 | NOVEMBER 1 | 4 | SECTIONALIZED MAINTENANCE |
| 1993 | INTERMOUNTAIN | 2 | DECEMBER 6 | 1 | SEMI-ANNUAL |
| 1994 | INTERMOUNTAIN | 1 | MARCH 7 | 1 | SEMI-ANNUAL |
| 1994 | INTERMOUNTAIN | 2 | MARCH 21 | 4 | SECTIONALIZED MAINTENANCE |

DKK Rdone
BP cc
SLS cc
JLY cc 3/7
GKH cc
MDR
FILE

NOTE:
1. ALL START DATES ARE SHOWN AS MONDAY, BUT THE ACTUAL UNIT SHUTDOWN WILL USUALLY OCCUR AFTER PEAK ON THE FRIDAY BEFORE THE DATE SHOWN.
2. PREVENTIVE MAINTENANCE OF THE STS REQUIRING MONOPOLAR OPERATION IS SCHEDULED TO COINCIDE WITH IGS SCHEDULED MAINTENANCE.

POWER OPERATING AND MAINTENANCE DIVISION
OPERATING ENGINEERING SECTION
FEBRUARY 14, 1990

IP7_004299

# BURNERS

Carry C -
- Jim Nelson has requested following information on Burner operation for consultants
- plus Include in Adv Oper Manual

Thanks

## Typical Operational Conditions

| | | Full Load |
|---|---|---|
| gross generation | | 840 |
| steam flow | | 5 954 KPPH |
| feedwater flow | | 5815 KPPH |
| coal flow | | 315.5 TPH |
| air flow | | 73.2 % |
| % O2 | E/W | 3.7 / 3.1 |
| ~~sec air flow~~ | E/W % | 67.0 / 66.5 |
| sec air duct press | "H2O | 2.5 / 2.7 |
| sec air temp | E/W | 656 / 651 |
| sec air damper position | | I/S 62.6% (O/S) O/S 10% |
| windbox press | level 4 | .8 |
| | " 3 | .6 |
| | " 2 | .7 |
| | " 1 | -.7 |

Burner front temps

| | | | |
|---|---|---|---|
| I/S | backplate | 930 °F | * Alarm 1050° burner tile fire |
| | nozzle | 586 °F | |
| (O/S) | backplate | 1116 °F | * Alarm 1350° insufficient cooling air flow |
| | nozzle | 1013 °F | |

IP7_004300

PA duct pressure 43.0 "WC

PA flow

PA Damper position

PA inlet temp

| Pulv | Pri Air Flow (%) | | PA Damper Pos (%) | PA Inlet temp (F) |
|---|---|---|---|---|
| 1A | ~~90~~ | 89.3 | 68.5 % | 315 |
| B | ~~86~~ | 86.6 | 78.0 | 319 |
| C | ~~90~~ | 90.1 | 68.6 | 343 |
| D | ~~87~~ | 87.2 | 64.9 | 329 |
| E | ~~90~~ | 88.8 | 83.3 | 323 |
| F | ~~91~~ | 91.1 | 77.7 | 347 |
| G | ~~0~~ | — | 0 | 81 |
| H | ~~92~~ | 89.7 | 74.5 | 364 |

UNDER SOFTWARE LOCK 04/17/90 10:21:59 U1MAIN

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 601. | 587. | 586. | LEVEL | 580. | 462. | 581. | |
| | 1057. | 1108. | 970. | | 971. | 877. | 783. | |
| | 999. | 984. | 973. | | 829. | 965. | 927. | |
| | 914. | 667. | 652. | | 720. | 747. | 709. | |
| | 623. | 590. | 600. | | 615. | 567. | 587. | |
| | 1074. | 1154. | 997. | | 649. | 1146. | 991. | |
| | 887. | 1111. | 1092. | | 1029. | 1138. | 1062. | |
| | 928. | 743. | 650. | | 985. | 881. | 656. | |
| | 617. | 586. | 616. | | 619. | 607. | 558. | |
| | 1003. | 1057. | 636. | | 1066. | 1068. | 1025. | |
| | 987. | 1045. | 1097. | | 1060. | 1036. | 1004. | |
| | 948. | 654. | 965. | | 1006. | 644. | 746. | |
| | 911. | 1083. | 1045. | | 571. | 590. | 565. | |
| | 1152. | 1263. | 1243. | | 967. | 976. | 955. | |
| | 1126. | 1273. | 1269. | | 889. | 954. | 993. | |
| | 1280. | 723. | 716. | | 963. | 877. | 922. | |

