BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

In the Matter of the Application of	)	
	)	
MAUI ELECTRIC COMPANY, LIMITED	)	Docket No. 2006-0387
	)	
For Approval of Rate Increases and Revised Rate Schedule and Rules	)	
	)	

PARTIAL CONFIDENTIAL (IN SEALED ENVELOPE)

MECO
2007 TEST YEAR

MECO Voluminous Responses to CONSUMER ADVOCATE Information Requests

FILED
OCT 30 2007
Public Utilities Commission

Book 6 of 12

October 30, 2007

Maui Electric Company, Ltd.
Lanai Division

BILLED DATA

SCHEDULE R : RESIDENTIAL SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Kwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	3,554,991			668			5,322		
1976	3,628,732	73,741	2.1%	677	9	1.4%	5,360	38	0.7%
1977	3,629,816	1,084	0.0%	679	2	0.3%	5,346	(14)	-0.3%
1978	3,575,617	(54,199)	-1.5%	677	(2)	-0.3%	5,282	(64)	-1.2%
1979	3,600,854	25,237	0.7%	680	3	0.4%	5,295	13	0.3%
1980	3,565,079	(35,775)	-1.0%	686	6	0.9%	5,197	(98)	-1.9%
1981	3,555,554	(9,525)	-0.3%	706	20	2.9%	5,036	(161)	-3.1%
1982	3,502,761	(52,793)	-1.5%	714	8	1.1%	4,906	(130)	-2.6%
1983	3,431,718	(71,043)	-2.0%	718	4	0.6%	4,780	(126)	-2.6%
1984	3,433,138	1,420	0.0%	732	14	2.0%	4,690	(90)	-1.9%
1985	3,382,006	(51,132)	-1.5%	750	18	2.5%	4,509	(181)	-3.9%
1986	3,463,744	81,738	2.4%	756	6	0.8%	4,582	73	1.6%
1987	3,541,223	77,479	2.2%	764	8	1.1%	4,635	53	1.2%
1988	3,720,422	179,199	5.1%	770	6	0.8%	4,832	197	4.3%
1989	4,072,459	352,037	9.5%	849	79	10.3%	4,797	(35)	-0.7%
1990	4,651,663	579,204	14.2%	909	60	7.1%	5,117	320	6.7%
1991	4,935,368	283,705	6.1%	972	63	6.9%	5,078	(39)	-0.8%
1992	5,338,053	402,685	8.2%	1,035	63	6.5%	5,158	80	1.6%
1993	5,878,343	540,290	10.1%	1,110	75	7.3%	5,296	138	2.7%
1994	5,985,484	107,141	1.8%	1,114	4	0.4%	5,373	77	1.5%
1995	6,121,152	135,668	2.3%	1,137	23	2.1%	5,384	11	0.2%
1996	6,351,061	229,909	3.8%	1,173	36	3.2%	5,414	30	0.6%
1997	6,446,231	95,170	1.5%	1,176	3	0.2%	5,482	68	1.3%
1998	6,576,195	129,964	2.0%	1,195	19	1.6%	5,503	21	0.4%
1999	6,577,297	1,102	0.0%	1,221	26	2.2%	5,387	(116)	-2.1%
2000	6,859,323	282,026	4.3%	1,262	41	3.4%	5,435	48	0.9%
2001	7,090,709	231,386	3.4%	1,303	41	3.3%	5,442	7	0.1%
2002	7,339,483	248,774	3.5%	1,313	10	0.8%	5,590	148	2.7%
2003	7,520,118	180,635	2.5%	1,314	1	0.1%	5,723	133	2.4%
2004	7,664,206	144,088	1.9%	1,332	18	1.4%	5,754	31	0.5%
2005	7,846,797	182,591	2.4%	1,342	10	0.8%	5,847	93	1.6%
2005 @	2,646,001			1,336			1,981		
2006 @	2,703,360	57,359	2.2%	1,360	24	1.8%	1,988	7	0.4%

* Formerly called Schedule D.
@ April year-to-date

Maui Electric Company, Ltd.
Lanai Division

BILLED DATA

SCHEDULE G/J : GENERAL SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Kwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	1,502,440			128			11,738		
1976	1,580,241	77,801	5.2%	124	(4)	-3.1%	12,744	1,006	8.6%
1977	1,775,333	195,092	12.4%	123	(1)	-0.8%	14,434	1,690	13.3%
1978	1,816,538	41,205	2.3%	126	3	2.4%	14,417	(17)	-0.1%
1979	1,797,636	(18,902)	-1.0%	125	(1)	-0.8%	14,381	(36)	-0.3%
1980	1,848,697	51,061	2.8%	126	1	0.8%	14,672	291	2.0%
1981	1,740,673	(108,024)	-5.8%	118	(8)	-6.4%	14,751	79	0.5%
1982	1,713,154	(27,519)	-1.6%	120	2	1.7%	14,276	(475)	-3.2%
1983	1,698,342	(14,812)	-0.9%	123	3	2.5%	13,808	(468)	-3.3%
1984	1,557,932	(140,410)	-8.3%	109	(14)	-11.4%	14,293	485	3.5%
1985	1,427,826	(130,106)	-8.4%	98	(11)	-10.1%	14,570	277	1.9%
1986	1,502,077	74,251	5.2%	97	(1)	-1.0%	15,485	915	6.3%
1987	1,505,928	3,851	0.3%	97	0	0.0%	15,525	40	0.3%
1988	2,065,761	559,833	37.2%	97	0	0.0%	21,297	5,772	37.2%
1989	2,659,655	593,894	28.8%	105	8	8.3%	25,330	4,033	18.9%
1990	3,520,966	861,311	32.4%	111	6	5.7%	31,720	6,390	25.2%
1991	5,694,162	2,173,196	61.7%	126	15	13.5%	45,192	13,472	42.5%
1992	4,466,985	(1,227,177)	-21.6%	130	4	3.2%	34,361	(10,831)	-24.0%
1993	4,484,319	17,334	0.4%	127	(3)	-2.3%	35,310	949	2.8%
1994	6,002,104	1,517,785	33.9%	135	8	6.3%	44,460	9,150	25.9%
1995	6,547,154	545,050	9.1%	146	11	8.2%	44,844	384	0.9%
1996	6,691,202	144,048	2.2%	152	6	4.0%	44,069	(775)	-1.7%
1997	6,947,493	256,291	3.8%	160	8	5.4%	43,422	(647)	-1.5%
1998	7,170,643	223,150	3.2%	170	10	6.3%	42,180	(1,242)	-2.9%
1999	7,069,276	(101,367)	-1.4%	175	5	2.9%	40,396	(1,784)	-4.2%
2000	7,369,129	299,853	4.2%	188	13	7.4%	39,197	(1,199)	-3.0%
2001	7,387,635	18,506	0.3%	192	4	2.1%	38,477	(720)	-1.8%
2002	7,405,813	18,178	0.3%	196	4	2.1%	37,785	(692)	-1.8%
2003	7,580,897	175,084	2.4%	197	1	0.5%	38,482	697	1.8%
2004	7,719,161	138,264	1.8%	198	1	0.5%	38,986	504	1.3%
2005	7,842,381	123,220	1.6%	204	6	3.0%	38,443	(543)	-1.4%
2005 @	2,476,310			203			12,184		
2006 @	2,540,170	63,860	2.6%	216	13	6.3%	11,760	(424)	-3.5%

* Formerly called Schedules L-1, H-2, P-1 and P-4, which have been combined.
@ April year-to-date

Maui Electric Company, Ltd.
Lanai Division

BILLED DATA

SCHEDULE H : COMMERCIAL COOKING, HEATING, AIR CONDITIONING & REFRIGERATION SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Kwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	518,569			41			12,648		
1976	543,116	24,547	4.7%	42	1	2.4%	12,931	283	2.2%
1977	563,281	20,165	3.7%	40	(2)	-4.8%	14,082	1,151	8.9%
1978	577,480	14,199	2.5%	38	(2)	-5.0%	15,197	1,115	7.9%
1979	606,620	29,140	5.1%	38	0	0.0%	15,964	767	5.1%
1980	634,047	27,427	4.5%	37	(1)	-2.6%	17,136	1,172	7.3%
1981	650,406	16,359	2.6%	32	(5)	-13.5%	20,325	3,189	18.6%
1982	631,206	(19,200)	-3.0%	30	(2)	-6.3%	21,040	715	3.5%
1983	638,607	7,401	1.2%	32	2	6.7%	19,956	(1,084)	-5.2%
1984	609,578	(29,029)	-4.6%	27	(5)	-15.6%	22,577	2,621	13.1%
1985	588,201	(21,377)	-3.5%	21	(6)	-22.2%	28,010	5,433	24.1%
1986	589,897	1,696	0.3%	19	(2)	-9.5%	31,047	3,037	10.8%
1987	621,292	31,395	5.3%	18	(1)	-5.3%	34,516	3,469	11.2%
1988	663,415	42,123	6.8%	19	1	5.6%	34,917	401	1.2%
1989	636,483	(26,932)	-4.1%	17	(2)	-10.5%	37,440	2,523	7.2%
1990	600,556	(35,927)	-5.6%	16	(1)	-5.9%	37,535	95	0.3%
1991	598,579	(1,977)	-0.3%	15	(1)	-6.3%	39,905	2,370	6.3%
1992	616,772	18,193	3.0%	15	0	0.0%	41,118	1,213	3.0%
1993	553,992	(62,780)	-10.2%	14	(1)	-6.7%	39,571	(1,547)	-3.8%
1994	523,418	(30,574)	-5.5%	14	0	0.0%	37,387	(2,184)	-5.5%
1995	475,364	(48,054)	-9.2%	13	(1)	-7.1%	36,566	(821)	-2.2%
1996	554,926	79,562	16.7%	9	(5)	-34.6%	65,285	28,719	78.5%
1997	550,209	(4,717)	-0.9%	5	(4)	-41.2%	110,042	44,757	68.6%
1998	527,542	(22,667)	-4.1%	5	0	0.0%	105,508	(4,534)	-4.1%
1999	536,108	8,566	1.6%	5	0	0.0%	107,222	1,714	1.6%
2000	549,444	13,336	2.5%	5	0	0.0%	109,889	2,667	2.5%
2001	546,033	(3,411)	-0.6%	6	1	20.0%	91,006	(18,883)	-17.2%
2002	544,825	(1,208)	-0.2%	5	(1)	-16.7%	108,965	17,959	19.7%
2003	524,230	(20,595)	-3.8%	4	(1)	-20.0%	131,058	22,093	20.3%
2004	532,757	8,527	1.6%	4	0	0.0%	133,189	2,131	1.6%
2005	539,516	6,759	1.3%	4	0	0.0%	134,879	1,690	1.3%
2004 @	172,820			4			43,205		
2005 @	174,628	1,808	1.1%	4	0	0.0%	43,657	452	1.1%

* Formerly called Schedule H-1.
@ April year-to-date

Maui Electric Company, Ltd.
Lanai Division

BILLED DATA

SCHEDULE P : LARGE POWER SERVICE

Year		Billed Sales			Average Customers			Use / Average Customer		
		Kwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975										
1976										
1977										
1978										
1979										
1980										
1981										
1982										
1983										
1984										
1985										
1986										
1987										
1988	*	1,925,500			1			1,925,500		
1989		4,469,600	2,544,100	132.1%	1	0	0.0%	4,469,600	2,544,100	132.1%
1990		6,496,600	2,027,000	45.4%	2	1	100.0%	3,248,300	(1,221,300)	-27.3%
1991		8,466,200	1,969,600	30.3%	2	0	0.0%	4,233,100	984,800	30.3%
1992		12,280,300	3,814,100	45.1%	3	1	50.0%	4,093,433	(139,667)	-3.3%
1993		12,732,000	451,700	3.7%	3	0	0.0%	4,244,000	150,567	3.7%
1994		13,544,400	812,400	6.4%	3	0	0.0%	4,514,800	270,800	6.4%
1995		12,721,600	(822,800)	-6.1%	3	0	0.0%	4,240,533	(274,267)	-6.1%
1996		12,847,400	125,800	1.0%	3	0	0.0%	4,282,467	41,934	1.0%
1997		11,969,600	(877,800)	-6.8%	3	0	0.0%	3,989,867	(292,600)	-6.8%
1998		11,658,600	(311,000)	-2.6%	3	0	0.0%	3,886,200	(103,667)	-2.6%
1999		12,113,600	455,000	3.9%	3	0	0.0%	4,037,867	151,667	3.9%
2000		12,241,200	127,600	1.1%	3	0	0.0%	4,080,400	42,533	1.1%
2001		11,889,600	(351,600)	-2.9%	3	0	0.0%	3,963,200	(117,200)	-2.9%
2002		11,618,400	(271,200)	-2.3%	3	0	0.0%	3,872,800	(90,400)	-2.3%
2003		12,415,600	797,200	6.9%	3	0	0.0%	4,138,533	265,733	6.9%
2004		11,665,000	(750,600)	-6.1%	3	0	0.0%	3,888,333	(250,200)	-6.1%
2005		11,543,600	(121,400)	-1.0%	3	0	0.0%	3,847,867	(40,466)	-1.0%
2005	@	3,624,200			3			1,208,067		
2006	@	4,048,400	424,200	11.7%	3	0	0.0%	1,349,467	141,400	11.7%

* Dole Company pumps came on line as Schedule "P" from September, 1988.
@ April year-to-date

Maui Electric Company, Ltd.
Lanai Division

BILLED DATA

SCHEDULE F: PUBLIC STREET LIGHTING SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Kwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	49,991			6			8,332		
1976	62,310	12,319	24.6%	6	0	0.0%	10,385	2,053	24.6%
1977	83,069	20,759	33.3%	6	0	0.0%	13,845	3,460	33.3%
1978	87,312	4,243	5.1%	6	0	0.0%	14,552	707	5.1%
1979	89,262	1,950	2.2%	6	0	0.0%	14,877	325	2.2%
1980	93,956	4,694	5.3%	6	0	0.0%	15,659	782	5.3%
1981	101,811	7,855	8.4%	6	0	0.0%	16,969	1,310	8.4%
1982	100,361	(1,450)	-1.4%	6	0	0.0%	16,727	(242)	-1.4%
1983	98,810	(1,551)	-1.6%	6	0	0.0%	16,468	(259)	-1.6%
1984	100,306	1,496	1.5%	6	0	0.0%	16,718	250	1.5%
1985	108,665	8,359	8.3%	6	0	0.0%	18,111	1,393	8.3%
1986	98,613	(10,052)	-9.3%	6	0	0.0%	16,436	(1,675)	-9.3%
1987	96,429	(2,184)	-2.2%	5	(1)	-16.7%	19,286	2,850	17.3%
1988	96,159	(270)	-0.3%	4	(1)	-20.0%	24,040	4,754	24.7%
1989	108,690	12,531	13.0%	6	2	50.0%	18,115	(5,925)	-24.7%
1990	128,125	19,435	17.9%	8	2	33.3%	16,016	(2,099)	-11.6%
1991	114,304	(13,821)	-10.8%	8	0	0.0%	14,288	(1,728)	-10.8%
1992	114,505	201	0.2%	7	(1)	-12.5%	16,358	2,070	14.5%
1993	136,843	22,338	19.5%	6	(1)	-14.3%	22,807	6,449	39.4%
1994	125,526	(11,317)	-8.3%	6	0	0.0%	20,921	(1,886)	-8.3%
1995	125,357	(169)	-0.1%	6	0	0.0%	20,893	(28)	-0.1%
1996	113,859	(11,498)	-9.2%	4	(2)	-29.2%	26,790	5,897	28.2%
1997	115,356	1,497	1.3%	4	0	-5.9%	28,839	2,049	7.7%
1998	115,756	400	0.4%	4	0	0.0%	28,939	100	0.4%
1999	113,566	(2,190)	-1.9%	4	0	0.0%	28,392	(547)	-1.9%
2000	114,918	1,352	1.2%	3	(1)	-25.0%	38,306	9,914	34.9%
2001	114,746	(172)	-0.2%	3	0	0.0%	38,249	(57)	-0.2%
2002	114,237	(509)	-0.4%	3	0	0.0%	38,079	(170)	-0.4%
2003	114,353	116	0.1%	3	0	0.0%	38,118	39	0.1%
2004	114,695	342	0.3%	3	0	0.0%	38,232	114	0.3%
2005	114,652	(43)	0.0%	3	0	0.0%	38,217	(15)	0.0%
2005 @	38,251			3			12,750		
2006 @	38,064	(187)	-0.5%	3	0	0.0%	12,688	(62)	-0.5%

* Formerly called Schedule SL.
@ April year-to-date

Maui Electric Company, Ltd.
Lanai Division

BILLED DATA

TOTAL SYSTEM

Year	Billed Sales			Average Customers			Use / Average Customer		
	Kwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	5,625,991			843			6,674		
1976	5,814,399	188,408	3.4%	849	6	0.7%	6,849	175	2.6%
1977	6,051,499	237,100	4.1%	848	(1)	-0.1%	7,136	287	4.2%
1978	6,056,947	5,448	0.1%	847	(1)	-0.1%	7,151	15	0.2%
1979	6,094,372	37,425	0.6%	849	2	0.2%	7,178	27	0.4%
1980	6,141,779	47,407	0.8%	855	6	0.7%	7,183	5	0.1%
1981	6,048,444	(93,335)	-1.5%	862	7	0.8%	7,017	(166)	-2.3%
1982	5,947,482	(100,962)	-1.7%	870	8	0.9%	6,836	(181)	-2.6%
1983	5,867,477	(80,005)	-1.4%	879	9	1.0%	6,675	(161)	-2.4%
1984	5,700,954	(166,523)	-2.8%	874	(5)	-0.6%	6,523	(152)	-2.3%
1985	5,506,698	(194,256)	-3.4%	875	1	0.1%	6,293	(230)	-3.5%
1986	5,654,331	147,633	2.7%	878	3	0.3%	6,440	147	2.3%
1987	5,764,872	110,541	2.0%	884	6	0.7%	6,521	81	1.3%
1988	8,471,257	2,706,385	47.0%	891	7	0.8%	9,508	2,987	45.8%
1989	11,946,887	3,475,630	41.0%	978	87	9.8%	12,216	2,708	28.5%
1990	15,397,910	3,451,023	28.9%	1,046	68	7.0%	14,721	2,505	20.5%
1991	19,808,613	4,410,703	28.6%	1,123	77	7.4%	17,639	2,918	19.8%
1992	22,816,615	3,008,002	15.2%	1,190	67	6.0%	19,174	1,535	8.7%
1993	23,785,497	968,882	4.3%	1,260	70	5.9%	18,877	(297)	-1.6%
1994	26,180,932	2,395,435	10.1%	1,272	12	1.0%	20,582	1,705	9.0%
1995	25,990,627	(190,305)	-0.7%	1,305	33	2.6%	19,916	(666)	-3.2%
1996	26,558,448	567,821	2.2%	1,341	36	2.7%	19,810	(106)	-0.5%
1997	26,028,889	(529,559)	-2.0%	1,348	7	0.5%	19,312	(498)	-2.5%
1998	26,048,736	19,847	0.1%	1,377	29	2.2%	18,917	(395)	-2.1%
1999	26,409,847	361,111	1.4%	1,408	31	2.3%	18,757	(160)	-0.9%
2000	27,134,014	724,167	2.7%	1,461	53	3.8%	18,572	(185)	-1.0%
2001	27,028,723	(105,291)	-0.4%	1,507	46	3.2%	17,935	(637)	-3.4%
2002	27,022,758	(5,965)	0.0%	1,520	13	0.9%	17,778	(157)	-0.9%
2003	28,155,198	1,132,440	4.2%	1,521	1	0.1%	18,511	733	4.1%
2004	27,695,819	(459,379)	-1.6%	1,540	19	1.3%	17,984	(527)	-2.9%
2005	27,886,946	191,127	0.7%	1,556	16	1.0%	17,922	(62)	-0.3%
2005 @	8,957,582			1,549			5,782		
2006 @	9,504,622	547,040	6.1%	1,586	37	2.4%	5,993	211	3.7%

* Formerly called Schedules D, L-1, H-1, H-2, P-1 and P-4.
@ April year-to-date

Maui Electric Company, LTD.
Lanai Division

Schedule R - Residential Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.9790	7,838.6	8,028.0	8,272.6	8,461.5	8,650.5	8,839.4	9,028.3
% Incr			2.42%	3.05%	2.28%	2.23%	2.18%	2.14%
Linear	0.9803		8,018.7	8,309.1	8,543.9	8,778.6	9,013.4	9,248.1
% Incr			2.30%	3.62%	2.83%	2.75%	2.67%	2.60%
Exponential	0.9795		8,023.0	8,351.3	8,632.9	8,923.8	9,224.2	9,534.6
% Incr			2.35%	4.09%	3.37%	3.37%	3.37%	3.36%
Winters-Linear	0.9823		8,021.8	8,312.3	8,547.0	8,781.7	9,016.5	9,251.2
% Incr			2.34%	3.62%	2.82%	2.75%	2.67%	2.60%
Winters-Exponential	0.9820		7,987.8	8,193.0	8,345.2	8,500.2	8,658.0	8,818.7
% Incr			1.90%	2.57%	1.86%	1.86%	1.86%	1.86%
Customer Service			8,022.0	8,183.0	8,369.0	8,513.0	8,684.0	8,857.0
% Incr			2.34%	2.01%	2.27%	1.72%	2.01%	1.99%
Sch R Econometric			8,055.8	8,240.5	8,370.5	8,499.5	8,632.5	8,771.5
% Incr			2.77%	2.29%	1.58%	1.54%	1.56%	1.61%

Maui Electric Company, LTD.
Lanai Division

Schedule G/J - General Service Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box Jenkins	0.8526	7,762.2	7,822.9	7,969.7	8,116.6	8,263.4	8,410.3	8,557.1
% Incr			0.78%	1.88%	1.84%	1.81%	1.78%	1.75%
Linear	0.8795		7,899.9	8,164.0	8,428.0	8,692.1	8,956.1	9,220.2
% Incr			0.78%	3.34%	3.23%	3.13%	3.04%	2.95%
Exponential	0.8781		7,834.1	7,983.1	8,134.9	8,289.6	8,447.1	8,607.6
% Incr			0.93%	1.90%	1.90%	1.90%	1.90%	1.90%
Winters-Linear	0.8807		7,888.0	8,152.1	8,416.1	8,680.2	8,944.2	9,208.3
% Incr			0.93%	3.35%	3.24%	3.14%	3.04%	2.95%
Winters-Exponential	0.8791		7,822.6	7,970.6	8,121.3	8,274.8	8,431.1	8,590.4
% Incr			0.78%	1.89%	1.89%	1.89%	1.89%	1.89%
Customer Service			8,004.0	8,164.0	8,309.0	8,369.0	8,453.0	8,537.0
% Incr			3.12%	2.00%	1.78%	0.72%	1.00%	0.99%
Customer Service Gwth Rate			7,600.0	7,800.0	7,820.0	7,840.3	7,860.7	7,881.1
% Incr			-2.09%	2.63%	0.26%	0.26%	0.26%	0.26%

Maui Electric Company, LTD.
Lanai Division

Sch H -- Heating, Cooking, Air-Conditioning Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.6379	539.5	533.1	531.9	530.7	529.5	528.3	527.1
% Incr			-1.18%	-0.23%	-0.23%	-0.23%	-0.23%	-0.23%
Linear	0.7141		532.5	530.1	527.6	525.2	522.8	520.3
% Incr			-1.30%	-0.46%	-0.46%	-0.46%	-0.46%	-0.47%
Exponential	0.7134		534.6	536.2	537.7	539.3	540.8	542.4
% Incr			-0.90%	0.29%	0.29%	0.29%	0.29%	0.29%
Damped-Additive	0.7178		532.0	531.6	531.6	531.6	531.6	531.6
% Incr			-1.40%	-0.07%	0.00%	0.00%	0.00%	0.00%
Winters-Linear	0.7100		532.4	530.0	527.5	525.1	522.7	520.2
% Incr			-1.32%	-0.46%	-0.46%	-0.46%	-0.46%	-0.47%
Winters-Exponential	0.7092		534.6	536.1	537.7	539.2	540.8	542.3
% Incr			-0.91%	0.29%	0.29%	0.29%	0.29%	0.29%
Winters-Damped	0.7130		532.0	531.7	531.6	531.6	531.6	531.6
% Incr			-1.40%	-0.06%	0.00%	0.00%	0.00%	0.00%
Customer Service			545.0	545.0	546.0	545.0	545.0	545.0
% Incr			1.02%	0.00%	0.18%	-0.18%	0.00%	0.00%
Customer Service Gwth Rate			524.2	524.2	524.2	524.2	524.2	524.2
% Incr			-2.84%	0.00%	0.00%	0.00%	0.00%	0.00%

Maui Electric Company, LTD.
Lanai Division

Schedule P -- Large Power Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.4317	11,543.6	11,935.8	11,921.8	11,907.7	11,893.6	11,879.6	11,865.5
% Incr			3.40%	-0.12%	-0.12%	-0.12%	-0.12%	-0.12%
Linear	0.5817		11,848.4	11,730.6	11,612.8	11,495.0	11,377.2	11,259.4
% Incr			2.64%	-0.99%	-1.00%	-1.01%	-1.02%	-1.04%
Exponential	0.5762		11,993.5	12,111.5	12,230.7	12,351.0	12,472.6	12,595.4
% Incr			3.90%	0.98%	0.98%	0.98%	0.98%	0.98%
Winters-Linear	0.5788		11,861.1	11,743.3	11,625.5	11,507.7	11,389.9	11,272.1
% Incr			2.75%	-0.99%	-1.00%	-1.01%	-1.02%	-1.03%
Winters-Exponential	0.5732		12,011.2	12,129.4	12,248.8	12,369.3	12,491.0	12,614.0
% Incr			4.05%	0.98%	0.98%	0.98%	0.98%	0.98%
Customer Service			12,514.5	13,005.8	13,268.7			
% Incr			8.40%	3.93%	2.02%	-100.00%	#DIV/0!	#DIV/0!
Customer Service Growth Rate			12,514.5	13,005.8	13,268.7	0.0	#DIV/0!	#DIV/0!
% Incr			8.40%	3.93%	2.02%	-100.00%	#DIV/0!	#DIV/0!

Maui Electric Company, LTD.
Lanai Division

Schedule F -- Public Street Lighting Sales (mwh)

INDEX	2005	2006	2007	2008	2009	2010	2011
Customer Service	113.6	113.6	113.7	113.9	114.1	114.2	114.2
% Incr		0.00%	0.20%	0.20%	0.20%	0.10%	0.00%
Customer Service Growth Rate		113.6	113.7	113.9	114.1	114.3	114.5
% Incr		0.00%	0.20%	0.20%	0.20%	0.20%	0.20%

MAUI PROJECTS (5/31/2006)

PROJECTS	ESTIMATED DATE OF POWER FOR CONSTRUCTION DATE	PROJECTED START OF LOAD DATE	NO. OF LOTS or UNITS	COMMENTS
SINGLE-FAMILY				
LAHAINA SUBD. PH. 1	Aug-06		67	Lots only; No projected date for full load
LAHAINA SUBD. PH. 2	Aug-06		65	Lots only; No projected date for full load
KIHEI VILLAS	Dec-06	Dec-08	152	Condo Lot w/ 152 Individual Homes. Homes to be completed in 3 phases over two years.
KIHEI SUBD.	Dec-06		31	Lots only; No projected date for full load
KIHEI OCEAN SUBD.	Jul-06		90	Lots only; No projected date for full load
KIHEI VILLAGE SUBD.	Mar-07		65	Lots only; No projected date for full load
KEOKEA-WAIOHULI	Mar-07		164	Lots only; No projected date for full load. Tenants have one year from service date to start construction.
WAIKAPU SUBD.	Oct-07	Nov-07	392	Service date projects total build out of 5 phases. Phase 1 (59 homes) completed. Remaining 4 phases to be completed within two years. Phase 5 pending transmission line relocation.
WAILUKU SITE 11	May-07	Jan-08	114	Hse/Lot Subd. - Homes to be energized from service date to actual load date.
WAILEA MF-5	Jun-06	May-07	38	Condo Lot w/ 38 Individual Homes & Rec Center
WAILEA MF-9	Dec-06	Dec-07	120	Hse/Lot Subd. - Homes to be energized from service date to actual load date.
KIHEI SUBD.	Sep-06	Apr-07	60	Hse/Lot Subd. - Homes to be energized from service date to actual load date.
WAILUKU SITE 10	Sep-06		97	Lots only; No projected date for full load
WAILUKU SITE 22	Sep-06		44	Lots only; No projected date for full load
WAIKAPU SUBD.	Jan-07		105	Lots only; No projected date for full load
KAPAULA PH. 2	Oct-06		21	Lots only; No projected date for full load
WAILUKU SUBD.	Completed		108	Lots only; No projected date for full load
KAPALUA MAUKA	Jun-07		51	Lots only; No projected date for full load
KAANAPALI SUBD.	Jun-07		60	Lots only; No projected date for full load
MAUI LANI PH. 7 INCR. 2	Jul-06	Jul-07	134	Hse/Lot Subd. - Homes to be energized from service date to actual load date.
SPRECKELSVILLE SUBD.	Sep-06		19	Lots only; No projected date for full load
MAUI LANI PH. 1D	Dec-06		48	Lots only; No projected date for full load
HAIKU SUBD.	Dec-06		16	Lots only; No projected date for full load. Require substation installation.
MAUI LANI PH. 7 INCR. 3	Dec-06	Dec-07	161	Hse/Lot Subd. - Homes to be energized from service date to actual load date.
KAANAPALI LOT 10-H	Jun-07		23	Lots only; No projected date for full load
KULA SUBD.	Jul-06		64	Lots only; No projected date for full load
UKUMEHAME SUBD.	May-07		46	Lots only; No projected date for full load
WAIKAPU SUBD.	Nov-06		36	Lots only; No projected date for full load
UPCOUNTRY SUBD	Nov-06		49	Lots only; No projected date for full load
WAIEHU SUBD	Jul-07	Sep-07	99	House & lot package
KULA SUBD.	Dec-07		37	Lots only; No projected date for full load
MULTI-FAMILY				
KIHEI CONDOS	Oct-06		112	Individual meter
LAHAINA VILLAS PH. 1	May-07	Nov-07	125	Individual meter
KIHEI ESTATES	Jul-07		144	Single & Multi-family mixture, individual meters
KIHEI VILLAS	Dec-06	Jan-07	33	Individual meter
KIHEI VILLAS	Nov-06	Dec-06	144	Individual meter
WAILEA	Dec-06	Jun-07	152	Individual metered duplex units. Project is done in 4 phases. Phase 1 units (36) to be energized in 12/2006.
WAILUKU MODULE 5	May-07	Nov-07	80	Individual meter
KAHULUI STUDENT HOUSING	Aug-07	Sep-07	104	Master meter dorms
WAILUKU MODULE 23	Jan-07	May-07	94	Afforadable housing
KIHEI VILLAGE	Jun-07	Dec-07	99	Individual meter
KIHEI VILLAGE	Mar-07	Dec-07	77	Individual meter
KAANAPALI	Jun-07	Jun-08	93	Individual metered condos. Half load to be energized around 7/2007.
KIHEI ESTATES	Mar-07	Aug-07	32	Multi-family project.
LAHAINA LOT 3	Oct-07	Nov-07	100	Individual meter

MAUI PROJECTS (5/31/2006)

PROJECTS	ESTIMATED DATE OF POWER FOR CONSTRUCTION DATE	PROJECTED START OF LOAD DATE	NO. OF LOTS or UNITS	COMMENTS
MULTI-FAMILY				
WAILEA	Oct-06	Mar-07	24	Individual meter
WAILUKU CONDOS	Apr-07	May-07	28	Individual meter
COMMERCIAL				
KAHULUI MULTIPLE USE PROJECT	Dec-06	Dec-06		Project down sized for office only.
LAHAINA MULTIPLE USE PROJECT	Aug-06		11 Units	Tenants have not been identified to determine full load usage.
KAHULUI SERVICES BUILDING	Jan-07	Jan-07		This project may be pushed out. We have no confirmation that this project has been contracted.
WAILUKU HEALTH CENTER	Feb-07	Feb-07		
WAILUKU MULTIPLE USE FACILITY	Sep-06	Sep-06		
KULA EDUCATION BUILDING	Feb-07	Feb-07		Office building for Upcountry Commecial Sub'd.
HALEAKALA SERVICES FACILITY	Feb-07	Feb-07		No work by MECO. Customer to add load only.
KAHULUI RETAIL	Jul-06	Jul-06		Additional load to existing customer in Kahului.
OTHER PUMPING	Jul-06	Jul-06		Expect full load in 7/2006.
KIHEI SERVICES CENTER	Jun-06	Aug-06		800 kW immediately with 700 kW future load (no timeframe).
KAHULUI EDUCATION	Dec-06	Dec-06		School should be open for 2007 school year.
FOOD SERVICE	Jun-06			
WAILEA RETAIL	Oct-07	Oct-07		Retail units. Expectation is that individual stalls to be energized by early 12/2006.
KIHEI EDUCATION	Jul-06	Jul-06		Additional load for A/C units.
KAHULUI CONCRETE WHOLE PRODUCTS	Sep-06			Project to be cancelled. No confimation from customer on service date.
HANA RETAIL	Dec-06	Dec-06		Additional load to existing customer.
OTHER PUMPING	Completed	Jan-07		Tranmission water line to be completed by 12/2006.
KAHULUI OFFICE SPACE	Aug-06		8	Office spaces; No projected date for full load
KIHEI SERVICES ANNEX	Jun-07	Jun-07		
KAHULUI RETAIL - FOOD	Sep-07	Sep-07		
KAPALUA SUBD	Nov-06	Nov-06		Good chance that full load may be achieved by 1st quarter 2007. We understand that all available retail spaces have a perspective tenant.
KIHEI RETAIL - NONFOOD	Mar-07		13	Retail spaces; No projected date for full load
KIHEI OFFICE SPACE	Oct-06		9	Office spaces; No projected date for full load
OFFICE SPACE	Jun-07		12	Office spaces; No projected date for full load
COMMERCIAL SUBD./COMPLEX				
LAHAINA MULTIPLE USE	Aug-06		27 LOTS	Lots only; No projected date for full load
LAHAINA RETAIL - NONFOOD	done		16 UNITS	Retail spaces; house meter energized
KAHULUI HOTEL RENOVATION	Apr-07	Apr-07	135 UNITS	Service upgrade
KAANAPALI HOTEL	Aug-06	Aug-07	256 UNITS	
WAIKAPU HOUSING	Jul-06		18 LOTS	Lots only; No projected date for full load
KIHEI MUILTIPLE USE	Jun-07		73 UNITS	Individual owned commercial units. No full load date available.
KIHEI HOUSING	Oct-06		99 UNITS	Individual metered condos. Some units will be live/work units. No full load date available.
KAANAPALI HOTEL	Jan-07	Jan-07	78 UNITS	New master meter.
WEST MAUI MULTIPLE USE	Mar-07	Dec-07	86 RES./27 COMM.	Half commercial and half residential units.
KAANAPALI HOTEL	Jan-08	Jan-08	71 UNITS	New master meter.
KAANAPALI HOUSING - PHASE 1	Dec-08	Dec-08	318 UNITS	First building only.
KAANAPALI HOUSING - PHASE 2	Dec-09	Dec-09	320 UNITS	Second building only.
KAANAPALI HOUSING - PHASE 3	Dec-08	Dec-08	76 UNITS	4-unit clusters - 19 clusters.
LAHAINA GATEWAY				Project service request under review.
WAIKAPU BASEYARD	Jun-07			
KULA MULTIPLE USE	Jan-07		12 Bldgs	

Confidential Information Deleted
Pursuant to Protective Order No. 23379

CA-IR-40
DOCKET NO. 2006-0387
ATTACHMENT 18

The requested information is confidential and will be provided pursuant to Protective Order No. 23379, dated April 23, 2007.

Confidential Information Deleted
Pursuant to Protective Order No. 23379

CA-IR-40
DOCKET NO. 2006-0387
ATTACHMENT 19

The requested information is confidential and will be provided pursuant to Protective Order No. 23379, dated April 23, 2007.

Maui Electric Company, Ltd.
Maui Division

BILLED DATA

SCHEDULE R : RESIDENTIAL SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Mwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	105,058			16,631			6,317		
1976	114,664	9,606	9.1%	18,004	1,373	8.3%	6,369	52	0.8%
1977	124,250	9,586	8.4%	19,001	997	5.5%	6,539	170	2.7%
1978	134,508	10,258	8.3%	20,030	1,029	5.4%	6,715	176	2.7%
1979	145,351	10,843	8.1%	21,639	1,609	8.0%	6,717	2	0.0%
1980	147,432	2,081	1.4%	23,447	1,808	8.4%	6,288	(429)	-6.4%
1981	156,287	8,855	6.0%	25,204	1,757	7.5%	6,201	(87)	-1.4%
1982	158,700	2,413	1.5%	26,062	858	3.4%	6,089	(112)	-1.8%
1983	160,663	1,963	1.2%	27,391	1,329	5.1%	5,866	(223)	-3.7%
1984	167,620	6,957	4.3%	28,076	685	2.5%	5,970	104	1.8%
1985	174,240	6,620	4.0%	28,674	598	2.1%	6,077	107	1.8%
1986 **	189,519	15,279	8.8%	29,432	758	2.6%	6,439	362	6.0%
1987	202,704	13,185	7.0%	30,597	1,165	4.0%	6,625	186	2.9%
1988	215,646	12,942	6.4%	31,911	1,314	4.3%	6,758	133	2.0%
1989	233,802	18,156	8.4%	33,680	1,769	5.5%	6,942	184	2.7%
1990	253,484	19,682	8.4%	35,521	1,841	5.5%	7,136	194	2.8%
1991	262,523	9,039	3.6%	37,355	1,834	5.2%	7,028	(108)	-1.5%
1992	276,396	13,873	5.3%	38,934	1,579	4.2%	7,099	71	1.0%
1993	285,575	9,179	3.3%	39,943	1,009	2.6%	7,150	51	0.7%
1994	301,585	16,010	5.6%	41,017	1,074	2.7%	7,353	203	2.8%
1995	312,743	11,158	3.7%	41,794	777	1.9%	7,483	130	1.8%
1996	328,386	15,643	5.0%	42,322	528	1.3%	7,759	276	3.7%
1997	328,772	386	0.1%	42,843	522	1.2%	7,674	(85)	-1.1%
1998	328,697	(75)	0.0%	43,374	531	1.2%	7,578	(96)	-1.3%
1999	337,898	9,201	2.8%	44,048	674	1.6%	7,671	93	1.2%
2000	354,648	16,750	5.0%	44,940	892	2.0%	7,892	221	2.9%
2001	360,423	5,775	1.6%	45,908	968	2.2%	7,851	(41)	-0.5%
2002	378,588	18,165	5.0%	46,788	880	1.9%	8,092	241	3.1%
2003	398,494	19,906	5.3%	47,736	948	2.0%	8,348	256	3.2%
2004	418,450	19,956	5.0%	48,692	956	2.0%	8,594	246	3.0%
2005	420,903	2,453	0.6%	49,648	956	2.0%	8,478	(116)	-1.4%
2005 @	136,396			49,380			2,762		
2006 @	137,945	1,549	1.1%	50,340	960	1.9%	2,740	(22)	-0.8%

* Formerly called Schedule D.
** Includes refolio adjustment of 494 mwh.
@ April year-to-date

Maui Electric Company, Ltd.
Maui Division

BILLED DATA

SCHEDULE G/J : GENERAL SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Mwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	74,754			2,718			27,503		
1976	93,907	19,153	25.6%	2,905	187	6.9%	32,326	4,823	17.5%
1977	103,305	9,398	10.0%	3,113	208	7.2%	33,185	859	2.7%
1978	115,916	12,611	12.2%	3,401	288	9.3%	34,083	898	2.7%
1979	126,644	10,728	9.3%	3,679	278	8.2%	34,423	340	1.0%
1980	132,773	6,129	4.8%	3,808	129	3.5%	34,867	444	1.3%
1981	147,846	15,073	11.4%	3,906	98	2.6%	37,851	2,984	8.6%
1982	136,463	(11,383)	-7.7%	3,964	58	1.5%	34,426	(3,425)	-9.1%
1983	142,946	6,483	4.8%	4,070	106	2.7%	35,122	696	2.0%
1984	154,140	11,194	7.8%	4,236	166	4.1%	36,388	1,266	3.6%
1985	155,593	1,453	0.9%	4,383	147	3.5%	35,499	(889)	-2.4%
1986 **	173,663	18,070	11.6%	4,540	157	3.6%	38,252	2,753	7.8%
1987	190,634	16,971	9.8%	4,891	351	7.7%	38,976	724	1.9%
1988	203,973	13,339	7.0%	5,135	244	5.0%	39,722	746	1.9%
1989	212,423	8,450	4.1%	5,419	284	5.5%	39,200	(522)	-1.3%
1990	221,592	9,169	4.3%	5,699	280	5.2%	38,883	(317)	-0.8%
1991	232,230	10,638	4.8%	5,828	129	2.3%	39,847	964	2.5%
1992	239,552	7,322	3.2%	6,000	172	3.0%	39,925	78	0.2%
1993	245,037	5,485	2.3%	6,103	103	1.7%	40,150	225	0.6%
1994	256,946	11,909	4.9%	6,256	153	2.5%	41,072	922	2.3%
1995	262,489	5,543	2.2%	6,368	112	1.8%	41,220	148	0.4%
1996	272,453	9,964	3.8%	6,459	91	1.4%	42,179	959	2.3%
1997	275,350	2,898	1.1%	6,604	144	2.2%	41,698	(481)	-1.1%
1998	284,303	8,953	3.3%	6,752	149	2.3%	42,107	409	1.0%
1999	292,652	8,349	2.9%	6,927	175	2.6%	42,248	141	0.3%
2000	307,796	15,144	5.2%	7,198	271	3.9%	42,761	513	1.2%
2001	326,253	18,457	6.0%	7,491	293	4.1%	43,553	792	1.9%
2002	326,076	(177)	-0.1%	7,657	166	2.2%	42,585	(968)	-2.2%
2003	342,227	16,151	5.0%	7,902	245	3.2%	43,309	724	1.7%
2004	349,408	7,181	2.1%	8,105	203	2.6%	43,110	(199)	-0.5%
2005	355,141	5,732	1.6%	8,342	237	2.9%	42,573	(537)	-1.3%
2005 @	110,526			8,249			13,398		
2006 @	114,394	3,868	3.5%	8,543	294	3.6%	13,390	(8)	-0.1%

* Formerly called Schedules L-1, H-2, C and P-1, which have been combined.
** Includes refolio adjustment of 935 mwh.
@ April year-to-date

Maui Electric Company, Ltd.
Maui Division

BILLED DATA

SCHEDULE H : COMMERCIAL COOKING, HEATING, AIR CONDITIONING & REFRIGERATION SERVICE

Year	Billed Sales			Average Customers			Use / Average Customer		
	Mwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975 *	5,223			196			26,648		
1976	6,036	813	15.6%	187	(9)	-4.6%	32,278	5,630	21.1%
1977	7,553	1,517	25.1%	187	0	0.0%	40,390	8,112	25.1%
1978	8,772	1,219	16.1%	196	9	4.8%	44,755	4,365	10.8%
1979	9,869	1,097	12.5%	216	20	10.2%	45,690	935	2.1%
1980	11,477	1,608	16.3%	230	14	6.5%	49,900	4,210	9.2%
1981	12,852	1,375	12.0%	235	5	2.2%	54,689	4,789	9.6%
1982	14,068	1,216	9.5%	250	15	6.4%	56,272	1,583	2.9%
1983	14,900	832	5.9%	258	8	3.2%	57,752	1,480	2.6%
1984	15,830	930	6.2%	256	(2)	-0.8%	61,836	4,084	7.1%
1985	16,246	416	2.6%	259	3	1.2%	62,726	890	1.4%
1986 **	19,656	3,410	21.0%	268	9	3.5%	73,343	10,617	16.9%
1987	21,399	1,743	8.9%	287	19	7.1%	74,561	1,218	1.7%
1988	23,309	1,910	8.9%	294	7	2.4%	79,282	4,721	6.3%
1989	23,625	316	1.4%	296	2	0.7%	79,814	532	0.7%
1990	24,717	1,092	4.6%	296	0	0.0%	83,503	3,689	4.6%
1991	25,485	768	3.1%	306	10	3.4%	83,284	(219)	-0.3%
1992	26,525	1,040	4.1%	317	11	3.6%	83,675	391	0.5%
1993	26,619	94	0.4%	317	0	0.0%	83,972	297	0.4%
1994	26,629	10	0.0%	314	(3)	-1.0%	84,806	834	1.0%
1995	26,659	30	0.1%	306	(8)	-2.6%	87,120	2,314	2.7%
1996	26,565	(93)	-0.4%	290	(16)	-5.3%	91,683	4,563	5.2%
1997	26,261	(304)	-1.2%	285	(5)	-1.6%	92,062	379	0.4%
1998	23,966	(2,295)	-8.7%	276	(9)	-3.2%	86,834	(5,228)	-5.7%
1999	23,569	(397)	-1.7%	265	(11)	-4.0%	88,939	2,105	2.4%
2000	23,843	275	1.2%	251	(14)	-5.3%	94,994	6,055	6.8%
2001	23,612	(231)	-1.0%	241	(10)	-4.0%	97,976	2,982	3.1%
2002	22,430	(1,182)	-5.0%	240	(1)	-0.4%	93,457	(4,519)	-4.6%
2003	23,051	621	2.8%	239	(1)	-0.4%	96,447	2,990	3.2%
2004	23,184	133	0.6%	236	(3)	-1.3%	98,235	1,788	1.9%
2005	22,260	(923)	-4.0%	233	(3)	-1.3%	95,537	(2,698)	-2.8%
2005 @	6,653			234			28,431		
2006 @	6,523	(130)	-2.0%	230	(4)	-1.7%	28,362	(69)	-0.2%

* Formerly called Schedule H-1.
** Includes refolio adjustment of 38 mwh.
@ April year-to-date

Maui Electric Company, Ltd.
Maui Division

BILLED DATA

SCHEDULE P : LARGE POWER SERVICE

Year		Billed Sales Mwh	Chg	% Chg	Average Customers No.	Chg	% Chg	Use / Average Customer Kwh	Chg	% Chg
1975	*	78,278			54			1,449,593		
1976		87,143	8,865	11.3%	35	(19)	-35.2%	2,489,800	1,040,207	71.8%
1977		103,361	16,218	18.6%	44	9	25.7%	2,349,114	(140,686)	-5.7%
1978		110,367	7,006	6.8%	47	3	6.8%	2,348,234	(880)	0.0%
1979		119,005	8,638	7.8%	51	4	8.5%	2,333,431	(14,803)	-0.6%
1980		139,110	20,105	16.9%	53	2	3.9%	2,624,717	291,286	12.5%
1981		150,456	11,346	8.2%	55	2	3.8%	2,735,564	110,847	4.2%
1982		163,429	12,973	8.6%	60	5	9.1%	2,723,817	(11,747)	-0.4%
1983		167,586	4,157	2.5%	63	3	5.0%	2,660,095	(63,722)	-2.3%
1984		186,909	19,323	11.5%	70	7	11.1%	2,670,129	10,034	0.4%
1985		182,578	(4,331)	-2.3%	72	2	2.9%	2,535,806	(134,323)	-5.0%
1986	**	197,168	14,590	8.0%	71	(1)	-1.4%	2,777,014	241,208	9.5%
1987		200,781	3,613	1.8%	71	0	0.0%	2,827,901	50,887	1.8%
1988		218,048	17,267	8.6%	72	1	1.4%	3,028,444	200,543	7.1%
1989		218,846	798	0.4%	73	1	1.4%	2,997,890	(30,554)	-1.0%
1990		234,593	15,747	7.2%	78	5	6.9%	3,007,603	9,713	0.3%
1991		252,471	17,878	7.6%	80	2	2.6%	3,155,888	148,285	4.9%
1992		287,670	35,199	13.9%	88	8	10.0%	3,268,977	113,089	3.6%
1993		298,642	10,972	3.8%	93	5	5.7%	3,211,204	(57,773)	-1.8%
1994		309,483	10,841	3.6%	98	5	5.4%	3,157,990	(53,214)	-1.7%
1995		327,180	17,697	5.7%	103	5	5.1%	3,176,506	18,516	0.6%
1996		335,085	7,905	2.4%	104	1	1.3%	3,211,679	35,173	1.1%
1997		333,654	(1,431)	-0.4%	107	2	2.2%	3,130,449	(81,230)	-2.5%
1998		326,436	(7,218)	-2.2%	106	(1)	-0.6%	3,079,585	(50,864)	-1.6%
1999		337,466	11,030	3.4%	107	1	0.9%	3,153,889	74,304	2.4%
2000		349,445	11,979	3.6%	109	2	1.9%	3,205,921	52,032	1.7%
2001		358,205	8,759	2.5%	113	4	3.7%	3,169,953	(35,968)	-1.1%
2002		363,511	5,306	1.5%	116	3	2.7%	3,133,711	(36,242)	-1.1%
2003		374,011	10,500	2.9%	118	2	1.7%	3,169,585	35,874	1.1%
2004		386,731	12,720	3.4%	117	(1)	-0.9%	3,305,396	135,811	4.3%
2005		383,086	(3,646)	-0.9%	117	0	0.0%	3,274,236	(31,160)	-0.9%
2005	@	120,342			116			1,037,430		
2006	@	122,672	2,330	1.9%	119	3	2.6%	1,030,855	(6,575)	-0.6%

* Formerly called Schedule P-4.
** Includes refolio adjustment of 4966 mwh.
@ April year-to-date

Maui Electric Company, Ltd.
Maui Division

BILLED DATA

SCHEDULE F : PUBLIC STREET LIGHTING SERVICE

Year		Billed Sales			Average Customers			Use / Average Customer		
		Mwh	Chg	% Chg	No.	Chg	% Chg	Kwh	Chg	% Chg
1975	*	3,253			345			9,429		
1976		3,410	157	4.8%	354	9	2.6%	9,633	204	2.2%
1977		3,505	95	2.8%	358	4	1.1%	9,791	158	1.6%
1978		3,690	185	5.3%	361	3	0.8%	10,222	431	4.4%
1979		3,634	(56)	-1.5%	361	0	0.0%	10,066	(156)	-1.5%
1980		3,606	(28)	-0.8%	362	1	0.3%	9,961	(105)	-1.0%
1981		3,815	209	5.8%	369	7	1.9%	10,339	378	3.8%
1982		4,083	268	7.0%	370	1	0.3%	11,035	696	6.7%
1983		3,993	(90)	-2.2%	370	0	0.0%	10,792	(243)	-2.2%
1984		3,925	(68)	-1.7%	371	1	0.3%	10,580	(212)	-2.0%
1985		3,901	(24)	-0.6%	371	0	0.0%	10,515	(65)	-0.6%
1986	**	4,027	126	3.2%	373	2	0.5%	10,796	281	2.7%
1987		4,115	88	2.2%	375	2	0.5%	10,973	177	1.6%
1988		4,204	89	2.2%	374	(1)	-0.3%	11,241	268	2.4%
1989		4,139	(65)	-1.6%	373	(1)	-0.3%	11,097	(144)	-1.3%
1990		4,205	66	1.6%	367	(6)	-1.6%	11,458	361	3.3%
1991		4,325	120	2.9%	367	0	0.0%	11,785	327	2.9%
1992		4,472	147	3.4%	367	0	0.0%	12,185	400	3.4%
1993		4,532	60	1.3%	368	1	0.3%	12,315	130	1.1%
1994		4,631	99	2.2%	368	0	0.0%	12,584	269	2.2%
1995		4,799	168	3.6%	368	0	0.0%	13,040	456	3.6%
1996	#	4,808	10	0.2%	124	(244)	-66.3%	38,726	25,686	197.0%
1997		4,688	(120)	-2.5%	131	7	5.4%	35,833	(2,893)	-7.5%
1998		4,689	1	0.0%	132	1	0.9%	35,523	(310)	-0.9%
1999		4,758	69	1.5%	132	0	0.0%	36,044	521	1.5%
2000		4,896	138	2.9%	137	5	3.8%	35,737	(307)	-0.9%
2001		4,986	90	1.8%	142	5	3.7%	35,110	(627)	-1.8%
2002		5,079	94	1.9%	144	2	1.4%	35,273	163	0.5%
2003		5,141	62	1.2%	149	5	3.5%	34,506	(767)	-2.2%
2004		5,196	54	1.1%	150	1	0.7%	34,637	131	0.4%
2005		5,273	77	1.5%	158	8	5.3%	33,373	(1,264)	-3.7%
2005	@	1,756			155			11,345		
2006	@	1,780	24	1.4%	166	11	7.3%	10,720	(625)	-5.5%

* Formerly called Schedule SL.
** Includes refolio adjustment of 4 mwh.
\# Change in source of customer count.
@ April year-to-date

Maui Electric Company, Ltd.
Maui Division

BILLED DATA

TOTAL SYSTEM

Year		Billed Sales Mwh	Chg	% Chg	Average Customers No.	Chg	% Chg	Use / Average Customer Kwh	Chg	% Chg
1975	*	266,566			19,944			13,366		
1976		305,160	38,594	14.5%	21,485	1,541	7.7%	14,203	837	6.3%
1977		341,974	36,814	12.1%	22,703	1,218	5.7%	15,063	860	6.1%
1978		373,253	31,279	9.2%	24,035	1,332	5.9%	15,530	467	3.1%
1979		404,503	31,250	8.4%	25,946	1,911	8.0%	15,590	60	0.4%
1980		434,398	29,895	7.4%	27,900	1,954	7.5%	15,570	(20)	-0.1%
1981		471,256	36,858	8.5%	29,769	1,869	6.7%	15,830	260	1.7%
1982		476,743	5,487	1.2%	30,706	937	3.2%	15,526	(304)	-1.9%
1983		490,088	13,345	2.8%	32,152	1,446	4.7%	15,243	(283)	-1.8%
1984		528,424	38,336	7.8%	33,009	857	2.7%	16,008	765	5.0%
1985		532,558	4,134	0.8%	33,759	750	2.3%	15,775	(233)	-1.5%
1986	**	584,033	51,475	9.7%	34,684	925	2.7%	16,839	1,064	6.7%
1987		619,633	35,600	6.1%	36,221	1,537	4.4%	17,107	268	1.6%
1988		665,180	45,547	7.4%	37,786	1,565	4.3%	17,604	497	2.9%
1989		692,835	27,655	4.2%	39,841	2,055	5.4%	17,390	(214)	-1.2%
1990		738,591	45,756	6.6%	41,961	2,120	5.3%	17,602	212	1.2%
1991		777,034	38,443	5.2%	43,936	1,975	4.7%	17,686	84	0.5%
1992		834,615	57,581	7.4%	45,706	1,770	4.0%	18,261	575	3.3%
1993		860,405	25,790	3.1%	46,824	1,118	2.5%	18,375	114	0.6%
1994		899,274	38,869	4.5%	48,053	1,229	2.6%	18,714	339	1.8%
1995		933,869	34,595	3.9%	48,939	886	1.8%	19,082	368	2.0%
1996		967,297	33,428	3.6%	49,299	360	0.7%	19,621	539	2.8%
1997		968,725	1,428	0.2%	49,969	670	1.4%	19,386	(235)	-1.2%
1998		968,091	(634)	-0.1%	50,640	671	1.3%	19,117	(269)	-1.4%
1999		996,343	28,252	2.9%	51,479	839	1.7%	19,354	237	1.2%
2000		1,040,629	44,286	4.4%	52,635	1,156	2.3%	19,771	417	2.2%
2001		1,073,479	32,850	3.2%	53,895	1,260	2.4%	19,918	147	0.7%
2002		1,095,684	22,205	2.1%	54,945	1,050	2.0%	19,941	23	0.1%
2003		1,142,924	47,240	4.3%	56,144	1,199	2.2%	20,357	416	2.1%
2004		1,182,968	40,044	3.5%	57,300	1,156	2.1%	20,645	288	1.4%
2005		1,186,662	3,694	0.3%	58,498	1,198	2.1%	20,286	(359)	-1.7%
		1,199,494	12,832	20.4%						
2005	@	375,673			58,134			6,462		
2006	@	383,314	7,641	2.0%	59,398	1,264	2.2%	6,453	(9)	-0.1%

* Formerly called Schedules D, L-1, H-1, H-2, C, P-1, P-4 and SL.
** Includes refolio adjustment of 6,436 mwh.
@ April year-to-date

Maui Electric Company, LTD.
Maui Division

Schedule R -- Residential Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.9900	421,130	421,130	430,167	441,914	449,653	458,241	466,856
% Incr			0.00%	2.15%	2.73%	1.75%	1.91%	1.88%
Linear	0.9895		431,967	443,814	455,578	465,729	475,518	485,307
% Incr			2.57%	5.39%	5.91%	5.39%	5.75%	5.91%
Exponential	0.9890		433,699	448,744	464,275	478,782	493,537	508,924
% Incr			2.98%	6.56%	7.93%	8.34%	9.76%	11.06%
Winters-Linear	0.9896		431,819	443,670	455,439	465,594	475,387	485,181
% Incr			2.54%	5.35%	5.87%	5.36%	5.72%	5.88%
Winters -Exponen.	0.9892		433,289	448,051	463,286	477,482	491,912	506,957
% Incr			2.89%	6.39%	7.70%	8.05%	9.40%	10.63%
Customer Service			421,130	430,757	442,001	450,932	463,648	475,564
% Incr			0.00%	2.29%	2.61%	2.02%	2.82%	2.57%
REEPS			432,832	443,725	453,005	461,760	472,813	483,026
% Incr			2.78%	2.52%	2.09%	1.93%	2.39%	2.16%
Sch R Use Econometrics			424,776	434,715	444,489	452,228	460,263	468,129
% Incr			0.87%	2.34%	2.25%	1.74%	1.78%	1.71%
Schedule R Sales Econometrics			423,742	432,873	441,580	448,343	454,385	460,983
% Incr			0.62%	2.16%	2.01%	1.53%	1.35%	1.45%

Maui Electric Company, LTD.
Maui Division

Schedule GJ -- General Service Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.98640	355,894	363,505	372,510	380,651	389,496	398,341	408,471
% Incr			2.14%	2.48%	2.19%	2.32%	2.27%	2.54%
Linear	0.98680		365,101	373,968	381,970	390,678	399,384	409,376
% Incr			2.59%	2.43%	2.14%	2.28%	2.23%	2.50%
Exponential	0.98610		365,174	375,011	384,337	394,734	405,505	417,951
% Incr			2.61%	2.69%	2.49%	2.71%	2.73%	3.07%
Winters-Linear	0.98940		363,767	372,634	380,637	389,344	398,050	408,042
% Incr			2.21%	2.44%	2.15%	2.29%	2.24%	2.51%
Winters -Exponen.	0.98900		362,968	371,290	379,018	387,728	396,722	407,294
% Incr			1.99%	2.29%	2.08%	2.30%	2.32%	2.66%
Customer Service			357,673	364,386	372,473	378,847	385,931	394,576
% Incr			0.50%	1.88%	2.22%	1.71%	1.87%	2.24%
GJ Econometrics			363,403	371,616	378,814	386,361	393,585	402,390
% Incr			2.11%	2.26%	1.94%	1.99%	1.87%	2.24%
Commercial Econometrics			359,959	366,351	371,554	377,137	382,396	389,237
% Incr			1.14%	1.78%	1.42%	1.50%	1.39%	1.79%

Maui Electric Company, LTD.
Maui Division

Sch H -- Heating, Cooking, Air-Conditioning Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.9049	22,272	22,780	22,478	22,179	21,881	21,582	21,284
% Incr			2.28%	-1.32%	-1.33%	-1.35%	-1.36%	-1.38%
Linear	0.9201		22,743	22,567	22,394	22,221	22,048	21,876
% Incr			2.12%	-0.77%	-0.77%	-0.77%	-0.78%	-0.78%
Damped-Linear	0.919		22,798	22,696	22,596	22,497	22,398	22,299
% Incr			2.36%	-0.45%	-0.44%	-0.44%	-0.44%	-0.44%
Customer Service			21,159	21,075	21,217	21,159	21,159	21,159
% Incr			-5.00%	-0.40%	0.67%	-0.27%	0.00%	0.00%
Commercial Econometrics - H			22,473	22,371	22,263	22,164	22,065	21,966
% Incr			0.90%	-0.45%	-0.48%	-0.44%	-0.45%	-0.45%

Maui Electric Company, LTD.
Maui Division

Schedule P -- Large Power Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Box-Jenkins	0.00000	383,669	390,761	387,881	378,150	368,768	360,729	353,889
% Incr			1.85%	-0.74%	-2.51%	-2.48%	-2.18%	-1.90%
Linear	0.00000		391,933	395,096	391,408	388,069	386,073	385,276
% Incr			2.15%	0.81%	-0.93%	-0.85%	-0.51%	-0.21%
Winters-Linear	0.00000		389,615	387,439	378,470	369,909	362,752	356,855
% Incr			1.55%	-0.56%	-2.31%	-2.26%	-1.93%	-1.63%
Customer Service			385,725	388,918	400,225	410,150	430,492	436,002
% Incr			0.54%	0.83%	2.91%	2.48%	4.96%	1.28%
P Econometrics			381,197	384,874	380,794	376,247	372,256	369,156
% Incr			-0.64%	0.96%	-1.06%	-1.19%	-1.06%	-0.83%
Commercial Econometrics - P			383,516	384,628	378,539	372,455	367,374	363,722
% Incr			-0.04%	0.29%	-1.58%	-1.61%	-1.36%	-0.99%

Maui Electric Company, LTD.
Maui Division

Schedule F -- Public Street Lighting Sales (mwh)

	INDEX	2005	2006	2007	2008	2009	2010	2011
Customer Service		5,287	5,287	5,340	5,408	5,448	5,502	5,557
% Incr			0.00%	1.00%	1.27%	0.74%	0.99%	1.00%
0.84% increase in 2004-2006								
Box-Jenkins	0.9856		5,344	5,415	5,486	5,556	5,627	5,698
% Incr			1.08%	1.32%	1.31%	1.29%	1.27%	1.26%
Linear	0.9876		5,332	5,401	5,470	5,538	5,607	5,675
% Incr			0.86%	1.29%	1.27%	1.25%	1.24%	1.22%
Exponential	0.9872		5,333	5,407	5,481	5,556	5,632	5,709
% Incr			0.88%	1.37%	1.37%	1.37%	1.37%	1.37%
Winters-Linear	0.9869		5,324	5,393	5,462	5,530	5,599	5,667
% Incr			0.71%	1.29%	1.27%	1.26%	1.24%	1.23%
Winters -Exponen.	0.9866		5,325	5,398	5,472	5,547	5,623	5,700
% Incr			0.72%	1.37%	1.37%	1.37%	1.37%	1.37%

Confidential Information Deleted
Pursuant to Protective Order No. 23379

CA-IR-40
DOCKET NO. 2006-0387
ATTACHMENT 22

The requested information is confidential and will be provided pursuant to Protective Order No. 23379, dated April 23, 2007.

Maui Electric Company, Ltd. - Maui Division
2006 - 2011 Sales and Customer Forecast

	Actual 2005	Fcst 2006	Fcst 2007	Fcst 2008	Fcst 2009	Fcst 2010	Fcst 2011
Mwh Sales							
R	421,130	421,130	430,167	441,914	449,653	458,241	466,856
G	355,894	357,673	364,386	372,473	378,847	385,931	394,576
H	22,272	21,159	21,075	21,217	21,159	21,159	21,159
P	383,669	389,328	390,961	400,974	410,712	430,715	435,622
F	5,287	5,287	5,340	5,408	5,448	5,502	5,557
Total	1,188,252	1,194,578	1,211,929	1,241,986	1,265,818	1,301,548	1,323,771
		0.5%	1.5%	2.5%	1.9%	2.8%	1.7%
Diff from adopted forecast		3,390.4	3,424.3	3,468.0	3,502.8	3,544.1	3,587.7
Avg. No. of Customers							
R	49,648	50,548	51,398	52,198	52,998	53,798	54,598
G	8,343	8,567	8,773	8,979	9,185	9,391	9,597
H	233	233	233	233	233	233	233
P	117	120	121	122	123	124	124
F	158	166	169	172	175	178	181
Total	58,499	59,634	60,694	61,704	62,714	63,724	64,733
		1.9%	1.8%	1.7%	1.6%	1.6%	1.6%

Schedule P corrected to include KOR acct 0500-1861-002

Maui Electric Company, Ltd. - Maui Division
2006 - 2011 Sales and Customer Forecast

	Actual 2005	Fcst 2006	Fcst 2007	Fcst 2008	Fcst 2009	Fcst 2010	Fcst 2011
Mwh Sales							
R	421,130	421,130	430,167	441,914	449,653	458,241	466,856
G	355,894	357,673	364,386	372,473	378,847	385,931	394,576
H	22,272	21,159	21,075	21,217	21,159	21,159	21,159
P	383,669	385,938	387,537	397,506	407,209	427,171	432,035
F	5,287	5,287	5,340	5,408	5,448	5,502	5,557
Total	1,188,252	1,191,188	1,208,505	1,238,518	1,262,315	1,298,004	1,320,183
		0.2%	1.5%	2.5%	1.9%	2.8%	1.7%
Avg. No. of Customers							
R	49,648	50,548	51,398	52,198	52,998	53,798	54,598
G	8,343	8,567	8,773	8,979	9,185	9,391	9,597
H	233	233	233	233	233	233	233
P	117	120	121	122	123	124	124
F	158	166	169	172	175	178	181
Total	58,499	59,634	60,694	61,704	62,714	63,724	64,733
		1.9%	1.8%	1.7%	1.6%	1.6%	1.6%

Adopted by the Forecast Planning Committee, June 29, 2006

Growth Rates for Customers							
R		1.8%	1.7%	1.6%	1.5%	1.5%	1.5%
GJ		2.7%	2.4%	2.3%	2.3%	2.2%	2.2%
HK		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
P		2.6%	0.8%	0.8%	0.8%	0.8%	0.0%
F		5.1%	1.8%	1.8%	1.7%	1.7%	1.7%
Total		1.9%	1.8%	1.7%	1.6%	1.6%	1.6%
Avg Use/Cust							
R	706.9	694.3	697.4	705.5	707.0	709.8	712.6
G	3,554.8	3,479.2	3,461.2	3,456.9	3,437.2	3,424.7	3,426.2
H	7,965.7	7,567.5	7,537.5	7,588.2	7,567.5	7,567.5	7,567.5
P	273,268.5	268,012.4	266,898.6	271,520.5	275,887.0	287,077.2	290,345.9
F	2,788.5	2,654.3	2,633.2	2,620.4	2,594.1	2,575.9	2,558.5

Maui Electric Company, Ltd. - Lanai Division
2006 - 2011 Sales and Customer Forecast

	Actual 2005	Fcst 2006	Fcst 2007	Fcst 2008	Fcst 2009	Fcst 2010	Fcst 2011
Mwh Sales							
R	7,864.8	8,022.3	8,182.7	8,369.3	8,513.3	8,683.6	8,857.3
G	7,846.7	8,004.0	8,164.0	8,308.7	8,368.9	8,452.5	8,537.1
H	540.0	545.0	545.0	546.5	545.0	545.0	545.0
P	11,576.9	12,295.7	12,773.9	13,065.5	13,029.8	13,029.8	13,029.8
F	113.6	113.6	113.7	114.2	114.1	114.2	114.2
Total	27,942.0	28,980.6	29,779.4	30,404.2	30,571.1	30,825.2	31,083.4
		3.7%	2.8%	2.1%	0.5%	0.8%	0.8%
Avg. No. of Customers							
R	1,342	1,357	1,372	1,387	1,402	1,417	1,432
G	204	214	224	229	234	239	244
H	4	4	4	4	4	4	4
P	3	3	3	3	3	3	3
F	3	3	3	3	3	3	3
Total	1,556	1,581	1,606	1,626	1,646	1,666	1,686
		1.6%	1.6%	1.2%	1.2%	1.2%	1.2%

Adopted by the Forecast Planning Committee, June 29, 2006

Maui Electric Company, Ltd. - Molokai Division
2006 - 2011 Sales and Customer Forecast

	Actual 2005	Fcst 2006	Fcst 2007	Fcst 2008	Fcst 2009	Fcst 2010	Fcst 2011
Mwh Sales							
R	13,012.2	13,012.0	13,077.0	13,142.0	13,207.7	13,273.7	13,340.1
G	11,685.2	11,860.0	11,979.0	12,099.0	12,220.0	12,342.2	12,465.6
H	1,994.5	1,994.2	1,994.2	1,994.2	1,994.2	1,994.2	1,994.2
P	8,749.1	8,879.7	9,019.4	9,163.0	9,309.6	9,458.6	9,609.9
F	476.6	477.5	478.5	479.5	480.5	478.0	478.0
Total	35,917.6	36,223.5	36,548.2	36,877.8	37,212.1	37,546.8	37,887.9
		0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Avg. No. of Customers							
R	2,481	2,521	2,546	2,566	2,586	2,606	2,626
G	510	530	540	550	552	554	556
H	32	32	32	32	32	32	32
P	14	14	14	14	14	14	14
F	9	9	9	9	9	9	9
Total	3,046	3,106	3,141	3,171	3,193	3,215	3,237
		2.0%	1.1%	1.0%	0.7%	0.7%	0.7%

Adopted by the Forecast Planning Committee, June 29, 2006

CA-IR-73

Ref: MECO-WP-404, page 89.

a. Please explain any tests or related data that were used to develop the Heat Rate Constants for each generating unit.

b. Please provide copies of all workpapers, analyses and source documents that support this information. The workpapers and analysis should set forth all computations, state all assumptions made in performing such calculations, and explain the basis for such assumptions.

MECO Response:

a. Periodically, MECO performs heat rate tests on their existing units. When historical data permitted, a five year average (2001-2005 and any heat rate tests performed through August 2006) of heat rate test data was used to calculate the Heat Rate Constants (i.e., ABC coefficients). However, for some units (M1, M2, M3, MX1, MX2, M8, M9, M14 and 15, M15 and 16, M17 and 18, M18 and 19), heat rate test data were only available for a limited number of years, and therefore, the Heat Rate Constants were based on the available data. The date of the data used to generate the Heat Rate Constants are shown below for each MECO unit:

Kahului 1:	1/5/01, 6/15/01, 9/6/01, 11/26/01, 2/4/02, 4/25/02, 7/29/02, 12/5/02, 1/23/03, 2/28/03, 4/23/03, 7/17/03, 12/5/03, 1/21/04, 3/15/04, 5/22/04, 9/18/04, 12/2/04, 1/31/05, 3/28/05, 6/18/05, 8/19/05, 11/5/05, 2/25/06, 5/19/06, 8/12/06
Kahului 2:	1/8/01, 1/31/01, 6/8/01, 9/19/01, 12/26/01, 2/1/02, 4/24/02, 8/14/02, 12/23/02, 1/20/03, 6/23/03, 8/27/03, 10/25/03, 2/13/04, 6/16/04, 8/16/04, 10/4/04, 3/12/05, 6/2/05, 10/3/05, 11/21/05, 2/13/06, 5/4/06, 8/1/06

Kahului 3: 1/10/01, 6/14/01, 9/20/01, 11/8/01, 1/2/02, 5/9/02, 8/15/02, 9/9/02, 12/16/02, 1/16/03, 5/30/03, 8/20/03, 10/15/03, 12/17/03, 2/9/04, 5/27/04, 9/17/04, 11/11/04, 2/2/05, 6/22/05, 7/20/05, 11/24/05, 11/25/05, 1/7/06, 4/26/06, 5/12/06, 5/29/06, 7/22/06

Kahului 4: 1/15/01, 4/11/01, 9/17/01, 12/27/01, 2/6/02, 4/11/02, 4/26/02, 8/12/02, 11/27/02, 1/15/03, 4/14/03, 4/17/03, 6/2/03, 8/9/03, 8/11/03, 8/25/03, 11/14/03, 12/11/03, 2/20/04, 6/7/04, 6/8/04, 7/28/04, 8/2/04, 8/7/04, 8/12/04, 12/16/04, 2/17/05, 4/13/05, 5/24/05, 8/27/05, 12/22/05, 1/21/06, 4/15/06, 8/31/06

EMD Units: (MX1, MX2, M1, M2, M3)

3/13/02, 3/19/04, 3/2/05, 3/5/05, 3/14/06

The EMD units were tested only at their maximum rating during source testing because they are dispatched only at their normal top load. Therefore, Heat Rate Constants could not be determined for these units. To determine Heat Rate Constants for a second degree polynomial curve-fit, at least four data points are needed.

Maalaea 4: 4/17/01, 12/19/03, 10/29/04, 12/29/04, 4/8/05, 3/30/06

Maalaea 5: 11/14/01, 6/26/02, 6/7/04, 12/7/04, 11/18/05

Maalaea 6: 7/21/01, 3/19/02, 5/14/04, 3/18/05, 2/1/06

Maalaea 7: 5/11/01, 4/16/02, 12/3/02, 5/27/04, 11/22/05

Maalaea 8: 3/12/03, 8/13/04, 7/29/05, 11/25/05

Maalaea 9: 4/30/04, 3/30/05

Maalaea 10: 4/20/01, 3/11/02, 10/6/03, 5/24/04, 1/28/05, 1/24/06

Maalaea 11: 1/3/01, 3/5/02, 9/17/03, 9/25/03, 7/16/04, 1/21/05, 1/30/06

Maalaea 12: 11/7/01, 3/26/02, 9/11/03, 2/23/04, 5/9/05, 1/31/06

Maalaea 13: 4/18/01, 9/7/01, 3/12/02, 11/26/03, 3/1/04, 9/28/05

Maalaca 14 and 15, Maalaea 15 and 16, Maalaca 17 and 18, Maalaea 18 and 19: 4/25/05, 5/10/05

The Heat Rate test data are voluminous and is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information. An electronic version of the requested data is being provided on a compact disc.

M18 was installed after the 2007 test year production simulations were performed. Therefore, due to the similarities between Maalaea units M14-15/M15-16 and M17-18/18-19, the same Heat Rate Constants were used for these units based on the heat rate tests performed on M14-15/M15-16.

Data for the Hana units should be omitted from MECO-WP-404, page 89, as the Hana units were modeled as transaction units in the production simulation and the Heat Rate Constants do not apply.

b. The data accumulated from the various heat rate tests were used to calculate the Heat Rate Constants shown in MECO-WP-404, page 89. Data for similar units (i.e., Cooper-Bessemer: M4, M5, M6, M7; Colt-Pielstik: M8, M9; Mitstubishi: M10, M11, M12, M13; EMD: MX1, MX2, M1, M2, M3; Combined Cycle units: M14-15, M15-16, M17-18, M18-19) were grouped together to calculate an average Heat Rate Constant. The Heat Rate Constant calculations are voluminous and are available for inspection at HECO's Regulatory

Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the requested information. An electronic version of the requested data is being provided on a compact disc.

Pages 5-362 are voluminous and are available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4662 to make arrangements to inspect the requested information. An electronic version of the requested data is being provided on a compact disc.

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 08-12-06

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,900	3,500	4,500	5,500	
BOILER-TURBINE						
Ambient Air Temp	°F.	92	92	94	95	
Gas Entering A.H.	°F.	365	370	410	440	
Gas Leaving A.H.	°F.	320	325	360	385	
Air Entering A.H.	°F.	98	107	107	110	
Air Leaving A.H.	°F.	335	335	345	360	
Circ. Water Inlet	°F.	76.0	77.0	77.0	77.0	
Circ. Water Outlet	°F.	85.2	87.4	91.2	95.0	
Condenser Vacuum	"Hg.	28.60	28.50	28.30	27.90	
Barometric Pressure	"Hg.	29.50	29.50	29.50	29.50	
Excess O2	%	0.60	0.70	0.80	0.80	
Feedwater Flow (X1000)	Lb/Hr	35.00	43.10	57.10	70.00	
Steam Flow (X1000)	Lb/Hr	34.30	42.30	56.80	69.90	
Throttle Stm. Press.	PSIG	397	395	395	393	
Feedwater to Blr.	°F.	295	305	325	325	
GENERATOR						
Generator Integrator, Start		9690.2	9695.2	9701.9	9710.6	
Generator Integrator, Stop		9692.9	9698.6	9706.3	9716.1	
Generator Integrator, Diff.	MWH	2.7	3.4	4.4	5.5	0.0
Generator Volts	V.	Wrong rdg.	Wrong rdg.	Wrong rdg.	Wrong rdg.	
Generator Amps	A.	190	210	240	290	
Generator VARS	MVAR	2.4	1.7	2.0	2.0	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	1294.8	1298.9	1303.2	1307.8	
Aux. KWH Mtr. End (X100)	KWH	1297.2	1301.3	1305.7	1310.4	
Aux. Load Indicator	MW	0.24	0.24	0.25	0.25	
Aux. KWH Mtr. Diff.	KWH	2.4	2.4	2.5	2.6	
Aux. Amps	A.	15.0	15.0	16.0	18.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	20434286	20438616	20444312	20451670	
Start Test	Time	0603	0748	0935	1124	
F.O. Totalizer-End	Lbs/Hr.	20436596	20441438	20448022	20456238	
End Test	Time	0703	0848	1035	1224	
F.O. Diff.	Lbs/Hr.	2310	2822	3710	4568	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	245	245	243	243	
F.O. Temp. @ Burner Deck	°F	245	245	243	243	
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	15.4				
Higher Heating Value	BTU/Gal	148,143	TEST BY: D.Sakuma			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-12-06
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.9	3.5	4.5	5.5	0.0
F.O. Temp. °F.	245	245	243	243	0
F.O. Temp. (Corr.)	0.9357	0.9357	0.9364	0.9364	1.02145
F.O. Usage (Lbs./Hr.)	2310.0	2822.0	3710.0	4568.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	281.3	343.6	451.8	556.3	0.0
PT RATIO	1,000	1,000	1,000	1,000	1.000
KW (Gen.)	2,700	3,400	4,400	5,500	0
KW (Aux.)	240	240	250	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,143	148,143	148,143	148,143	148,143
HEAT RATE (APPROX.)	16,990	14,826	15,160	16,799	#DIV/0!
HEAT RATE (APPROX.)N	18,795	15,917	16,051	17,720	#DIV/0!
HEAT RATE (ACTUAL)-G	16,669	14,545	14,873	16,481	#DIV/0!
HEAT RATE (ACTUAL)-N	18,439	15,616	15,748	17,385	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
Page 5 of 362

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 08-15-06
DATE: 08-12-06 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.9	4.5	5.5
HEAT RATE(BTU/MW)G	16,669	14,873	16,481
HEAT RATE(BTU/MW)N	18,439	15,748	17,385
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$58.7187	act.	
H.H.V. (BTU/GAL)	148,143	act.	

A, B, C CONSTANTS:

GROSS	A=	33,630.60	
	B=	(8,894.825)	
	C=	1,050.3174	
NET	A=	39,978.22	
	B=	(11,129.892)	
	C=	1,276.7400	

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	20,042	19,146	17,958	17,271	16,399	15,922	15,365	15,099	14,856	14,800
GENERATED (MW)N	1.77	1.97	2.27	2.47	2.77	2.97	3.25	3.45	3.75	3.95
HEAT RATE(BTU/MW)N	22,825	21,672	20,133	19,235	18,079	17,436	16,664	16,276	15,886	15,754
GROSS (MBTU)	40.084	42.120	44.895	46.633	49.197	50.952	53.778	55.865	59.426	62.160
NET (MBTU)	40.401	42.694	45.702	47.510	50.079	51.786	54.157	56.153	59.574	62.230
COST/KWH	$0.1891	$0.1807	$0.1695	$0.1630	$0.1548	$0.1503	$0.1450	$0.1425	$0.1402	$0.1397
G/KWH	495.19	473.04	443.70	426.73	405.18	393.40	379.63	373.05	367.06	365.67
G/PS-H	360.76	344.62	323.24	310.88	295.18	286.60	276.57	271.77	267.41	266.40

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	14,873	15,026	15,414	15,778	16,758	17,373	17,713	18,073	18,454
GENERATED (MW)N	4.24	4.44	4.74	4.94	5.34	5.54	5.64	5.74	5.84
HEAT RATE(BTU/MW)N	15,748	15,871	16,247	16,626	17,689	18,374	18,755	19,162	19,593
GROSS (MBTU)	66.928	70.624	77.072	82.046	93.842	100.765	104.505	108.438	112.572
NET (MBTU)	66.770	70.467	77.012	82.132	94.461	101.794	105.779	109.987	114.425
COST/KWH	$0.1404	$0.1418	$0.1455	$0.1489	$0.1581	$0.1640	$0.1672	$0.1706	$0.1742
G/KWH	367.47	371.27	380.85	389.84	414.04	429.25	437.64	446.54	455.96
G/PS-H	267.71	270.48	277.46	284.01	301.64	312.72	318.83	325.32	332.18

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.9	8.41	24.389	70.7281	16668.7774	48339.454	140184.42
0	0	0	0	0	0	0
4.5	20.25	91.125	410.0625	14872.814885	66927.667	301174.5
5.5	30.25	166.375	915.0625	16481.163445	90646.399	498555.19
0	0	0	0	0	0	0
0	0	0	0	0	0	0
12.9	58.91	281.889	1395.8531	48022.7557	205913.52	939914.11

a=	10.32	C=	1050.317383
b=	-9278.199089	B=	-8894.825227
d=	-1752.98773	A=	33630.60137
e=	85.728		
f=	717.1712		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.9	8.41	24.389	70.7281	18438.913	53472.848	155071.26
0	0	0	0	0	0	0
4.5	20.25	91.125	410.0625	15747.686	70864.588	318890.65
5.5	30.25	166.375	915.0625	17385.194	95618.564	525902.1
0	0	0	0	0	0	0
0	0	0	0	0	0	0
12.9	58.91	281.889	1395.8531	51571.793	219956	999864.01

a=	10.32	C=	1276.74
b=	-38502.29	B=	-11129.89
d=	-5408.126	A=	39978.218
e=	85.728		
f=	717.1712		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 05-19-06

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	97	97	98	96	
Gas Entering A.H.	*F.	362	362	372	381	
Gas Leaving A.H.	*F.	295	307	333	355	
Air Entering A.H.	*F.	134	115	139	127	
Air Leaving A.H.	*F.	340	340	340	340	
Circ. Water Inlet	*F.	76.0	76.0	76.0	76.0	
Circ. Water Outlet	*F.	83.5	86.6	90.2	93.6	
Condenser Vacuum	"Hg.	28.90	28.80	28.50	28.20	
Barometric Pressure	"Hg.	29.72	29.71	29.71	29.72	
Excess O2	%	2.60	1.50	0.60	0.60	
Feedwater Flow (X1000)	Lb/Hr	30.58	43.38	58.28	69.96	
Steam Flow (X1000)	Lb/Hr	28.81	42.44	56.71	69.35	
Throttle Stm. Press.	PSIG	395	395	395	395	
Feedwater to Blr.	*F.	284	300	320	325	
GENERATOR						
Generator Integrator, Start		3133.1	3136.7	3141.8	3150.5	
Generator Integrator, Stop		3135.4	3140.2	3146.2	3156.0	
Generator Integrator, Diff.	MWH	2.3	3.5	4.4	5.5	0.0
Generator Volts	V.	11,700	11,700	11,800	11,800	
Generator Amps	A.	160	198	258	302	
Generator VARS	MVAR	1.2	1.9	2.5	2.6	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	6780.0	6783.3	6786.8	6791.6	
Aux. KWH Mtr. End (X100)	KWH	6782.3	6785.8	6789.4	6794.2	
Aux. Load Indicator	MW					
Aux. KWH Mtr. Diff.	KWH	2.3	2.5	2.6	2.6	
Aux. Amps	A.	14.5	15.0	15.8	16.1	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	54105976	54109160	54113400	54120732	
Start Test	Time	0628	0754	0918	1110	
F.O. Totalizer-End	Lbs/Hr.	54107968	54112020	54117120	54125272	
End Test	Time	0728	0854	1018	1210	
F.O. Diff.	Lbs/Hr.	1992	2860	3720	4540	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	244	240	240	240	
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	18.8				
Higher Heating Value	BTU/Gal	144,833				

TEST BY: J.Higgins

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-19-06
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.5	5.5	0.0
F.O. Temp. *F.	244	240	240	240	0
F.O. Temp. (Corr.)	0.93605	0.93745	0.93745	0.93745	1.02145
F.O. Usage (Lbs./Hr.)	1992.0	2860.0	3720.0	4540.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	242.6	348.3	453.0	552.8	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,300	3,500	4,400	5,500	0
KW (Aux.)	230	250	260	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	144,833	144,833	144,833	144,833	144,833
HEAT RATE (APPROX.)	14,651	15,025	15,201	16,696	#DIV/0!
HEAT RATE (APPROX.)N	16,136	16,181	16,133	17,612	#DIV/0!
HEAT RATE (ACTUAL)-G	14,053	14,412	14,580	16,014	#DIV/0!
HEAT RATE (ACTUAL)-N	15,477	15,520	15,474	16,893	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 05-22-06
DATE: 05-19-06 — Tested by: rh

DATA:

GENERATED (MW)	3.5	4.5	5.5
HEAT RATE(BTU/MW)G	14,412	14,580	16,014
HEAT RATE(BTU/MW)N	15,520	15,474	16,893
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$57.0714 act.		
H.H.V. (BTU/GAL)	144,833 act.		