FRONT

FORWARD PAGING SGAG09

IP7_004302

# BOILER

## Expected Operating Parameters

| Load (MWg) min load | | | 840 | 873.2 | 878.46 |
|---|---|---|---|---|---|
| condition | 2nd Valve Pt | 3rd Valve Pt | test Case | A mill o/s VWO test case | VWO/520P |
| % rated load | | | 100% | | |
| Steam Flow M lb/hr | | | 6111.9 | 6360.9 | |
| Final Feedwater Flow M lb/hr | | | 6019.7 | 6327.1 | 6333.68 |
| Throttle temp °F | | | 1005.6 | 997.5 | |
| throttle press PSIG | | | 2399.5 | 2408.0 | 2407.0 |
| SH spray flow | | | 81.5 | 33.8 | |
| drum press PSIG | | | 2655.9 PSIG | 2681.8 PSIG | 2681.22 |
| sat temp drum °F | | | 677.9 F | 679.3 F | |
| RH temp F | | | 1006.3 | 996.6 | 992.56 |
| RH temp F | | | 621.6 | 624.0 | 623.4 |
| RH spray flow | | | 48.7 | 25.5 | |
| coal flow TPH | | | 317.3 | 324.2 | 324.1 |
| HHV BTU/lb | | | 12169 | 12167 | |
| we feeder speed | | | 66.66 | 68.11 | 68.1 |
| air flow % | | | 73.07 | 74.67 | 74.4 |
| $O_2$ | | | 3.21 | 3.45 | |
| CO PPM | | | 32.42 | 30.62 | |

Unit 1

1987

| est | Load | Pulv o/s | Excess Air LVG ECON | Excess Air to Burners | Damper Pos | Ave Coal Pipe temp/Backplate | Ave High Coal Pipe temp/BP | EFF Test | EFF Corr |
|---|---|---|---|---|---|---|---|---|---|
| A | 850 | D | 28.6 | 26.4 | 62.5 | 870/1116 | 900/1141 | 88.53 | 87.99 |
| A | 850 | H | 25.9 | 23.8 | 99.9 | 837/1193 | 878/1288 | 87.94 | 88.20 |
| A | 830 | D | 24.5 | 22.3 | 65.3 | 836/1135 | 860/1180 | 88.26 | 88.41 |
| A | 825 | E | 25.3 | 23.1 | 75.4 | 868/1134 | 909/1184 | 88.58 | 88.40 |
| A | 847 | F | 19.5 | 17.4 | 89.3 | 814/1098 | 849/1182 | 88.32 | 88.49 |
| A | 846 | E | 37.3 | 35.2 | 89.4 | 828/1075 | 855/1129 | 87.77 | 87.54 |
| A | 846 | B | 16.6 | 14.5 | 47.9 | 819/1043 | 854/1111 | 88.59 | 88.34 |
| A | 842 | B | 18.1 | 15.9 | 54.2 | 794/1040 | 829/1116 | 88.65 | 88.27 |

1988

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 843 | D | 17.9 | 15.7 | 1% | 1054/1141 | 1114/1220 | 88.45 | 88.92 |
| A | 843 | E | 20.0 | 17.8 | 1% | 830/1079 | 848/1224 | 88.48 | 88.87 |
| A | 840 | A | 17.5 | 15.3 | 11% | 949/1300 | 1072/1395 | 88.53 | 88.93 |
| 1 | 841 | A | 17.3 | 15.2 | 11% | 949/1300 | 1072/1395 | 88.51 | 88.89 |
| A | 844 | F | 17.5 | 15.3 | 1% | 1028/1217 | 1130/1286 | 88.39 | 88.98 |
| A | 843 | G | 18.7 | 16.5 | 1% | 817/1162 | 864/1224 | 88.56 | 89.07 |
| A | 842 | H | 17.8 | 15.6 | 7.5 | 949/1241 | 1016/1361 | 88.54 | 89.07 |