A, B, C CONSTANTS:

GROSS	A=	23,797.49	
	B=	(4,897.989)	
	C=	633.2448	
NET	A=	27,223.63	
	B=	(5,908.276)	
	C=	732.7110	

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,534	16,087	15,510	15,189	14,803	14,608	14,412	14,344	14,337	14,396
GENERATED (MW)N	1.77	1.97	2.27	2.47	2.77	2.97	3.25	3.45	3.75	3.95
HEAT RATE(BTU/MW)N	18,338	17,772	17,032	16,613	16,093	15,820	15,520	15,394	15,314	15,334
GROSS (MBTU)	33.069	35.391	38.776	41.011	44.408	46.747	50.441	53.073	57.350	60.465
NET (MBTU)	32.458	35.010	38.664	41.033	44.578	46.986	50.441	53.109	57.427	60.569
COST/KWH	$0.1551	$0.1509	$0.1455	$0.1425	$0.1389	$0.1371	$0.1352	$0.1346	$0.1345	$0.1351
G/KWH	408.53	397.46	383.22	375.29	365.74	360.94	356.08	354.41	354.24	355.70
G/PS-H	297.62	289.56	279.19	273.41	266.45	262.95	259.41	258.19	258.07	259.13

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	14,580	14,765	15,139	15,451	16,227	16,692	16,943	17,206	17,483
GENERATED (MW)N	4.24	4.44	4.74	4.94	5.34	5.54	5.64	5.74	5.84
HEAT RATE(BTU/MW)N	15,474	15,640	16,000	16,313	17,115	17,604	17,870	18,152	18,447
GROSS (MBTU)	65.609	69.397	75.693	80.345	90.873	96.811	99.961	103.238	106.645
NET (MBTU)	65.609	69.443	75.840	80.587	91.395	97.526	100.789	104.190	107.732
COST/KWH	$0.1368	$0.1385	$0.1420	$0.1450	$0.1522	$0.1566	$0.1590	$0.1614	$0.1640
G/KWH	360.23	364.81	374.04	381.75	400.94	412.40	418.61	425.13	431.96
G/PS-H	262.44	265.78	272.50	278.12	292.09	300.45	304.97	309.71	314.69

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	
3.5	12.25	42.875	150.0625	14411.77835	50441.224	176544.28	
4.5	20.25	91.125	410.0625	14579.74779	65608.865	295239.89	
5.5	30.25	166.375	915.0625	16014.20685	88078.138	484429.76	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
13.5	62.75	300.375	1475.1875	45005.733	204128.23	956213.93	

a=	6	C=	633.2448063
b=	44532.05916	B=	-4897.98901
d=	4807.285506	A=	23797.49099
e=	54		
f=	488		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	
3.5	12.25	42.875	150.0625	15520.377	54321.318	190124.61	
4.5	20.25	91.125	410.0625	15473.789	69632.05	313344.23	
5.5	30.25	166.375	915.0625	16892.623	92909.428	511001.85	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
13.5	62.75	300.375	1475.1875	47886.789	216862.8	1014470.7	

a=	6	C=	732.71104
b=	38516.08	B=	-5908.276
d=	4116.7397	A=	27223.633
e=	54		
f=	488		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 02-25-06

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	3,500	4,500	5,000		
BOILER-TURBINE							
Ambient Air Temp	°F.	100	100	102	102		
Gas Entering A.H.	°F.	345	370	400	420		
Gas Leaving A.H.	°F.	315	325	352	368		
Air Entering A.H.	°F.	145	157	168	170		
Air Leaving A.H.	°F.	344	340	341	342		
Circ. Water Inlet	°F.	76.0	76.0	76.0	76.0		
Circ. Water Outlet	°F.	83.4	86.6	89.9	91.8		
Condenser Vacuum	ig.	28.80	28.70	28.40	28.30		
Barometric Pressure	ig.	29.54	29.52	29.52	29.52		
Excess O2	%	1.10	0.72	0.55	0.51		
Feedwater Flow (X1000)	Lb/Hr	32.09	44.79	57.79	64.85		
Steam Flow (X1000)	Lb/Hr	30.48	43.57	56.90	63.83		
Throttle Stm. Press.	PSIG	395	395	395	395		
Feedwater to Blr.	°F.	290	300	318	320		
GENERATOR							
Generator Integrator, Start		6892.2	6896.4	6902.0	6908.9		
Generator Integrator, Stop		6894.7	6899.8	6906.5	6913.9		
Generator Integrator, Diff.	MWH	2.5	3.4	4.5	5.0	0.0	
Generator Volts	V.	11,700	11,700	11,700	11,700		
Generator Amps	A.	151	188	241	265		
Generator VARS	MVAR	1.5	1.5	1.9	1.9		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	2574.4	2577.8	2581.4	2585.2		
Aux. KWH Mtr. End (X100)	KWH	2576.6	2580.0	2583.9	2587.7		
Aux. Load Indicator	MW	0.24	0.24	0.26	0.26		
Aux. KWH Mtr. Diff.	KWH	2.2	2.4	2.5	2.5		
Aux. Amps	A.	14.0	15.0	15.3	15.5		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	48834992	48838536	41537672	41542788		
Start Test	Time	0601	0731	1011	1131		
F.O. Totalizer-End	Lbs/Hr.	48837100	48841448	41541472	41546900		
End Test	Time	0701	0831	1111	1231		
F.O. Diff.	Lbs/Hr.	2108	2912	3800	4112	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	°F	243	242	242	240		
F.O. Temp. @ Burner Deck	°F						
Sulfur, Wt. %							
API Gravity @ 60 °F.	API	15.2					
Higher Heating Value	BTU/Gal	148,333					

TEST BY: J.Higgins

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-25-06
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.5	5.0	0.0
F.O. Temp. °F.	243	242	242	240	0
F.O. Temp. (Corr.)	0.9364	0.93675	0.93675	0.93745	1.02145
F.O. Usage (Lbs./Hr.)	2108.0	2912.0	3800.0	4112.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	256.7	354.6	462.7	500.7	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,400	4,500	5,000	0
KW (Aux.)	220	220	250	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,333	148,333	148,333	148,333	148,333
HEAT RATE (APPROX.)G	15,505	15,299	15,527	15,122	#DIV/0!
HEAT RATE (APPROX.)N	17,001	16,325	16,441	15,918	#DIV/0!
HEAT RATE (ACTUAL)-G	15,231	15,028	15,253	14,855	#DIV/0!
HEAT RATE (ACTUAL)-N	16,700	16,036	16,150	15,637	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 02-28-06
DATE: 02-25-06 — Tested by: rh

DATA:

GENERATED (MW)	2.5	3.5	5.0
HEAT RATE(BTU/MW)G	15,231	15,028	14,855
HEAT RATE(BTU/MW)N	16,700	16,036	15,637
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$53.9491	act.	
H.H.V. (BTU/GAL)	148,333	act.	

A, B, C CONSTANTS:

GROSS	A=	16,039.94	NET A=	19,751.63
	B=	(410.391)	B=	(1,618.067)
	C=	34.6810	C=	159.0224

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,358	15,305	15,231	15,185	15,121	15,082	15,028	14,996	14,953	14,928
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	17,152	16,962	16,700	16,542	16,329	16,202	16,036	15,942	15,824	15,761
GROSS (MBTU)	30.716	33.671	38.077	40.999	45.363	48.262	52.599	55.486	59.813	62.698
NET (MBTU)	30.530	33.584	38.077	41.024	45.394	48.283	52.599	55.477	59.814	62.728
COST/KWH	$0.1330	$0.1325	$0.1319	$0.1315	$0.1309	$0.1306	$0.1301	$0.1299	$0.1295	$0.1293
G/KWH	379.45	378.15	376.31	375.18	373.60	372.63	371.31	370.52	369.46	368.83
G/PS-H	276.44	275.49	274.15	273.32	272.18	271.47	270.51	269.93	269.16	268.71

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	14,895	14,877	14,855	14,844	14,829	14,826	14,826	14,826	14,827
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.7	5.8	5.9
HEAT RATE(BTU/MW)N	15,691	15,660	15,637	15,638	15,677	15,716	15,741	15,768	15,799
GROSS (MBTU)	67.030	69.923	74.275	77.187	83.044	85.993	87.473	88.957	90.445
NET (MBTU)	66.685	69.685	74.275	77.406	83.874	87.226	88.934	90.666	92.422
COST/KWH	$0.1290	$0.1288	$0.1286	$0.1285	$0.1284	$0.1284	$0.1284	$0.1284	$0.1284
G/KWH	368.03	367.58	367.03	366.75	366.40	366.32	366.31	366.32	366.34
G/PS-H	268.12	267.79	267.39	267.19	266.93	266.87	266.87	266.87	266.89

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	15230.71927	38076.798	95191.995
3.5	12.25	42.875	150.0625	15028.4137	52599.448	184098.07
0	0	0	0	0	0	0
5	25	125	625	14855.00893	74275.045	371375.22
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11	43.5	183.5	814.125	45114.14191	164951.29	650665.29

a=	9.5	C=	34.6809547
b=	-10469.3132	B=	-410.391297
d=	-1401.688586	A=	16039.94155
e=	72		
f=	550.125		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	16700.35	41750.875	104377.19
3.5	12.25	42.875	150.0625	16036.417	56127.46	196446.11
0	0	0	0	0	0	0
5	25	125	625	15636.852	78184.258	390921.29
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11	43.5	183.5	814.125	48373.619	176062.59	691744.58

a=	9.5	C=	159.02239
b=	-29018.66	B=	-1618.067
d=	-3922.028	A=	19751.629
e=	72		
f=	550.125		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 11-05-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	4,800	
BOILER-TURBINE						
Ambient Air Temp	°F.	94	98	98	99	
Gas Entering A.H.	°F.	355	370	400	410	
Gas Leaving A.H.	°F.	315	331	361	365	
Air Entering A.H.	°F.	112	145	154	152	
Air Leaving A.H.	°F.	330	330	340	340	
Circ. Water Inlet	°F.	75.0	75.0	75.0	76.0	
Circ. Water Outlet	°F.	84.2	87.2	91.1	92.5	
Condenser Vacuum	ig.	28.80	28.60	28.30	28.20	
Barometric Pressure	ig.	29.80	29.80	29.70	29.80	
Excess O2	%	2.20	1.80	0.50	0.60	
Feedwater Flow (X1000)	Lb/Hr	35.00	48.00	61.00	65.00	
Steam Flow (X1000)	Lb/Hr	40.00	47.00	54.00	57.00	
Throttle Stm. Press.	PSIG	396	396	396	396	
Feedwater to Blr.	°F.	280	300	330	335	
GENERATOR						
Generator Integrator, Start		8294.1	8298.5	8304.2	8310.3	
Generator Integrator, Stop		8296.5	8301.9	8308.7	8315.1	
Generator Integrator, Diff.	MWH	2.4	3.4	4.5	4.8	0.0
Generator Volts	V.	11,600	11,500	11,600	11,700	
Generator Amps	A.	148	198	255	270	
Generator VARS	MVAR	1.5	1.8	2.4	2.5	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	6724.5	6728.5	6732.5	6736.0	
Aux. KWH Mtr. End (X100)	KWH	6727.0	6731.1	6735.1	6738.6	
Aux. Load Indicator	MW	0.24	0.25	0.26	0.26	
Aux. KWH Mtr. Diff.	KWH	2.5	2.6	2.6	2.6	
Aux. Amps	A.	16.0	16.0	16.0	16.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	41528864	41532724	41537672	41542788	
Start Test	*Time*	*0702*	*0938*	*1111*	*1231*	
F.O. Totalizer-End	Lbs/Hr.	41531012	41535668	41541472	41546900	
End Test	Time	0802	0938	1111	1231	
F.O. Diff.	Lbs/Hr.	2148	2944	3800	4112	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	244	240	240	238	
F.O. Temp. @ Burner Deck	°F					
Sulfur, Wt. %		1.84				
API Gravity @ 60 °F.	API	15.6				
Higher Heating Value	BTU/Gal	149,500	TEST BY: J.Higgins			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-05-05
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.5	4.8	0.0
F.O. Temp. °F.	244	240	240	238	0
F.O. Temp. (Corr.)	0.93605	0.93745	0.93745	0.93815	1.02145
F.O. Usage (Lbs./Hr.)	2148.0	2944.0	3800.0	4112.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	261.6	358.5	462.7	500.7	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,400	4,500	4,800	0
KW (Aux.)	250	260	260	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,500	149,500	149,500	149,500	149,500
HEAT RATE (APPROX.)	15,799	15,467	15,527	15,122	#DIV/0!
HEAT RATE (APPROX.)N	17,554	16,708	16,480	15,952	#DIV/0!
HEAT RATE (ACTUAL)-G	15,642	15,313	15,373	14,972	#DIV/0!
HEAT RATE (ACTUAL)-N	17,380	16,542	16,316	15,793	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 11-08-05
DATE: 11-05-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.5	3.5	4.5	4.8
HEAT RATE(BTU/MW)G	15,642	15,313	15,373	14,972
HEAT RATE(BTU/MW)N	17,380	16,542	16,316	15,793
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$50.4350	act.		
H.H.V. (BTU/GAL)	149,500	act.		

A, B, C CONSTANTS:

GROSS A=	16,072.85	NET A=	19,725.24
B=	(161.928)	B=	(1,127.144)
C=	(8.3192)	C=	70.8036

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,716	15,676	15,616	15,575	15,512	15,469	15,404	15,360	15,292	15,246
GENERATED (MW)N	1.75	1.95	2.25	2.45	2.75	2.95	3.24	3.44	3.74	3.94
HEAT RATE(BTU/MW)N	17,754	17,588	17,350	17,198	16,981	16,843	16,648	16,524	16,350	16,240
GROSS (MBTU)	31.431	34.488	39.040	42.052	46.537	49.502	53.915	56.831	61.168	64.033
NET (MBTU)	31.070	34.297	39.037	42.135	46.698	49.688	53.938	56.843	61.147	63.986
COST/KWH	$0.1262	$0.1259	$0.1254	$0.1251	$0.1246	$0.1243	$0.1237	$0.1234	$0.1228	$0.1225
G/KWH	388.30	387.32	385.83	384.82	383.27	382.21	380.60	379.50	377.83	376.69
G/PS-H	282.88	282.17	281.09	280.35	279.22	278.45	277.28	276.48	275.26	274.43

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	15,176	15,128	15,055	15,006	14,905	14,854	14,828	14,802	14,776
GENERATED (MW)N	4.24	4.44	4.74	4.94	5.34	5.54	5.64	5.74	5.84
HEAT RATE(BTU/MW)N	16,087	15,992	15,860	15,779	15,634	15,570	15,540	15,511	15,484
GROSS (MBTU)	68.291	71.102	75.276	78.031	83.469	86.152	87.485	88.811	90.131
NET (MBTU)	68.208	71.003	75.175	77.946	83.484	86.256	87.644	89.035	90.428
COST/KWH	$0.1219	$0.1215	$0.1209	$0.1205	$0.1197	$0.1193	$0.1191	$0.1189	$0.1187
G/KWH	374.95	373.77	371.98	370.76	368.27	367.00	366.36	365.71	365.07
G/PS-H	273.16	272.30	270.99	270.11	268.29	267.37	266.90	266.43	265.96

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	15641.7925	39104.481	97761.203
3.5	12.25	42.875	150.0625	15313.06103	53595.714	187585
4.5	20.25	91.125	410.0625	15373.16664	69179.25	311306.62
4.8	23.04	110.592	530.8416	14971.84608	71864.861	344951.33
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15.3	61.79	260.217	1130.0291	61299.86624	233744.31	941604.16

a=	13.07	C=	-8.3192389
b=	-21302.09999	B=	-161.928133
d=	-2910.729942	A=	16072.85311
e=	95.481		
f=	702.1123		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	17379.769	43449.424	108623.56
3.5	12.25	42.875	150.0625	16541.887	57896.604	202638.11
4.5	20.25	91.125	410.0625	16315.861	73421.374	330396.18
4.8	23.04	110.592	530.8416	15793.087	75806.816	363872.71
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15.3	61.79	260.217	1130.0291	66030.604	250574.22	1005530.6

a=	13.07	C=	70.803627
b=	-57908.73	B=	-1127.144
d=	-7971.369	A=	19725.237
e=	95.481		
f=	702.1123		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 08-19-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	3,000	4,000	5,000	5,500		
BOILER-TURBINE							
Ambient Air Temp	°F.	89	89	90	92		
Gas Entering A.H.	°F.	380	400	420	440		
Gas Leaving A.H.	°F.	370	380	390	400		
Air Entering A.H.	°F.	340	340	340	340		
Air Leaving A.H.	°F.	350	355	370	385		
Circ. Water Inlet	°F.	76.0	76.0	77.0	77.0		
Circ. Water Outlet	°F.	86.0	90.0	93.0	95.0		
Condenser Vacuum	ig.	28.60	28.40	28.10	27.90		
Barometric Pressure	ig.	30.40	30.40	30.40	30.40		
Excess O2	%	64.00	59.00	60.00	60.00		
Feedwater Flow (X1000)	Lb/Hr	37.00	52.00	65.00	72.00		
Steam Flow (X1000)	Lb/Hr	37.00	51.00	65.00	71.00		
Throttle Stm. Press.	PSIG	400	400	400	400		
Feedwater to Blr.	°F.	300	330	340	340		
GENERATOR							
Generator Integrator, Start		1705.9	1711.7	1719.7	1728.6		
Generator Integrator, Stop		1708.8	1715.7	1724.7	1734.1		
Generator Integrator, Diff.	MWH	2.9	4.0	5.0	5.5	0.0	
Generator Volts	V.	11,700	11,700	11,700	11,700		
Generator Amps	A.	172	225	270	295		
Generator VARS	MVAR	2.0	2.1	2.3	2.0		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	2500.2	2504.9	2510.0	2514.7		
Aux. KWH Mtr. End (X100)	KWH	2502.9	2507.6	2512.7	2517.6		
Aux. Load Indicator	MW	2.70	3.90	5.00	5.50		
Aux. KWH Mtr. Diff.	KWH	N/A	N/A	N/A	N/A		
Aux. Amps	A.	16.0	16.0	17.0	17.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	35804248	35809148	35815876	35823336		
Start Test	Time	0625	810	1000	1142		
F.O. Totalizer-End	Lbs/Hr.	35806720	35812484	35820092	35828012		
End Test	Time	0725	0910	1052	1242		
F.O. Diff.	Lbs/Hr.	2472	3336	4216	4676	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	*Yes/No*	*No*	*No*	*No*	*No*		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	°F	240	240	239	238		
F.O. Temp. @ Burner Deck	°F						
Sulfur, Wt. %							
API Gravity @ 60 °F.	API	15.7					
Higher Heating Value	BTU/Gal	149,024					

TEST BY: Jcorcino

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-19-05
KPP UNIT NO. 1

	TEST LOADS - MW				
	3.0	4.0	5.0	5.5	0.0
F.O. Temp. °F.	240	240	239	238	0
F.O. Temp. (Corr.)	0.93745	0.93745	0.9378	0.93815	1.02145
F.O. Usage (Lbs./Hr.)	2472.0	3336.0	4216.0	4676.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	301.0	406.2	513.4	569.4	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,900	4,000	5,000	5,500	0
KW (Aux.)	270	270	270	290	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,024	149,024	149,024	149,024	149,024
HEAT RATE (APPROX.)	18,182	17,526	17,227	17,196	#DIV/0!
HEAT RATE (APPROX.)N	20,383	18,991	18,327	18,255	#DIV/0!
HEAT RATE (ACTUAL)-G	17,944	17,297	17,002	16,971	#DIV/0!
HEAT RATE (ACTUAL)-N	20,116	18,743	18,087	18,016	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 08-24-05
DATE: 08-19-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	3.0	4.0	5.0	5.5
HEAT RATE(BTU/MW)G	17,944	17,297	17,002	16,971
HEAT RATE(BTU/MW)N	20,116	18,743	18,087	18,016
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$45.4307	act.		
H.H.V. (BTU/GAL)	149,024	act.		

A, B, C CONSTANTS:

GROSS	A=	21,915.17	
	B=	(1,834.828)	
	C=	170.2470	
NET	A=	28,479.27	
	B=	(3,850.879)	
	C=	354.3355	

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	18,927	18,703	18,392	18,202	17,943	17,787	17,579	17,457	17,300	17,212
GENERATED (MW)N	1.73	1.93	2.23	2.43	2.73	2.93	3.23	3.43	3.73	3.93
HEAT RATE(BTU/MW)N	22,195	21,722	21,067	20,665	20,116	19,785	19,342	19,082	18,745	18,556
GROSS (MBTU)	37.853	41.146	45.980	49.146	53.829	56.919	61.526	64.591	69.199	72.291
NET (MBTU)	38.397	41.924	46.979	50.216	54.916	57.970	62.474	65.451	69.919	72.925
COST/KWH	$0.1374	$0.1358	$0.1335	$0.1321	$0.1302	$0.1291	$0.1276	$0.1267	$0.1256	$0.1249
G/KWH	467.63	462.09	454.42	449.73	443.32	439.47	434.33	431.32	427.43	425.27
G/PS-H	340.68	336.65	331.06	327.64	322.97	320.17	316.42	314.23	311.40	309.82

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	17,106	17,052	16,997	16,978	16,979	17,000	17,016	17,035	17,058
GENERATED (MW)N	4.23	4.43	4.73	4.93	5.31	5.51	5.61	5.71	5.81
HEAT RATE(BTU/MW)N	18,326	18,207	18,083	18,036	18,026	18,064	18,094	18,130	18,174
GROSS (MBTU)	76.977	80.146	84.986	88.283	95.083	98.602	100.394	102.211	104.051
NET (MBTU)	77.517	80.659	85.534	88.917	*95.720*	*99.533*	*101.505*	*103.523*	*105.589*
COST/KWH	$0.1242	$0.1238	$0.1234	$0.1232	$0.1232	$0.1234	$0.1235	$0.1236	$0.1238
G/KWH	422.64	421.32	419.96	419.47	419.51	420.03	420.42	420.89	421.45
G/PS-H	307.91	306.94	305.95	305.60	305.62	306.01	306.29	306.63	307.04

WORKSHEET (GROSS)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
3	9	27	81	17943.83133	53831.494	161494.48
4	16	64	256	17296.75835	69187.033	276748.13
5	25	125	625	17001.79631	85008.982	425044.91
5.5	30.25	166.375	915.0625	16971.14791	93341.314	513377.22
0	0	0	0	0	0	0
0	0	0	0	0	0	0
17.5	80.25	382.375	1877.0625	69213.53391	301368.82	1376664.7

a=	14.75	C=	170.2470126
b=	-47727.10479	B=	-1834.82786
d=	-5761.553433	A=	21915.17466
e=	125.125		
f=	1068.1875		

WORKSHEET (NET)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
3	9	27	81	20116.403	60349.208	181047.63
4	16	64	256	18742.617	74970.47	299881.88
5	25	125	625	18087.017	90435.087	452175.43
5.5	30.25	166.375	915.0625	18016.081	99088.443	544986.44
0	0	0	0	0	0	0
0	0	0	0	0	0	0
17.5	80.25	382.375	1877.0625	74962.118	324843.21	1478091.4

a=	14.75	C=	354.33552
b=	-103344.5	B=	-3850.879
d=	-12464.24	A=	28479.27
e=	125.125		
f=	1068.1875		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 06-18-05

Gross Load (K1-2) --->	kWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	kWH	2,400	3,400	4,400	5,000		
BOILER-TURBINE							
Ambient Air Temp	°F.	88.1	89.3	91.1	92		
Gas Entering A.H.	°F.	358	362	381	388		
Gas Leaving A.H.	°F.	313	320	345	364		
Air Entering A.H.	°F.	144	148	151	153		
Air Leaving A.H.	°F.	335	335	338	339		
Circ. Water Inlet	°F.	76.0	76.0	76.0	77.0		
Circ. Water Outlet	°F.	83.9	78.2	90.5	92.6		
Condeneer Vacuum	ig.	28.80	28.60	28.40	28.20		
Barometric Pressure	ig.	30.46	30.47	30.47	30.45		
Excess O2	%	1.70	0.70	0.70	0.60		
Feedwater Flow (X1000)	Lb/Hr	31.00	43.10	57.00	65.20		
Steam Flow (X1000)	Lb/Hr	28.90	43.00	56.40	64.80		
Throttle Stm. Press.	PSIG	400	400	396	395		
Feedwater to Blr.	°F.	265	278	340	360		
GENERATOR							
Generator Integrator, Start		7231.3	7236.4	7242.9	7251.3		
Generator Integrator, Stop		7233.7	7239.8	7247.3	7256.3		
Generator Integrator, Diff.	MWH	2.4	3.4	4.4	5.0	0.0	
Generator Volts	V.	11,600	11,600	11,600	11,600		
Generator Amps	A.	148	277	235	264		
Generator VARS	MVAR	2.0	2.0	2.2	2.3		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	kWH	9369.4	9374.0	9378.2	9382.7		
Aux. KWH Mtr. End (X100)	kWH	9371.7	9376.4	9380.7	9385.2		
Aux. Load Indicator	MW	2.30	2.40	2.50	2.50		
Aux. KWH Mtr. Diff.	kWH	N/A	N/A	N/A	N/A		
Aux. Amps	A.	14.2	14.9	15.1	15.4		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	31515024	31519792	31525334	31532434		
Start Test	Time	0607	0807	0952	1142		
F.O. Totalizer-End	Lbs/Hr.	31517068	31522634	31528988	31536576		
End Test	Time	0707	0907	1052	1242		
F.O. Diff.	Lbs/Hr.	2044	2842	3654	4142	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	°F	234	230	230	229		
F.O. Temp. @ Burner Deck	°F	234	230	230	229		
Sulfur, Wt. %							
API Gravity @ 60 °F.	API	14.8					
Higher Heating Value	BTU/Gal	149,357	TEST BY: Kawika/Martin Ah Yuen				

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-18-05
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.4	3.4	4.4	5.0	0.0
F.O. Temp. °F.	234	230	230	229	0
F.O. Temp. (Corr.)	0.93955	0.94095	0.94095	0.9413	1.02145
F.O. Usage (Lbs./Hr.)	2044.0	2842.0	3654.0	4142.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	248.9	346.1	445.0	504.4	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,400	4,400	5,000	0
KW (Aux.)	230	240	250	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,357	149,357	149,357	149,357	149,357
HEAT RATE (APPROX.)	15,034	14,931	14,931	15,232	#DIV/0!
HEAT RATE (APPROX.)N	16,557	16,030	15,809	16,034	#DIV/0!
HEAT RATE (ACTUAL)-G	14,870	14,768	14,768	15,067	#DIV/0!
HEAT RATE (ACTUAL)-N	16,377	15,856	15,637	15,860	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 06-24-05
DATE: 06-18-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.4	3.4	4.4	5.0
HEAT RATE(BTU/MW)G	14,870	14,768	14,768	15,067
HEAT RATE(BTU/MW)N	16,377	15,856	15,637	15,860
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$42.5625	act.		
H.H.V. (BTU/GAL)	149,357	act.		

A, B, C CONSTANTS:

GROSS A=	16,421.32	NET A=	19,607.61	
B=	(974.999)	B=	(1,881.925)	
C=	139.5651	C=	225.4239	

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,030	14,952	14,856	14,806	14,752	14,730	14,718	14,724	14,754	14,788
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	16,745	16,558	16,312	16,170	15,991	15,894	15,782	15,731	15,687	15,680
GROSS (MBTU)	30.059	32.894	37.140	39.977	44.257	47.138	51.515	54.481	59.017	62.111
NET (MBTU)	29.639	32.620	37.028	39.939	44.294	47.205	51.450	54.428	58.982	62.093
COST/KWH	$0.1020	$0.1014	$0.1008	$0.1005	$0.1001	$0.0999	$0.0999	$0.0999	$0.1001	$0.1003
G/KWH	371.34	369.42	367.06	365.83	364.49	363.95	363.66	363.80	364.54	365.38
G/PS-H	270.53	269.13	267.41	266.51	265.54	265.15	264.93	265.04	265.58	266.19

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	14,860	14,922	15,035	15,125	15,338	15,461	15,527	15,596	15,667
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.7	5.8	5.9
HEAT RATE(BTU/MW)N	15,704	15,742	15,834	15,917	16,138	16,276	16,351	16,431	16,516
GROSS (MBTU)	66.870	70.133	75.177	78.651	85.893	89.676	91.610	93.574	95.569
NET (MBTU)	66.741	70.053	75.209	78.789	86.339	90.330	92.385	94.480	96.618
COST/KWH	$0.1008	$0.1012	$0.1020	$0.1026	$0.1041	$0.1049	$0.1054	$0.1058	$0.1063
G/KWH	367.15	368.68	371.49	373.70	378.97	382.01	383.63	385.33	387.09
G/PS-H	267.48	268.59	270.64	272.25	276.09	278.30	279.49	280.72	282.01

WORKSHEET (GROSS)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
2.4	5.76	13.824	33.1776	14870.23860	35688.573	85652.575
3.4	11.56	39.304	133.6336	14768.38773	50212.518	170722.56
4.4	19.36	85.184	374.8096	14768.38773	64980.906	285915.99
5	25	125	625	15066.66551	75333.328	376666.64
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15.2	61.68	263.312	1166.6208	59473.67963	226215.32	918957.76

a=	15.68	C=	139.565053
b=	7494.481891	B=	-974.99894
d=	861.3680328	A=	16421.32276
e=	115.712		
f=	862.0608		

WORKSHEET (NET)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
2.4	5.76	13.824	33.1776	16376.915	39304.596	94331.029
3.4	11.56	39.304	133.6336	15855.631	53909.145	183291.09
4.4	19.36	85.184	374.8096	15637.116	68803.312	302734.57
5	25	125	625	15859.648	79298.24	396491.2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15.2	61.68	263.312	1166.6208	63729.31	241315.29	976847.9

a=	15.68	C=	225.42388
b=	-23432.27	B=	-1881.925
d=	-3424.343	A=	19607.608
e=	115.712		
f=	862.0608		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 03-28-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	4,000	4,900	5,500		
BOILER-TURBINE							
Ambient Air Temp	*F.	83	86	87	88		
Gas Entering A.H.	*F.	358	358	360	362		
Gas Leaving A.H.	*F.	292	304	315	325		
Air Entering A.H.	*F.	87	86	87	92		
Air Leaving A.H.	*F.	358	358	358	362		
Circ. Water Inlet	*F.	76.0	76.0	76.0	76.0		
Circ. Water Outlet	*F.	84.3	87.1	90.0	91.6		
Condenser Vacuum	Hg.	28.80	28.70	28.60	28.40		
Barometric Preasure	Hg.	30.00	30.05	30.05	30.05		
Excess O2	%	2.30	1.60	1.00	0.80		
Feedwater Flow (X1000)	Lb/Hr	41.00	54.00	68.00	73.00		
Steam Flow (X1000)	Lb/Hr	44.00	51.00	58.00	64.00		
Throttle Stm. Press.	PSIG	398	395	394	390		
Feedwater to Blr.	*F.	291	305	320	325		
GENERATOR							
Generator Integrator, Start		8062.3	8069.3	8076.8	8084.9		
Generator Integrator, Stop		8065.3	8073.3	8081.7	8090.3		
Generator Integrator, Diff.	MWH	3.0	4.0	4.9	5.4	0.0	
Generator Volts	V.	11,300	11,400	11,400	11,400		
Generator Amps	A.	170	230	270	291		
Generator VARS	MVAR	2.0	2.5	2.5	2.4		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	4905.5	4910.3	4914.9	4919.1		
Aux. KWH Mtr. End (X100)	KWH	4907.8	4912.8	4917.5	4921.8		
Aux. Load Indicator	MW	0.24	0.25	0.26	0.26		
Aux. KWH Mtr. Diff.	KWH	2.3	2.5	2.6	2.7		
Aux. Amps	A.	15.0	16.0	17.0	16.2		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	24981090	24987024	24993390	25000020		
Start Test	Time	0640	0846	1030	1205		
F.O. Totalizer-End	Lbs/Hr.	24983688	24990232	24997246	25004362		
End Test	Time	0740	0946	1130	1305		
F.O. Diff.	Lbs/Hr.	2598	3208	3856	4342		0
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	Secured	Secured	Secured	Secured		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	240	237	236	235		
F.O. Temp. @ Burner Deck	*F	240	237	236	235		
Sulfur, Wt. %							
API Gravity @ 60 *F.	API	13					
Higher Heating Value	BTU/Gal	149,381	TEST BY: Keith Lambert				

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 03-28-05
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	4.0	4.9	5.5	0.0
F.O. Temp. *F.	240	237	236	235	0
F.O. Temp. (Corr.)	0.93745	0.9385	0.93885	0.9392	1.02145
F.O. Usage (Lbs./Hr.)	2598.0	3208.0	3856.0	4342.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	316.4	390.6	469.6	528.7	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	4,000	4,900	5,400	0
KW (Aux.)	230	250	260	270	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,381	149,381	149,381	149,381	149,381
HEAT RATE (APPROX.)	19,109	16,854	15,756	15,968	#DIV/0!
HEAT RATE (APPROX.)N	21,045	18,150	16,722	16,879	#DIV/0!
HEAT RATE (ACTUAL)-G	18,904	16,673	15,587	15,797	#DIV/0!
HEAT RATE (ACTUAL)-N	20,819	17,955	16,543	16,698	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
Page 17 of 362

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 04-05-05
DATE: 03-28-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.5	4.0	4.9
HEAT RATE(BTU/MW)G	18,904	16,673	15,587
HEAT RATE(BTU/MW)N	20,819	17,955	16,543
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$33.6844	act.	
H.H.V. (BTU/GAL)	149.381	act.	

A, B, C CONSTANTS:

GROSS	A=	23,791.59	NET	A=	27,006.88
	B=	(2,247.715)		B=	(2,829.010)
	C=	117.0142		C=	141.5405

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	19,764	19,413	18,904	18,576	18,102	17,797	17,358	17,077	16,673	16,415
GENERATED (MW)N	1.77	1.97	2.27	2.47	2.77	2.97	3.27	3.47	3.75	3.95
HEAT RATE(BTU/MW)N	21,915	21,468	20,819	20,400	19,794	19,403	18,839	18,477	17,955	17,622
GROSS (MBTU)	39.528	42.709	47.259	50.155	54.305	56.951	60.753	63.185	66.692	68.944
NET (MBTU)	38.790	42.292	47.259	50.389	54.829	57.628	61.604	64.116	67.333	69.606
COST/KWH	$0.1061	$0.1042	$0.1015	$0.0997	$0.0972	$0.0956	$0.0932	$0.0917	$0.0895	$0.0881
G/KWH	488.32	479.65	467.06	458.96	447.24	439.72	428.87	421.93	411.95	405.58
G/PS-H	355.76	349.43	340.27	334.36	325.83	320.35	312.44	307.39	300.11	295.48

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	16,046	15,812	15,478	15,268	14,874	14,691	14,603	14,518	14,435
GENERATED (MW)N	4.25	4.45	4.74	4.94	5.34	5.53	5.63	5.73	5.83
HEAT RATE(BTU/MW)N	17,143	16,837	16,400	16,123	15,603	15,360	15,243	15,128	15,017
GROSS (MBTU)	72.209	74.317	77.392	79.391	83.294	85.209	86.160	87.107	88.051
NET (MBTU)	72.856	74.925	77.738	79.649	83.321	84.941	85.817	86.685	87.547
COST/KWH	$0.0862	$0.0849	$0.0831	$0.0820	$0.0799	$0.0789	$0.0784	$0.0779	$0.0775
G/KWH	396.47	390.68	382.43	377.22	367.50	362.98	360.81	358.70	356.64
G/PS-H	288.84	284.62	278.61	274.82	267.73	264.44	262.86	261.32	259.82

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
2.5	6.25	15.625	39.0625	18903.63927	47259.098	118147.75	
4	16	64	256	16672.95579	66691.823	266767.29	
4.9	24.01	117.649	576.4801	15587.29643	76377.753	374250.99	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
11.4	46.26	197.274	871.5426	51163.89149	190328.67	759166.03	

a=	8.82	C=	117.0142303
b=	-89343.54427	B=	-2247.71482
d=	-12282.34147	A=	23791.58739
e=	64.458		
f=	474.6402		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
2.5	6.25	15.625	39.0625	20818.986	52047.465	130118.66	
4	16	64	256	17955.491	71821.963	287287.85	
4.9	24.01	117.649	576.4801	16543.121	81061.294	397200.34	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
11.4	46.26	197.274	871.5426	55317.598	204930.72	814606.86	

a=	8.82	C=	141.54049
b=	-115171.5	B=	-2829.01
d=	-15828.45	A=	27006.883
e=	64.458		
f=	474.6402		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 01-31-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	4,600	5,200
BOILER-TURBINE						
Ambient Air Temp	*F.	86	86	89	95	90
Gas Entering A.H.	*F.	350	370	379	300	403
Gas Leaving A.H.	*F.	305	320	325	335	355
Air Entering A.H.	*F.	102	95	96	99	110
Air Leaving A.H.	*F.	340	340	360	345	345
Circ. Water Inlet	*F.	76.0	76.0	76.0	76.0	76.0
Circ. Water Outlet	*F.	83.5	87.4	89.5	91.4	93.7
Condenser Vacuum	Ig.	29.20	29.00	28.90	28.80	28.50
Barometric Pressure	Ig.	29.70	29.87	29.90	29.90	29.85
Excess O2	%	2.20	1.40	1.00	1.00	1.10
Feedwater Flow (X1000)	Lb/Hr	31.30	45.10	52.30	59.00	69.10
Steam Flow (X1000)	Lb/Hr	35.10	49.30	57.10	64.20	73.9
Throttle Stm. Press.	PSIG	400	400	400	400	400
Feedwater to Blr.	*F.	280	300	310	315	325
GENERATOR						
Generator Integrator, Start		6900.9	6906.6	6913.0	6920.0	6927.5
Generator Integrator, Stop		6903.4	6910.1	6917.1	6924.5	6932.8
Generator Integrator, Diff.	MWH	2.5	3.5	4.1	4.5	5.3
Generator Volts	V.	11,600	11,600	11,600	11,500	11,600
Generator Amps	A.	121	187	215	240	272
Generator VARS	MVAR	1.0	2.5	1.7	1.8	2.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	3906.0	3910.9	3915.3	3919.4	3923.4
Aux. KWH Mtr. End (X100)	KWH	3908.3	3912.4	3917.7	3921.9	3925.9
Aux. Load Indicator	MW	0.23	0.25	0.24	0.24	0.24
Aux. KWH Mtr. Diff.	KWH	2.3	2.5	2.4	2.5	2.5
Aux. Amps	A.	14.7	15.0	15.0	15.3	15.8
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	23924686	23929688	23935146	23941046	23947354
Start Test	Time	0605	0810	0955	1135	1306
F.O. Totalizer-End	Lbs/Hr.	23926786	23932638	23938546	23944858	23951515
End Test	Time	0705	0910	1055	1235	1406
F.O. Diff.	Lbs/Hr.	2100	2950	3400	3812	4161
EQUIPMENT STATUS						
Boiler Blowdown-Opsn	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	248	245	243	243	240
F.O. Temp. @ Burner Deck	*F	248	245	243	243	240
Sulfur, Wt. %		1.92				
API Gravity @ 60 *F.	API	16.4				
Higher Heating Value	BTU/Gal	148,571				

TEST BY: Daryl

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-31-05
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	4.6	5.2
F.O. Temp. *F.	248	245	243	243	240
F.O. Temp. (Corr.)	0.93465	0.9357	0.9364	0.9364	0.93745
F.O. Usage (Lbs./Hr.)	2100.0	2950.0	3400.0	3812.0	4161.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	255.7	359.2	414.0	464.2	506.7
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	4,100	4,500	5,300
KW (Aux.)	230	150	240	250	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,571	148,571	148,571	148,571	148,571
HEAT RATE (APPROX.)	15,446	15,498	13,893	14,019	14,436
HEAT RATE (APPROX.)N	17,011	16,192	14,676	14,757	15,151
HEAT RATE (ACTUAL)-G	15,197	15,249	13,670	13,793	14,204
HEAT RATE (ACTUAL)-N	16,737	15,932	14,440	14,519	14,907

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 02-02-05
DATE: 01-31-05 — Tested by: D.Rinehart

DATA:

GENERATED (MW)	2.5	3.5	4.0	4.6	5.2
HEAT RATE(BTU/MW)G	15,197	15,249	13,670	13,793	14,204
HEAT RATE(BTU/MW)N	16,737	15,932	14,440	14,519	14,907
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$40.6027	act.			
H.H.V. (BTU/GAL)	148,571	act.			

A, B, C CONSTANTS:

GROSS A=	19,487.59	NET A=	24,614.11	
B=	(2,189.280)	B=	(4,206.491)	
C=	217.9298	C=	444.4110	

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,981	15,726	15,376	15,165	14,881	14,713	14,495	14,371	14,217	14,137
GENERATED (MW)N	1.77	1.97	2.27	2.47	2.77	2.97	3.27	3.47	3.77	3.96
HEAT RATE(BTU/MW)N	17,979	17,511	16,875	16,496	15,994	15,704	15,335	15,134	14,899	14,786
GROSS (MBTU)	31.961	34.597	38.441	40.946	44.643	47.083	50.732	53.172	56.869	59.375
NET (MBTU)	31.822	34.496	38.307	40.746	44.304	46.641	50.147	52.515	56.168	58.554
COST/KWH	$0.1040	$0.1023	$0.1001	$0.0987	$0.0968	$0.0957	$0.0943	$0.0935	$0.0925	$0.0920
G/KWH	394.84	388.55	379.91	374.69	367.67	363.53	358.13	355.06	351.27	349.29
G/PS-H	287.65	283.07	276.78	272.97	267.86	264.84	260.91	258.67	255.91	254.46

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	14,049	14,012	13,989	13,996	14,062	14,121	14,157	14,197	14,242
GENERATED (MW)N	4.25	4.45	4.75	4.95	5.35	5.55	5.65	5.75	5.85
HEAT RATE(BTU/MW)N	14,684	14,661	14,692	14,757	14,994	15,166	15,266	15,374	15,491
GROSS (MBTU)	63.220	65.857	69.947	72.780	78.747	81.901	83.526	85.184	86.877
NET (MBTU)	62.408	65.240	69.787	73.048	80.221	84.174	86.252	88.400	90.623
COST/KWH	$0.0914	$0.0912	$0.0910	$0.0911	$0.0915	$0.0919	$0.0921	$0.0924	$0.0927
G/KWH	347.11	346.20	345.64	345.81	347.43	348.89	349.78	350.78	351.89
G/PS-H	252.88	252.22	251.81	251.93	253.11	254.18	254.83	255.55	256.36

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
2.5	6.25	15.625	39.0625	15197.27228	37993.181	94982.952	
3.5	12.25	42.875	150.0625	15248.96369	53371.373	186799.81	
4	16	64	256	13669.50417	54678.017	218712.07	
4.6	21.16	97.336	447.7456	13793.3338	63449.335	291866.94	
5.2	27.04	140.608	731.1616	14203.91958	73860.382	384073.99	
0	0	0	0	0	0	0	
19.8	82.7	360.444	1624.0322	72112.99352	283352.29	1176435.8	

a=	21.46	C=	217.9298125
b=	-81565.80265	B=	-2189.28004
d=	-11075.83377	A=	19487.58857
e=	164.76		
f=	1280.871		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
2.5	6.25	15.625	39.0625	16737.084	41842.71	104606.78	
3.5	12.25	42.875	150.0625	15931.753	55761.136	195163.98	
4	16	64	256	14439.617	57758.468	231033.87	
4.6	21.16	97.336	447.7456	14519.299	66788.774	307228.36	
5.2	27.04	140.608	731.1616	14907.084	77516.836	403087.55	
0	0	0	0	0	0	0	
19.8	82.7	360.444	1624.0322	76534.837	299667.92	1241120.5	

a=	21.46	C=	444.41097
b=	-123828.3	B=	-4206.491
d=	-17050.15	A=	24614.114
e=	164.76		
f=	1280.871		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 12-02-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	4,500	5,200
BOILER-TURBINE						
Ambient Air Temp	*F.	82	84	85	86	87
Gas Entering A.H.	*F.	350	365	375	385	400
Gas Leaving A.H.	*F.	310	320	335	345	365
Air Entering A.H.	*F.	82	84	85	86	87
Air Leaving A.H.	*F.	340	340	340	340	340
Circ. Water Inlet	*F.	76.0	76.0	77.0	77.0	77.0
Circ. Water Outlet	*F.	83.4	87.1	88.2	90.0	92.4
Condenser Vacuum	ig.	29.40	29.20	29.10	28.90	28.70
Barometric Pressure	ig.	29.93	29.92	29.93	29.94	29.90
Excess O2	%	2.60	1.60	1.40	1.30	0.90
Feedwater Flow (X1000)	Lb/Hr	31.50	45.70	51.00	58.30	67.20
Steam Flow (X1000)	Lb/Hr	34.60	50.00	56.00	63.60	73.1
Throttle Stm. Press.	PSIG	400	400	400	400	400
Feedwater to Blr.	*F.	260	300	310	315	322
GENERATOR						
Generator Integrator, Start		1362.8	1367.7	1373.8	1379.9	1386.8
Generator Integrator, Stop		1365.2	1371.2	1377.8	1384.4	1392.0
Generator Integrator, Diff.	MWH	2.4	3.5	4.0	4.5	5.2
Generator Volts	V.	11,600	11,600	11,600	11,600	11,600
Generator Amps	A.	150	195	220	250	280
Generator VARS	MVAR	2.0	2.0	2.1	2.5	2.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	520.5	524.9	529.0	532.7	536.5
Aux. KWH Mtr. End (X100)	KWH	522.9	527.4	531.5	535.3	539.1
Aux. Load Indicator	MW	0.24	0.24	0.25	0.26	0.26
Aux. KWH Mtr. Diff.	KWH	2.4	2.5	2.5	2.6	2.6
Aux. Amps	A.	14.5	15.0	15.5	5.5	15.7
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	18525910	18530160	18535312	18540474	18546290
Start Test	Time	0603	0753	0933	1103	1233
F.O. Totalizer-End	Lbs/Hr.	18527970	18533116	18538634	18544230	18550592
End Test	Time	0703	0853	1033	1203	1333
F.O. Diff.	Lbs/Hr.	2060	2956	3327	3756	4302
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	227	225	223	230
F.O. Temp. @ Burner Deck	*F	230	227	225	223	230
Sulfur, Wt. %		1.93				
API Gravity @ 60 *F.	API	19				
Higher Heating Value	BTU/Gal	144,881	TEST BY: Daryl			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-02-04
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	4.5	5.2
F.O. Temp. *F.	230	227	225	223	230
F.O. Temp. (Corr.)	0.94095	0.942	0.9427	0.9434	0.94095
F.O. Usage (Lbs./Hr.)	2060.0	2956.0	3322.0	3756.0	4302.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	250.9	360.0	404.5	457.4	523.9
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,500	4,000	4,500	5,200
KW (Aux.)	240	250	250	260	260
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	144,881	144,881	144,881	144,881	144,881
HEAT RATE (APPROX.)	15,151	15,530	13,574	13,813	15,212
HEAT RATE (APPROX.)N	16,760	16,724	14,373	14,571	16,013
HEAT RATE (ACTUAL)-G	14,537	14,900	13,024	13,253	14,596
HEAT RATE (ACTUAL)-N	16,081	16,047	13,790	13,980	15,364

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 12-10-04
DATE: 12-02-04 — Tested by: E.Wong

DATA:

GENERATED (Mw)	2.5	3.5	4.0	4.5	5.2
HEAT RATE(BTU/MW)G	14,537	14,900	13,024	13,253	14,596
HEAT RATE(BTU/MW)N	16,081	16,047	13,790	13,980	15,364
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	*$39.5024 act.*				
H.H.V. (BTU/GAL)	144,881 act.				

A, B, C CONSTANTS:

GROSS	A=	21,424.97	NET	A= 25,596.62
	B=	(3,822.965)		B= (5,214.517)
	C=	470.7006		C= 611.3855

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,662	15,293	14,809	14,534	14,192	14,011	13,811	13,724	13,664	13,672
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	17,613	17,084	16,381	15,974	15,456	15,171	14,835	14,673	14,521	14,480
GROSS (MBTU)	31.324	33.644	37.024	39.243	42.577	44.837	48.337	50.778	54.657	57.421
NET (MBTU)	30.999	33.484	37.022	39.297	42.657	44.905	48.215	50.621	54.453	57.198
COST/KWH	$0.1017	$0.0993	$0.0961	$0.0944	$0.0921	$0.0910	$0.0897	$0.0891	$0.0887	$0.0888
G/KWH	386.96	377.84	365.90	359.11	350.66	346.19	341.23	339.08	337.61	337.79
G/PS-H	281.91	275.27	266.57	261.62	255.46	252.21	248.59	247.03	245.96	246.09

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	13,753	13,855	14,078	14,273	14,778	15,086	15,255	15,432	15,620
GENERATED (MW)N	4.2	4.4	4.7	4.9	5.3	5.5	5.6	5.7	5.8
HEAT RATE(BTU/MW)N	14,512	14,594	14,809	15,013	15,568	15,919	16,113	16,319	16,538
GROSS (MBTU)	61.890	65.118	70.388	74.221	82.754	87.500	90.002	92.594	95.280
NET (MBTU)	61.530	64.797	70.193	74.164	83.135	88.194	90.879	93.673	96.580
COST/KWH	$0.0893	$0.0899	$0.0914	$0.0927	$0.0959	$0.0979	$0.0990	$0.1002	$0.1014
G/KWH	339.81	342.32	347.82	352.66	366.12	372.74	376.90	381.30	385.92
G/PS-H	247.56	249.39	253.40	256.92	266.00	271.55	274.58	277.78	281.15

WORKSHEET (GROSS)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	14537.49449	36343.736	90859.341
3.5	12.25	42.875	150.0625	14900.42778	52151.497	182530.24
4	16	64	256	13024.15229	52096.609	208386.44
4.5	20.25	91.125	410.0625	13253.11391	59639.013	268375.56
5.2	27.04	140.608	731.1616	14595.85075	75898.424	394671.8
0	0	0	0	0	0	0
19.7	81.79	354.233	1586.3491	70311.03922	276129.28	1144823.4

a=	20.86	C=	470.7005834
b=	-26623.00544	B=	-3822.96461
d=	-4481.07708	A=	21424.96826
e=	159.902		
f=	1242.1414		

WORKSHEET (NET)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	16081.299	40203.248	100508.12
3.5	12.25	42.875	150.0625	16046.615	56163.151	196571.03
4	16	64	256	13790.279	55161.116	220644.46
4.5	20.25	91.125	410.0625	13980.078	62910.351	283096.58
5.2	27.04	140.608	731.1616	15364.053	79893.078	415444
0	0	0	0	0	0	0
19.7	81.79	354.233	1586.3491	75262.324	294330.94	1216264.2

a=	20.86	C=	611.38547
b=	-74384.51	B=	-5214.517
d=	-11013.07	A=	25596.619
e=	159.902		
f=	1242.1414		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 09-18-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	107	108	107	108	
Gas Entering A.H.	*F.	359	359	364	398	
Gas Leaving A.H.	*F.	300	315	345	363	
Air Entering A.H.	*F.	N/A	N/A	N/A	N/A	
Air Leaving A.H.	*F.	340	335	337	343	
Circ. Water Inlet	*F.	75.0	75.0	75.0	75.0	
Circ. Water Outlet	*F.	83.9	87.4	91.1	95.0	
Condenser Vacuum	Ig.	29.30	29.30	28.90	28.60	
Barometric Pressure	Ig.	29.87	29.88	29.88	29.88	
Excess O2	%	0.45	0.49	0.61	0.55	
Feedwater Flow (X1000)	Lb/Hr	31.37	43.34	57.49	70.92	
Steam Flow (X1000)	Lb/Hr	35.35	48.32	62.81	76.82	
Throttle Stm. Press.	PSIG	400	399	395	390	
Feedwater to Blr.	*F.	285	300	329	329	
GENERATOR						
Generator Integrator, Start		5169.7	5174.0	5181.4	5189.4	
Generator Integrator, Stop		5172.2	5177.5	5185.9	5194.9	
Generator Integrator, Diff.	MWH	2.5	3.5	4.5	5.5	0.0
Generator Volts	V.	11,600	11,600	11,600	11,700	
Generator Amps	A.	141	170	243	295	
Generator VARS	MVAR	1.7	1.5	2.3	2.7	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	6628.3	6632.1	6636.9	6641.3	
Aux. KWH Mtr. End (X100)	KWH	6630.7	6634.6	6639.5	6643.9	
Aux. Load Indicator	MW	0.24	0.24	0.25	0.26	0.00
Aux. KWH Mtr. Diff.	KWH	N/A	N/A	N/A	N/A	
Aux. Amps	A.	15.0	15.1	16.0	16.1	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	13658551	13662257	13668461	13675100	
Start Test	Time	0700	0836	1030	1210	
F.O. Totalizer-End	Lbs/Hr.	13660663	13665155	13672180	13679687	
End Test	Time	0800	0936	1130	1310	
F.O. Diff.	Lbs/Hr.	2112	2898	3719	4587	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	\	No	No	No	No	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	244	243	242	239	240
F.O. Temp. @ Burner Deck	*F	N/A	N/A	N/A	N/A	N/A
Sulfur, Wt. %		1.70				
API Gravity @ 60 *F.	API	13.8				
Higher Heating Value	BTU/Gal	148,214	TEST BY: Daryl			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-18-04
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.5	5.5	0.0
F.O. Temp. *F.	244	243	242	239	240
F.O. Temp. (Corr.)	0.93605	0.9364	0.93675	0.9378	0.93745
F.O. Usage (Lbs./Hr.)	2112.0	2898.0	3719.0	4587.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	257.2	352.9	452.9	558.6	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	4,500	5,500	0
KW (Aux.)	240	250	260	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,214	148,214	148,214	148,214	148,214
HEAT RATE (APPROX.)	15,534	15,225	15,196	16,869	#DIV/0!
HEAT RATE (APPROX.)N	17,184	16,396	16,128	17,794	#DIV/0!
HEAT RATE (ACTUAL)-G	15,247	14,944	14,916	16,558	#DIV/0!
HEAT RATE (ACTUAL)-N	16,867	16,094	15,831	17,466	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 09-21-04
DATE: 09-18-04 — Tested by: E.Wong

DATA:

GENERATED (MW)	2.5	3.5	4.5
HEAT RATE(BTU/MW)G	15,247	14,944	14,916
HEAT RATE(BTU/MW)N	16,867	16,094	15,831
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$34.4559	act.	
H.H.V. (BTU/GAL)	148,214	act.	

A, B, C CONSTANTS:

GROSS	A=	17,209.14	NET A=	21,029.48
	B=	(1,128.633)	B=	(2,302.535)
	C=	137.5697	C=	254.9468

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,502	15,392	15,247	15,165	15,061	15,006	14,944	14,917	14,896	14,896
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	17,444	17,198	16,867	16,671	16,416	16,272	16,094	16,000	15,898	15,856
GROSS (MBTU)	31.004	33.862	38.118	40.945	45.184	48.020	52.305	55.191	59.583	62.562
NET (MBTU)	30.702	33.708	38.118	41.011	45.309	48.165	52.305	55.201	59.619	62.632
COST/KWH	$0.0858	$0.0852	$0.0844	$0.0839	$0.0834	$0.0831	$0.0827	$0.0826	$0.0824	$0.0824
G/KWH	383.02	380.30	376.72	374.68	372.13	370.77	369.23	368.55	368.04	368.03
G/PS-H	279.04	277.06	274.45	272.96	271.10	270.11	268.99	268.50	268.12	268.12

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	14,916	14,943	15,005	15,060	15,203	15,291	15,339	15,390	15,443
GENERATED (MW)N	4.2	4.4	4.7	4.9	5.3	5.5	5.6	5.7	5.8
HEAT RATE(BTU/MW)N	15,831	15,839	15,890	15,950	16,130	16,251	16,319	16,392	16,471
GROSS (MBTU)	67.122	70.234	75.026	78.313	85.137	88.687	90.500	92.339	94.205
NET (MBTU)	67.122	70.327	75.321	78.793	86.136	90.032	92.040	94.092	96.188
COST/KWH	$0.0826	$0.0827	$0.0831	$0.0834	$0.0841	$0.0846	$0.0849	$0.0852	$0.0855
G/KWH	368.54	369.22	370.74	372.10	375.63	377.80	378.99	380.24	381.57
G/PS-H	268.49	268.98	270.09	271.08	273.65	275.24	276.10	277.02	277.98

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	15247.37318	38118.433	95296.082
3.5	12.25	42.875	150.0625	14944.15837	52304.554	183065.94
4.5	20.25	91.125	410.0625	14916.08293	67122.373	302050.68
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10.5	38.75	149.625	599.1875	45107.61449	157545.36	580412.7

a=	6	C=	137.5696812
b=	-6681.955945	B=	-1128.63289
d=	-993.8707582	A=	17209.14491
e=	42		
f=	296		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	16866.563	42166.408	105416.02
3.5	12.25	42.875	150.0625	16093.709	56327.982	197147.94
4.5	20.25	91.125	410.0625	15830.748	71238.368	320572.65
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10.5	38.75	149.625	599.1875	48791.021	169732.76	623136.61

a=	6	C=	254.9468
b=	-21242.22	B=	-2302.535
d=	-3107.445	A=	21029.483
e=	42		
f=	296		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 05-22-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	4,500	5,600
BOILER-TURBINE						
Ambient Air Temp	*F.	94	95	96	98	100
Gas Entering A.H.	*F.	350	360	365	380	400
Gas Leaving A.H.	*F.	300	315	325	340	355
Air Entering A.H.	*F.	94	95	96	88	100
Air Leaving A.H.	*F.	350	340	340	340	350
Circ. Water Inlet	*F.	76.0	76.0	76.0	77.0	78.0
Circ. Water Outlet	*F.	80.5	87.0	88.6	90.4	92.7
Condenser Vacuum	Ig.	29.40	29.30	29.20	29.00	28.80
Barometric Pressure	Ig.	30.01	30.02	30.05	30.01	30.00
Excess O2	%	2.50	1.40	0.90	0.90	0.50
Feedwater Flow (X1000)	Lb/Hr	31.60	44.10	50.40	57.10	66.5
Steam Flow (X1000)	Lb/Hr	34.80	48.50	55.50	63.00	72.5
Throttle Stm. Press.	PSIG	400	400	400	400	400
Feedwater to Blr.	*F.	680	710	725	745	755
GENERATOR						
Generator Integrator, Start		5863.8	5869.3	5874.8	5881.1	5888.9
Generator Integrator, Stop		5866.3	5872.8	5878.8	5885.6	5894.1
Generator Integrator, Diff.	MWH	2.5	3.5	4.0	4.5	5.2
Generator Volts	V.	11,600	11,500	11,500	11,500	11,500
Generator Amps	A.	130	180	207	234	265
Generator VARS	MVAR	1.3	1.3	1.3	1.5	1.4
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	290.2	295.5	299.8	304.1	308.9
Aux. KWH Mtr. End (X100)	KWH	293.0	298.4	302.7	307.0	311.7
Aux. Load Indicator	MW	0.27	0.28	0.29	0.29	0.28
Aux. KWH Mtr. Diff.	KWH	2.8	2.9	2.9	2.9	2.8
Aux. Amps	A.	16.2	16.8	17.0	17.1	17.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	4887888	4892532	4897027	4902133	4908560
Start Test	Time	0606	0802	0932	1102	1240
F.O. Totalizer-End	Lbs/Hr.	4889968	4895412	4900299	4905830	4912829
End Test	Time	0706	0902	1032	1202	1340
F.O. Diff.	Lbs/Hr.	2080	2880	3272	3697	4269
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	240	241	239	240	240
F.O. Temp. @ Burner Deck	*F	124	124	128	124	124
Sulfur, Wt. %		1.79				
API Gravity @ 60 *F.	API	15.4				
Higher Heating Value	BTU/Gal	149,095	TEST BY: Daryl			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-22-04
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	4.5	5.6
F.O. Temp. *F.	240	241	239	240	240
F.O. Temp. (Corr.)	0.93745	0.9371	0.9378	0.93745	0.93745
F.O. Usage (Lbs./Hr.)	2080.0	2880.0	3272.0	3697.0	4269.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	253.3	350.7	398.4	450.2	519.8
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	4,000	4,500	5,200
KW (Aux.)	280	290	290	290	280
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,095	149,095	149,095	149,095	149,095
HEAT RATE (APPROX.)	15,299	15,130	13,370	13,596	15,096
HEAT RATE (APPROX.)N	17,228	16,497	14,291	14,433	15,955
HEAT RATE (ACTUAL)-G	15,106	14,940	13,201	13,424	14,905
HEAT RATE (ACTUAL)-N	17,011	16,289	14,111	14,251	15,753

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 05-28-04
DATE: 05-22-04 — Tested by: K.Nakamatsu/E.Wong

DATA:

GENERATED (MW)	2.5	3.5	4.0	4.5	5.6
HEAT RATE(BTU/MW)G	15,106	14,940	13,201	13,424	14,905
HEAT RATE(BTU/MW)N	17,011	16,289	14,111	14,251	15,753
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$29.2919	act.			
H.H.V. (BTU/GAL)	149,095	act.			

A, B, C CONSTANTS:

GROSS	A=	23,597.61	NET A=	28,790.88
	B=	(4,680.218)	B=	(6,405.370)
	C=	553.4825	C=	722.4325

PREDICTED VALUES:										
GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,451	15,980	15,356	14,996	14,538	14,289	13,997	13,858	13,732	13,704
GENERATED (MW)N	1.7	1.9	2.2	2.4	2.7	2.9	3.2	3.4	3.7	3.9
HEAT RATE(BTU/MW)N	18,870	18,196	17,293	16,763	16,077	15,691	15,222	14,981	14,728	14,632
GROSS (MBTU)	32.902	35.156	38.391	40.489	43.615	45.723	48.990	51.275	54.930	57.557
NET (MBTU)	32.456	34.936	38.390	40.566	43.729	45.819	48.862	51.086	54.642	57.211
COST/KWH	$0.0770	$0.0747	$0.0718	$0.0701	$0.0680	$0.0668	$0.0655	$0.0648	$0.0642	$0.0641
G/KWH	406.47	394.82	379.42	370.51	359.20	353.03	345.83	342.40	339.29	338.59
G/PS-H	296.12	287.64	276.41	269.93	261.69	257.19	251.95	249.44	247.18	246.67

PREDICTED VALUES (CONT.):									
GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	5.9	6.0	6.1
HEAT RATE(BTU/MW)G	13,745	13,827	14,034	14,227	14,746	15,071	15,251	15,442	15,643
GENERATED (MW)N	4.2	4.4	4.7	4.9	5.3	5.5	5.6	5.7	5.8
HEAT RATE(BTU/MW)N	14,596	14,644	14,825	15,018	15,576	15,942	16,147	16,366	16,600
GROSS (MBTU)	61.851	64.987	70.168	73.979	82.575	87.415	89.981	92.650	95.425
NET (MBTU)	61.449	64.581	69.825	73.736	82.710	87.842	90.585	93.451	96.445
COST/KWH	$0.0643	$0.0647	$0.0656	$0.0665	$0.0690	$0.0705	$0.0713	$0.0722	$0.0732
G/KWH	339.60	341.63	346.73	351.50	364.33	372.38	376.81	381.52	386.51
G/PS-H	247.40	248.89	252.60	256.08	265.42	271.29	274.52	277.95	281.58

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	15105.6062	37764.015	94410.039
3.5	12.25	42.875	150.0625	14939.61053	52288.637	183010.23
4	16	64	256	13201.26695	52805.068	211220.27
4.5	20.25	91.125	410.0625	13424.38128	60409.716	271843.72
5.6	31.36	175.616	983.4496	14905.19436	83469.088	467426.89
0	0	0	0	0	0	0
20.1	86.11	389.241	1838.6371	71576.05931	286736.52	1227911.2

a=	26.54	C=	553.4825386
b=	-23858.69326	B=	-4680.21811
d=	-4996.170693	A=	23597.61238
e=	215.394		
f=	1778.2534		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	17010.818	42527.044	106317.61
3.5	12.25	42.875	150.0625	16289.295	57012.532	199543.86
4	16	64	256	14110.618	56442.472	225769.89
4.5	20.25	91.125	410.0625	14250.936	64129.21	288581.44
5.6	31.36	175.616	983.4496	15753.457	88219.362	494028.43
0	0	0	0	0	0	0
20.1	86.11	389.241	1838.6371	77415.124	308330.62	1314241.2

a=	26.54	C=	722.43254
b=	-95010.14	B=	-6405.37
d=	-14390.88	A=	28790.879
e=	215.394		
f=	1778.2534		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 03-15-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	3,600	4,600	5,600		
BOILER-TURBINE							
Ambient Air Temp	*F.	90	91	94	95		
Gas Entering A.H.	*F.	335	340	350	365		
Gas Leaving A.H.	*F.	287	298	318	335		
Air Entering A.H.	*F.	90	91	94	95		
Air Leaving A.H.	*F.	335	340	340	340		
Circ. Water Inlet	*F.	75.0	76.0	77.0	78.0		
Circ. Water Outlet	*F.	83.1	86.3	89.5	92.8		
Condenser Vacuum	ig.	29.80	29.60	29.40	29.10		
Barometric Pressure	ig.	30.01	30.05	30.05	30.06		
Excess O2	%	2.40	1.50	1.50	1.30		
Feedwater Flow (X1000)	Lb/Hr	33.00	46.00	59.00	72.00		
Steam Flow (X1000)	Lb/Hr	34.00	47.00	60.00	74.00		
Throttle Stm. Press.	PSIG	390	390	390	390		
Feedwater to Blr.	*F.	285	300	320	330		
GENERATOR							
Generator Integrator, Start		311.5	317.3	323.9	332.1		
Generator Integrator, Stop		314.0	320.9	328.5	337.7		
Generator Integrator, Diff.	MWH	2.5	3.6	4.6	5.6	0.0	
Generator Volts	V.	11,600	11,700	11,700	11,700		
Generator Amps	A.	150	212	262	305		
Generator VARS	MVAR	1.8	2.6	3.1	3.0		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	6546.6	6552.1	6557.0	6561.9		
Aux. KWH Mtr. End (X100)	KWH	6549.3	6555.0	6559.9	6564.9		
Aux. Load Indicator	MW	0.27	0.29	0.29	0.30	0.00	
Aux. Volts	V.						
Aux. Amps	A.	15.0	16.0	17.5	17.5		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	595530	600473	606028	612831		
Start Test	*Time*	*0710*	*0908*	*1050*	*1230*		
F.O. Totalizer-End	Lbs/Hr.	597655	603457	609800	617421		
End Test	Time	0810	1008	1150	1330		
F.O. Diff.	Lbs/Hr.	2125	2984	3772	4590	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	*Yes/No*	*Yes*	*Yes*	*Yes*	*Yes*		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	246	243	242	243		
F.O. Temp. @ Burner Deck	*F						
Sulfur, Wt. %		1.67					
API Gravity @ 60 *F.	API	8.6					
Higher Heating Value	BTU/Gal	152,952					

TEST BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 03-15-04
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.6	4.6	5.6	0.0
F.O. Temp. *F.	246	243	242	243	0
F.O. Temp. (Corr.)	0.93535	0.9364	0.93675	0.9364	1.02145
F.O. Usage (Lbs./Hr.)	2125.0	2984.0	3772.0	4590.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	258.8	363.4	459.3	558.9	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,600	4,600	5,600	0
KW (Aux.)	270	290	290	300	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	152,952	152,952	152,952	152,952	152,952
HEAT RATE (APPROX.)	15,630	15,677	15,413	16,880	#DIV/0!
HEAT RATE (APPROX.)N	17,522	17,093	16,475	17,957	#DIV/0!
HEAT RATE (ACTUAL)-G	15,832	15,880	15,612	17,098	#DIV/0!
HEAT RATE (ACTUAL)-N	17,748	17,314	16,688	18,190	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 03-18-04
DATE: 03-15-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.5	3.6	4.6	5.6
HEAT RATE(BTU/MW)G	15,832	15,880	15,612	17,098
HEAT RATE(BTU/MW)N	17,748	17,314	16,688	18,190
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$30.6426	act.		
H.H.V. (BTU/GAL)	152,952	act.		

A, B, C CONSTANTS:

GROSS A=	19,769.94		NET A=	23,908.92
B=	(2,375.299)		B=	(3,529.570)
C=	335.4148		C=	443.8339

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,361	16,168	15,928	15,802	15,663	15,604	15,565	15,573	15,635	15,710
GENERATED (MW)N	1.7	1.9	2.2	2.4	2.7	2.9	3.2	3.4	3.7	3.9
HEAT RATE(BTU/MW)N	18,625	18,292	17,859	17,615	17,315	17,159	16,992	16,926	16,892	16,914
GROSS (MBTU)	32.722	35.569	39.820	42.665	46.988	49.932	54.478	57.621	62.542	65.984
NET (MBTU)	32.221	35.304	39.825	42.804	47.269	50.276	54.885	57.716	62.669	66.134
COST/KWH	$0.0780	$0.0771	$0.0760	$0.0754	$0.0747	$0.0744	$0.0742	$0.0743	$0.0746	$0.0749
G/KWH	404.24	399.46	393.54	390.42	386.99	385.53	384.58	384.77	386.31	388.16
G/PS-H	294.50	291.02	286.70	284.43	281.93	280.87	280.17	280.32	281.44	282.79

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,873	16,015	16,279	16,488	16,987	17,277	17,593	17,761
GENERATED (MW)N	4.2	4.4	4.7	4.9	5.3	5.5	5.7	5.8
HEAT RATE(BTU/MW)N	17,013	17,124	17,357	17,556	18,062	18,368	18,710	18,894
GROSS (MBTU)	71.430	75.272	81.394	85.738	95.126	100.204	105.558	108.344
NET (MBTU)	71.627	75.518	81.751	86.202	95.728	101.024	106.644	109.583
COST/KWH	$0.0757	$0.0764	$0.0777	$0.0786	$0.0810	$0.0824	$0.0839	$0.0847
G/KWH	392.19	395.70	402.21	407.38	419.70	426.86	434.68	438.84
G/PS-H	285.72	288.28	293.02	296.78	305.76	310.98	316.68	319.71

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
2.5	6.25	15.625	39.0625	15831.65171	39579.129	98947.823	
3.6	12.96	46.656	167.9616	15879.54578	57166.365	205798.91	
4.6	21.16	97.336	447.7456	15612.28503	71816.511	330355.95	
5.6	31.36	175.616	983.4496	17098.18384	95749.83	536199.05	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
16.3	71.73	335.233	1638.2193	64421.66636	264311.83	1171301.7	

a=	21.23	C=	335.4147531
b=	64240.80415	B=	-2375.29932
d=	7174.177273	A=	19769.93625
e=	171.733		
f=	1407.6843		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
2.5	6.25	15.625	39.0625	17748.488	44371.221	110928.05	
3.6	12.96	46.656	167.9616	17314.146	62330.927	224391.34	
4.6	21.16	97.336	447.7456	16687.716	76763.492	353112.06	
5.6	31.36	175.616	983.4496	18189.557	101861.52	570424.52	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
16.3	71.73	335.233	1638.2193	69939.908	285327.16	1258856	

a=	21.23	C=	443.83387
b=	18634.29	B=	-3529.57
d=	1288.1465	A=	23908.925
e=	171.733		
f=	1407.6843		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 01-21-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	3,300	4,200	5,000		
BOILER-TURBINE							
Ambient Air Temp	*F.	80	80	80	80		
Gas Entering A.H.	*F.	358	359	375	390		
Gas Leaving A.H.	*F.	310	315	333	360		
Air Entering A.H.	*F.	93	94	95	96		
Air Leaving A.H.	*F.	335	335	335	335		
Circ. Water Inlet	*F.	76.0	76.0	76.0	76.0		
Circ. Water Outlet	*F.	84.0	86.8	88.9	93.2		
Condenser Vacuum	ig.	28.70	28.70	28.30	27.90		
Barometric Pressure	ig.	30.02	30.04	30.03	30.01		
Excess O2	%	2.20	1.70	1.40	1.30		
Feedwater Flow (X1000)	Lb/Hr	31.01	40.90	53.11	65.40		
Steam Flow (X1000)	Lb/Hr	30.65	40.27	51.76	63.00		
Throttle Stm. Press.	PSIG	405	405	405	405		
Feedwater to Blr.	*F.	282	295	314	328		
GENERATOR							
Generator Integrator, Start		3186.2	3188.9	3192.6	3197.7		
Generator Integrator, Stop		3188.0	3191.2	3195.6	3201.2		
Generator Integrator, Diff.	MWH	1.8	2.3	3.0	3.5	0.0	
Generator Volts	V.	11,600	11,800	11,700	11,500		
Generator Amps	A.	150	192	255	297		
Generator VARS	MVAR	2.0	2.3	3.2	3.4		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	5706.4	5709.7	5713.3	5717.3		
Aux. KWH Mtr. End (X100)	KWH	5708.7	5712.1	5715.8	5719.8		
Aux. Load Indicator	MW	0.23	0.24	0.25	0.25	0.00	
Aux. Volts	V.	480	480	480	480		
Aux. Amps	A.	300.0	310.0	320.0	330.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	38799720	38803165	38807855	38813933		
Start Test	Time	0734	0900	1030	1206		
F.O. Totalizer-End	Lbs/Hr.	38801975	38806075	38811497	38818275		
End Test	Time	0834	1000	1130	1306		
F.O. Diff.	Lbs/Hr.	2255	2910	3642	4342	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	220	240	238	238		
F.O. Temp. @ Burner Deck	*F						
Sulfur, Wt. %		1.08	LO-1 on sp 70, stroke 50				
API Gravity @ 60 *F.	API	14.9					
Higher Heating Value	BTU/Gal	149,238	TEST BY:				

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-21-04
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.3	4.2	5.0	0.0
F.O. Temp. *F.	220	240	238	238	0
F.O. Temp. (Corr.)	0.94445	0.93745	0.93815	0.93815	1.02145
F.O. Usage (Lbs./Hr.)	2255.0	2910.0	3642.0	4342.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	274.6	354.4	443.5	528.7	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	1,800	2,300	3,000	3,500	0
KW (Aux.)	230	240	250	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,238	149,238	149,238	149,238	149,238
HEAT RATE (APPROX.)	16,586	15,288	14,882	15,966	#DIV/0!
HEAT RATE (APPROX.)N	18,266	16,414	15,757	16,808	#DIV/0!
HEAT RATE (ACTUAL)-G	16,392	15,110	14,708	15,782	#DIV/0!
HEAT RATE (ACTUAL)-N	18,053	16,222	15,573	16,612	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 02-02-04
DATE: 01-21-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.5	3.5	4.5
HEAT RATE(BTU/MW)G	16,392	15,110	14,708
HEAT RATE(BTU/MW)N	18,053	16,222	15,573
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$28.8498	act.	
H.H.V. (BTU/GAL)	149,238	act.	

A, B, C CONSTANTS:

GROSS	A=	23,452.70	NET A=	27,803.18
	B=	(3,925.405)	B=	(5,377.906)
	C=	440.4831	C=	591.1476

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	17,364	16,949	16,392	16,065	15,641	15,402	15,110	14,959	14,799	14,736
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	19,412	18,833	18,053	17,592	16,990	16,647	16,222	15,998	15,750	15,644
GROSS (MBTU)	34.728	37.287	40.981	43.376	46.922	49.286	52.884	55.348	59.195	61.892
NET (MBTU)	34.359	37.101	40.800	43.277	46.722	49.109	52.722	55.192	59.062	61.793
COST/KWH	$0.0799	$0.0780	$0.0754	$0.0739	$0.0720	$0.0709	$0.0695	$0.0689	$0.0681	$0.0678
G/KWH	429.02	418.76	405.01	396.93	386.45	380.54	373.32	369.60	365.64	364.09
G/PS-H	312.55	305.08	295.06	289.17	281.53	277.24	271.97	269.26	266.38	265.25

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,708	14,734	14,838	14,951	15,284	15,503	15,758	15,898
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	15,573	15,585	15,692	15,823	16,225	16,498	16,817	16,995
GROSS (MBTU)	66.187	69.248	74.189	77.747	85.590	89.919	94.546	96.978
NET (MBTU)	66.187	69.355	74.539	78.322	86.805	91.561	96.698	99.418
COST/KWH	$0.0677	$0.0678	$0.0683	$0.0688	$0.0703	$0.0714	$0.0725	$0.0732
G/KWH	363.40	364.03	366.60	369.41	377.63	383.04	389.33	392.80
G/PS-H	264.75	265.20	267.08	269.12	275.11	279.06	283.64	286.17

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	16392.20189	40980.505	102451.26
3.5	12.25	42.875	150.0625	15109.69512	52883.933	185093.77
4.5	20.25	91.125	410.0625	14708.15454	66186.695	297840.13
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10.5	38.75	149.625	599.1875	46210.05155	160051.13	585385.16

a=	6	C=	440.4830937
b=	-34484.02813	B=	-3925.40533
d=	-5052.142045	A=	23452.69588
e=	42		
f=	296		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	18053.086	45132.714	112831.79
3.5	12.25	42.875	150.0625	16222.065	56777.229	198720.3
4.5	20.25	91.125	410.0625	15573.34	70080.03	315360.14
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10.5	38.75	149.625	599.1875	49848.491	171989.97	626912.22

a=	6	C=	591.14763
b=	-50892.36	B=	-5377.906
d=	-7439.237	A=	27803.179
e=	42		
f=	296		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 12-05-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	3,500	4,500	5,000		
BOILER-TURBINE							
Ambient Air Temp	°F.						
Gas Entering A.H.	°F.	340	350	375	385		
Gas Leaving A.H.	°F.	311	323	345	358		
Air Entering A.H.	°F.	85	86	89	92		
Air Leaving A.H.	°F.	325	330	333	336		
Circ. Water Inlet	°F.	71.0	71.0	71.0	71.0		
Circ. Water Outlet	°F.	83.0	87.0	90.0	92.0		
Condenser Vacuum	Ig.	28.70	28.50	28.20	28.00		
Barometric Pressure	Ig.	30.07	30.09	30.08	30.03		
Excess O2	%	2.20	1.60	1.10	1.10		
Feedwater Flow (X1000)	Lb/Hr	32	44	57	63		
Steam Flow (X1000)	Lb/Hr	30	43	55	62		
Throttle Stm. Press.	PSIG	403	403	403	404		
Feedwater to Blr.	°F.	280	300	325	328		
GENERATOR							
Generator Integrator, Start							
Generator Integrator, Stop							
Generator Integrator, Diff.	MWH	0.0	0.0	0.0	0.0	0.0	
Generator Volts	V.	11,400	11,400	11,500	11,500		
Generator Amps	A.	133	190	242	260		
Generator VARS	MVAR	1.4	1.8	2.2	2.0		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	3525.0	3528.9	3532.7	3536.3		
Aux. KWH Mtr. End (X100)	KWH	3527.2	3531.2	3535.2	3538.7		
Aux. Load Indicator	MW	0.22	0.23	0.25	0.24	0.00	
Aux. Volts	V.						
Aux. Amps	A.	14.0	14.0	14.0	14.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	35386389	35390847	35396190	35401958		
Start Test	Time						
F.O. Totalizer-End	Lbs/Hr.	35388661	35393915	35400057	35406214		
End Test	Time						
F.O. Diff.	Lbs/Hr.	2272	3068	3867	4256	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	°F	253	250	249	248		
F.O. Temp. @ Burner Deck	°F						
Sulfur, Wt. %		1.65					
API Gravity @ 60 °F.	API	15.5					
Higher Heating Value	BTU/Gal	147,357	TEST BY:	Jkealiinghomoku			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-05-03
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.5	5.0	0.0
F.O. Temp. °F.	253	250	249	248	0
F.O. Temp. (Corr.)	0.9329	0.93395	0.9343	0.93465	1.02145
F.O. Usage (Lbs./Hr.)	2272.0	3068.0	3867.0	4256.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	276.7	373.6	470.9	518.3	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	0	0	0	0	0
KW (Aux.)	220	230	250	240	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	147,357	147,357	147,357	147,357	147,357
HEAT RATE (APPROX.)	16,277	16,114	15,661	15,556	#DIV/0!
HEAT RATE (APPROX.)N	16,327	16,282	16,241	16,443	#DIV/0!
HEAT RATE (ACTUAL)-G	16,605	15,726	15,428	15,824	#DIV/0!
HEAT RATE (ACTUAL)-N	17,961	17,816	17,697	17,844	#DIV/0!

FUEL CORRECTION: 1

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

NOTE: PM calculator not working. Using analog meter.

KPP UNIT NO. 1 — Fuel Oil Tested: 12-12-03
DATE: 12-05-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.5	3	3.5	4
HEAT RATE(BTU/MW)G	16,308	15,729	15,420	15,274
HEAT RATE(BTU/MW)N	17,881	16,836	16,327	16,044
NUMBER OF TESTS	1			
PRICE OF FUEL/BBL	$29.6225	act.		
H.H.V. (BTU/GAL)	147,357	act.		

A, B, C CONSTANTS:

GROSS	A=	18,556.52	NET A=	21,911.52
	B=	(1,150.034)	B=	(2,069.299)
	C=	99.3003	C=	180.6443

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,654	16,507	16,302	16,175	16,000	15,893	15,748	15,661	15,545	15,478
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	18,495	18,233	17,867	17,641	17,329	17,140	16,882	16,728	16,525	16,407
GROSS (MBTU)	33.307	36.316	40.755	43.673	48.000	50.858	55.117	57.945	62.181	65.008
NET (MBTU)	32.922	36.102	40.737	43.750	48.176	51.076	55.204	58.047	62.298	65.136
COST/KWH	$0.0797	$0.0790	$0.0780	$0.0774	$0.0766	$0.0761	$0.0754	$0.0750	$0.0744	$0.0741
G/KWH	411.47	407.85	402.78	399.65	395.32	392.68	389.09	386.94	384.08	382.42
G/PS-H	299.77	297.13	293.44	291.16	288.00	286.08	283.46	281.89	279.81	278.60

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,392	15,345	15,289	15,261	15,230	15,227	15,231	15,236
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	16,258	16,176	16,081	16,036	15,988	15,986	15,999	16,011
GROSS (MBTU)	69.265	72.121	76.444	79.359	85.290	88.315	91.387	92.941
NET (MBTU)	69.095	71.984	76.546	79.537	85.698	88.885	92.154	93.822
COST/KWH	$0.0737	$0.0734	$0.0732	$0.0730	$0.0729	$0.0729	$0.0729	$0.0729
G/KWH	380.30	379.13	377.75	377.07	376.30	376.22	376.32	376.45
G/PS-H	277.06	276.21	275.20	274.71	274.15	274.08	274.16	274.25

WORKSHEET (GROSS)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	16307.61951	40769.049	101922.62
3.5	12.25	42.875	150.0625	15729.30604	55052.571	192684
4.5	20.25	91.125	410.0625	15419.98353	69389.926	312254.67
5	25	125	625	15274.03799	76370.19	381850.95
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15.5	63.75	274.625	1224.1875	62730.94708	241581.74	988712.24

a=	14.75	C=	99.30026369
b=	-44248.92703	B=	-1150.03411
d=	-6002.736579	A=	18556.52101
e=	110.375		
f=	832.6875		

WORKSHEET (NET)

MEGAWATTS = X — HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
2.5	6.25	15.625	39.0625	17881.162	44702.904	111757.26
3.5	12.25	42.875	150.0625	16835.649	58924.77	206236.7
4.5	20.25	91.125	410.0625	16327.041	73471.686	330622.59
5	25	125	625	16044.158	80220.788	401103.94
0	0	0	0	0	0	0
0	0	0	0	0	0	0
15.5	63.75	274.625	1224.1875	67088.009	257320.15	1049720.5

a=	14.75	C=	180.64431
b=	-77978.66	B=	-2069.299
d=	-10583.55	A=	21911.519
e=	110.375		
f=	832.6875		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 07-17-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	4,000	4,500	5,400	
BOILER-TURBINE						
Ambient Air Temp	*F.	84	86	87	90	
Gas Entering A.H.	*F.	360	360	370	385	
Gas Leaving A.H.	*F.	320	332	344	365	
Air Entering A.H.	*F.	84	86	87	90	
Air Leaving A.H.	*F.	320	32.5	325	330	
Circ. Water Inlet	*F.	76.0	76.0	77.0	77.0	
Circ. Water Outlet	*F.	85.0	88.5	90.0	92.6	
Condenser Vacuum	ig.	28.60	28.40	28.30	28.10	
Barometric Pressure	ig.	30.09	30.09	30.10	30.06	
Excess O2	%	2.90	1.65	1.10	1.12	
Feedwater Flow (X1000)	Lb/Hr	39	53	59	69	
Steam Flow (X1000)	Lb/Hr	38	51	58	68	
Throttle Stm. Press.	PSIG	408	408	410	409	
Feedwater to Blr.	*F.	290	310	320	330	
GENERATOR						
Generator Integrator, Start		9316.6	9322.5	9328.6	9336.8	
Generator Integrator, Stop		9319.5	9326.5	9333.1	9342.2	
Generator Integrator, Diff.	MWH	2.9	4.0	4.5	5.4	0.0
Generator Volts	V.	11,500	11,600	11,600	11,500	
Generator Amps	A.	172	230	260	285	
Generator VARS	MVAR	2.1	2.5	2.8	2.5	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	6060.8	6064.8	6068.3	6072.4	
Aux. KWH Mtr. End (X100)	KWH	6063.1	6067.2	6070.7	6074.8	
Aux. Load Indicator	MW	0.23	0.24	0.24	0.24	0.00
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.0	14.0	14.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	24890800	24895848	24901058	24908000	
Start Test	Time	0700	0846	1015	1200	
F.O. Totalizer-End	Lbs/Hr.	24893318	24899259	24904848	24912495	
End Test	Time	0800	0946	1115	1300	
F.O. Diff.	Lbs/Hr.	2518	3411	3790	4495	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	223	227	228	218
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.48				
API Gravity @ 60 *F.	API	9.4				
Higher Heating Value	BTU/Gal	152,071				

TEST BY: G.G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 07-17-03
KPP UNIT NO. 1

	TEST LOADS - MW				
	3.0	4.0	4.5	5.4	0.0
F.O. Temp. *F.	225	223	227	228	218
F.O. Temp. (Corr.)	0.9427	0.9434	0.942	0.94165	0.94515
F.O. Usage (Lbs./Hr.)	2518.0	3411.0	3790.0	4495.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	306.6	415.4	461.5	547.4	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,900	4,000	4,500	5,400	0
KW (Aux.)	230	240	240	240	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	152,071	152,071	152,071	152,071	152,071
HEAT RATE (APPROX.)	15,966	15,680	15,487	15,306	#DIV/0!
HEAT RATE (APPROX.)N	17,341	16,681	16,359	16,018	#DIV/0!
HEAT RATE (ACTUAL)-G	16,079	15,791	15,596	15,415	#DIV/0!
HEAT RATE (ACTUAL)-N	17,464	16,799	16,475	16,132	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 07-21-03
DATE: 07-17-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.9	4.0	4.5	5.4
HEAT RATE(BTU/MW)G	16,079	15,791	15,596	15,415
HEAT RATE(BTU/MW)N	17,464	16,799	16,475	16,132
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$25.7572	act.		
H.H.V. (BTU/GAL)	152,071	act.		

A, B, C CONSTANTS:

GROSS	A=	17,118.68	NET A=	20,129.71
	B=	(403.003)	B=	(1,121.167)
	C=	15.9460	C=	70.2633

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,376	16,309	16,211	16,147	16,053	15,992	15,904	15,846	15,762	15,707
HEAT RATE(BTU/MW)N	18,168	18,003	17,766	17,615	17,399	17,261	17,066	16,943	16,769	16,660
GROSS (MBTU)	32.753	35.880	40.527	43.596	48.160	51.176	55.662	58.630	63.047	65.971
NET (MBTU)	36.337	39.607	44.415	47.560	52.196	55.237	59.732	62.690	67.077	69.973
COST/KWH	$0.0660	$0.0658	$0.0654	$0.0651	$0.0647	$0.0645	$0.0641	$0.0639	$0.0636	$0.0633
G/KWH	404.62	402.96	400.53	398.95	396.63	395.13	392.94	391.51	389.43	388.09
G/PS-H	294.78	293.57	291.80	290.64	288.96	287.86	286.26	285.23	283.71	282.73

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,628	15,577	15,502	15,454	15,362	15,318	15,275	15,254
HEAT RATE(BTU/MW)N	16,507	16,412	16,280	16,200	16,055	15,991	15,932	15,905
GROSS (MBTU)	70.326	73.211	77.512	80.362	86.027	88.843	91.648	93.048
NET (MBTU)	74.283	77.138	81.402	84.238	89.906	92.745	95.593	97.021
COST/KWH	$0.0630	$0.0628	$0.0625	$0.0623	$0.0620	$0.0618	$0.0616	$0.0615
G/KWH	386.13	384.86	383.02	381.84	379.55	378.46	377.40	376.88
G/PS-H	281.31	280.38	279.04	278.18	276.51	275.72	274.94	274.57

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 04-23-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	3,000	4,000	5,000	5,800		
BOILER-TURBINE							
Ambient Air Temp	*F.	82	85	83	85		
Gas Entering A.H.	*F.	380	391	407	420		
Gas Leaving A.H.	*F.	300	308	324	340		
Air Entering A.H.	*F.	82	83	83	85		
Air Leaving A.H.	*F.	340	340	342	342		
Circ. Water Inlet	*F.	74.0	76.0	76.0	76.0		
Circ. Water Outlet	*F.	84.9	88.4	91.7	94.3		
Condenser Vacuum	ig.	28.60	28.40	28.10	28.00		
Barometric Pressure	ig.	30.16	30.18	30.18	30.15		
Excess O2	%	1.99	1.24	1.16	1.39		
Feedwater Flow (X1000)	Lb/Hr	36	51	63	70		
Steam Flow (X1000)	Lb/Hr	36	49	61	70		
Throttle Stm. Press.	PSIG	400	400	400	400		
Feedwater to Blr.	*F.	290	305	315	318		
GENERATOR							
Generator Integrator, Start		860.4	865.6	872.0	879.4		
Generator Integrator, Stop		863.4	869.6	877.0	885.2		
Generator Integrator, Diff.	MWH	3.0	4.0	5.0	5.8	0.0	
Generator Volts	V.	11,700	11,500	11,700	11,700		
Generator Amps	A.	158	218	262	298		
Generator VARS	MVAR	1.6	2.0	2.0	2.0		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	1167.3	1170.9	1174.4	1177.8		
Aux. KWH Mtr. End (X100)	KWH	1169.6	1173.2	1176.8	1180.3		
Aux. Load Indicator	MW	0.23	0.23	0.24	0.25	0.00	
Aux. Volts	V.						
Aux. Amps	A.	14.0	14.0	14.0	14.5		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	17693359	17697718	17703000	17709041		
Start Test	Time	0640	0815	0945	1110		
F.O. Totalizer-End	Lbs/Hr.	17695842	17701030	17707124	17713805		
End Test	Time	0740	0915	1045	1210		
F.O. Diff.	Lbs/Hr.	2483	3312	4124	4764	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	No	No	No	No	No	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	2	
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	229	229	229	229	218	
F.O. Temp. @ Burner Deck	*F						
Sulfur, Wt. %		1.54					
API Gravity @ 60 *F.	API	11.5					
Higher Heating Value	BTU/Gal	151,452	TEST BY: G.Graf				

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-23-03
KPP UNIT NO. 1

	TEST LOADS - MW				
	3.0	4.0	5.0	5.8	0.0
F.O. Temp. *F.	229	229	229	229	218
F.O. Temp. (Corr.)	0.9413	0.9413	0.9413	0.9413	0.94515
F.O. Usage (Lbs./Hr.)	2483.0	3312.0	4124.0	4764.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	302.4	403.3	502.2	580.1	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	4,000	5,000	5,800	0
KW (Aux.)	230	230	240	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,452	151,452	151,452	151,452	151,452
HEAT RATE (APPROX.)	15,219	15,225	15,166	15,103	#DIV/0!
HEAT RATE (APPROX.)N	16,483	16,154	15,931	15,784	#DIV/0!
HEAT RATE (ACTUAL)-G	15,265	15,271	15,212	15,149	#DIV/0!
HEAT RATE (ACTUAL)-N	16,532	16,202	15,979	15,831	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 05-02-03
DATE: 04-23-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.0	4.0	5.0	5.8
HEAT RATE(BTU/MW)G	15,265	15,271	15,212	15,149
HEAT RATE(BTU/MW)N	16,532	16,202	15,979	15,831
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$31.6169	act.		
H.H.V. (BTU/GAL)	151,452	act.		

A, B, C CONSTANTS:

GROSS	A=	14,989.79	NET A=	17,961.36
	B=	161.998	B=	(595.801)
	C=	(23.2831)	C=	39.4975

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,221	15,233	15,249	15,257	15,266	15,270	15,272	15,270	15,265	15,259
HEAT RATE(BTU/MW)N	16,928	16,842	16,719	16,641	16,529	16,459	16,360	16,298	16,210	16,156
GROSS (MBTU)	30.441	33.514	38.123	41.195	45.799	48.863	53.450	56.501	61.061	64.090
NET (MBTU)	33.855	37.052	41.797	44.930	49.588	52.670	57.260	60.301	64.840	67.854
COST/KWH	$0.0757	$0.0757	$0.0758	$0.0758	$0.0759	$0.0759	$0.0759	$0.0759	$0.0759	$0.0758
G/KWH	376.06	376.38	376.77	376.97	377.19	377.28	377.32	377.29	377.17	377.02
G/PS-H	273.97	274.20	274.49	274.63	274.79	274.86	274.89	274.87	274.77	274.67

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,247	15,237	15,218	15,203	15,167	15,146	15,124	15,112
HEAT RATE(BTU/MW)N	16,080	16,034	15,970	15,931	15,864	15,834	15,808	15,797
GROSS (MBTU)	68.613	71.613	76.089	79.054	84.934	87.848	90.742	92.181
NET (MBTU)	72.360	75.358	79.849	82.842	88.836	91.840	94.851	96.360
COST/KWH	$0.0758	$0.0757	$0.0756	$0.0756	$0.0754	$0.0753	$0.0752	$0.0751
G/KWH	376.72	376.46	375.99	375.62	374.73	374.22	373.67	373.37
G/PS-H	274.45	274.26	273.92	273.65	273.00	272.63	272.22	272.01

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 02-28-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,000	5,400
BOILER-TURBINE						
Ambient Air Temp	*F.	80	86	88	90	93
Gas Entering A.H.	*F.	330	350	380	390	400
Gas Leaving A.H.	*F.	318	340	365	368	370
Air Entering A.H.	*F.	80	88	89	91	93
Air Leaving A.H.	*F.	305	299	300	300	300
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0	71.0
Circ. Water Outlet	*F.	83.9	87.2	91.4	92.5	94.4
Condenser Vacuum	ig.	28.80	28.60	28.30	28.10	27.90
Barometric Pressure	ig.	30.19	30.21	30.20	30.18	30.13
Excess O2	%	1.30	1.10	1.00	0.90	0.90
Feedwater Flow (X1000)	Lb/Hr	33	46	61	65	70
Steam Flow (X1000)	Lb/Hr	32	45	60	64	69
Throttle Stm. Press.	PSIG	425	424	425	426	427
Feedwater to Blr.	*F.	260	300	320	320	320
GENERATOR						
Generator Integrator, Start		604.5	609.3	615.6	623.1	630.6
Generator Integrator, Stop		607.0	612.8	620.2	628.0	635.9
Generator Integrator, Diff.	MWH	2.5	3.5	4.6	4.9	5.3
Generator Volts	V.	11,700	11,600	11,700	11,700	11,700
Generator Amps	A.	137	190	248	263	279
Generator VARS	MVAR	1.5	1.8	2.2	2.2	2.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	388.8	392.6	396.3	400.1	403.6
Aux. KWH Mtr. End (X100)	KWH	391.0	394.9	398.7	402.4	406.0
Aux. Load Indicator	MW	0.22	0.23	0.24	0.23	0.24
Aux. Volts	V.					
Aux. Amps	A.	12.8	13.0	13.8	13.8	14.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	16765998	16770199	16775361	16781640	16788046
Start Test	Time	0616	0759	0935	1110	1241
F.O. Totalizer-End	Lbs/Hr.	16768147	16773143	16779249	16785792	16792569
End Test	Time	0716	0859	1035	1210	1341
F.O. Diff.	Lbs/Hr.	2149	2944	3888	4152	4523
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	221	220	220	218
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.07				
API Gravity @ 60 *F.	API	11.9				
Higher Heating Value	BTU/Gal	150,024				

TEST BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-28-03
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.5	5.0	5.4
F.O. Temp. *F.	225	221	220	220	218
F.O. Temp. (Corr.)	0.9427	0.9441	0.94445	0.94445	0.94515
F.O. Usage (Lbs./Hr.)	2149.0	2944.0	3888.0	4152.0	4523.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	261.7	358.5	473.5	505.6	550.8
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	4,600	4,900	5,300
KW (Aux.)	220	230	240	230	240
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,024	150,024	150,024	150,024	150,024
HEAT RATE (APPROX.)	15,806	15,467	15,542	15,581	15,692
HEAT RATE (APPROX.)N	17,331	16,555	16,397	16,348	16,436
HEAT RATE (ACTUAL)-G	15,704	15,367	15,441	15,480	15,591
HEAT RATE (ACTUAL)-N	17,219	16,448	16,291	16,242	16,330

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 03-07-03
DATE: 02-28-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		3.5	4.6	4.9	5.3
HEAT RATE(BTU/MW)G		15,367	15,441	15,480	15,591
HEAT RATE(BTU/MW)N		16,448	16,291	16,242	16,330
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$28.7805	act.			
H.H.V. (BTU/GAL)	150,024	act.			

A, B, C CONSTANTS:

GROSS	A=	16,565.18	NET A=	19,159.08
	B=	(649.045)	B=	(1,237.720)
	C=	87.6541	C=	132.4422

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,618	15,562	15,490	15,452	15,407	15,386	15,367	15,364	15,371	15,385
HEAT RATE(BTU/MW)N	17,213	17,077	16,893	16,783	16,638	16,555	16,449	16,393	16,327	16,297
GROSS (MBTU)	31.235	34.235	38.726	41.720	46.221	49.235	53.785	56.846	61.486	64.619
NET (MBTU)	34.427	37.570	42.231	45.313	49.914	52.975	57.573	60.653	65.309	68.447
COST/KWH	$0.0713	$0.0711	$0.0708	$0.0706	$0.0704	$0.0703	$0.0702	$0.0702	$0.0702	$0.0703
G/KWH	385.87	384.49	382.73	381.77	380.67	380.14	379.69	379.60	379.79	380.13
G/PS-H	281.12	280.11	278.83	278.13	277.32	276.94	276.61	276.55	276.69	276.94

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,419	15,451	15,511	15,560	15,679	15,749	15,826	15,868
HEAT RATE(BTU/MW)N	16,271	16,267	16,282	16,304	16,381	16,436	16,501	16,537
GROSS (MBTU)	69.388	72.619	77.557	80.914	87.804	91.347	94.959	96.792
NET (MBTU)	73.221	76.457	81.408	84.782	91.735	95.327	99.004	100.877
COST/KWH	$0.0704	$0.0706	$0.0708	$0.0711	$0.0716	$0.0719	$0.0723	$0.0725
G/KWH	380.98	381.75	383.25	384.46	387.40	389.13	391.03	392.05
G/PS-H	277.55	278.12	279.20	280.09	282.23	283.49	284.88	285.62

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 01-23-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,600	3,400	4,100	4,600	5,100
BOILER-TURBINE						
Ambient Air Temp	*F.	88	88	88	90	91
Gas Entering A.H.	*F.	360	360	365	380	385
Gas Leaving A.H.	*F.	320	327	340	357	365
Air Entering A.H.	*F.	88	88	88	90	91
Air Leaving A.H.	*F.	305	305	310	310	310
Circ. Water Inlet	*F.	76.0	77.0	77.0	78.0	78.0
Circ. Water Outlet	*F.	84.0	87.0	89.0	91.5	93.4
Condenser Vacuum	Hg.	28.50	28.40	28.20	28.00	27.80
Barometric Pressure	Hg.	29.97	29.99	29.99	29.97	29.92
Excess O2	%	3.00	1.60	1.50	1.20	1.00
Feedwater Flow (X1000)	Lb/Hr	37	48	56	63	70
Steam Flow (X1000)	Lb/Hr	34	44	52	59	65
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	285	300	315	315	320
GENERATOR						
Generator Integrator, Start		7800.6	7805.1	7810.4	7816.7	7822.9
Generator Integrator, Stop		7803.2	7808.5	7814.5	7821.3	7828.0
Generator Integrator, Diff.	MWH	2.6	3.4	4.1	4.6	5.1
Generator Volts	V.	11,600	11,800	11,800	11,800	11,900
Generator Amps	A.	150	200	245	268	290
Generator VARS	MVAR	1.8	2.5	3.0	3.2	3.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8575.5	8579.7	8583.8	8587.9	8591.6
Aux. KWH Mtr. End (X100)	KWH	8578.1	8582.4	8586.5	8590.7	8594.4
Aux. Load Indicator	MW	0.26	0.27	0.27	0.28	0.28
Aux. Volts	V.					
Aux. Amps	A.	16.8	16.8	16.9	17.0	17.1
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	14179914	14183824	14188410	14193725	14199024
Start Test	Time	0655	0830	1000	1130	1250
F.O. Totalizer-End	Lbs/Hr.	14182175	14186718	14191838	14197600	14203315
End Test	Time	0755	0930	1100	1230	1350
F.O. Diff.	Lbs/Hr.	2261	2894	3428	3875	4291
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	234	232	230	229	229
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.22				
API Gravity @ 60 *F.	API	13.2				
Higher Heating Value	BTU/Gal	149,452				

TEST BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-23-03
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.6	3.4	4.1	4.6	5.1
F.O. Temp. *F.	234	232	230	229	229
F.O. Temp. (Corr.)	0.93955	0.94025	0.94095	0.9413	0.9413
F.O. Usage (Lbs./Hr.)	2261.0	2894.0	3428.0	3875.0	4291.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	275.3	352.4	417.4	471.9	522.5
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,600	3,400	4,100	4,600	5,100
KW (Aux.)	260	270	270	280	280
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,452	149,452	149,452	149,452	149,452
HEAT RATE (APPROX.)	15,990	15,651	15,374	15,490	15,471
HEAT RATE (APPROX.)N	17,767	17,001	16,458	16,494	16,370
HEAT RATE (ACTUAL)-G	15,826	15,491	15,216	15,331	15,312
HEAT RATE (ACTUAL)-N	17,585	16,827	16,289	16,325	16,202

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 01-27-03
DATE: 01-23-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		3.4	4.6	5.1
HEAT RATE(BTU/MW)G		15,491	15,331	15,312
HEAT RATE(BTU/MW)N		16,827	16,325	16,202
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$28.8636	act.		
H.H.V. (BTU/GAL)	149,452	act.		

A, B, C CONSTANTS:

GROSS	A=	16,828.42	NET A=	19,845.50
	B=	(585.731)	B=	(1,234.462)
	C=	56.5618	C=	101.9661

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,883	15,814	15,718	15,659	15,580	15,533	15,471	15,436	15,390	15,366
HEAT RATE(BTU/MW)N	17,784	17,623	17,397	17,256	17,060	16,939	16,774	16,674	16,539	16,459
GROSS (MBTU)	31.766	34.790	39.294	42.280	46.741	49.706	54.149	57.112	61.562	64.538
NET (MBTU)	35.569	38.771	43.492	46.591	51.179	54.206	58.709	61.693	66.156	69.130
COST/KWH	$0.0730	$0.0727	$0.0723	$0.0720	$0.0716	$0.0714	$0.0711	$0.0710	$0.0708	$0.0707
G/KWH	392.43	390.71	388.34	386.90	384.95	383.79	382.26	381.37	380.26	379.66
G/PS-H	285.90	284.64	282.92	281.87	280.45	279.60	278.48	277.84	277.03	276.59

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,338	15,325	15,314	15,312	15,322	15,334	15,350	15,360
HEAT RATE(BTU/MW)N	16,355	16,296	16,222	16,183	16,130	16,116	16,110	16,109
GROSS (MBTU)	69.021	72.027	76.569	79.623	85.804	88.937	92.102	93.697
NET (MBTU)	73.599	76.591	81.112	84.154	90.329	93.471	96.657	98.268
COST/KWH	$0.0705	$0.0705	$0.0704	$0.0704	$0.0705	$0.0705	$0.0706	$0.0706
G/KWH	378.96	378.64	378.37	378.32	378.57	378.86	379.27	379.51
G/PS-H	276.08	275.85	275.65	275.62	275.80	276.01	276.30	276.48

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 12-05-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	5,000	5,400
BOILER-TURBINE						
Ambient Air Temp	*F.	76	78	82	82	83
Gas Entering A.H.	*F.	330	340	370	385	388
Gas Leaving A.H.	*F.	309	326	350	360	365
Air Entering A.H.	*F.	70	70	77	79	80
Air Leaving A.H.	*F.	300	300	300	310	320
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0	71.0
Circ. Water Outlet	*F.	84.0	87.5	90.9	92.6	94.0
Condenser Vacuum	ig.	28.70	28.50	28.20	28.10	28.00
Barometric Pressure	ig.	30.11	30.13	30.12	30.08	30.06
Excess O2	%	1.76	2.10	1.40	1.00	0.90
Feedwater Flow (X1000)	Lb/Hr	36	49	61	68	72
Steam Flow (X1000)	Lb/Hr	33	46	58	64	68
Throttle Stm. Press.	PSIG	420	421	422	422	423
Feedwater to Blr.	*F.	659	699	725	735	735
GENERATOR						
Generator Integrator, Start		4467.0	4473.3	4480.3	4487.6	4493.1
Generator Integrator, Stop		4469.6	4476.8	4484.8	4492.5	4498.3
Generator Integrator, Diff.	MWH	2.6	3.5	4.5	4.9	5.2
Generator Volts	V.	11,700	11,700	11,800	11,800	11,800
Generator Amps	A.	132	209	255	279	890
Generator VARS	MVAR	1.5	2.5	3.0	3.1	2.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	6273.4	6278.1	6282.3	6286.0	6288.7
Aux. KWH Mtr. End (X100)	KWH	6275.6	6280.4	6284.7	6288.4	6291.0
Aux. Load Indicator	MW	0.22	0.23	0.24	0.24	0.23
Aux. Volts	V.					
Aux. Amps	A.	13.0	13.0	14.0	14.0	14.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	10988050	10993472	10999453	11005559	11010240
Start Test	Time	0624	0831	1022	1130	1302
F.O. Totalizer-End	Lbs/Hr.	10990233	10996470	11003255	11009726	11014623
End Test	Time	0724	0931	1122	1230	1401
F.O. Diff.	Lbs/Hr.	2183	2998	3802	4167	4383
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	229	222	220	219	219
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.48				
API Gravity @ 60 *F.	API	13.5				
Higher Heating Value	BTU/Gal	149,738				

TEST BY: J.Moku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-05-02
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	5.0	5.4
F.O. Temp. *F.	229	222	220	219	219
F.O. Temp. (Corr.)	0.9413	0.94375	0.94445	0.9448	0.9448
F.O. Usage (Lbs./Hr.)	2183.0	2998.0	3802.0	4167.0	4383.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	265.8	365.1	463.0	507.4	533.7
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,600	3,500	4,500	4,900	5,200
KW (Aux.)	220	230	240	240	230
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,738	149,738	149,738	149,738	149,738
HEAT RATE (APPROX.)	15,439	15,750	15,536	15,637	15,499
HEAT RATE (APPROX.)N	16,866	16,858	16,411	16,442	16,216
HEAT RATE (ACTUAL)-G	15,310	15,619	15,406	15,506	15,369
HEAT RATE (ACTUAL)-N	16,725	16,717	16,274	16,305	16,080

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 12-13-02
DATE: 12-05-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.5	4.5	4.9	5.2
HEAT RATE(BTU/MW)G	15,619	15,406	15,506	15,369
HEAT RATE(BTU/MW)N	16,717	16,274	16,305	16,080
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$31.5767 act.			
H.H.V. (BTU/GAL)	149,738 act.			

A, B, C CONSTANTS:

GROSS	A=	16,987.91	NET A=	18,821.89
	B=	(576.437)	B=	(777.870)
	C=	52.4479	C=	49.8906

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,045	15,974	15,875	15,814	15,731	15,680	15,613	15,573	15,521	15,492
HEAT RATE(BTU/MW)N	17,466	17,352	17,189	17,085	16,937	16,844	16,711	16,627	16,509	16,435
GROSS (MBTU)	32.090	35.142	39.687	42.697	47.192	50.177	54.645	57.620	62.085	65.067
NET (MBTU)	34.931	38.175	42.973	46.130	50.812	53.899	58.487	61.519	66.035	69.027
COST/KWH	$0.0806	$0.0802	$0.0797	$0.0794	$0.0790	$0.0787	$0.0784	$0.0782	$0.0779	$0.0778
G/KWH	396.43	394.67	392.22	390.72	388.66	387.42	385.75	384.77	383.49	382.77
G/PS-H	288.81	287.52	285.74	284.65	283.15	282.25	281.03	280.32	279.38	278.86

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,456	15,437	15,417	15,409	15,405	15,409	15,417	15,423
HEAT RATE(BTU/MW)N	16,332	16,268	16,180	16,126	16,030	15,989	15,951	15,933
GROSS (MBTU)	69.552	72.555	77.085	80.125	86.266	89.372	92.504	94.082
NET (MBTU)	73.493	76.460	80.899	83.855	89.770	92.734	95.704	97.193
COST/KWH	$0.0776	$0.0775	$0.0774	$0.0774	$0.0773	$0.0774	$0.0774	$0.0774
G/KWH	381.88	381.41	380.91	380.71	380.61	380.72	380.92	381.07
G/PS-H	278.21	277.87	277.50	277.36	277.28	277.36	277.51	277.62

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 07-29-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	5,100	5,600
BOILER-TURBINE						
Ambient Air Temp	*F.	82	83	84	87	89
Gas Entering A.H.	*F.	350	350	358	365	380
Gas Leaving A.H.	*F.	305	315	330	355	365
Air Entering A.H.	*F.	82	83	84	87	89
Air Leaving A.H.	*F.	315	318	318	318	318
Circ. Water Inlet	*F.	75.0	76.0	76.0	76.0	76.0
Circ. Water Outlet	*F.	83.1	84.9	88.3	91.7	93.5
Condenser Vacuum	ig.	28.70	28.70	28.50	28.30	28.10
Barometric Pressure	ig.	30.02	30.04	30.05	30.03	30.01
Excess O2	%	2.36	1.86	1.22	1.09	0.99
Feedwater Flow (X1000)	Lb/Hr	35	43	55	68	75
Steam Flow (X1000)	Lb/Hr	32	39	52	64	71
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	680	690	718	745	760
GENERATOR						
Generator Integrator, Start		4366.9	4371.1	4376.4	4383.3	4391.2
Generator Integrator, Stop		4369.4	4374.1	4380.4	4388.4	4396.8
Generator Integrator, Diff.	MWH	2.5	3.0	4.0	5.1	5.6
Generator Volts	V.	11,600	11,600	11,700	11,700	11,600
Generator Amps	A.	142	180	240	300	310
Generator VARS	MVAR	1.7	2.2	3.0	3.6	3.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	9841.3	9845.0	9848.9	9853.0	9856.9
Aux. KWH Mtr. End (X100)	KWH	9843.7	9847.5	9851.4	9855.5	9859.4
Aux. Load Indicator	MW	0.24	0.25	0.25	0.25	0.25
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.5	14.9	15.1	15.3
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	1571999	1575586	1580078	1585892	1592438
Start Test	Time	0646	0820	0955	1130	1300
F.O. Totalizer-End	Lbs/Hr.	1574137	1578175	1583475	1590134	1597105
End Test	Time	0746	0920	1055	1230	1400
F.O. Diff.	Lbs/Hr.	2138	2589	3397	4242	4667
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	270	269	254	215	210
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.44				
API Gravity @ 60 *F.	API	11				
Higher Heating Value	BTU/Gal	151,167				

TEST BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 07-29-02
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	5.1	5.6
F.O. Temp. *F.	270	269	254	215	210
F.O. Temp. (Corr.)	0.92695	0.9273	0.93255	0.9462	0.94795
F.O. Usage (Lbs./Hr.)	2138.0	2589.0	3397.0	4242.0	4667.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	260.4	315.3	413.7	516.6	568.3
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,000	4,000	5,100	5,600
KW (Aux.)	240	250	250	250	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,167	151,167	151,167	151,167	151,167
HEAT RATE (APPROX.)	15,725	15,869	15,616	15,294	15,324
HEAT RATE (APPROX.)N	17,395	17,311	16,657	16,083	16,040
HEAT RATE (ACTUAL)-G	15,743	15,886	15,633	15,311	15,341
HEAT RATE (ACTUAL)-N	17,414	17,330	16,675	16,100	16,058

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 07/31/02
DATE: 07-29-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		3.0	4.0	5.1	5.6
HEAT RATE(BTU/MW)G		15,886	15,633	15,311	15,341
HEAT RATE(BTU/MW)N		17,330	16,675	16,100	16,058
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$26.8466 act.				
H.H.V. (BTU/GAL)	151,167 act.				

A, B, C CONSTANTS:

GROSS	A=	17,395.18	NET A=	20,911.55
	B=	(644.340)	B=	(1,557.134)
	C=	48.5064	C=	122.3622

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,301	16,212	16,087	16,009	15,899	15,830	15,734	15,675	15,594	15,545
HEAT RATE(BTU/MW)N	18,287	18,078	17,783	17,599	17,341	17,182	16,961	16,825	16,641	16,530
GROSS (MBTU)	32.601	35.667	40.219	43.225	47.696	50.656	55.070	57.998	62.376	65.287
NET (MBTU)	36.573	39.772	44.459	47.518	52.024	54.981	59.362	62.254	66.563	69.426
COST/KWH	$0.0689	$0.0686	$0.0680	$0.0677	$0.0672	$0.0669	$0.0665	$0.0663	$0.0659	$0.0657
G/KWH	402.74	400.57	397.48	395.54	392.82	391.12	388.75	387.29	385.29	384.07
G/PS-H	293.41	291.82	289.57	288.16	286.18	284.94	283.22	282.15	280.69	279.80

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,478	15,438	15,386	15,356	15,308	15,290	15,275	15,270
HEAT RATE(BTU/MW)N	16,382	16,296	16,185	16,123	16,029	15,996	15,974	15,966
GROSS (MBTU)	69.651	72.560	76.931	79.852	85.725	88.681	91.652	93.145
NET (MBTU)	73.720	76.591	80.925	83.840	89.762	92.779	95.843	97.393
COST/KWH	$0.0654	$0.0653	$0.0651	$0.0649	$0.0647	$0.0647	$0.0646	$0.0646
G/KWH	382.42	381.44	380.15	379.41	378.22	377.77	377.42	377.27
G/PS-H	278.60	277.89	276.95	276.41	275.54	275.22	274.96	274.85

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 04-25-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	5,000	5,500
BOILER-TURBINE						
Ambient Air Temp	*F.	81	83	87	90	92
Gas Entering A.H.	*F.	340	350	360	395	400
Gas Leaving A.H.	*F.	308	328	337	360	368
Air Entering A.H.	*F.	81	83	87	90	92
Air Leaving A.H.	*F.	320	320	320	320	320
Circ. Water Inlet	*F.	74.0	74.0	74.0	75.0	75.0
Circ. Water Outlet	*F.	79.9	86.7	88.5	92.1	93.6
Condenser Vacuum	Ig.	28.70	28.40	28.20	27.90	27.70
Barometric Pressure	Ig.	30.10	30.11	30.12	30.12	30.11
Excess O2	%	2.60	1.44	1.54	1.45	1.41
Feedwater Flow (X1000)	Lb/Hr	33	47	53	65	71
Steam Flow (X1000)	Lb/Hr	34	47	53	66	71
Throttle Stm. Press.	PSIG	420	420	240	420	422
Feedwater to Blr.	*F.	290	303	313	322	325
GENERATOR						
Generator Integrator, Start		8209.6	8214.2	8219.4	8226.3	8234.1
Generator Integrator, Stop		8212.1	8217.8	8223.5	8231.4	8239.7
Generator Integrator, Diff.	MWH	2.5	3.6	4.1	5.1	5.6
Generator Volts	V.	11,700	11,600	11,600	11,600	11,500
Generator Amps	A.	140	182	220	265	288
Generator VARS	MVAR	1.8	1.5	2.0	2.0	1.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	5489.6	5493.4	5496.7	5500.4	5504.1
Aux. KWH Mtr. End (X100)	KWH	5491.9	5495.7	5499.0	5502.9	5506.5
Aux. Load Indicator	MW	0.23	0.24	0.24	0.24	0.24
Aux. Volts	V.					
Aux. Amps	A.	13.5	14.2	14.0	14.5	15.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	95720442	95724569	95729062	95734945	95741605
Start Test	Time	0620	0800	0925	1100	1230
F.O. Totalizer-End	Lbs/Hr.	95722647	95727632	95732534	95739272	95746280
End Test	Time	0720	0900	1025	1200	1330
F.O. Diff.	Lbs/Hr.	2205	3063	3472	4327	4675
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	240	235	234	232	234
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.72				
API Gravity @ 60 *F.	API	9.3				
Higher Heating Value	BTU/Gal	152,429	TEST BY: G.A.Graf			

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-25-02
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	5.0	5.5
F.O. Temp. *F.	240	235	234	232	234
F.O. Temp. (Corr.)	0.93745	0.9392	0.93955	0.94025	0.93955
F.O. Usage (Lbs./Hr.)	2205.0	3063.0	3472.0	4327.0	4675.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	268.5	373.0	422.8	526.9	569.3
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,600	4,100	5,100	5,600
KW (Aux.)	230	230	230	230	240
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	152,429	152,429	152,429	152,429	152,429
HEAT RATE (APPROX.)	16,218	15,645	15,571	15,601	15,350
HEAT RATE (APPROX.)N	17,861	16,713	16,497	16,405	16,038
HEAT RATE (ACTUAL)-G	16,371	15,793	15,719	15,748	15,496
HEAT RATE (ACTUAL)-N	18,030	16,871	16,653	16,560	16,190

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 04-30.02
DATE: 04-25-02 — Tested by: E.Wong/S.Oshiro

DATA:

GENERATED (MW)	2.5	3.6	4.1	5.1	5.6
HEAT RATE(BTU/MW)G	16,371	15,793	15,719	15,748	15,496
HEAT RATE(BTU/MW)N	18,030	16,871	16,653	16,560	16,190
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$20.1779	act.			
H.H.V. (BTU/GAL)	152,429	act.			

A, B, C CONSTANTS:

GROSS	A=	18,240.00	NET A=	21,991.69
	B=	(991.603)	B=	(2,077.510)
	C=	92.6374	C=	190.2221

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,627	16,507	16,340	16,238	16,099	16,015	15,904	15,839	15,756	15,709
HEAT RATE(BTU/MW)N	18,598	18,342	17,987	17,769	17,471	17,292	17,051	16,909	16,725	16,622
GROSS (MBTU)	33.255	36.315	40.850	43.843	48.297	51.250	55.665	58.605	63.023	65.979
NET (MBTU)	37.195	40.352	44.967	47.977	52.413	55.333	59.677	62.563	66.901	69.811
COST/KWH	$0.0524	$0.0520	$0.0515	$0.0512	$0.0507	$0.0505	$0.0501	$0.0499	$0.0497	$0.0495
G/KWH	410.82	407.84	403.72	401.20	397.76	395.70	392.95	391.35	389.29	388.14
G/PS-H	299.29	297.12	294.12	292.28	289.78	288.28	286.28	285.11	283.60	282.77

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,654	15,626	15,598	15,589	15,592	15,605	15,625	15,638
HEAT RATE(BTU/MW)N	16,495	16,429	16,360	16,332	16,323	16,341	16,375	16,397
GROSS (MBTU)	70.442	73.441	77.990	81.061	87.316	90.509	93.752	95.393
NET (MBTU)	74.227	77.218	81.798	84.928	91.409	94.779	98.248	100.022
COST/KWH	$0.0493	$0.0492	$0.0492	$0.0491	$0.0491	$0.0492	$0.0492	$0.0493
G/KWH	386.76	386.07	385.39	385.15	385.24	385.56	386.06	386.38
G/PS-H	281.77	281.26	280.76	280.59	280.66	280.89	281.26	281.49

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 02-04-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,200	3,700	4,100	4,500	5,000
BOILER-TURBINE						
Ambient Air Temp	*F.	86	88	90	92	92
Gas Entering A.H.	*F.	320	340	360	370	380
Gas Leaving A.H.	*F.	300	310	320	325	333
Air Entering A.H.	*F.	86	88	90	92	92
Air Leaving A.H.	*F.	320	320	325	325	325
Circ. Water Inlet	*F.	74.0	74.0	74.0	75.0	75.0
Circ. Water Outlet	*F.	85.0	87.0	88.0	90.0	91.0
Condenser Vacuum	ig.	28.70	28.60	28.50	28.40	28.20
Barometric Pressure	ig.	30.22	30.22	30.21	30.21	30.20
Excess O2	%	2.30	2.00	1.70	1.40	1.40
Feedwater Flow (X1000)	Lb/Hr	43	49	54	59	66
Steam Flow (X1000)	Lb/Hr	42	47	52	57	64
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	300	310	320	320	325
GENERATOR						
Generator Integrator, Start		2023.8	2029.1	2035.3	2042.1	2049.1
Generator Integrator, Stop		2027.0	2032.8	2039.4	2046.6	2054.1
Generator Integrator, Diff.	MWH	3.2	3.7	4.1	4.5	5.0
Generator Volts	V.	11,600	11,600	11,600	11,600	11,800
Generator Amps	A.	180	220	250	260	300
Generator VARS	MVAR	2.1	2.6	3.0	3.0	3.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	1718.9	1722.5	1726.2	1730.0	1733.6
Aux. KWH Mtr. End (X100)	KWH	1721.1	1724.8	1728.6	1732.4	1736.0
Aux. Load Indicator	MW	0.21	0.23	0.24	0.24	0.24
Aux. Volts	V.					
Aux. Amps	A.	13.5	14.0	14.2	14.2	14.2
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	90229975	90234640	90239915	90245545	90251455
Start Test	Time	0715	0849	1025	1200	1330
F.O. Totalizer-End	Lbs/Hr.	90232860	90237830	90243360	90249350	90255695
End Test	Time	0815	0949	1125	1300	1430
F.O. Diff.	Lbs/Hr.	2885	3190	3445	3805	4240
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	126/247	126/245	126/245	126/245	126/245
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.87				
API Gravity @ 60 *F.	API	10.9				
Higher Heating Value	BTU/Gal	150,810				

TEST BY: Raymond R. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-04-02
KPP UNIT NO. 1

	TEST LOADS - MW				
	3.2	3.7	4.1	4.5	5.0
F.O. Temp. *F.	126/247	126/245	126/245	126/245	126/245
F.O. Temp. (Corr.)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
F.O. Usage (Lbs./Hr.)	2885.0	3190.0	3445.0	3805.0	4240.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	351.3	388.5	419.5	463.3	516.3
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,200	3,700	4,100	4,500	5,000
KW (Aux.)	220	230	240	240	240
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,810	150,810	150,810	150,810	150,810
HEAT RATE (APPROX.)	16,578	15,853	15,450	15,548	15,593
HEAT RATE (APPROX.)N	17,802	16,904	16,411	16,424	16,379
HEAT RATE (ACTUAL)-G	16,557	15,833	15,431	15,528	15,573
HEAT RATE (ACTUAL)-N	17,779	16,883	16,390	16,403	16,358

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 02-05-02
DATE: 02-04-02 — Tested by: E.Wong

DATA:

GENERATED (MW)	3.2	3.7	4.1	4.5	5.0
HEAT RATE(BTU/MW)G	16,557	15,833	15,431	15,528	15,573
HEAT RATE(BTU/MW)N	17,779	16,883	16,390	16,403	16,358
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$19.7084	act.			
H.H.V. (BTU/GAL)	150,810	act.			

A, B, C CONSTANTS:

GROSS A=	29,242.57	NET A=	32,172.67
B=	(6,176.319)	B=	(6,900.865)
C=	689.8909	C=	749.1294

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	19,649	18,994	18,114	17,596	16,923	16,543	16,077	15,835	15,576	15,472
HEAT RATE(BTU/MW)N	21,367	20,617	19,603	19,001	18,212	17,761	17,196	16,895	16,555	16,404
GROSS (MBTU)	39.299	41.786	45.284	47.509	50.768	52.937	56.268	58.589	62.302	64.981
NET (MBTU)	42.735	45.356	49.006	51.304	54.637	56.835	60.188	62.512	66.221	68.895
COST/KWH	$0.0611	$0.0591	$0.0564	$0.0547	$0.0527	$0.0515	$0.0500	$0.0493	$0.0485	$0.0481
G/KWH	485.49	469.29	447.54	434.75	418.12	408.73	397.21	391.24	384.83	382.27
G/PS-H	353.69	341.89	326.04	316.72	304.61	297.77	289.38	285.03	280.36	278.49

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,419	15,454	15,608	15,780	16,290	16,628	17,021	17,238
HEAT RATE(BTU/MW)N	16,289	16,287	16,397	16,545	17,021	17,348	17,736	17,952
GROSS (MBTU)	69.387	72.632	78.041	82.058	91.225	96.442	102.124	105.151
NET (MBTU)	73.299	76.548	81.983	86.032	95.315	100.620	106.417	109.510
COST/KWH	$0.0480	$0.0481	$0.0486	$0.0491	$0.0507	$0.0517	$0.0530	$0.0536
G/KWH	380.97	381.82	385.64	389.89	402.49	410.83	420.54	425.90
G/PS-H	277.55	278.16	280.95	284.05	293.22	299.30	306.37	310.28

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 11-26-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	5,000	5,500
BOILER-TURBINE						
Ambient Air Temp	*F.	95	97	97	102	103
Gas Entering A.H.	*F.	380	378	380	381	395
Gas Leaving A.H.	*F.	310	310	310	311	313
Air Entering A.H.	*F.	95	97	97	102	103
Air Leaving A.H.	*F.	320	324	340	355	367
Circ. Water Inlet	*F.	0.0	75.0	75.0	75.0	76.0
Circ. Water Outlet	*F.	83.0	86.4	89.5	91.4	93.4
Condenser Vacuum	ig.	25.60	28.50	28.20	28.10	28.00
Barometric Pressure	ig.	29.88	29.89	29.90	29.90	29.86
Excess O2	%	3.28	2.29	2.18	2.20	2.15
Feedwater Flow (X1000)	Lb/Hr	31	42	53	60	69
Steam Flow (X1000)	Lb/Hr	33	45	57	63	70
Throttle Stm. Press.	PSIG	410	410	410	410	412
Feedwater to Blr.	*F.	290	300	325	327	330
GENERATOR						
Generator Integrator, Start		5334.3	5338.8	5344.9	5351.1	5357.5
Generator Integrator, Stop		5336.9	5342.4	5349.5	5356.1	5363.1
Generator Integrator, Diff.	MWH	2.6	3.6	4.6	5.0	5.6
Generator Volts	V.	11,400	11,400	11,300	11,300	11,300
Generator Amps	A.	161	202	251	285	29.3
Generator VARS	MVAR	2.2	2.4	2.4	2.9	2.6
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8091.2	8095.1	8099.3	8102.9	8106.4
Aux. KWH Mtr. End (X100)	KWH	8093.6	8097.7	8102.0	8105.7	8109.1
Aux. Load Indicator	MW	0.22	0.25	0.26	0.28	0.28
Aux. Volts	V.					
Aux. Amps	A.	13.0	15.0	16.0	16.5	16.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	84617721	84621586	84626665	84631779	84637081
Start Test	Time	0600	0735	0910	1030	1145
F.O. Totalizer-End	*Lbs/Hr.*	*84619919*	*84624580*	*84630418*	*84635941*	*84641689*
End Test	Time	0700	0835	1010	1130	1245
F.O. Diff.	Lbs/Hr.	2198	2994	3753	4162	4608
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	228	225	220	220	217
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.71				
API Gravity @ 60 *F.	API	11.4				
Higher Heating Value	BTU/Gal	150,667				

TEST BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-26-01
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	5.0	5.5
F.O. Temp. *F.	228	225	220	220	217
F.O. Temp. (Corr.)	0.94165	0.9427	0.94445	0.94445	0.9455
F.O. Usage (Lbs./Hr.)	2198.0	2994.0	3753.0	4162.0	4608.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	267.7	364.6	457.0	506.8	561.1
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,600	3,600	4,600	5,000	5,600
KW (Aux.)	240	260	270	280	270
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,667	150,667	150,667	150,667	150,667
HEAT RATE (APPROX.)	15,545	15,292	15,002	15,306	15,130
HEAT RATE (APPROX.)N	17,126	16,483	15,937	16,214	15,897
HEAT RATE (ACTUAL)-G	15,510	15,259	14,969	15,272	15,097
HEAT RATE (ACTUAL)-N	17,088	16,447	15,902	16,178	15,862

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 11-27-01
DATE: 11-26-01 — Tested by: E.Wong

DATA:

GENERATED (MW)	2.6	3.6	4.6	5.0	5.6
HEAT RATE(BTU/MW)G	15,545	15,292	15,002	15,306	15,130
HEAT RATE(BTU/MW)N	17,126	16,483	15,937	16,214	15,897
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$26.3348	act.			
H.H.V. (BTU/GAL)	150,667	act.			

A, B, C CONSTANTS:

GROSS	A=	16,985.42	NET A=	19,985.46
	B=	(753.472)	B=	(1,434.988)
	C=	76.8483	C=	127.9118

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,786	15,700	15,582	15,511	15,417	15,361	15,290	15,250	15,201	15,176
HEAT RATE(BTU/MW)N	17,627	17,448	17,197	17,043	16,832	16,703	16,530	16,427	16,292	16,215
GROSS (MBTU)	31.572	34.539	38.955	41.880	46.250	49.156	53.514	56.424	60.804	63.741
NET (MBTU)	35.254	38.385	42.994	46.017	50.495	53.451	57.855	60.780	65.168	68.102
COST/KWH	$0.0657	$0.0653	$0.0648	$0.0646	$0.0642	$0.0639	$0.0636	$0.0635	$0.0633	$0.0632
G/KWH	390.03	387.90	384.99	383.24	380.91	379.54	377.77	376.78	375.58	374.97
G/PS-H	284.15	282.60	280.48	279.20	277.50	276.50	275.21	274.49	273.62	273.18

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,151	15,142	15,139	15,145	15,176	15,200	15,231	15,249
HEAT RATE(BTU/MW)N	16,118	16,067	16,008	15,982	15,961	15,965	15,980	15,992
GROSS (MBTU)	68.179	71.166	75.696	78.756	84.985	88.163	91.387	93.018
NET (MBTU)	72.532	75.513	80.042	83.108	89.381	92.600	95.882	97.549
COST/KWH	$0.0631	$0.0630	$0.0630	$0.0630	$0.0632	$0.0633	$0.0634	$0.0635
G/KWH	374.34	374.11	374.05	374.20	374.96	375.56	376.32	376.76
G/PS-H	272.72	272.55	272.51	272.62	273.17	273.61	274.16	274.48

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 09-06-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	4,500	5,000
BOILER-TURBINE						
Ambient Air Temp	*F.	102	102	103	102	101
Gas Entering A.H.	*F.	350	375	390	400	415
Gas Leaving A.H.	*F.	315	332	340	355	367
Air Entering A.H.	*F.	86	87	88	88	89
Air Leaving A.H.	*F.	319	319	320	321	330
Circ. Water Inlet	*F.	73.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	83.0	87.0	88.0	90.0	92.0
Condenser Vacuum	ig.	28.80	28.50	28.40	28.30	28.10
Barometric Pressure	ig.	30.08	30.09	30.10	30.08	30.05
Excess O2	%	2.50	1.00	0.95	0.80	0.60
Feedwater Flow (X1000)	Lb/Hr	36	50	55	62	68
Steam Flow (X1000)	Lb/Hr	31	44	50	56	62
Throttle Stm. Press.	PSIG	88	131	150	175	195
Feedwater to Blr.	*F.	690	730	750	755	760
GENERATOR						
Generator Integrator, Start		2351.9	2356.6	2362.4	2370.2	2376.6
Generator Integrator, Stop		2354.4	2360.1	2366.4	2374.8	2381.6
Generator Integrator, Diff.	MWH	2.5	3.5	4.0	4.6	5.0
Generator Volts	V.	11,700	11,700	11,700	11,800	11,800
Generator Amps	A.	143	199	238	271	280
Generator VARS	MVAR	1.8	2.1	2.8	3.2	3.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	5920.7	5925.1	5929.3	5934.2	5937.9
Aux. KWH Mtr. End (X100)	KWH	5923.3	5927.7	5931.9	5936.8	5940.6
Aux. Load Indicator	MW	2.50	2.50	2.50	2.50	2.50
Aux. Volts	V.					
Aux. Amps	A.	16.0	16.0	16.0	16.1	16.4
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	82004234	82008250	82013199	82019693	82025097
Start Test	Time	0601	0740	0915	1105	1228
F.O. Totalizer-End	Lbs/Hr.	82006369	82011245	82016515	82023520	82029306
End Test	Time	0701	0840	1015	1205	1328
F.O. Diff.	Lbs/Hr.	2135	2995	3316	3827	4209
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	232	231	230	230	228
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.83				
API Gravity @ 60 *F.	API	14.9				
Higher Heating Value	BTU/Gal	148,714				

TEST BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-06-01
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.5	4.0	4.5	5.0
F.O. Temp. *F.	232	231	230	230	228
F.O. Temp. (Corr.)	0.94025	0.9406	0.94095	0.94095	0.94165
F.O. Usage (Lbs./Hr.)	2135.0	2995.0	3316.0	3827.0	4209.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	260.0	364.7	403.8	466.0	512.5
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	4,000	4,600	5,000
KW (Aux.)	260	260	260	260	270
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,714	148,714	148,714	148,714	148,714
HEAT RATE (APPROX.)	15,703	15,735	15,243	15,298	15,479
HEAT RATE (APPROX.)N	17,526	16,997	16,303	16,214	16,362
HEAT RATE (ACTUAL)-G	15,465	15,496	15,013	15,066	15,244
HEAT RATE (ACTUAL)-N	17,261	16,740	16,056	15,969	16,115

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 09-10-01
DATE: 09-06-01 — Tested by: E.Wong

DATA:

GENERATED (MW)	2.5	3.5	4.0	4.6	5.0
HEAT RATE(BTU/MW)G	15,465	15,496	15,013	15,066	15,244
HEAT RATE(BTU/MW)N	17,261	16,740	16,056	15,969	16,115
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.4008	act.			
H.H.V. (BTU/GAL)	148,714	act.			

A, B, C CONSTANTS:

GROSS	A=	16,759.54	NET A=	21,066.64
	B=	(673.027)	B=	(1,992.664)
	C=	70.4053	C=	196.6692

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,695	15,620	15,517	15,456	15,374	15,327	15,266	15,233	15,194	15,175
HEAT RATE(BTU/MW)N	17,868	17,635	17,314	17,120	16,859	16,704	16,502	16,386	16,243	16,167
GROSS (MBTU)	31.390	34.363	38.793	41.730	46.122	49.046	53.432	56.363	60.776	63.734
NET (MBTU)	35.736	38.796	43.285	46.224	50.576	53.453	57.755	60.629	64.971	67.900
COST/KWH	$0.0638	$0.0635	$0.0631	$0.0629	$0.0625	$0.0623	$0.0621	$0.0619	$0.0618	$0.0617
G/KWH	387.79	385.92	383.39	381.87	379.86	378.69	377.19	376.37	375.40	374.93
G/PS-H	282.51	281.15	279.31	278.20	276.73	275.88	274.80	274.20	273.49	273.15

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,157	15,152	15,155	15,164	15,198	15,224	15,256	15,274
HEAT RATE(BTU/MW)N	16,082	16,046	16,020	16,023	16,075	16,125	16,191	16,229
GROSS (MBTU)	68.205	71.212	75.773	78.851	85.112	88.302	91.536	93.171
NET (MBTU)	72.370	75.414	80.100	83.318	90.022	93.526	97.145	99.000
COST/KWH	$0.0616	$0.0616	$0.0616	$0.0617	$0.0618	$0.0619	$0.0620	$0.0621
G/KWH	374.48	374.36	374.43	374.65	375.52	376.16	376.94	377.38
G/PS-H	272.82	272.73	272.78	272.94	273.57	274.04	274.61	274.93

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 06-15-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,600	4,000	4,500	5,000
BOILER-TURBINE						
Ambient Air Temp	*F.	85	85	87	87	88
Gas Entering A.H.	*F.	370	375	378	385	400
Gas Leaving A.H.	*F.	337	334	345	360	371
Air Entering A.H.	*F.	85	85	87	87	88
Air Leaving A.H.	*F.	325	325	330	332	339
Circ. Water Inlet	*F.					
Circ. Water Outlet	*F.	82.4	85.1	86.3	87.5	89.1
Condenser Vacuum	ig.	28.20	27.80	27.30	27.00	26.70
Barometric Pressure	ig.	30.09	30.10	30.10	30.10	30.10
Excess O2	%	2.95	2.10	2.05	1.86	1.60
Feedwater Flow (X1000)	Lb/Hr	39	52	50	64	71
Steam Flow (X1000)	Lb/Hr	35	47	58	60	67
Throttle Stm. Press.	PSIG	400	400	400	400	400
Feedwater to Blr.	*F.	262	300	310	312	318
GENERATOR						
Generator Integrator, Start		5143.2	5147.7	5153.0	5158.0	5163.6
Generator Integrator, Stop		5145.8	5151.2	5157.1	5162.6	5168.6
Generator Integrator, Diff.	MWH	2.6	3.5	4.1	4.6	5.0
Generator Volts	V.	11,300	11,400	11,300	11,400	11,500
Generator Amps	A.	153	210	245	280	295
Generator VARS	MVAR	1.8	2.5	3.0	3.5	3.2
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	1297.7	1302.2	1306.5	1310.2	1313.9
Aux. KWH Mtr. End (X100)	KWH	1299.4	1305.4	1309.6	1313.2	1317.0
Aux. Load Indicator	MW	0.30	0.29	0.29	0.30	0.30
Aux. Volts	V.					
Aux. Amps	A.	17.0	16.0	16.0	17.0	18.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	75666752	75671052	75675971	75680574	75685565
Start Test	Time	0731	0904	1031	1144	1256
F.O. Totalizer-End	Lbs/Hr.	75669350	75674339	75679689	75684655	75690056
End Test	Time	0831	1004	1131	1244	1356
F.O. Diff.	Lbs/Hr.	2598	3287	3718	4081	4491
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	227	226	225	225	224
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.59				
API Gravity @ 60 *F.	API	11.4				
Higher Heating Value	BTU/Gal	149,833				

TEST BY: Glen A. Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-15-01
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.5	3.6	4.0	4.5	5.0
F.O. Temp. *F.	227	226	225	225	224
F.O. Temp. (Corr.)	0.942	0.94235	0.9427	0.9427	0.94305
F.O. Usage (Lbs./Hr.)	2598.0	3287.0	3718.0	4081.0	4491.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	316.4	400.3	452.8	497.0	546.9
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,600	3,500	4,100	4,600	5,000
KW (Aux.)	170	320	310	300	310
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,833	149,833	149,833	149,833	149,833
HEAT RATE (APPROX.)	18,374	17,269	16,675	16,313	16,516
HEAT RATE (APPROX.)N	19,659	19,006	18,038	17,451	17,608
HEAT RATE (ACTUAL)-G	18,232	17,135	16,546	16,187	16,388
HEAT RATE (ACTUAL)-N	19,507	18,860	17,899	17,316	17,471

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 06-20-01
DATE: 06-15-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	2.6	3.5	4.1	4.6	5.0
HEAT RATE(BTU/MW)G	18,232	17,135	16,546	16,187	16,388
HEAT RATE(BTU/MW)N	19,507	18,860	17,899	17,316	17,471
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.2211	act.			
H.H.V. (BTU/GAL)	149,833	act.			

A, B, C CONSTANTS:

GROSS	A=	25,049.35	NET	A= 23,390.65
	B=	(3,540.897)		B= (1,721.532)
	C=	358.0257		C= 99.8615

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	19,400	18,992	18,435	18,099	17,649	17,385	17,042	16,849	16,614	16,493
HEAT RATE(BTU/MW)N	20,347	20,087	19,711	19,471	19,125	18,904	18,589	18,388	18,102	17,922
GROSS (MBTU)	*38.799*	*41.783*	*46.087*	*48.867*	*52.947*	*55.631*	*59.647*	*62.343*	*66.457*	*69.271*
NET (MBTU)	40.694	44.191	49.277	52.570	57.374	60.494	65.060	68.036	72.409	75.271
COST/KWH	$0.0777	$0.0761	$0.0739	$0.0725	$0.0707	$0.0697	$0.0683	$0.0675	$0.0666	$0.0661
G/KWH	479.32	469.25	455.48	447.18	436.06	429.53	421.07	416.31	410.49	407.50
G/PS-H	349.19	341.86	331.83	325.78	317.68	312.92	306.76	303.29	299.06	296.88

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	16,365	16,316	16,296	16,318	16,448	16,556	16,693	16,772
HEAT RATE(BTU/MW)N	17,666	17,505	17,280	17,139	16,882	16,765	16,656	16,605
GROSS (MBTU)	73.644	76.685	81.478	84.852	92.109	96.026	100.157	102.309
NET (MBTU)	79.497	82.275	86.398	89.123	94.538	97.238	99.939	101.291
COST/KWH	*$0.0656*	*$0.0654*	*$0.0653*	*$0.0654*	*$0.0659*	*$0.0664*	*$0.0669*	*$0.0672*
G/KWH	404.35	403.12	402.62	403.17	406.39	409.06	412.44	414.39
G/PS-H	294.58	293.69	293.32	293.72	296.06	298.01	300.47	301.90

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 1
DATE: 01-05-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,400	3,500	4,100	4,600	5,100
BOILER-TURBINE						
Ambient Air Temp	*F.	86	89	91	95	94
Gas Entering A.H.	*F.	378	378	380	382	385
Gas Leaving A.H.	*F.	310	325	340	352	362
Air Entering A.H.	*F.	86	89	91	95	94
Air Leaving A.H.	*F.	338	335	335	338	340
Circ. Water Inlet	*F.	72.0	72.0	72.0	73.0	73.0
Circ. Water Outlet	*F.	82.0	85.0	87.0	89.0	90.0
Condenser Vacuum	ig.	28.50	28.20	28.00	27.70	27.50
Barometric Pressure	ig.	30.09	30.10	30.10	30.09	30.05
Excess O2	%	3.60	2.50	2.10	2.00	1.90
Feedwater Flow (X1000)	Lb/Hr	35	49	56	64	70.5
Steam Flow (X1000)	Lb/Hr	32	46	53	60	66
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	692	730	730	740	755
GENERATOR						
Generator Integrator, Start		6491.7	6496.3	6504.6	6511.0	6516.9
Generator Integrator, Stop		6494.1	6499.9	6508.7	6515.6	6522.0
Generator Integrator, Diff.	MWH	2.4	3.6	4.1	4.6	5.1
Generator Volts	V.	11,400	11,400	11,500	11,400	11,400
Generator Amps	A.	139	192	250	268	282
Generator VARS	MVAR	1.5	2.0	3.0	3.0	3.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	695.2	699.4	704.9	708.8	712.1
Aux. KWH Mtr. End (X100)	KWH	697.7	701.9	707.5	711.4	714.7
Aux. Load Indicator	MW	0.26	0.26	0.26	0.26	0.26
Aux. Volts	V.					
Aux. Amps	A.	15.5	15.5	15.8	16.0	16.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	59830428	59834355	59841262	59846620	59851570
Start Test	Time	0630	0810	1020	1150	1305
F.O. Totalizer-End	Lbs/Hr.	59832501	59837360	59844715	59850490	59855855
End Test	Time	0730	0910	1120	1250	1405
F.O. Diff.	Lbs/Hr.	2073	3005	3453	3870	4285
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	0	0	0	0
Supplying Sth Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	131	130	128	128	127
F.O. Temp. @ Burner Deck	*F	222	220	218	218	218
Sulfur, Wt. %		1.87				
API Gravity @ 60 *F.	API	11.6				
Higher Heating Value	BTU/Gal	150,143				

TEST BY: Raymond J. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-05-01
KPP UNIT NO. 1

	TEST LOADS - MW				
	2.4	3.5	4.1	4.6	5.1
F.O. Temp. *F.	131	130	128	128	127
F.O. Temp. (Corr.)	0.9756	0.97595	0.97665	0.97665	0.977
F.O. Usage (Lbs./Hr.)	2073.0	3005.0	3453.0	3870.0	4285.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	252.4	365.9	420.5	471.3	521.8
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,600	4,100	4,600	5,100
KW (Aux.)	250	250	260	260	260
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,143	150,143	150,143	150,143	150,143
HEAT RATE (APPROX.)	15,882	15,349	15,486	15,470	15,449
HEAT RATE (APPROX.)N	17,729	16,494	16,535	16,396	16,279
HEAT RATE (ACTUAL)-G	15,792	15,262	15,398	15,382	15,362
HEAT RATE (ACTUAL)-N	17,629	16,400	16,441	16,303	16,187

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 1 — Fuel Oil Tested: 01-08-01
DATE: 01-05-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	2.4	3.6	4.1	4.6	5.1
HEAT RATE(BTU/MW)G	15,792	15,262	15,398	15,382	15,362
HEAT RATE(BTU/MW)N	17,629	16,400	16,441	16,303	16,187
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.6781	act.			
H.H.V. (BTU/GAL)	150,143	act.			

A, B, C CONSTANTS:

GROSS A=	17,719.48	NET A=	21,840.35	
B=	(1,130.167)	B=	(2,363.614)	
C=	132.7121	C=	248.5812	

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,990	15,875	15,724	15,635	15,523	15,462	15,390	15,355	15,322	15,314
HEAT RATE(BTU/MW)N	18,107	17,844	17,485	17,271	16,987	16,822	16,613	16,498	16,363	16,298
GROSS (MBTU)	31.980	34.926	39.309	42.216	46.570	49.478	53.864	56.812	61.289	64.318
NET (MBTU)	36.215	39.256	43.712	46.631	50.960	53.831	58.145	61.043	65.453	68.452
COST/KWH	$0.0803	$0.0798	$0.0790	$0.0785	$0.0780	$0.0777	$0.0773	$0.0771	$0.0770	$0.0769
G/KWH	395.07	392.24	388.49	386.31	383.54	382.02	380.24	379.38	378.57	378.37
G/PS-H	287.82	285.76	283.02	281.44	279.42	278.31	277.01	276.38	275.80	275.65

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,321	15,339	15,386	15,431	15,552	15,629	15,716	15,764
HEAT RATE(BTU/MW)N	16,238	16,223	16,237	16,271	16,400	16,494	16,608	16,672
GROSS (MBTU)	68.945	72.095	76.932	80.242	87.093	90.648	94.297	96.158
NET (MBTU)	73.070	76.246	81.184	84.610	91.838	95.663	99.646	101.699
COST/KWH	$0.0770	$0.0771	$0.0773	$0.0775	$0.0781	$0.0785	$0.0789	$0.0792
G/KWH	378.55	379.00	380.16	381.26	384.26	386.15	388.31	389.48
G/PS-H	275.78	276.11	276.96	277.76	279.94	281.32	282.89	283.75

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 08-01-06

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	4,000	5,100	5,700	
BOILER-TURBINE						
Ambient Air Temp	*F.	83	84	86	90	
Gas Entering A.H.	*F.	500	535	570	600	
Gas Leaving A.H.	*F.	340	360	390	410	
Air Entering A.H.	*F.	83	84	86	90	
Air Leaving A.H.	*F.	363	365	385	405	
Circ. Water Inlet	*F.	74.0	74.0	74.0	74.0	
Circ. Water Outlet	*F.	81.5	83.9	87.1	89.0	
Condenser Vacuum	Hg.	29	28.80	28.60	28.40	
Barometric Pressure	Hg.	30.31	30.33	30.34	30.33	
Excess O2	%	0.91	0.65	0.00	0.00	
Feedwater Flow (X1000)	Lb/Hr	35	46	60	69	
Steam Flow (X1000)	Lb/Hr	37	49	64	73	
Throttle Stm. Press.	PSIG	389	389	389	390	
Feedwater to Blr.	*F.	315	330	345	355	
GENERATOR						
Generator Integrator, Start		5139.5	5144.4	5152.7	5161.6	
Generator Integrator, Stop		5142.5	5148.4	5157.8	5167.3	
Generator Integrator, Diff.	MWH	3.0	4.0	5.1	5.7	0.0
Generator Volts	V.	11,500	11,500	11,500	11,500	
Generator Amps	A.	214	235	246	239	
Generator VARS	MVAR	1.8	2.3	2.3	1.8	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	6178.6	6181.9	6186.3	6190.2	
Aux. KWH Mtr. End (X100)	KWH	6180.8	6184.2	6188.6	6192.7	
Aux. Load Indicator	MW	0.22	0.23	0.23	0.25	0.00
Aux. Volts	V.	N/A	N/A	N/A	N/A	
Aux. Amps	A.	13.5	13.8	14.0	14.3	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	40086468.0	40090492.0	40097372.0	40104880.0	
Start Test	Time	0605	0736	0929	1110	
F.O. Totalizer-End	Lbs/Hr.	40088908.0	40093752.0	40101684.0	40109740.0	
End Test	Time	0705	0836	1029	1210	
F.O. Diff.	Lbs/Hr.	2440	3260	4312	4860	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS		LO-1 Pump Off				
F.O. Temp. @ Heater	*F	218	222	223	223	
F.O. Temp. @ Burner Deck	*F	232	224	227	227	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.3				
Higher Heating Value	BTU/Gal	149,310	TEST BY:			

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-01-06
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	4.0	5.1	5.7	0.0
F.O. Temp. *F.	218	222	223	223	0
F.O. Temp. (Corr.)	0.94515	0.94375	0.9434	0.9434	1.02145
F.O. Usage (Lbs./Hr.)	2440.0	3260.0	4312.0	4860.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	297.1	397.0	525.1	591.8	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	4,000	5,100	5,700	0
KW (Aux.)	220	230	230	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,310	149,310	149,310	149,310	149,310
HEAT RATE (APPROX.)	14,955	14,986	15,547	15,678	#DIV/0!
HEAT RATE (APPROX.)N	16,139	15,900	16,281	16,397	#DIV/0!
HEAT RATE (ACTUAL)-G	14,788	14,818	15,373	15,502	#DIV/0!
HEAT RATE (ACTUAL)-N	15,958	15,722	16,099	16,214	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 08-03-06
DATE: 08-01-06 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.0	4.0	5.1	5.7
HEAT RATE(BTU/MW)G	14,788	14,818	15,373	15,502
HEAT RATE(BTU/MW)N	15,958	15,722	16,099	16,214
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$57.0714	act.		
H.H.V. (BTU/GAL)	149,310	act.		

A, B, C CONSTANTS:

GROSS	A=	15,458.58	NET A=	18,176.31
	B=	(509.881)	B=	(1,205.389)
	C=	92.4880	C=	152.6141

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	14,809	14,784	14,762	14,756	14,761	14,774	14,807	14,838	14,899	14,949
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	16,376	16,263	16,117	16,034	15,934	15,882	15,827	15,806	15,797	15,806
GROSS (MBTU)	29.618	32.526	36.905	39.842	44.284	47.277	51.824	54.901	59.595	62.784
NET (MBTU)	29.149	32.201	36.746	39.765	44.296	47.328	51.912	55.004	59.553	62.749
COST/KWH	$0.1348	$0.1346	$0.1343	$0.1343	$0.1343	$0.1345	$0.1348	$0.1350	$0.1356	$0.1360
G/KWH	365.89	365.29	364.73	364.59	364.71	365.03	365.84	366.61	368.11	369.34
G/PS-H	266.56	266.12	265.71	265.61	265.70	265.93	266.53	267.09	268.18	269.07

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,037	15,105	15,221	15,308	15,504	15,613	15,729	15,790
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	15,842	15,882	15,965	16,035	16,212	16,319	16,438	16,502
GROSS (MBTU)	67.666	70.994	76.107	79.602	86.821	90.553	94.373	96.318
NET (MBTU)	67.647	70.994	76.152	79.694	87.059	90.570	94.519	96.538
COST/KWH	$0.1368	$0.1375	$0.1385	$0.1393	$0.1411	$0.1421	$0.1431	$0.1437
G/KWH	371.53	373.21	376.08	378.22	383.06	385.75	388.62	390.13
G/PS-H	270.67	271.89	273.98	275.55	279.07	281.03	283.12	284.22

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 05-04-06

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,400	4,000	4,600	5,400	
BOILER-TURBINE						
Ambient Air Temp	*F.	86.57	88.4	91.1	94.1	
Gas Entering A.H.	*F.	495	520	545	570	
Gas Leaving A.H.	*F.	285	313	332	350	
Air Entering A.H.	*F.	82	84	85	88	
Air Leaving A.H.	*F.	410	420	430	440	
Circ. Water Inlet	*F.	73.0	73.0	73.0	74.0	
Circ. Water Outlet	*F.	80.0	84.4	86.1	88.3	
Condenser Vacuum	Hg.	29.1	28.80	28.80	28.60	
Barometric Pressure	Hg.	30.36	30.37	30.37	30.35	
Excess O2	%	2.02	0.98	0.76	0.82	
Feedwater Flow (X1000)	Lb/Hr	28	47	55	64	
Steam Flow (X1000)	Lb/Hr	30	50	57	67	
Throttle Stm. Press.	PSIG	388	388	388	388	
Feedwater to Blr.	*F.	305	330	340	347	
GENERATOR						
Generator Integrator, Start		7880.2	7887.4	7894.6	7902.1	
Generator Integrator, Stop		7882.6	7891.5	7899.2	7907.5	
Generator Integrator, Diff.	MWH	2.4	4.1	4.6	5.4	0.0
Generator Volts	V.	11,500	11,500	11,500	11,500	
Generator Amps	A.	157	239	245	240	
Generator VARS	MVAR	2.0	2.5	2.5	2.1	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	1765.9	1771.1	1775.0	1778.6	
Aux. KWH Mtr. End (X100)	KWH	1768.1	1773.4	1777.3	1781.0	
Aux. Load Indicator	MW	0.22	0.23	0.23	0.24	0.00
Aux. Volts	V.	N/A	N/A	N/A	N/A	
Aux. Amps	A.	13.8	14.0	14.1	14.2	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	34091784.0	34097816.0	34103656.0	34109828.0	
Start Test	Time	0651	0910	1050	1223	
F.O. Totalizer-End	Lbs/Hr.	34093816.0	34101144.0	34107396.0	34114212.0	
End Test	Time	0751	1010	1150	1300.00	
F.O. Diff.	Lbs/Hr.	2032	3328	3740	4384	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS		LO-1 Pump Off				
F.O. Temp. @ Heater	*F	250	224	230	227	
F.O. Temp. @ Burner Deck	*F	240	232	232	232	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.1				
Higher Heating Value	BTU/Gal	146,714				

TEST BY: Craig Amaral,Paulette Stierman

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-04-06
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.4	4.0	4.6	5.4	0.0
F.O. Temp. *F.	250	224	230	227	0
F.O. Temp. (Corr.)	0.93395	0.94305	0.94095	0.942	1.02145
F.O. Usage (Lbs./Hr.)	2032.0	3328.0	3740.0	4384.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	247.4	405.3	455.4	533.9	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	4,100	4,600	5,400	0
KW (Aux.)	220	230	230	240	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	146,714	146,714	146,714	146,714	146,714
HEAT RATE (APPROX.)	15,568	14,925	14,950	14,928	#DIV/0!
HEAT RATE (APPROX.)N	17,139	15,812	15,737	15,622	#DIV/0!
HEAT RATE (ACTUAL)-G	15,126	14,502	14,526	14,504	#DIV/0!
HEAT RATE (ACTUAL)-N	16,653	15,364	15,290	15,179	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 05-10-06
DATE: 05-04-06 — Tested by: rh

DATA:

GENERATED (MW)	2.4	4.1	4.6	5.4
HEAT RATE(BTU/MW)G	15,126	14,502	14,526	14,504
HEAT RATE(BTU/MW)N	16,653	15,364	15,290	15,179
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$57.0714	act.		
H.H.V. (BTU/GAL)	146,714	act.		

A, B, C CONSTANTS:

GROSS	A=	17,039.46	NET A=	20,295.31
	B=	(1,063.444)	B=	(1,978.484)
	C=	110.4040	C=	191.3790

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,354	15,234	15,071	14,973	14,843	14,767	14,670	14,616	14,552	14,521
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	17,104	16,869	16,545	16,349	16,082	15,924	15,715	15,595	15,443	15,362
GROSS (MBTU)	30.708	33.515	37.677	40.427	44.528	47.254	51.344	54.080	58.209	60.986
NET (MBTU)	30.445	33.400	37.723	40.544	44.709	47.453	51.545	54.270	58.376	60.986
COST/KWH	$0.1422	$0.1411	$0.1396	$0.1387	$0.1375	$0.1368	$0.1359	$0.1354	$0.1348	$0.1345
G/KWH	379.36	376.40	372.36	369.95	366.73	364.85	362.45	361.13	359.55	358.77
G/PS-H	276.38	274.22	271.28	269.51	267.17	265.81	264.06	263.09	261.94	261.37

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,490	14,480	14,482	14,495	14,546	14,585	14,633	14,661
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	15,268	15,224	15,187	15,182	15,217	15,258	15,314	15,348
GROSS (MBTU)	65.203	68.056	72.412	75.373	81.460	84.596	87.800	89.430
NET (MBTU)	65.192	68.051	72.444	75.455	81.566	84.835	88.209	89.938
COST/KWH	$0.1342	$0.1341	$0.1341	$0.1342	$0.1347	$0.1351	$0.1355	$0.1358
G/KWH	358.00	357.77	357.82	358.13	359.41	360.37	361.55	362.23
G/PS-H	260.81	260.64	260.68	260.91	261.84	262.54	263.40	263.89

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 02-13-06

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,400	4,000	5,000	
BOILER-TURBINE						
Ambient Air Temp	*F.	85.6	85.2	87.6	87.7	
Gas Entering A.H.	*F.	480	490	510	530	
Gas Leaving A.H.	*F.	290	300	315	330	
Air Entering A.H.	*F.	81	84	84	86	
Air Leaving A.H.	*F.	410	410	420	430	
Circ. Water Inlet	*F.	73.0	74.0	74.0	74.0	
Circ. Water Outlet	*F.	88.8	88.8	88.8	88.7	
Condenser Vacuum	Hg.	29.1	29.10	29.00	28.90	
Barometric Pressure	Hg.	30.41	30.43	30.43	30.39	
Excess O2	%	1.19	0.87	1.18	0.83	
Feedwater Flow (X1000)	Lb/Hr	34	40	47	52	
Steam Flow (X1000)	Lb/Hr	37	43	50	56	
Throttle Stm. Press.	PSIG	388	388	388	388	
Feedwater to Blr.	*F.	720	740	750	760	
GENERATOR						
Generator Integrator, Start		3631.7	3637.5	3643.5	3649.8	
Generator Integrator, Stop		3634.7	3641.0	3647.5	3654.3	
Generator Integrator, Diff.	MWH	3.0	3.5	4.0	4.5	0.0
Generator Volts	V.	11,800	11,800	11,800	11,800	
Generator Amps	A.	160	188	215	220	
Generator VARS	MVAR	1.5	1.7	2.0	2.0	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	8988.1	8992.3	8996.1	8999.6	
Aux. KWH Mtr. End (X100)	KWH	8990.4	8994.6	8998.4	9001.9	
Aux. Load Indicator	MW	0.23	0.23	0.23	0.23	0.00
Aux. Volts	V.	N/A	N/A	N/A	N/A	
Aux. Amps	A.	14.0	14.0	14.0	14.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	30552016.0	30556650.0	30561452.0	30566556.0	
Start Test	Time	0701	0850	1028	1200	
F.O. Totalizer-End	Lbs/Hr.	30554428.0	30559452.0	30564668.0	30570182.0	
End Test	Time	0801	0950	1128	1300.00	
F.O. biff.	Lbs/Hr.	2412	2802	3216	3626	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS		LO-1 Pump Off				
F.O. Temp. @ Heater	*F	230	235	238	223	
F.O. Temp. @ Burner Deck	*F	232	232	233	228	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	16.9				
Higher Heating Value	BTU/Gal	141,881	TEST BY: Paulette Stierman			

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-13-06
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.4	4.0	5.0	0.0
F.O. Temp. *F.	230	235	238	223	0
F.O. Temp. (Corr.)	0.94095	0.9392	0.93815	0.9434	1.02145
F.O. Usage (Lbs./Hr.)	2412.0	2802.0	3216.0	3626.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	293.7	341.2	391.6	441.5	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	3,500	4,000	4,500	0
KW (Aux.)	230	230	230	230	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	141,881	141,881	141,881	141,881	141,881
HEAT RATE (APPROX.)	14,784	14,721	14,784	14,816	#DIV/0!
HEAT RATE (APPROX.)N	16,011	15,756	15,686	15,614	#DIV/0!
HEAT RATE (ACTUAL)-G	13,891	13,832	13,891	13,922	#DIV/0!
HEAT RATE (ACTUAL)-N	15,044	14,805	14,738	14,672	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: rh
DATE: 02-13-06 — Tested by: 02-14-06

DATA:

GENERATED (MW)	3.0	3.5	4.0	4.5
HEAT RATE(BTU/MW)G	13,891	13,832	13,891	13,922
HEAT RATE(BTU/MW)N	15,044	14,805	14,738	14,672
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$53.9491	act.		
H.H.V. (BTU/GAL)	141,881	est.		

A, B, C CONSTANTS:

GROSS	A=	15,007.09	NET A=	18,080.51
	B=	(644.360)	B=	(1,533.663)
	C=	89.9515	C=	172.8992

PREDICTED VALUES:

GENERATED (MW)G	**2.0**	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	**4.2**
HEAT RATE(BTU/MW)G	**14,078**	14,025	13,958	13,923	13,884	**13,866**	13,854	13,854	13,869	**13,888**
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	15,705	15,543	15,327	15,200	15,036	**14,943**	14,831	14,773	14,712	**14,689**
GROSS (MBTU)	28.156	30.855	34.896	37.592	41.651	44.372	48.488	51.261	55.476	58.328
NET (MBTU)	27.797	30.620	34.792	37.544	41.649	44.382	48.496	51.262	55.465	58.316
COST/KWH	$0.1275	$0.1270	$0.1264	$0.1261	$0.1257	$0.1255	$0.1254	$0.1254	$0.1256	$0.1257
G/KWH	347.84	346.52	344.88	344.00	343.03	342.60	342.29	342.31	342.66	343.13
G/PS-H	253.41	252.45	251.25	250.62	249.90	249.59	249.37	249.38	249.64	249.98

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	**5.0**	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	13,929	13,966	**14,034**	14,089	14,220	14,296	14,379	14,424
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	14,680	14,692	**14,735**	14,781	14,914	15,002	15,103	15,159
GROSS (MBTU)	62.680	65.638	70.170	73.261	79.630	82.915	86.275	87.984
NET (MBTU)	62.685	65.672	70.284	73.460	80.089	83.559	87.144	88.982
COST/KWH	$0.1261	$0.1264	$0.1271	$0.1276	$0.1287	$0.1294	$0.1302	$0.1306
G/KWH	344.15	345.06	346.75	348.10	351.33	353.21	355.27	356.37
G/PS-H	250.72	251.38	252.61	253.60	255.95	257.32	258.83	259.62

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 11-21-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	3,400	4,000	5,000		
BOILER-TURBINE							
Ambient Air Temp	*F.	81.01	90.45	95.93	89.19		
Gas Entering A.H.	*F.	470	480	510	540		
Gas Leaving A.H.	*F.	330	345	365	385		
Air Entering A.H.	*F.	82	86	92	90		
Air Leaving A.H.	*F.	350	345	360	380		
Circ. Water Inlet	*F.	73.0	74.0	74.0	74.0		
Circ. Water Outlet	*F.	79.6	81.9	83.7	86.2		
Condenser Vacuum	Hg.	29.2	29.20	29.10	28.80		
Barometric Pressure	Hg.	30.38	30.38	30.38	30.36		
Excess O2	%	2.55	1.75	1.43	1.29		
Feedwater Flow (X1000)	Lb/Hr	29	39	46	58		
Steam Flow (X1000)	Lb/Hr	30	41	49	62		
Throttle Stm. Press.	PSIG	385	385	390	390		
Feedwater to Blr.	*F.	690	730	760	780		
GENERATOR							
Generator Integrator, Start		7391.8	7396.8	7402.6	7410.7		
Generator Integrator, Stop		7394.2	7400.2	7406.6	7415.7		
Generator Integrator, Diff.	MWH	2.4	3.4	4.0	5.0	0.0	
Generator Volts	V.	11,800	11,700	11,800	11,700		
Generator Amps	A.	140	195	228	270		
Generator VARS	MVAR	2.5	2.1	2.3	2.0		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start	KWH	5008.1	5012.4	5016.3	5021.0		
Aux. KWH Mtr. End (X100)	KWH	5010.5	5014.8	5018.8	5023.5		
Aux. Load Indicator	MW	0.24	0.24	0.25	0.25	0.00	
Aux. Volts	V.	N/A	N/A	N/A	N/A		
Aux. Amps	A.	14.0	14.0	14.0	14.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	25299230.0	25303414.0	25308164.0	25314758.0		
Start Test	Time	0629	0816	0953	1146		
F.O. Totalizer-End	Lbs/Hr.	25301266.0	25306198.0	25311436.0	25318842.0		
End Test	Time	0729	0916	1053	1246		
F.O. Diff.	Lbs/Hr.	2036	2784	3272	4084	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS		LO-1 Pump On					
F.O. Temp. @ Heater	*F	222	235	230	225		
F.O. Temp. @ Burner Deck	*F	232	228	228	229		
Sulfur, Wt. %							
API Gravity @ 60 *F.	API	15.7					
Higher Heating Value	BTU/Gal	148,310	TEST BY: Paulette Stierman				

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-21-05
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.4	4.0	5.0	0.0
F.O. Temp. *F.	222	235	230	225	0
F.O. Temp. (Corr.)	0.94375	0.9392	0.94095	0.9427	1.02145
F.O. Usage (Lbs./Hr.)	2036.0	2784.0	3272.0	4084.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	247.9	339.0	398.4	497.3	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,400	4,000	5,000	0
KW (Aux.)	240	240	250	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,310	148,310	148,310	148,310	148,310
HEAT RATE (APPROX.)	15,599	15,056	15,041	15,019	#DIV/0!
HEAT RATE (APPROX.)N	17,332	16,200	16,044	15,810	#DIV/0!
HEAT RATE (ACTUAL)-G	15,321	14,788	14,773	14,751	#DIV/0!
HEAT RATE (ACTUAL)-N	17,023	15,911	15,758	15,528	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 11-29-05
DATE: 11-21-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.4	3.4	4.0	5.0
HEAT RATE(BTU/MW)G	15,321	14,788	14,773	14,751
HEAT RATE(BTU/MW)N	17,023	15,911	15,758	15,528
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$50.4350	act.		
H.H.V. (BTU/GAL)	148,310	act.		

A, B, C CONSTANTS:

GROSS	A=	17,727.62	NET A=	21,651.30
	B=	(1,391.545)	B=	(2,598.578)
	C=	159.7743	C=	275.6201

PREDICTED VALUES:

GENERATED (MW)G	**2.0**	2.2	2.5	2.7	3.0	**3.2**	3.5	3.7	4.0	**4.2**
HEAT RATE(BTU/MW)G	**15,584**	15,440	15,247	15,135	14,991	**14,911**	14,814	14,766	14,718	**14,702**
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	**17,557**	17,268	16,877	16,644	16,336	**16,158**	15,933	15,810	15,667	**15,599**
GROSS (MBTU)	31.167	33.967	38.118	40.865	44.973	47.714	51.851	54.635	58.871	61.747
NET (MBTU)	30.900	33.846	38.143	40.945	45.088	47.828	51.940	54.702	58.751	61.617
COST/KWH	$0.1262	$0.1250	$0.1235	$0.1225	$0.1214	$0.1207	$0.1199	$0.1196	$0.1192	$0.1190
G/KWH	385.03	381.47	376.72	373.95	370.39	368.41	366.03	364.84	363.64	363.24
G/PS-H	280.51	277.91	274.45	272.43	269.84	268.39	266.66	265.79	264.92	264.63

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,701	14,717	**14,764**	14,812	14,945	15,031	15,130	15,184
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	15,539	15,526	**15,549**	15,591	15,743	15,851	15,982	16,056
GROSS (MBTU)	66.155	69.169	73.821	77.022	83.695	87.183	90.781	92.625
NET (MBTU)	66.041	69.093	73.857	77.178	84.223	87.975	91.897	93.926
COST/KWH	$0.1190	$0.1192	$0.1195	$0.1199	$0.1210	$0.1217	$0.1225	$0.1229
G/KWH	363.23	363.61	364.79	365.96	369.27	371.39	373.83	375.17
G/PS-H	264.62	264.90	265.76	266.61	269.02	270.57	272.34	273.32

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 11-21-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,400	4,000	4,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	92.2	92.2	92.1	92.3	
Gas Entering A.H.	*F.	482	485	500	510	
Gas Leaving A.H.	*F.	327	340	355	363	
Air Entering A.H.	*F.	108	117	117	110	
Air Leaving A.H.	*F.	365	368	371	380	
Circ. Water Inlet	*F.	74.0	74.0	74.0	74.0	
Circ. Water Outlet	*F.	79.6	82.0	83.5	85.1	
Condenser Vacuum	Hg.	29.3	29.30	29.20	29.10	
Barometric Pressure	Hg.	30.4	30.40	30.40	30.40	
Excess O2	%	3.60	2.30	1.40	1.10	
Feedwater Flow (X1000)	Lb/Hr	27.8	38.7	45.7	51.9	
Steam Flow (X1000)	Lb/Hr	29.6	40.7	47.8	55.8	
Throttle Stm. Press.	PSIG	390	390	390	390	
Feedwater to Blr.	*F.	302	320	329	333	
GENERATOR						
Generator Integrator, Start		4152.1	4157.9	4163.4	4170.0	
Generator Integrator, Stop		4154.5	4161.3	4167.4	4174.6	
Generator Integrator, Diff.	MWH	2.4	3.4	4.0	4.6	0.0
Generator Volts	V.	11,700	11,700	11,800	11,900	
Generator Amps	A.	142	192	223	258	
Generator VARS	MVAR	1.7	2.0	2.4	2.5	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	2902.1	2906.6	2910.1	2913.7	
Aux. KWH Mtr. End (X100)	KWH	2904.2	2908.8	2912.3	2916.0	
Aux. Load Indicator	MW	0.21	0.22	0.22	0.23	0.00
Aux. Volts	V.	N/A	N/A	N/A	N/A	
Aux. Amps	A.	13.0	13.0	13.0	13.4	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	22489000.0	22493854.0	22498366.0	22503790.0	
Start Test	Time	0705	0909	1042	1219	
F.O. Totalizer-End	Lbs/Hr.	22491025.0	22496620.0	22501568.0	22507440.0	
End Test	Time	0805	1009	1142	1319	
F.O. Diff.	Lbs/Hr.	2025	2766	3202	3650	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS		LO-1 Pump On				
F.O. Temp. @ Heater	*F	250	250	251	249	
F.O. Temp. @ Burner Deck	*F	227	227	229	228	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.2				
Higher Heating Value	BTU/Gal	149,452				

TEST BY: M.Takushi

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-21-05
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.4	4.0	4.5	0.0
F.O. Temp. *F.	250	250	251	249	0
F.O. Temp. (Corr.)	0.93395	0.93395	0.9336	0.9343	1.02145
F.O. Usage (Lbs./Hr.)	2025.0	2766.0	3202.0	3650.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	246.6	336.8	389.9	444.5	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,400	4,000	4,600	0
KW (Aux.)	210	220	220	230	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,452	149,452	149,452	149,452	149,452
HEAT RATE (APPROX.)	15,515	14,959	14,719	14,590	#DIV/0!
HEAT RATE (APPROX.)N	17,002	15,994	15,576	15,358	#DIV/0!
HEAT RATE (ACTUAL)-G	15,356	14,806	14,569	14,441	#DIV/0!
HEAT RATE (ACTUAL)-N	16,828	15,830	15,416	15,201	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 10-05-05
DATE: 11-21-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.4	3.4	4.0	4.6
HEAT RATE(BTU/MW)G	15,356	14,806	14,569	14,441
HEAT RATE(BTU/MW)N	16,828	15,830	15,416	15,201
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$45.6529	act.		
H.H.V. (BTU/GAL)	149,452	act.		

A, B, C CONSTANTS:

GROSS	A=	17,647.01	NET A=	21,069.22
	B=	(1,234.060)	B=	(2,300.473)
	C=	116.6100	C=	222.5612

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,645	15,496	15,291	15,165	14,994	14,892	14,756	14,677	14,577	14,521
GENERATED (MW)N	1.79	1.99	2.29	2.49	2.79	2.99	3.28	3.48	3.78	3.98
HEAT RATE(BTU/MW)N	17,359	17,085	16,709	16,480	16,171	15,987	15,744	15,604	15,428	15,333
GROSS (MBTU)	31.291	34.092	38.227	40.946	44.983	47.655	51.647	54.306	58.306	60.988
NET (MBTU)	31.072	34.000	38.264	41.036	45.117	47.800	51.640	54.303	58.319	61.026
COST/KWH	$0.1138	$0.1127	$0.1112	$0.1103	$0.1091	$0.1083	$0.1073	$0.1067	$0.1060	$0.1056
G/KWH	386.56	382.88	377.79	374.69	370.47	367.95	364.59	362.64	360.15	358.78
G/PS-H	281.62	278.94	275.23	272.97	269.90	268.06	265.61	264.19	262.38	261.38

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,455	14,423	14,392	14,383	14,393	14,412	14,441	14,458
GENERATED (MW)N	4.29	4.47	4.77	4.97	5.37	5.57	5.77	5.87
HEAT RATE(BTU/MW)N	15,224	15,173	15,131	15,125	15,166	15,213	15,279	15,318
GROSS (MBTU)	65.048	67.787	71.960	74.792	80.602	83.591	86.644	88.196
NET (MBTU)	65.311	67.825	72.174	75.170	81.442	84.739	88.157	89.916
COST/KWH	$0.1051	$0.1049	$0.1047	$0.1046	$0.1047	$0.1048	$0.1050	$0.1052
G/KWH	357.15	356.35	355.59	355.37	355.62	356.09	356.79	357.23
G/PS-H	260.19	259.61	259.06	258.89	259.08	259.42	259.93	260.25

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 06-02-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,400	4,000	4,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	87	90.2	92.4	91.8	
Gas Entering A.H.	*F.	500	510	521	545	
Gas Leaving A.H.	*F.	337	367	383	395	
Air Entering A.H.	*F.	91	92	95	95	
Air Leaving A.H.	*F.	365	362	379	385	
Circ. Water Inlet	*F.	73.0	73.0	73.0	73.0	
Circ. Water Outlet	*F.	79.7	82.1	83.5	85.1	
Condenser Vacuum	Hg.	29.3	29.20	29.10	29.00	
Barometric Pressure	Hg.	30.4	30.50	30.50	30.40	
Excess O2	%	1.92	1.90	1.40	0.90	
Feedwater Flow (X1000)	Lb/Hr	28	39	45	52	
Steam Flow (X1000)	Lb/Hr	30	42	48	55	
Throttle Stm. Press.	PSIG	389	389	390	390	
Feedwater to Blr.	*F.	705	735	745	762	
GENERATOR						
Generator Integrator, Start		7762.3	7767.3	7773.3	7780.8	
Generator Integrator, Stop		7764.7	7770.7	7777.2	7785.3	
Generator Integrator, Diff.	MWH	2.4	3.4	3.9	4.5	0.0
Generator Volts	V.	11,800	11,800	11,800	11,800	
Generator Amps	A.	150	180	215	245	
Generator VARS	MVAR	1.8	2.0	2.1	2.1	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	8695.2	8699.6	8703.7	8708.3	
Aux. KWH Mtr. End (X100)	KWH	8697.6	8702.1	8706.2	8710.8	
Aux. Load Indicator	MW	0.24	0.25	0.25	0.25	0.00
Aux. Volts	V.	N/A	N/A	N/A	N/A	
Aux. Amps	A.	14.0	14.0	14.0	14.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	16760936.0	16764918.0	16769640.0	16775610.0	
Start Test	Time	0622	0811	0951	1140	
F.O. Totalizer-End	Lbs/Hr.	16762828.0	16767618.0	16772714.0	16779172.0	
End Test	Time	0722	0911	1051	1240	
F.O. Diff.	Lbs/Hr.	1892	2700	3074	3562	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS		LO-1 Pump on				
F.O. Temp. @ Heater	*F	227	225	219	219	
F.O. Temp. @ Burner Deck	*F	228	229	224	224	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	14.3				
Higher Heating Value	BTU/Gal	148,190	TEST BY: Paulette Stierman			

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-02-05
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.4	4.0	4.5	0.0
F.O. Temp. *F.	227	225	219	219	0
F.O. Temp. (Corr.)	0.942	0.9427	0.9448	0.9448	1.02145
F.O. Usage (Lbs./Hr.)	1892.0	2700.0	3074.0	3562.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	230.4	328.8	374.3	433.8	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,400	3,900	4,500	0
KW (Aux.)	240	250	250	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,190	148,190	148,190	148,190	148,190
HEAT RATE (APPROX.)	14,496	14,602	14,493	14,555	#DIV/0!
HEAT RATE (APPROX.)N	16,106	15,761	15,486	15,411	#DIV/0!
HEAT RATE (ACTUAL)-G	14,226	14,330	14,224	14,284	#DIV/0!
HEAT RATE (ACTUAL)-N	15,807	15,468	15,198	15,124	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 06-07-05
DATE: 06-02-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.4	3.4	3.9	4.5
HEAT RATE(BTU/MW)G	14,226	14,330	14,224	14,284
HEAT RATE(BTU/MW)N	15,807	15,468	15,198	15,124
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$42.5625	act.		
H.H.V. (BTU/GAL)	148,190	act.		

A, B, C CONSTANTS:

GROSS	A=	13,877.19	NET A=	17,209.71
	B=	220.519	B=	(710.292)
	C=	(29.8623)	C=	53.8797

PREDICTED VALUES:

GENERATED (MW)G	**2.0**	2.2	2.5	2.7	3.0	**3.2**	3.5	3.7	4.0	**4.2**
HEAT RATE(BTU/MW)G	**14,199**	14,218	14,242	14,255	14,270	**14,277**	14,283	14,284	14,281	**14,277**
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	**16,005**	15,908	15,771	15,685	15,564	**15,489**	15,384	15,319	15,231	**15,177**
GROSS (MBTU)	28.398	31.279	35.605	38.488	42.810	45.687	49.991	52.852	57.126	59.962
NET (MBTU)	28.168	31.179	35.642	38.584	42.956	45.846	49.997	52.851	57.115	59.949
COST/KWH	$0.0971	$0.0972	$0.0974	$0.0975	$0.0976	$0.0976	$0.0977	$0.0977	$0.0977	$0.0976
G/KWH	350.82	351.29	351.88	352.20	352.58	352.75	352.90	352.93	352.86	352.74
G/PS-H	255.58	255.92	256.35	256.59	256.86	256.99	257.10	257.12	257.07	256.98

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	**5.0**	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,265	14,254	**14,233**	14,216	14,176	14,152	14,125	14,111
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	15,104	15,062	**15,005**	14,973	14,922	14,903	14,888	14,882
GROSS (MBTU)	64.192	66.994	71.166	73.925	79.383	82.079	84.752	86.078
NET (MBTU)	64.194	67.024	71.275	74.117	79.831	82.709	85.604	87.058
COST/KWH	$0.0975	$0.0975	$0.0973	$0.0972	$0.0969	$0.0968	$0.0966	$0.0965
G/KWH	352.45	352.18	351.67	351.25	350.24	349.65	349.00	348.65
G/PS-H	256.77	256.57	256.20	255.90	255.16	254.73	254.25	254.00

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 03-12-05

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,000	4,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	94	94	94	94	
Gas Entering A.H.	*F.	500	510	520	520	
Gas Leaving A.H.	*F.	339	360	370	384	
Air Entering A.H.	*F.	81	79	77	76	
Air Leaving A.H.	*F.	350	350	360	362	
Circ. Water Inlet	*F.	74.0	74.0	74.0	74.0	
Circ. Water Outlet	*F.	80.9	83.0	85.0	87.0	
Condenser Vacuum	Hg.	28.9	28.80	28.70	28.60	
Barometric Pressure	Hg.	29.8	29.80	29.80	29.80	
Excess O2	%	3.80	1.80	1.20	0.77	
Feedwater Flow (X1000)	Lb/Hr	28	40	46	54	
Steam Flow (X1000)	Lb/Hr	30	42	47	50	
Throttle Stm. Press.	PSIG	385	385	385	386	
Feedwater to Blr.	*F.	700	730	744	762	
GENERATOR						
Generator Integrator, Start		1778.0	1782.7	1789.6	1797.6	
Generator Integrator, Stop		1780.5	1786.2	1793.5	1802.0	
Generator Integrator, Diff.	MWH	2.5	3.5	3.9	4.4	0.0
Generator Volts	V.	11,300	11,300	11,300	11,300	
Generator Amps	A.	140	173	189	220	
Generator VARS	MVAR	2.0	2.0	1.9	2.0	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	4844.2	4848.2	4852.8	4857.5	
Aux. KWH Mtr. End (X100)	KWH	4846.6	4850.7	4855.2	4859.9	
Aux. Load Indicator	MW	0.24	0.25	0.24	0.24	0.00
Aux. Volts	V.	N/A	N/A	N/A	N/A	
Aux. Amps	A.	14.0	14.0	14.0	14.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	11739817.0	11743509.0	11748888.0	11755127.0	
Start Test	Time	0631	0813	1007	1202	
F.O. Totalizer-End	Lbs/Hr.	11741702.0	11746184.0	11751931.0	11758590.0	
End Test	Time	0731	0913	1107	1302	
F.O. Diff.	Lbs/Hr.	1885	2675	3043	3463	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	220	220	212	215	
F.O. Temp. @ Burner Deck	*F	224	225	218	221	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	14.9				
Higher Heating Value	BTU/Gal	148,667				

TEST BY: Paulette Steirman/Martin Ah Yuen

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 03-12-05
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.0	4.5	0.0
F.O. Temp. *F.	220	220	212	215	0
F.O. Temp. (Corr.)	0.94445	0.94445	0.94725	0.9462	1.02145
F.O. Usage (Lbs./Hr.)	1885.0	2675.0	3043.0	3463.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	229.5	325.7	370.6	421.7	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	3,900	4,400	0
KW (Aux.)	240	250	240	240	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,667	148,667	148,667	148,667	148,667
HEAT RATE (APPROX.)	13,864	14,053	14,347	14,472	#DIV/0!
HEAT RATE (APPROX.)N	15,337	15,135	15,288	15,307	#DIV/0!
HEAT RATE (ACTUAL)-G	13,650	13,836	14,125	14,248	#DIV/0!
HEAT RATE (ACTUAL)-N	15,100	14,901	15,052	15,070	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 03-24-05
DATE: 03-12-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	2.5	3.5	3.9	4.4
HEAT RATE(BTU/MW)G	13,650	13,836	14,125	14,248
HEAT RATE(BTU/MW)N	15,100	14,901	15,052	15,070
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$33.6844	act.		
H.H.V. (BTU/GAL)	148,667	act.		

A, B, C CONSTANTS:

GROSS A=	13,757.19	NET A=	16,795.62
B=	(261.335)	B=	(1,068.260)
C=	86.0852	C=	154.8149

PREDICTED VALUES:

GENERATED (MW)G	**2.0**	2.2	2.5	2.7	3.0	**3.2**	3.5	3.7	4.0	**4.2**
HEAT RATE(BTU/MW)G	**13,579**	13,599	13,642	13,679	13,748	**13,802**	13,897	13,969	14,089	**14,178**
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	**15,278**	15,195	15,093	15,040	14,984	**14,962**	14,953	14,962	15,000	**15,040**
GROSS (MBTU)	27.158	29.918	34.105	36.934	41.244	44.168	48.640	51.684	56.357	59.548
NET (MBTU)	26.890	29.782	34.109	36.998	41.356	44.289	48.598	51.621	56.399	59.558
COST/KWH	$0.0733	$0.0734	$0.0736	$0.0738	$0.0742	$0.0745	$0.0750	$0.0754	$0.0760	$0.0765
G/KWH	335.50	335.99	337.06	337.98	339.68	341.02	343.36	345.13	348.11	350.31
G/PS-H	244.42	244.78	245.55	246.22	247.46	248.44	250.15	251.44	253.61	255.21

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	**5.0**	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,324	14,431	**14,603**	14,726	14,993	15,137	15,288	15,366
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	15,123	15,195	**15,325**	15,427	15,668	15,808	15,959	16,040
GROSS (MBTU)	64.460	67.824	73.013	76.575	83.963	87.797	91.729	93.734
NET (MBTU)	64.426	67.768	72.946	76.517	83.982	87.891	91.926	93.994
COST/KWH	$0.0773	$0.0778	$0.0788	$0.0794	$0.0809	$0.0817	$0.0825	$0.0829
G/KWH	353.92	356.54	360.79	363.84	370.45	374.01	377.73	379.66
G/PS-H	257.84	259.75	262.85	265.07	269.88	272.47	275.19	276.59

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 10-04-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,600	
BOILER-TURBINE						
Ambient Air Temp	*F.	108	110	112	116	
Gas Entering A.H.	*F.	485	490	510	548	
Gas Leaving A.H.	*F.	355	355	370	398	
Air Entering A.H.	*F.	108	115	118	117	
Air Leaving A.H.	*F.					
Circ. Water Inlet	*F.	74.0	74.0	74.0	74.0	
Circ. Water Outlet	*F.	85.9	89.1	84.4	87.4	
Condenser Vacuum	Hg.	29	28.80	29.00	28.80	
Barometric Pressure	Hg.	29.78	29.79	29.79	29.76	
Excess O2	%	2.70	1.80	1.30	1.20	
Feedwater Flow (X1000)	Lb/Hr	28.6	40.1	50.2	64.3	
Steam Flow (X1000)	Lb/Hr	30.4	42.5	53.2	67.8	
Throttle Stm. Press.	PSIG	384	388	390	390	
Feedwater to Blr.	*F.	300	315	330	344	
GENERATOR						
Generator Integrator, Start		8025.1	8030.0	8037.7	8047.6	
Generator Integrator, Stop		8027.6	8033.5	8042.2	8053.3	
Generator Integrator, Diff.	MWH	2.5	3.5	4.5	5.7	0.0
Generator Volts	V.	11,700	11,800	12,000	11,900	
Generator Amps	A.	143	195	260	310	
Generator VARS	MVAR	1.6	2.0	3.6	2.3	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	6892.9	6896.5	6900.9	6905.9	
Aux. KWH Mtr. End (X100)	KWH	6894.9	6898.5	6903.2	6908.5	
Aux. Load Indicator	MW	0.20	0.20	0.23	0.26	0.00
Aux. Volts	V.					
Aux. Amps	A.	12.0	12.5	12.8	15.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	471474.0	475410.0	481492.0	489330.0	
Start Test	Time	0639	0824	1022	1223	
F.O. Totalizer-End	Lbs/Hr.	473461.0	478180.0	484961.0	493705.0	
End Test	Time	0739	0924	1122	1323	
F.O. Diff.	Lbs/Hr.	1987	2770	3469	4375	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	Yes	Yes	
Circulating Pumps	Number	1	1	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	225	222	224	
F.O. Temp. @ Burner Deck	*F	190	175	180	192	
Sulfur, Wt. %		1.59				
API Gravity @ 60 *F.	API	7.5				
Higher Heating Value	BTU/Gal	152,024	TEST BY:	M.T.		

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 10-04-04
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.5	5.6	0.0
F.O. Temp. *F.	230	225	222	224	0
F.O. Temp. (Corr.)	0.94095	0.9427	0.94375	0.94305	1.02145
F.O. Usage (Lbs./Hr.)	1987.0	2770.0	3469.0	4375.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	242.0	337.3	422.4	532.8	0.0
PT RATIO	1.000	1.000	1.000	1.000	1.000
KW (Gen.)	2,500	3,500	4,500	5,700	0
KW (Aux.)	200	200	230	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	152,024	152,024	152,024	152,024	152,024
HEAT RATE (APPROX.)	14,615	14,553	14,175	14,113	#DIV/0!
HEAT RATE (APPROX.)N	15,885	15,435	14,938	14,788	#DIV/0!
HEAT RATE (ACTUAL)-G	14,714	14,651	14,271	14,209	#DIV/0!
HEAT RATE (ACTUAL)-N	15,993	15,539	15,040	14,888	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 10-08-04
DATE: 10-04-04 — Tested by: E.Wong

DATA:

GENERATED (MW)	2.5	3.5	4.5	5.7
HEAT RATE(BTU/MW)G	14,714	14,651	14,271	14,209
HEAT RATE(BTU/MW)N	15,993	15,539	15,040	14,888
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$34.5863	act.		
H.H.V. (BTU/GAL)	152,024	act.		

A, B, C CONSTANTS:

GROSS	A=	15,358.63	NET A=	18,101.64
	B=	(272.635)	B=	(1,043.567)
	C=	11.6105	C=	83.6529

PREDICTED VALUES:

GENERATED (MW)G	**2.0**	2.2	2.5	2.7	3.0	**3.2**	3.5	3.7	4.0	**4.2**
HEAT RATE(BTU/MW)G	**14,860**	14,815	14,750	14,707	14,645	**14,605**	14,547	14,509	14,454	**14,418**
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	**16,349**	16,211	16,016	15,894	15,724	**15,619**	15,474	15,386	15,266	**15,194**
GROSS (MBTU)	29.720	32.593	36.874	39.709	43.936	46.736	50.913	53.683	57.815	60.557
NET (MBTU)	29.428	32.421	36.836	39.735	44.027	46.856	51.064	53.850	58.010	60.777
COST/KWH	$0.0805	$0.0803	$0.0799	$0.0797	$0.0793	$0.0791	$0.0788	$0.0786	$0.0783	$0.0781
G/KWH	367.15	366.04	364.43	363.38	361.85	360.85	359.41	358.48	357.12	356.24
G/PS-H	267.48	266.67	265.49	264.73	263.61	262.89	261.84	261.16	260.17	259.53

PREDICTED VALUES (CONT.):

GENERATED (MW)G	**4.5**	4.7	**5.0**	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,367	14,334	**14,286**	14,255	14,196	14,168	14,141	14,128
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.5	5.7	5.8
HEAT RATE(BTU/MW)N	15,100	15,045	**14,975**	14,937	14,881	14,863	14,852	14,849
GROSS (MBTU)	64.651	67.368	71.429	74.125	79.497	82.174	84.845	86.178
NET (MBTU)	64.475	67.250	71.431	74.237	79.911	82.341	85.249	86.716
COST/KWH	$0.0778	$0.0776	$0.0774	$0.0772	$0.0769	$0.0767	$0.0766	$0.0765
G/KWH	354.97	354.15	352.96	352.20	350.75	350.05	349.38	349.06
G/PS-H	258.60	258.01	257.14	256.59	255.53	255.02	254.53	254.30

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 08-16-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	4,000	5,000	5,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	108	106	111	111	
Gas Entering A.H.	*F.	490	525	565	580	
Gas Leaving A.H.	*F.	345	376	402	411	
Air Entering A.H.	*F.	112	116	114	110	
Air Leaving A.H.	*F.	370	385	400	405	
Circ. Water Inlet	*F.	74.0	74.0	74.0	74.0	
Circ. Water Outlet	*F.	81.0	83.5	86.3	87.2	
Condenser Vacuum	Hg.	28.7	28.50	28.30	28.10	
Barometric Pressure	Hg.	29.9	29.88	29.86	29.84	
Excess O2	%	1.70	1.50	1.20	1.00	
Feedwater Flow (X1000)	Lb/Hr	35	47	59	65	
Steam Flow (X1000)	Lb/Hr	40	50	66	69	
Throttle Stm. Press.	PSIG	395	395	396	396	
Feedwater to Blr.	*F.	305	322	336	342	
GENERATOR						
Generator Integrator, Start		7024.7	7035.4	7042.5	7048.9	
Generator Integrator, Stop		7027.6	7039.4	7047.4	7054.3	
Generator Integrator, Diff.	MWH	2.9	4.0	4.9	5.4	0.0
Generator Volts	V.	11,700	11,800	11,800	11,900	
Generator Amps	A.	170	228	278	308	
Generator VARS	MVAR	1.8	2.3	2.5	2.7	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	6167.5	6174.8	6178.8	6182.0	
Aux. KWH Mtr. End (X100)	KWH	6169.9	6177.2	6181.3	6184.6	
Aux. Load Indicator	MW	0.24	0.24	0.25	0.26	0.00
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.0	14.2	14.2	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	80680117.0	80689121.0	80695064.0	80700447.0	
Start Test	Time	0719	1019	1158	1315	
F.O. Totalizer-End	Lbs/Hr.	80682611.0	80692445.0	80699185.0	80704952.0	
End Test	Time	0819	1119	1258	1415	
F.O. Diff.	Lbs/Hr.	2494	3324	4121	4505	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	229	223	223	216	
F.O. Temp. @ Burner Deck	*F	226	224	222	218	
Sulfur, Wt. %		1.76				
API Gravity @ 60 *F.	API	15.5				
Higher Heating Value	BTU/Gal	146,714				

TEST BY: J. Kealiinohomoku

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-16-04
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	4.0	5.0	5.5	0.0
F.O. Temp. *F.	229	223	223	216	0
F.O. Temp. (Corr.)	0.9413	0.9434	0.9434	0.94585	1.02145
F.O. Usage (Lbs./Hr.)	2494.0	3324.0	4121.0	4505.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	303.7	404.8	501.8	548.6	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,900	4,000	4,900	5,400	0
KW (Aux.)	240	240	250	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	146,714	146,714	146,714	146,714	146,714
HEAT RATE (APPROX.)	15,813	15,280	15,464	15,340	#DIV/0!
HEAT RATE (APPROX.)N	17,240	16,256	16,296	16,116	#DIV/0!
HEAT RATE (ACTUAL)-G	15,365	14,847	15,026	14,905	#DIV/0!
HEAT RATE (ACTUAL)-N	16,751	15,794	15,833	15,659	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 08-27-04
DATE: 08-16-04 — Tested by: E.Wong

DATA:

GENERATED (MW)	2.9	4.9	5.4
HEAT RATE(BTU/MW)G	15,365	15,026	14,905
HEAT RATE(BTU/MW)N	16,751	15,833	15,659
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$33.5350 act.		
H.H.V. (BTU/GAL)	146,714 act.		

A, B, C CONSTANTS:

GROSS	A=	15,446.80	NET A=	18,703.22
	B=	55.234	B=	(800.126)
	C=	(28.8176)	C=	43.7633

PREDICTED VALUES:

GENERATED (MW)G	**2.0**	2.2	2.5	2.7	3.0	**3.2**	3.5	3.7	4.0	**4.2**
HEAT RATE(BTU/MW)G	**15,442**	15,429	15,405	15,386	15,353	**15,328**	15,287	15,257	15,207	**15,170**
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	**17,278**	17,155	16,976	16,862	16,697	**16,591**	16,439	16,342	16,203	**16,115**
GROSS (MBTU)	30.884	33.943	38.512	41.542	46.059	49.051	53.505	56.450	60.827	63.716
NET (MBTU)	30.409	33.623	38.367	41.480	46.083	49.109	53.591	56.543	60.923	63.814
COST/KWH	$0.0840	$0.0840	$0.0838	$0.0837	$0.0836	$0.0834	$0.0832	$0.0830	$0.0828	$0.0826
G/KWH	381.53	381.21	380.61	380.15	379.34	378.73	377.71	376.95	375.72	374.82
G/PS-H	277.96	277.72	277.29	276.95	276.36	275.91	275.17	274.62	273.72	273.07

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	**5.0**	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,112	15,070	**15,003**	14,955	14,852	14,798	14,741	14,711
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.3	5.5	5.7	5.8
HEAT RATE(BTU/MW)N	15,989	15,909	**15,797**	15,726	15,595	15,535	15,478	15,451
GROSS (MBTU)	68.003	70.828	75.013	77.765	83.173	85.827	88.445	89.740
NET (MBTU)	68.113	70.956	75.034	77.843	83.277	86.062	88.843	90.233
COST/KWH	$0.0822	$0.0820	$0.0816	$0.0814	$0.0808	$0.0805	$0.0802	$0.0801
G/KWH	373.37	372.34	370.67	369.49	366.96	365.61	364.21	363.48
G/PS-H	272.01	271.26	270.05	269.19	267.34	266.36	265.33	264.81

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 06-16-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,000	5,600
BOILER-TURBINE						
Ambient Air Temp	*F.	92	96	97	97	98
Gas Entering A.H.	*F.	480	505	545	560	580
Gas Leaving A.H.	*F.	328	352	383	396	410
Air Entering A.H.	*F.	107	110	129	130	131
Air Leaving A.H.	*F.	360	370	385	395	405
Circ. Water Inlet	*F.	72.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	79.0	81.0	84.0	86.0	87.0
Condenser Vacuum	Hg.	28.7	28.60	28.40	28.30	28.20
Barometric Pressure	Hg.	29.98	30.02	30.02	30.00	29.95
Excess O2	%	2.70	1.80	1.40	1.20	1.10
Feedwater Flow (X1000)	Lb/Hr	30	39	52	59	64
Steam Flow (X1000)	Lb/Hr	32	42	57	63	69
Throttle Stm. Press.	PSIG	391	393	394	394	394
Feedwater to Blr.	*F.	295	311	330	338	342
GENERATOR						
Generator Integrator, Start		1581.3	1585.7	1591.0	1597.9	1606.0
Generator Integrator, Stop		1583.9	1589.1	1595.5	1602.9	1611.4
Generator Integrator, Diff.	MWH	2.6	3.4	4.5	5.0	5.4
Generator Volts	V.	11,600	11,600	11,700	11,700	11,700
Generator Amps	A.	154	186	240	264	292
Generator VARS	MVAR	1.8	1.8	1.8	1.9	1.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	3032.0	3035.8	3039.4	3043.1	3047.1
Aux. KWH Mtr. End (X100)	KWH	3034.4	3038.2	3041.9	3045.6	3049.7
Aux. Load Indicator	MW	0.24	0.24	0.25	0.25	0.26
Aux. Volts	V.					
Aux. Amps	A.	14.1	14.1	14.3	14.4	14.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	75818181.0	75821879.0	75826353.0	75832133.0	75838909.0
Start Test	Time	0646	0820	0948	1117	1252
F.O. Totalizer-End	Lbs/Hr.	75820324.0	75824730.0	75830105.0	75836294.0	75843456.0
End Test	Time	0746	0920	1048	1217	1352
F.O. Diff.	Lbs/Hr.	2143	2851	3752	4161	4547
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS		* LO-1 injection rate				
F.O. Temp. @ Heater	*F	229	224	220	221	220
F.O. Temp. @ Burner Deck	*F	226	225	223	223	222
Sulfur, Wt. %		1.64				
API Gravity @ 60 *F.	API	11.5				
Higher Heating Value	BTU/Gal	151,048				

TEST BY: John Kealiinohomoku

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-16-04
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.5	5.0	5.6
F.O. Temp. *F.	229	224	220	221	220
F.O. Temp. (Corr.)	0.9413	0.94305	0.94445	0.9441	0.94445
F.O. Usage (Lbs./Hr.)	2143.0	2851.0	3752.0	4161.0	4547.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	261.0	347.2	456.9	506.7	553.7
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,600	3,400	4,500	5,000	5,400
KW (Aux.)	240	240	250	250	260
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,048	151,048	151,048	151,048	151,048
HEAT RATE (APPROX.)	15,156	15,419	15,331	15,302	15,483
HEAT RATE (APPROX.)N	16,697	16,590	16,233	16,108	16,266
HEAT RATE (ACTUAL)-G	15,161	15,424	15,336	15,307	15,488
HEAT RATE (ACTUAL)-N	16,702	16,595	16,238	16,113	16,271

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 06-22-04
DATE: 06-16-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.6	3.4	4.5	5.0	5.4
HEAT RATE(BTU/MW)G	15,161	15,424	15,336	15,307	15,488
HEAT RATE(BTU/MW)N	16,702	16,595	16,238	16,113	16,271
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.2753	act.			
H.H.V. (BTU/GAL)	151,048	act.			

A, B, C CONSTANTS:

GROSS	A=	14,643.63	NET A=	18,051.18
	B=	290.217	B=	(647.584)
	C=	(27.6979)	C=	56.0577

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,113	15,148	15,196	15,225	15,265	15,289	15,320	15,338	15,361	15,374
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	16,980	16,898	16,783	16,711	16,613	16,553	16,471	16,423	16,358	16,320
GROSS (MBTU)	30.227	33.326	37.990	41.108	45.795	48.924	53.620	56.752	61.445	64.571
NET (MBTU)	29.885	33.120	37.929	41.110	45.852	48.997	53.697	56.822	61.505	64.628
COST/KWH	$0.0745	$0.0747	$0.0749	$0.0751	$0.0753	$0.0754	$0.0755	$0.0756	$0.0757	$0.0758
G/KWH	373.41	374.27	375.46	376.18	377.16	377.74	378.52	378.97	379.54	379.85
G/PS-H	272.04	272.66	273.53	274.06	274.77	275.20	275.76	276.09	276.50	276.73

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,389	15,396	15,402	15,404	15,400	15,395	15,388	15,383
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.3	5.5	5.7	5.8
HEAT RATE(BTU/MW)N	16,272	16,246	16,215	16,200	16,183	16,181	16,184	16,187
GROSS (MBTU)	69.249	72.360	77.011	80.100	86.241	89.292	92.327	93.838
NET (MBTU)	69.157	72.294	77.020	80.188	86.415	89.643	92.895	94.531
COST/KWH	$0.0759	$0.0759	$0.0759	$0.0759	$0.0759	$0.0759	$0.0759	$0.0758
G/KWH	380.22	380.39	380.55	380.59	380.50	380.37	380.19	380.08
G/PS-H	277.00	277.12	277.24	277.27	277.20	277.11	276.98	276.90

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 02-13-04

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100	
Actual Test Load	KWH	2,500	3,500	4,500	5,500		
BOILER-TURBINE							
Ambient Air Temp	*F.	98	98	100	102		
Gas Entering A.H.	*F.	460	492	520	555		
Gas Leaving A.H.	*F.	327	355	371	395		
Air Entering A.H.	*F.	90	90	92	96		
Air Leaving A.H.	*F.	370	370	380	410		
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0		
Circ. Water Outlet	*F.	80.6	83.2	86.0	89.2		
Condenser Vacuum	Hg.	28.7	28.50	28.30	28.10		
Barometric Pressure	Hg.	30.02	30.04	30.05	30.01		
Excess O2	%	2.10	1.80	1.40	0.90		
Feedwater Flow (X1000)	Lb/Hr	29	41	52	69		
Steam Flow (X1000)	Lb/Hr	30	43	55	69		
Throttle Stm. Press.	PSIG	392	392	392	392		
Feedwater to Blr.	*F.	290	312	328	342		
GENERATOR							
Generator Integrator, Start		1506.0	1511.2	1517.2	1527.8		
Generator Integrator, Stop		1508.5	1514.7	1521.6	1533.3		
Generator Integrator, Diff.	MWH	2.5	3.5	4.4	5.5	0.0	
Generator Volts	V.	11,600	11,800	11,800	11,800		
Generator Amps	A.	142	207	235	300		
Generator VARS	MVAR	1.6	2.3	2.0	2.4		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start	KWH	7052.0	7056.3	7060.2	7065.8		
Aux. KWH Mtr. End (X100)	KWH	7054.3	7058.8	7062.7	7068.3		
Aux. Load Indicator	MW	0.23	0.25	0.25	0.25	0.00	
Aux. Volts	V.						
Aux. Amps	A.	13.5	14.0	14.0	12.1		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	66416148.0	66421115.0	66425580.0	66436201.0		
Start Test	Time	0602	0752	0928	1139		
F.O. Totalizer-End	Lbs/Hr.	66418526.0	66424344.0	66430602.0	66441141.0		
End Test	Time	0702	0852	1028	1239		
F.O. Diff.	Lbs/Hr.	2378	3229	5022	4940	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes		
Circulating Pumps	Number	2	2	2	2		
FUEL OIL ANALYSIS		* LO-1 injection rate					
F.O. Temp. @ Heater	*F	215	212	210	210		
F.O. Temp. @ Burner Deck	*F	215	213	212	209		
Sulfur, Wt. %		1.68					
API Gravity @ 60 *F.	API	12.1					
Higher Heating Value	BTU/Gal	147,762					

TEST BY: John Kealiinohomoku

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-13-04
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.5	5.5	0.0
F.O. Temp. *F.	215	212	210	210	0
F.O. Temp. (Corr.)	0.9462	0.94725	0.94795	0.94795	1.02145
F.O. Usage (Lbs./Hr.)	2378.0	3229.0	5022.0	4940.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	289.6	393.2	611.5	601.6	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,500	4,400	5,500	0
KW (Aux.)	230	250	250	250	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	147,762	147,762	147,762	147,762	147,762
HEAT RATE (APPROX.)	17,490	16,964	20,987	16,516	#DIV/0!
HEAT RATE (APPROX.)N	19,263	18,269	22,251	17,302	#DIV/0!
HEAT RATE (ACTUAL)-G	17,115	16,600	20,537	16,161	#DIV/0!
HEAT RATE (ACTUAL)-N	18,849	17,877	21,774	16,931	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 02-20-04
DATE: 02-13-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.5	3.5	5.5
HEAT RATE(BTU/MW)G	17,115	16,600	16,161
HEAT RATE(BTU/MW)N	18,849	17,877	16,931
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$28.3161	act.	
H.H.V. (BTU/GAL)	147,762	act.	

A, B, C CONSTANTS:

GROSS	A=	19,265.61	NET A=	22,736.45
	B=	(1,106.525)	B=	(1,970.815)
	C=	98.5665	C=	166.4126

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	17,447	17,308	17,115	16,997	16,833	16,734	16,600	16,521	16,417	16,357
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	19,460	19,206	18,849	18,628	18,322	18,134	17,877	17,723	17,516	17,395
GROSS (MBTU)	34.894	38.078	42.788	45.891	50.499	53.549	58.101	61.127	65.666	68.699
NET (MBTU)	34.445	37.836	42.788	46.012	50.751	53.858	58.101	61.143	65.684	68.708
COST/KWH	$0.0796	$0.0790	$0.0781	$0.0776	$0.0768	$0.0764	$0.0757	$0.0754	$0.0749	$0.0746
G/KWH	431.07	427.64	422.88	419.94	415.90	413.46	410.15	408.19	405.61	404.14
G/PS-H	314.04	311.55	308.08	305.94	303.00	301.21	298.80	297.38	295.50	294.42

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	16,282	16,242	16,197	16,177	16,160	16,164	16,175	16,183
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	17,238	17,150	17,043	16,988	16,919	16,904	16,902	16,907
GROSS (MBTU)	69.199	72.278	76.936	80.076	86.457	89.708	93.005	94.673
NET (MBTU)	77.569	80.603	85.213	88.338	94.744	98.042	101.414	103.131
COST/KWH	$0.0743	$0.0741	$0.0739	$0.0738	$0.0737	$0.0737	$0.0738	$0.0738
G/KWH	402.29	401.31	400.19	399.69	399.28	399.36	399.64	399.85
G/PS-H	293.08	292.36	291.55	291.18	290.88	290.94	291.15	291.30

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 10-25-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH		3,200	4,000	5,000	6,000
BOILER-TURBINE						
Ambient Air Temp	*F.		84	84	88	90
Gas Entering A.H.	*F.		490	490	510	530
Gas Leaving A.H.	*F.		348	355	365	375
Air Entering A.H.	*F.		84	84	88	90
Air Leaving A.H.	*F.		365	375	390	418
Circ. Water Inlet	*F.		74.0	74.0	75.0	75.0
Circ. Water Outlet	*F.		81.5	83.4	86.1	89.0
Condenser Vacuum	Hg.		28.60	28.60	28.40	28.20
Barometric Pressure	Hg.		30.01	30.03	30.10	30.10
Excess O2	%		3.38	2.35	1.04	1.20
Feedwater Flow (X1000)	Lb/Hr		37	45	57	70
Steam Flow (X1000)	Lb/Hr		39	48	60	73.5
Throttle Stm. Press.	PSIG		395	395	390	393
Feedwater to Blr.	*F.		720	740	775	798
GENERATOR						
Generator Integrator, Start			1314.7	1321.2	1328.6	1338.0
Generator Integrator, Stop			1317.8	1325.1	1333.4	1343.9
Generator Integrator, Diff.	MWH	0.0	3.1	3.9	4.8	5.9
Generator Volts	V.		11,600	11,700	11,800	11,800
Generator Amps	A.		170	211	260	312
Generator VARS	MVAR		1.6	1.9	2.0	1.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH		1259.8	1264.3	1268.5	1273.0
Aux. KWH Mtr. End (X100)	KWH		1262.1	1266.7	1271.0	1275.5
Aux. Load Indicator	MW	0.00	0.23	0.24	0.25	0.25
Aux. Volts	V.					
Aux. Amps	A.		14.0	14.0	14.0	14.1
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.		56860676.0	56866385.0	56872723.0	56880801.0
Start Test	Time		0610	0803	0947	1135
F.O. Totalizer-End	Lbs/Hr.		56863438.0	56869743.0	56876864.0	56885812.0
End Test	Time		0710	0903	1047	1235
F.O. Diff.	Lbs/Hr.	0	2762	3358	4141	5011
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F		250	240	232	231
F.O. Temp. @ Burner Deck	*F		234	233	227	232
Sulfur, Wt. %		1.63				
API Gravity @ 60 *F.	API	10.1				
Higher Heating Value	BTU/Gal	148,000				

TEST BY: Martin Ah Yuen

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 10-25-03
KPP UNIT NO. 2

	TEST LOADS - MW				
	0.0	3.2	4.0	5.0	6.0
F.O. Temp. *F.	0	250	240	232	231
F.O. Temp. (Corr.)	1.02145	0.93395	0.93745	0.94025	0.9406
F.O. Usage (Lbs./Hr.)	0.0	2762.0	3358.0	4141.0	5011.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	0.0	336.3	408.9	504.3	610.2
PT RATIO	1.000	1.000	1.000	1.000	1.000
KW (Gen.)	0	3,100	3,900	4,800	5,900
KW (Aux.)	0	230	240	250	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,000	148,000	148,000	148,000	148,000
HEAT RATE (APPROX.)	#DIV/0!	16,383	15,832	15,863	15,617
HEAT RATE (APPROX.)N	#DIV/0!	17,696	16,870	16,735	16,308
HEAT RATE (ACTUAL)-G	#DIV/0!	16,057	15,518	15,548	15,307
HEAT RATE (ACTUAL)-N	#DIV/0!	17,344	16,535	16,402	15,984

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 10-29-03
DATE: 10-25-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		3.1	3.9	4.8	5.9
HEAT RATE(BTU/MW)G		16,057	15,518	15,548	15,307
HEAT RATE(BTU/MW)N		17,344	16,535	16,402	15,984
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$31.2975 act.				
H.H.V. (BTU/GAL)	148,000 act.				

A, B, C CONSTANTS:

GROSS A=	18,461.80	NET A=	21,190.94
B=	(1,085.858)	B=	(1,687.696)
C=	94.3817	C=	137.5890

PREDICTED VALUES:

GENERATED (MW)G	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,668	16,530	16,337	16,218	16,054	15,954	15,817	15,736	15,628	15,566
GENERATED (MW)N	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	4.0
HEAT RATE(BTU/MW)N	18,366	18,144	17,832	17,637	17,366	17,199	16,969	16,830	16,642	16,530
GROSS (MBTU)	33.335	36.365	40.843	43.789	48.161	51.051	55.361	58.224	62.514	65.378
NET (MBTU)	32.508	35.744	40.478	43.564	48.104	51.082	55.490	58.400	62.572	65.458
COST/KWH	$0.0839	$0.0832	$0.0823	$0.0817	$0.0808	$0.0803	$0.0796	$0.0792	$0.0787	$0.0784
G/KWH	411.81	408.41	403.65	400.71	396.65	394.17	390.81	388.80	386.14	384.60
G/PS-H	300.02	297.53	294.07	291.92	288.97	287.16	284.71	283.25	281.31	280.19

PREDICTED VALUES (CONT.):

GENERATED (MW)G	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,487	15,443	15,392	15,367	15,341	15,339	15,344	15,350
GENERATED (MW)N	4.3	4.5	4.8	5.0	5.4	5.6	5.8	5.9
HEAT RATE(BTU/MW)N	16,382	16,298	16,192	16,135	16,055	16,031	16,018	16,016
GROSS (MBTU)	69.690	72.583	76.960	79.911	85.909	88.965	92.066	93.635
NET (MBTU)	69.626	72.690	76.913	79.870	85.892	88.971	92.103	93.692
COST/KWH	$0.0780	$0.0778	$0.0775	$0.0774	$0.0772	$0.0772	$0.0773	$0.0773
G/KWH	382.64	381.56	380.30	379.69	379.03	378.98	379.12	379.26
G/PS-H	278.76	277.98	277.06	276.61	276.13	276.10	276.20	276.30

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 08-27-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,300	3,500	4,600	5,600	
BOILER-TURBINE						
Ambient Air Temp	*F.	88	94	95	96	
Gas Entering A.H.	*F.	500	505	540	580	
Gas Leaving A.H.	*F.	325	355	380	405	
Air Entering A.H.	*F.	88	94	95	96	
Air Leaving A.H.	*F.	380	380	400	420	
Circ. Water Inlet	*F.	73.0	74.0	75.0	75.0	
Circ. Water Outlet	*F.	80.8	84.5	78.9	91.5	
Condenser Vacuum	ig.	29.30	29.10	28.80	28.40	
Barometric Pressure	ig.	30.06	30.08	30.08	30.07	
Excess O2	%	3.00	1.50	0.95	0.68	
Feedwater Flow (X1000)	Lb/Hr	28	42	55	68	
Steam Flow (X1000)	Lb/Hr	30	45	58	73	
Throttle Stm. Press.	PSIG	390	390	390	390	
Feedwater to Blr.	*F.	295	318	330	345	
GENERATOR						
Generator Integrator, Start		9419.9	9425.4	9431.1	9440.0	
Generator Integrator, Stop		9422.2	9428.9	9435.7	9445.6	
Generator Integrator, Diff.	MWH	2.3	3.5	4.6	5.6	0.0
Generator Volts	V.	11,600	11,800	12,000	11,800	
Generator Amps	A.	140	216	280	305	
Generator VARS	MVAR	1.5	2.4	3.0	2.0	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	9985.1	9989.6	9993.2	9997.6	
Aux. KWH Mtr. End (X100)	KWH	9987.4	9992.0	9995.7	10000.2	
Aux. Load Indicator	MW	0.23	0.24	0.25	0.26	0.00
Aux. Volts	V.					
Aux. Amps	A.	13.8	13.9	14.0	14.1	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	54739080.0	54744065.0	54749125.0	54756860.0	
Start Test	Time	0705	0900	1030	1217	
F.O. Totalizer-End	Lbs/Hr.	54741265.0	54747174.0	54753092.0	54761770.0	
End Test	Time	0805	1000	1130	1317	
F.O. Diff.	*Lbs/Hr.*	*2185*	*3109*	*3967*	*4910*	*0*
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	229	226	225	222	
F.O. Temp. @ Burner Deck	*F	227	225	225	222	
Sulfur, Wt. %		1.76				
API Gravity @ 60 *F.	API	15.7				
Higher Heating Value	BTU/Gal	148,690				

TEST BY: Raymond K. Ross

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-27-03
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.3	3.5	4.6	5.6	0.0
F.O. Temp. *F.	229	226	225	222	0
F.O. Temp. (Corr.)	0.9413	0.94235	0.9427	0.94375	1.02145
F.O. Usage (Lbs./Hr.)	2185.0	3109.0	3967.0	4910.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	266.1	378.6	483.1	597.9	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,300	3,500	4,600	5,600	0
KW (Aux.)	230	240	250	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,690	148,690	148,690	148,690	148,690
HEAT RATE (APPROX.)	17,468	16,334	15,857	16,122	#DIV/0!
HEAT RATE (APPROX.)N	19,409	17,536	16,769	16,907	#DIV/0!
HEAT RATE (ACTUAL)-G	17,201	16,084	15,615	15,876	#DIV/0!
HEAT RATE (ACTUAL)-N	19,112	17,268	16,512	16,648	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 09-03-03
DATE: 08-27-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	2.3	3.5	4.6	5.6
HEAT RATE(BTU/MW)G	17,201	16,084	15,615	15,876
HEAT RATE(BTU/MW)N	19,112	17,268	16,512	16,648
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$33.1883	act.		
H.H.V. (BTU/GAL)	148,690	act.		

A, B, C CONSTANTS:

GROSS	A=	21,599.13	NET A=	25,724.99
	B=	(2,522.417)	B=	(3,747.109)
	C=	267.4486	C=	379.5999

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	17,624	17,344	16,965	16,738	16,439	16,266	16,047	15,928	15,789	15,723
HEAT RATE(BTU/MW)N	19,749	19,319	18,730	18,375	17,900	17,621	17,260	17,057	16,810	16,683
GROSS (MBTU)	35.248	38.157	42.412	45.193	49.317	52.051	56.164	58.932	63.155	66.036
NET (MBTU)	39.498	42.501	46.824	49.613	53.700	56.388	60.411	63.112	67.241	70.070
COST/KWH	$0.0937	$0.0922	$0.0902	$0.0890	$0.0874	$0.0864	$0.0853	$0.0846	$0.0839	$0.0836
G/KWH	435.45	428.53	419.15	413.56	406.16	401.89	396.48	393.53	390.10	388.47
G/PS-H	317.23	312.20	305.36	301.29	295.90	292.79	288.84	286.70	284.20	283.01

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,664	15,652	15,673	15,714	15,861	15,966	16,093	16,164
HEAT RATE(BTU/MW)N	16,550	16,499	16,479	16,504	16,645	16,761	16,908	16,993
GROSS (MBTU)	70.488	73.563	78.366	81.715	88.820	92.603	96.557	98.601
NET (MBTU)	74.475	77.545	82.397	85.823	93.214	97.217	101.448	103.654
COST/KWH	$0.0832	$0.0832	$0.0833	$0.0835	$0.0843	$0.0848	$0.0855	$0.0859
G/KWH	387.02	386.71	387.25	388.26	391.88	394.48	397.61	399.38
G/PS-H	281.95	281.73	282.12	282.86	285.49	287.39	289.67	290.95

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 06-23-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	4,000	4,600	5,200	5,600
BOILER-TURBINE						
Ambient Air Temp	*F.	82	89	91	92	92
Gas Entering A.H.	*F.	510	510	520	540	560
Gas Leaving A.H.	*F.	300	355	370	385	395
Air Entering A.H.	*F.	82	89	91	92	92
Air Leaving A.H.	*F.	370	380	390	400	405
Circ. Water Inlet	*F.	73.0	73.0	74.0	74.0	74.0
Circ. Water Outlet	*F.	82.4	856.0	87.5	89.4	90.9
Condenser Vacuum	ig.	28.40	28.40	28.30	28.30	28.10
Barometric Pressure	ig.	30.10	30.10	30.10	30.08	30.05
Excess O2	%	1.40	0.90	0.90	0.90	0.90
Feedwater Flow (X1000)	Lb/Hr	36	48	54	62	68
Steam Flow (X1000)	Lb/Hr	38	51	58	66	72
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	310	320	330	340	340
GENERATOR						
Generator Integrator, Start		4575.5	4580.1	4586.3	4594.5	4601.5
Generator Integrator, Stop		4578.5	4584.1	4590.9	4599.7	4607.1
Generator Integrator, Diff.	MWH	3.0	4.0	4.6	5.2	5.6
Generator Volts	V.	11,700	12,000	11,800	12,000	11,900
Generator Amps	A.	172	250	280	310	310
Generator VARS	MVAR	2.0	3.0	3.1	3.1	2.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	7013.6	7017.0	7020.8	7025.2	7028.6
Aux. KWH Mtr. End (X100)	KWH	7016.0	7019.5	7023.3	7027.7	7031.6
Aux. Load Indicator	MW	0.24	0.25	0.25	0.25	0.30
Aux. Volts	V.					
Aux. Amps	A.	14.1	15.0	15.0	15.5	15.7
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	50007422.0	50011500.0	50017000.0	50024141.0	50030220.0
Start Test	Time	0655	0820	0950	1135	1255
F.O. Totalizer-End	Lbs/Hr.	50010100.0	50015033.0	50020987.0	50028613.0	50035068.0
End Test	Time	0755	0920	1050	1235	1355
F.O. Diff.	Lbs/Hr.	2678	3533	3987	4472	4848
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	225	225	222	220
F.O. Temp. @ Burner Deck	*F	222	222	222	222	220
Sulfur, Wt. %		1.70				
API Gravity @ 60 *F.	API	15.9				
Higher Heating Value	BTU/Gal	147,762				

TEST BY: Raymond K. Ross

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-23-03
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	4.0	4.6	5.2	5.6
F.O. Temp. *F.	225	225	225	222	220
F.O. Temp. (Corr.)	0.9427	0.9427	0.9427	0.94375	0.94445
F.O. Usage (Lbs./Hr.)	2678.0	3533.0	3987.0	4472.0	4848.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	326.1	430.2	485.5	544.6	590.4
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	4,000	4,600	5,200	5,600
KW (Aux.)	240	250	250	250	300
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	147,762	147,762	147,762	147,762	147,762
HEAT RATE (APPROX.)	16,414	16,241	15,937	15,813	15,919
HEAT RATE (APPROX.)N	17,841	17,324	16,853	16,612	16,820
HEAT RATE (ACTUAL)-G	16,062	15,893	15,596	15,474	15,577
HEAT RATE (ACTUAL)-N	17,459	16,952	16,492	16,256	16,459

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 06-27-03
DATE: 06-23-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.0	4.0	4.6	5.2	5.6
HEAT RATE(BTU/MW)G	16,062	15,893	15,596	15,474	15,577
HEAT RATE(BTU/MW)N	17,459	16,952	16,492	16,256	16,459
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$29.8895	act.			
H.H.V. (BTU/GAL)	147,762	act.			

A, B, C CONSTANTS:

GROSS	A=	17,595.74	NET A=	21,378.34
	B=	(650.879)	B=	(1,750.509)
	C=	49.7598	C=	152.4229

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,493	16,405	16,280	16,201	16,091	16,022	15,927	15,869	15,788	15,740
HEAT RATE(BTU/MW)N	18,487	18,265	17,955	17,763	17,499	17,338	17,119	16,988	16,815	16,715
GROSS (MBTU)	32.986	36.090	40.699	43.743	48.273	51.272	55.745	58.714	63.154	66.107
NET (MBTU)	36.974	40.183	44.887	47.960	52.496	55.480	59.916	62.856	67.260	70.203
COST/KWH	$0.0794	$0.0790	$0.0784	$0.0780	$0.0775	$0.0772	$0.0767	$0.0764	$0.0760	$0.0758
G/KWH	407.50	405.32	402.23	400.29	397.57	395.87	393.52	392.08	390.09	388.89
G/PS-H	296.87	295.28	293.03	291.62	289.64	288.40	286.69	285.64	284.19	283.32

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,674	15,636	15,585	15,557	15,511	15,495	15,482	15,477
HEAT RATE(BTU/MW)N	16,588	16,518	16,436	16,397	16,355	16,353	16,363	16,372
GROSS (MBTU)	70.535	73.488	77.927	80.895	86.863	89.868	92.891	94.409
NET (MBTU)	74.644	77.634	82.182	85.266	91.591	94.847	98.175	99.869
COST/KWH	$0.0755	$0.0753	$0.0751	$0.0749	$0.0747	$0.0746	$0.0746	$0.0745
G/KWH	387.28	386.32	385.07	384.37	383.24	382.83	382.52	382.40
G/PS-H	282.14	281.44	280.54	280.02	279.20	278.90	278.67	278.58

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 01-20-03

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	3,500	4,500	2,600	6,000
BOILER-TURBINE						
Ambient Air Temp	*F.	80	81	80	83	81
Gas Entering A.H.	*F.	500	510	550	590	605
Gas Leaving A.H.	*F.	340	343	373	398	420
Air Entering A.H.	*F.	79	80	80	81	80
Air Leaving A.H.	*F.	375	380	400	415	425
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0	71.0
Circ. Water Outlet	*F.	81.8	83.0	86.8	90.0	91.7
Condenser Vacuum	Ig.	29.00	28.90	28.70	28.30	28.20
Barometric Pressure	Ig.	29.93	29.96	29.98	29.98	29.97
Excess O2	%	2.00	1.30	1.10	0.97	1.10
Feedwater Flow (X1000)	Lb/Hr	34	39	53	67	72
Steam Flow (X1000)	Lb/Hr	38	43	58	73	79
Throttle Stm. Press.	PSIG	393	393	393	393	393
Feedwater to Blr.	*F.	725	140	780	805	815

GENERATOR		0641	0804	0935	1054	1124
Generator Integrator, Start		1908.6	1912.9	1918.5	1924.7	1933.3
Generator Integrator, Stop		1911.6	1916.3	1923.1	1930.3	1939.3
Generator Integrator, Diff.	MWH	3.0	3.4	4.6	5.6	6.0
Generator Volts	V.	11,700	11,800	11,800	11,900	11,700
Generator Amps	A.	164	180	256	308	310
Generator VARS	MVAR	1.7	1.5	2.3	2.1	1.0

AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	9682.9	9686.1	9689.8	9693.1	9696.9
Aux. KWH Mtr. End (X100)	KWH	9685.2	9688.5	9692.2	9695.6	9699.5
Aux. Load Indicator	MW	0.23	0.24	0.24	0.25	0.26
Aux. Volts	V.					
Aux. Amps	A.	14.1	14.1	14.3	14.5	15.0

FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	38088537.0	38092181.0	38097024.0	38102293.0	38109665.0
Start Test	Time	0642	0805	0936	1035	1125
F.O. Totalizer-End	Lbs/Hr.	38091087.0	38095084.0	38100909.0	38107121.0	38114847.0
End Test	Time	1742	0905	1036	1155	1325
F.O. Diff.	Lbs/Hr.	2550	2903	3885	4828	5182

EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2

FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	226	214	211	208	207
F.O. Temp. @ Burner Deck	*F	211	212	210	208	207
Sulfur, Wt. %		1.28				
API Gravity @ 60 *F.	API	13.2				
Higher Heating Value	BTU/Gal	150,143				

TEST BY: J.Kealiinohomoku

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-20-03
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	3.5	4.5	2.6	6.0
F.O. Temp. *F.	226	214	211	208	207
F.O. Temp. (Corr.)	0.94235	0.94655	0.9476	0.94865	0.949
F.O. Usage (Lbs./Hr.)	2550.0	2903.0	3885.0	4828.0	5182.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	310.5	353.5	473.1	587.9	631.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	3,400	4,600	5,600	6,000
KW (Aux.)	230	240	240	250	260
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,143	150,143	150,143	150,143	150,143
HEAT RATE (APPROX.)	15,630	15,700	15,530	15,853	15,881
HEAT RATE (APPROX.)N	16,927	16,892	16,384	16,594	16,600
HEAT RATE (ACTUAL)-G	15,541	15,611	15,441	15,763	15,791
HEAT RATE (ACTUAL)-N	16,831	16,796	16,291	16,499	16,506

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 01-23-03
DATE: 01-20-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.0	4.6	5.6	6.0
HEAT RATE(BTU/MW)G	15,541	15,441	15,763	15,791
HEAT RATE(BTU/MW)N	16,831	16,291	16,499	16,506
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$28.8636 act.			
H.H.V. (BTU/GAL)	150,143 act.			

A, B, C CONSTANTS:

GROSS	A=	17,006.57	NET A=	19,937.13
	B=	(785.724)	B=	(1,510.612)
	C=	98.3954	C=	157.7456

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,829	15,754	15,657	15,602	15,535	15,500	15,462	15,446	15,438	15,442
HEAT RATE(BTU/MW)N	17,547	17,377	17,147	17,008	16,825	16,718	16,582	16,507	16,419	16,375
GROSS (MBTU)	31.657	34.659	39.143	42.127	46.605	49.599	54.117	57.152	61.752	64.857
NET (MBTU)	35.094	38.230	42.866	45.923	50.475	53.499	58.038	61.077	65.674	68.776
COST/KWH	$0.0725	$0.0721	$0.0717	$0.0714	$0.0711	$0.0709	$0.0708	$0.0707	$0.0707	$0.0707
G/KWH	391.09	389.25	386.85	385.50	383.83	382.96	382.02	381.64	381.43	381.54
G/PS-H	284.92	283.58	281.83	280.84	279.63	279.00	278.31	278.04	277.88	277.96

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,463	15,487	15,538	15,581	15,692	15,759	15,834	15,875
HEAT RATE(BTU/MW)N	16,334	16,322	16,328	16,347	16,425	16,482	16,552	16,592
GROSS (MBTU)	69.585	72.790	77.689	81.023	87.876	91.404	95.007	96.837
NET (MBTU)	73.502	76.713	81.639	85.006	91.978	95.596	99.314	101.212
COST/KWH	$0.0708	$0.0709	$0.0711	$0.0713	$0.0718	$0.0721	$0.0725	$0.0727
G/KWH	382.06	382.65	383.90	384.98	387.71	389.37	391.23	392.23
G/PS-H	278.34	278.77	279.68	280.47	282.46	283.67	285.02	285.75

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 12-23-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	3,500	4,500	5,000	5,500
BOILER-TURBINE						
Ambient Air Temp	*F.	81	82	82	82	82
Gas Entering A.H.	*F.	495	505	540	560	575
Gas Leaving A.H.	*F.	335	340	368	382	392
Air Entering A.H.	*F.	76	79	84	85	84
Air Leaving A.H.	*F.	378	380	395	405	410
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0	71.0
Circ. Water Outlet	*F.	82.0	83.0	86.0	88.0	89.0
Condenser Vacuum	Ig.	29.30	29.20	28.90	28.80	286.00
Barometric Pressure	Ig.	30.16	30.16	30.16	30.11	30.09
Excess O2	%	1.80	1.30	1.00	0.90	0.90
Feedwater Flow (X1000)	Lb/Hr	35	39	52	58	63
Steam Flow (X1000)	Lb/Hr	39	44	58	64	69
Throttle Stm. Press.	PSIG	393	393	393	393	393
Feedwater to Blr.	*F.	730	740	775	785	800
GENERATOR						
Generator Integrator, Start		9722.1	9726.6	9733.4	9741.4	9746.7
Generator Integrator, Stop		9725.1	9730.1	9738.0	9746.5	9752.2
Generator Integrator, Diff.	MWH	3.0	3.5	4.6	5.1	5.5
Generator Volts	V.	11,800	11,700	11,800	11,800	11,800
Generator Amps	A.	178	198	260	280	300
Generator VARS	MVAR	2.0	2.0	2.5	2.4	2.2
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	8371.4	8374.9	8379.3	8383.5	8386.2
Aux. KWH Mtr. End (X100)	KWH	8373.8	8377.3	8381.8	8386.1	8388.7
Aux. Load Indicator	MW	0.24	0.24	0.25	0.26	0.25
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.1	14.9	15.0	15.2
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	36042408.0	36046459.0	36052282.0	36059114.0	36063599.0
Start Test	Time	0704	0833	1019	1201	1304
F.O. Totalizer-End	Lbs/Hr.	36045067.0	36049437.0	36056154.0	36063372.0	36068212.0
End Test	Time	0804	0938	1119	1301	1404
F.O. Diff.	Lbs/Hr.	2659	2978	3872	4258	4613
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes *	Yes *	Yes *	Yes *	Yes *
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	223	222	217	218	215
F.O. Temp. @ Burner Deck	*F	218	220	215	216	215
Sulfur, Wt. %		1.10				
API Gravity @ 60 *F.	API	14.0				
Higher Heating Value	BTU/Gal	149,833				

TEST BY: G.Graf

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-23-02
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	3.5	4.5	5.0	5.5
F.O. Temp. *F.	223	222	217	218	215
F.O. Temp. (Corr.)	0.9434	0.94375	0.9455	0.94515	0.9462
F.O. Usage (Lbs./Hr.)	2659.0	2978.0	3872.0	4258.0	4613.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	323.8	362.6	471.5	518.5	561.7
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	3,500	4,600	5,100	5,500
KW (Aux.)	240	240	250	260	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,833	149,833	149,833	149,833	149,833
HEAT RATE (APPROX.)	16,298	15,645	15,478	15,352	15,422
HEAT RATE (APPROX.)N	17,715	16,797	16,367	16,177	16,157
HEAT RATE (ACTUAL)-G	16,172	15,524	15,358	15,233	15,303
HEAT RATE (ACTUAL)-N	17,578	16,667	16,241	16,052	16,032

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 12-27-02
DATE: 12-23-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		3.5	4.6	5.1	5.5
HEAT RATE(BTU/MW)G		15,524	15,358	15,233	15,303
HEAT RATE(BTU/MW)N		16,667	16,241	16,052	16,032
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$31.5767	act.			
H.H.V. (BTU/GAL)	149,833	act.			

A, B, C CONSTANTS:

GROSS	A=	17,285.60	NET A=	19,619.67
	B=	(741.808)	B=	(1,170.568)
	C=	68.5670	C=	93.7050

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,076	15,985	15,860	15,783	15,677	15,614	15,529	15,480	15,415	15,380
HEAT RATE(BTU/MW)N	17,653	17,498	17,279	17,142	16,951	16,833	16,671	16,571	16,437	16,356
GROSS (MBTU)	32.153	35.168	39.649	42.613	47.032	49.965	54.352	57.274	61.662	64.594
NET (MBTU)	35.307	38.495	43.197	46.284	50.854	53.867	58.347	61.314	65.747	68.696
COST/KWH	$0.0807	$0.0802	$0.0796	$0.0792	$0.0787	$0.0783	$0.0779	$0.0777	$0.0774	$0.0772
G/KWH	397.20	394.96	391.85	389.95	387.35	385.78	383.69	382.46	380.88	379.99
G/PS-H	289.37	287.74	285.47	284.09	282.19	281.05	279.53	278.63	277.48	276.83

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,336	15,314	15,291	15,282	15,282	15,290	15,303	15,312
HEAT RATE(BTU/MW)N	16,250	16,188	16,109	16,067	16,003	15,983	15,970	15,966
GROSS (MBTU)	69.012	71.975	76.454	79.468	85.578	88.680	91.819	93.403
NET (MBTU)	73.123	76.083	80.547	83.546	89.617	92.699	95.818	97.392
COST/KWH	$0.0770	$0.0768	$0.0767	$0.0767	$0.0767	$0.0767	$0.0768	$0.0768
G/KWH	378.91	378.36	377.80	377.59	377.57	377.77	378.10	378.32
G/PS-H	276.05	275.65	275.23	275.08	275.07	275.21	275.46	275.62

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 08-14-02

Note: No LO-1 added

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	3,500	4,500	5,000	5,500
BOILER-TURBINE						
Ambient Air Temp	*F.	93	95	96	96	98
Gas Entering A.H.	*F.	500	505	536	555	575
Gas Leaving A.H.	*F.	350	355	376	388	400
Air Entering A.H.	*F.	93	95	96	96	98
Air Leaving A.H.	*F.	388	380	390	398	418
Circ. Water Inlet	*F.	73.0	74.0	74.0	74.0	74.0
Circ. Water Outlet	*F.	81.2	82.5	85.3	86.6	88.1
Condenser Vacuum	Ig.	29.20	29.10	29.00	28.90	28.80
Barometric Pressure	Ig.	30.00	30.03	30.09	30.09	30.06
Excess O2	%	2.63	2.31	1.91	1.87	1.80
Feedwater Flow (X1000)	Lb/Hr	36	42	54	60	67
Steam Flow (X1000)	Lb/Hr	37	43	56	62	69
Throttle Stm. Press.	PSIG	395	395	395	394	394
Feedwater to Blr.	*F.	312	320	338	342	350
GENERATOR						
Generator Integrator, Start		9066.6	9071.4	9078.9	9085.9	9093.6
Generator Integrator, Stop		9069.6	9074.9	9083.5	9090.9	9099.1
Generator Integrator, Diff.	MWH	3.0	3.5	4.6	5.0	5.5
Generator Volts	V.	11,800	11,750	11,800	11,800	11,800
Generator Amps	A.	183	205	258	275	300
Generator VARS	MVAR	2.6	2.5	2.5	2.5	2.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	2185.8	2189.4	2193.9	2197.6	2201.3
Aux. KWH Mtr. End (X100)	KWH	2188.2	2191.7	2196.3	2200.0	2203.8
Aux. Load Indicator	MW	0.24	0.23	0.24	0.24	0.25
Aux. Volts	V.					
Aux. Amps	A.	13.8	14.0	14.0	14.0	15.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	26347326.0	26351340.0	26357598.0	26363442.0	26369823.0
Start Test	Time	0604	0735	0930	1100	1230
F.O. Totalizer-End	Lbs/Hr.	26349851.0	26354274.0	26361387.0	26367571.0	26374382.0
End Test	Time	0704	0835	1030	1200	1330
F.O. Diff.	Lbs/Hr.	2525	2934	3789	4129	4559
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes *	Yes *	Yes *	Yes *	Yes *
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	234	225	223	220	220
F.O. Temp. @ Burner Deck	*F	229	222	222	218	219
Sulfur, Wt. %		1.75				
API Gravity @ 60 *F.	API	13.3				
Higher Heating Value	BTU/Gal	149,452				

TEST BY: G Graf

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-14-02
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	3.5	4.5	5.0	5.5
F.O. Temp. *F.	234	225	223	220	220
F.O. Temp. (Corr.)	0.93955	0.9427	0.9434	0.94445	0.94445
F.O. Usage (Lbs./Hr.)	2525.0	2934.0	3789.0	4129.0	4559.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	307.5	357.3	461.4	502.8	555.2
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	3,500	4,600	5,000	5,500
KW (Aux.)	240	230	240	240	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,452	149,452	149,452	149,452	149,452
HEAT RATE (APPROX.)	15,476	15,414	15,146	15,185	15,242
HEAT RATE (APPROX.)N	16,822	16,498	15,980	15,950	15,968
HEAT RATE (ACTUAL)-G	15,318	15,256	14,991	15,029	15,086
HEAT RATE (ACTUAL)-N	16,650	16,329	15,816	15,787	15,804

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: No LO-1 added

KPP UNIT NO. 2
DATE: 08-14-02

Fuel Oil Tested: 08/21/02
Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.0	3.5	4.6	5.0	5.5
HEAT RATE(BTU/MW)G	15,318	15,256	14,991	15,029	15,086
HEAT RATE(BTU/MW)N	16,650	16,329	15,816	15,787	15,804
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$27.3036	act.			
H.H.V. (BTU/GAL)	149,452	act.			

A, B, C CONSTANTS:

GROSS	A=	17,291.03	NET A=	20,828.04
	B=	(938.848)	B=	(1,955.964)
	C=	97.3071	C=	189.3715

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,803	15,697	15,552	15,466	15,350	15,283	15,197	15,149	15,093	15,064
HEAT RATE(BTU/MW)N	17,674	17,441	17,122	16,927	16,664	16,508	16,302	16,183	16,034	15,954
GROSS (MBTU)	31.605	34.532	38.880	41.757	46.051	48.906	53.190	56.053	60.370	63.270
NET (MBTU)	35.347	38.371	42.804	45.704	49.993	52.826	57.057	59.879	64.137	67.005
COST/KWH	$0.0687	$0.0683	$0.0676	$0.0673	$0.0668	$0.0665	$0.0661	$0.0659	$0.0656	$0.0655
G/KWH	390.44	387.82	384.25	382.11	379.27	377.61	375.48	374.30	372.90	372.20
G/PS-H	284.45	282.54	279.94	278.38	276.30	275.10	273.55	272.69	271.67	271.16

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,037	15,028	15,029	15,040	15,085	15,119	15,161	15,185
HEAT RATE(BTU/MW)N	15,861	15,818	15,783	15,778	15,813	15,854	15,910	15,943
GROSS (MBTU)	67.665	70.631	75.147	78.209	84.476	87.691	90.966	92.628
NET (MBTU)	71.374	74.346	78.913	82.044	88.555	91.953	95.458	97.253
COST/KWH	$0.0654	$0.0654	$0.0654	$0.0654	$0.0656	$0.0658	$0.0659	$0.0661
G/KWH	371.52	371.30	371.34	371.61	372.71	373.56	374.59	375.18
G/PS-H	270.66	270.50	270.53	270.72	271.53	272.14	272.90	273.33

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 04-24-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,500	6,000
BOILER-TURBINE						
Ambient Air Temp	*F.	90	90	92	92	94
Gas Entering A.H.	*F.	470	498	525	570	580
Gas Leaving A.H.	*F.	350	355	370	395	405
Air Entering A.H.	*F.	90	90	92	92	94
Air Leaving A.H.	*F.	360	360	380	400	418
Circ. Water Inlet	*F.	73.0	74.0	74.0	74.0	74.0
Circ. Water Outlet	*F.	79.8	82.5	84.8	88.0	89.7
Condenser Vacuum	ig.	28.20	29.10	29.00	28.80	28.60
Barometric Pressure	ig.	30.11	30.12	30.12	30.10	30.10
Excess O2	%	3.10	2.18	1.59	1.71	1.50
Feedwater Flow (X1000)	Lb/Hr	31	43	55	67	72
Steam Flow (X1000)	Lb/Hr	32	45	56	70	76
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	291	312	328	342	350
GENERATOR						
Generator Integrator, Start		250.9	255.8	261.4	269.5	277.0
Generator Integrator, Stop		253.4	259.4	265.9	275.0	283.0
Generator Integrator, Diff.	MWH	2.5	3.6	4.5	5.5	6.0
Generator Volts	V.	11,700	11,800	11,800	11,700	11,500
Generator Amps	A.	143	192	248	298	310
Generator VARS	MVAR	1.5	1.8	2.0	1.7	1.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	7017.7	7021.5	7025.0	7028.9	7032.2
Aux. KWH Mtr. End (X100)	KWH	7019.9	7023.9	7027.4	7031.4	7034.6
Aux. Load Indicator	MW	0.22	0.24	0.24	0.25	0.24
Aux. Volts	V.					
Aux. Amps	A.	12.0	14.0	14.0	14.0	14.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	18335629.0	18339793.0	18344458.0	18351193.0	18357451.0
Start Test	Time	0640	0822	0950	1130	1250
F.O. Totalizer-End	Lbs/Hr.	18337776.0	18342800.0	18348223.0	18355782.0	18362496.0
End Test	Time	0740	0922	1050	1230	1350
F.O. Diff.	Lbs/Hr.	2147	3007	3765	4589	5045
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes *	Yes *	Yes *	Yes *	Yes *
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	213	215	215	215	216
F.O. Temp. @ Burner Deck	*F	212	214	214	212	214
Sulfur, Wt. %		1.82				
API Gravity @ 60 *F.	API	11.4				
Higher Heating Value	BTU/Gal	150,857	TEST BY: G.Graf			

* F.O. Htr & atomizing steam.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-24-02
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.5	5.5	6.0
F.O. Temp. *F.	213	215	215	215	216
F.O. Temp. (Corr.)	0.9469	0.9462	0.9462	0.9462	0.94585
F.O. Usage (Lbs./Hr.)	2147.0	3007.0	3765.0	4589.0	5045.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	261.4	366.2	458.5	558.8	614.3
PT RATIO	1.000	1.000	1.000	1.000	1.000
KW (Gen.)	2,500	3,600	4,500	5,500	6,000
KW (Aux.)	220	240	240	250	240
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,857	150,857	150,857	150,857	150,857
HEAT RATE (APPROX.)	15,791	15,359	15,384	15,342	15,461
HEAT RATE (APPROX.)N	17,315	16,456	16,251	16,073	16,105
HEAT RATE (ACTUAL)-G	15,776	15,344	15,370	15,328	15,446
HEAT RATE (ACTUAL)-N	17,299	16,440	16,236	16,057	16,090

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
Page 91 of 362

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 04-30-02
DATE: 04-24-02 — Tested by: E.Wong/S.Oshiro

DATA:

GENERATED (MW)	2.5	3.6	4.5	5.5	6.0
HEAT RATE(BTU/MW)G	15,776	15,344	15,370	15,328	15,446
HEAT RATE(BTU/MW)N	17,299	16,440	16,236	16,057	16,090
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$20.1779	act.			
H.H.V. (BTU/GAL)	150,857	act.			

A, B, C CONSTANTS:

GROSS A=	17,383.03	NET A=	20,306.24
B=	(884.362)	B=	(1,579.449)
C=	93.5935	C=	146.5978

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,989	15,890	15,757	15,678	15,572	15,511	15,434	15,392	15,343	15,320
HEAT RATE(BTU/MW)N	17,734	17,541	17,274	17,110	16,887	16,753	16,574	16,469	16,334	16,259
GROSS (MBTU)	31.977	34.959	39.393	42.329	46.717	49.637	54.020	56.951	61.372	64.343
NET (MBTU)	35.467	38.590	43.185	46.198	50.662	53.610	58.009	60.936	65.336	68.286
COST/KWH	$0.0509	$0.0506	$0.0502	$0.0499	$0.0496	$0.0494	$0.0492	$0.0490	$0.0489	$0.0488
G/KWH	395.04	392.61	389.32	387.35	384.75	383.25	381.34	380.30	379.09	378.51
G/PS-H	287.80	286.03	283.63	282.20	280.30	279.21	277.82	277.06	276.18	275.75

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,299	15,294	15,301	15,315	15,366	15,402	15,446	15,471
HEAT RATE(BTU/MW)N	16,167	16,121	16,074	16,057	16,059	16,077	16,107	16,127
GROSS (MBTU)	68.844	71.882	76.505	79.639	86.048	89.333	92.677	94.373
NET (MBTU)	72.753	75.770	80.370	83.497	89.928	93.247	96.642	98.372
COST/KWH	$0.0487	$0.0487	$0.0487	$0.0488	$0.0489	$0.0491	$0.0492	$0.0493
G/KWH	377.99	377.88	378.05	378.40	379.65	380.55	381.64	382.25
G/PS-H	275.38	275.29	275.42	275.67	276.58	277.24	278.03	278.48

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 02-01-02

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	3,000	3,500	4,100	4,600	5,300
BOILER-TURBINE						
Ambient Air Temp	*F.	95	96	98	102	100
Gas Entering A.H.	*F.	505	510	520	550	575
Gas Leaving A.H.	*F.	340	360	375	396	415
Air Entering A.H.	*F.	95	96	98	102	100
Air Leaving A.H.	*F.	340	340	340	350	365
Circ. Water Inlet	*F.	74.0	74.0	74.0	74.0	74.0
Circ. Water Outlet	*F.	82.0	83.0	85.0	86.0	88.0
Condenser Vacuum	ig.	29.00	29.00	28.90	28.80	28.50
Barometric Pressure	ig.	30.17	30.17	30.18	30.17	30.12
Excess O2	%	1.80	1.40	1.10	1.00	1.00
Feedwater Flow (X1000)	Lb/Hr	38	44	50	56	65
Steam Flow (X1000)	Lb/Hr	38	45	51	58	67
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	315	320	325	335	345
GENERATOR						
Generator Integrator, Start		6688.4	6693.2	6698.7	6705.0	6712.1
Generator Integrator, Stop		6691.4	6696.7	6702.8	6709.6	6717.4
Generator Integrator, Diff.	MWH	3.0	3.5	4.1	4.6	5.3
Generator Volts	V.	11,800	11,800	11,900	12,000	11,900
Generator Amps	A.	180	210	245	280	285
Generator VARS	MVAR	2.2	2.5	3.0	3.3	2.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	4929.9	4933.4	4937.1	4940.8	4944.6
Aux. KWH Mtr. End (X100)	KWH	4932.3	4935.9	4939.6	4943.3	4947.1
Aux. Load Indicator	MW	0.24	0.25	0.25	0.25	0.25
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.5	15.0	15.0	15.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	14897518.0	14902208.0	14907570.0	14913590.0	14920450.0
Start Test	Time	0650	0820	0950	1120	1250
F.O. Totalizer-End	Lbs/Hr.	14900535.0	14905640.0	14911435.0	14917975.0	14925515.0
End Test	Time	0750	0920	1050	1220	1350
F.O. Diff.	Lbs/Hr.	3017	3432	3865	4385	5065
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	127/195	127/200	128/198	125/200	120/200
F.O. Temp. @ Burner Deck	*F	198	201	202	203	204
Sulfur, Wt. %		1.86				
API Gravity @ 60 *F.	API	11.2				
Higher Heating Value	BTU/Gal	150,381				

TEST BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-01-02
KPP UNIT NO. 2

	TEST LOADS - MW				
	3.0	3.5	4.1	4.6	5.3
F.O. Temp. *F.	127/195	127/200	128/198	125/200	120/200
F.O. Temp. (Corr.)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!
F.O. Usage (Lbs./Hr.)	3017.0	3432.0	3865.0	4385.0	5065.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	367.4	417.9	470.7	534.0	616.8
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	3,000	3,500	4,100	4,600	5,300
KW (Aux.)	240	250	250	250	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,381	150,381	150,381	150,381	150,381
HEAT RATE (APPROX.)	18,492	18,030	17,334	17,528	17,572
HEAT RATE (APPROX.)N	20,100	19,417	18,459	18,536	18,442
HEAT RATE (ACTUAL)-G	18,416	17,957	17,263	17,456	17,500
HEAT RATE (ACTUAL)-N	20,018	19,338	18,384	18,460	18,367

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 02-05-02
DATE: 02-01-02 — Tested by: E.Wong

DATA:

GENERATED (MW)	3.0	3.5	4.1	4.6	5.3
HEAT RATE(BTU/MW)G	18,416	17,957	17,263	17,456	17,500
HEAT RATE(BTU/MW)N	20,018	19,338	18,384	18,460	18,367
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$19.7084	act.			
H.H.V. (BTU/GAL)	150,381	act.			

A, B, C CONSTANTS:

GROSS	A=	26,420.19	NET A=	30,375.17
	B=	(3,940.779)	B=	(4,985.019)
	C=	426.9531	C=	514.0588

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	20,246	19,817	19,237	18,893	18,440	18,182	17,858	17,684	17,488	17,400
HEAT RATE(BTU/MW)N	22,461	21,896	21,125	20,663	20,047	19,687	19,225	18,968	18,660	18,506
GROSS (MBTU)	40.493	43.597	48.092	51.010	55.321	58.181	62.502	65.432	69.953	73.082
NET (MBTU)	44.923	48.172	52.814	55.790	60.140	62.999	67.287	70.182	74.640	77.726
COST/KWH	$0.0632	$0.0618	$0.0600	$0.0590	$0.0575	$0.0567	$0.0557	$0.0552	$0.0546	$0.0543
G/KWH	500.24	489.63	475.29	466.79	455.62	449.22	441.22	436.93	432.09	429.92
G/PS-H	364.44	356.70	346.26	340.07	331.93	327.27	321.44	318.32	314.79	313.21

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	17,332	17,330	17,390	17,473	17,741	17,926	18,146	18,268
HEAT RATE(BTU/MW)N	18,352	18,301	18,302	18,353	18,580	18,755	18,971	19,095
GROSS (MBTU)	77.996	81.451	86.951	90.859	99.350	103.973	108.875	111.437
NET (MBTU)	82.585	86.015	91.508	95.437	104.048	108.779	113.827	116.478
COST/KWH	$0.0541	$0.0541	$0.0543	$0.0545	$0.0554	$0.0559	$0.0566	$0.0570
G/KWH	428.24	428.18	429.67	431.71	438.34	442.92	448.34	451.36
G/PS-H	311.98	311.94	313.02	314.51	319.34	322.67	326.62	328.83

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 12-26-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,600	3,000	3,500	4,500	5,000
BOILER-TURBINE						
Ambient Air Temp	*F.	94	95	93	93	95
Gas Entering A.H.	*F.	490	475	500	535	550
Gas Leaving A.H.	*F.	330	343	355	380	390
Air Entering A.H.	*F.	94	95	93	93	95
Air Leaving A.H.	*F.	336	336	338	350	360
Circ. Water Inlet	*F.	72.0	72.0	71.0	72.0	72.0
Circ. Water Outlet	*F.	80.5	81.4	82.5	85.4	86.9
Condenser Vacuum	Ig.	28.90	28.80	28.80	28.55	28.40
Barometric Pressure	Ig.	30.02	30.05	30.08	30.09	30.08
Excess O2	%	2.13	2.35	2.02	1.76	1.71
Feedwater Flow (X1000)	Lb/Hr	32	38	42	57	63
Steam Flow (X1000)	Lb/Hr	35	39	45	58	64
Throttle Stm. Press.	PSIG	390	392	391	390	390
Feedwater to Blr.	*F.	290	305	310	328	335
GENERATOR						
Generator Integrator, Start		2648.2	2652.0	2656.7	2662.0	2669.0
Generator Integrator, Stop		2650.9	2655.1	2660.2	2666.5	2674.0
Generator Integrator, Diff.	MWH	2.7	3.1	3.5	4.5	5.0
Generator Volts	V.	11,500	11,500	11,500	11,500	11,500
Generator Amps	A.	150	170	183	230	250
Generator VARS	MVAR	1.9	3.0	2.0	2.3	2.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	2715.9	2719.2	2722.8	2726.4	2730.3
Aux. KWH Mtr. End (X100)	KWH	2718.3	2721.7	2725.3	2729.0	2732.9
Aux. Load Indicator	MW	0.24	0.25	0.25	0.26	0.26
Aux. Volts	V.					
Aux. Amps	A.	11.2	11.2	11.2	11.6	11.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	11009084.0	11012816.0	11017397.0	11022511.0	11029223.0
Start Test	Time	0600	0722	0850	1015	1145
F.O. Totalizer-End	Lbs/Hr.	11011727.0	11015841.0	11020790.0	11026860.0	11033961.0
End Test	Time	0700	0822	0950	1115	1245
F.O. Diff.	Lbs/Hr.	2643	3025	3393	4349	4738
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	222	222	223	225	225
F.O. Temp. @ Burner Deck	*F	210	208	209	212	212
Sulfur, Wt. %						
API Gravity @ 60 *F.	API					
Higher Heating Value	BTU/Gal					

TEST BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-26-01
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.6	3.0	3.5	4.5	5.0
F.O. Temp. *F.	222	222	223	225	225
F.O. Temp. (Corr.)	0.94375	0.94375	0.9434	0.9427	0.9427
F.O. Usage (Lbs./Hr.)	2643.0	3025.0	3393.0	4349.0	4738.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	321.8	368.4	413.2	529.6	577.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,700	3,100	3,500	4,500	5,000
KW (Aux.)	240	250	250	260	260
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)	18,000	17,943	17,826	17,771	17,424
HEAT RATE (APPROX.)N	19,756	19,517	19,197	18,860	18,380
HEAT RATE (ACTUAL)-G	0	0	0	0	0
HEAT RATE (ACTUAL)-N	0	0	0	0	0

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested:
DATE: 12-26-01 — Tested by:

DATA:				
GENERATED (MW)	2.7	3.1	3.5	4.5
HEAT RATE(BTU/MW)G	18,000	17,943	17,826	17,771
HEAT RATE(BTU/MW)N	19,756	19,517	19,197	18,860
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$25.5897	act.		
H.H.V. (BTU/GAL)	151,000	est.		

A, B, C CONSTANTS:

GROSS	A=	19,254.41	NET A=	23,240.73
	B=	(656.777)	B=	(1,749.677)
	C=	72.5624	C=	172.3120

PREDICTED VALUES:										
GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	18,231	18,161	18,066	18,010	17,937	17,896	17,845	17,818	17,788	17,776
HEAT RATE(BTU/MW)N	20,431	20,225	19,943	19,773	19,543	19,406	19,228	19,126	18,999	18,932
GROSS (MBTU)	36.462	39.954	45.165	48.627	53.811	57.266	62.456	65.926	71.153	74.659
NET (MBTU)	40.861	44.496	49.859	53.386	58.628	62.100	67.297	70.766	75.996	79.513
COST/KWH	$0.0736	$0.0733	$0.0729	$0.0727	$0.0724	$0.0722	$0.0720	$0.0719	$0.0718	$0.0717
G/KWH	450.44	448.70	446.36	444.98	443.18	442.16	440.89	440.23	439.50	439.20
G/PS-H	328.16	326.89	325.19	324.18	322.87	322.12	321.20	320.72	320.19	319.97

PREDICTED VALUES (CONT.):								
GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	17,768	17,770	17,785	17,801	17,852	17,886	17,926	17,948
HEAT RATE(BTU/MW)N	18,857	18,824	18,800	18,802	18,846	18,889	18,946	18,979
GROSS (MBTU)	79.957	83.521	88.923	92.567	99.971	103.739	107.556	109.484
NET (MBTU)	84.854	88.471	94.001	97.769	105.539	109.557	113.675	115.775
COST/KWH	$0.0717	$0.0717	$0.0718	$0.0718	$0.0720	$0.0722	$0.0723	$0.0724
G/KWH	439.01	439.06	439.41	439.82	441.08	441.92	442.91	443.45
G/PS-H	319.83	319.87	320.12	320.42	321.34	321.95	322.67	323.07

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 09-19-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,600	3,500	4,500	5,000	5,500
BOILER-TURBINE						
Ambient Air Temp	*F.	92	92	93	94	96
Gas Entering A.H.	*F.	490	490	505	535	555
Gas Leaving A.H.	*F.	345	325	355	400	412
Air Entering A.H.	*F.					
Air Leaving A.H.	*F.	330	325	340	350	360
Circ. Water Inlet	*F.	72.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	80.3	82.4	85.3	86.8	88.3
Condenser Vacuum	Ig.	29.10	28.80	28.70	28.60	28.50
Barometric Pressure	Ig.	30.11	30.12	30.12	30.12	30.12
Excess O2	%	2.80	2.14	1.53	1.47	1.48
Feedwater Flow (X1000)	Lb/Hr	32	42	55	61	67
Steam Flow (X1000)	Lb/Hr	33	43	56	63	69
Throttle Stm. Press.	PSIG	391	392	392	392	392
Feedwater to Blr.	*F.	310	318	332	342	350
GENERATOR						
Generator Integrator, Start		1813.2	1817.4	1822.9	1829.9	1838.6
Generator Integrator, Stop		1815.8	1820.9	1827.4	1834.9	1844.1
Generator Integrator, Diff.	MWH	2.6	3.5	4.5	5.0	5.5
Generator Volts	V.	11,400	11,500	11,400	11,300	11,300
Generator Amps	A.	142	190	282	275	275
Generator VARS	MVAR	2.0	2.3	3.1	2.4	2.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	6826.5	6830.0	6833.5	6837.2	6841.3
Aux. KWH Mtr. End (X100)	KWH	6828.8	6832.3	6836.0	6839.7	6843.8
Aux. Load Indicator	MW	0.23	0.23	0.25	0.25	0.25
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.0	15.0	15.0	15.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	1160697.0	1164340.0	1169025.0	1174976.0	1182313.0
Start Test	Time	0600	0730	0900	1030	1210
F.O. Totalizer-End	Lbs/Hr.	1162919.0	1167284.0	1172866.0	1179215.0	1186980.0
End Test	Time	0700	0830	1000	1130	1310
F.O. Diff.	Lbs/Hr.	2222	2944	3841	4239	4667
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	227	225	226	227
F.O. Temp. @ Burner Deck	*F	220	223	225	225	226
Sulfur, Wt. %		1.78				
API Gravity @ 60 *F.	API	15.7				
Higher Heating Value	BTU/Gal	147,714				

TEST BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-19-01
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.6	3.5	4.5	5.0	5.5
F.O. Temp. *F.	225	227	225	226	227
F.O. Temp. (Corr.)	0.9427	0.942	0.9427	0.94235	0.942
F.O. Usage (Lbs./Hr.)	2222.0	2944.0	3841.0	4239.0	4667.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	270.6	358.5	467.7	516.2	568.3
PT RATIO	1.000	1.000	1.000	1.000	1.000
KW (Gen.)	2,600	3,500	4,500	5,000	5,500
KW (Aux.)	230	230	250	250	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	147,714	147,714	147,714	147,714	147,714
HEAT RATE (APPROX.)	15,714	15,467	15,695	15,589	15,603
HEAT RATE (APPROX.)N	17,239	16,555	16,618	16,410	16,346
HEAT RATE (ACTUAL)-G	15,372	15,130	15,353	15,250	15,263
HEAT RATE (ACTUAL)-N	16,864	16,194	16,257	16,053	15,990

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 09-20-01
DATE: 09-19-01 — Tested by: E.Wong

DATA:

GENERATED (MW)	2.6	3.5	4.5	5.0	5.5
HEAT RATE(BTU/MW)G	15,372	15,130	15,353	15 250	15,263
HEAT RATE(BTU/MW)N	16,864	16,194	16,257	16,053	15,990
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.4008	act.			
H.H.V. (BTU/GAL)	147,714	act.			

A, B, C CONSTANTS:

GROSS	A=	15,908.42	NET A=	19,057.93
	B=	(322.899)	B=	(1,155.587)
	C=	38.5183	C=	110.5826

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,417	15,384	15,342	15,317	15,286	15,270	15,250	15,241	15,233	15,232
HEAT RATE(BTU/MW)N	17,189	17,051	16,860	16,744	16,586	16,492	16,368	16,296	16,205	16,155
GROSS (MBTU)	30.833	33.846	38.355	41.357	45.859	48.863	53.375	56.392	60.932	63.973
NET (MBTU)	34.378	37.512	42.150	45.209	49.759	52.776	57.288	60.296	64.820	67.852
COST/KWH	$0.0631	$0.0630	$0.0628	$0.0627	$0.0626	$0.0625	$0.0624	$0.0624	$0.0624	$0.0624
G/KWH	380.91	380.11	379.06	378.45	377.69	377.27	376.79	376.57	376.37	376.34
G/PS-H	277.50	276.92	276.15	275.71	275.15	274.85	274.50	274.34	274.20	274.17

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,235	15,242	15,257	15,271	15,308	15,331	15,358	15,372
HEAT RATE(BTU/MW)N	16,097	16,069	16,045	16,039	16,055	16,076	16,105	16,124
GROSS (MBTU)	68.559	71.636	76.284	79.409	85.725	88.922	92.146	93.769
NET (MBTU)	72.437	75.526	80.223	83.403	89.905	93.238	96.632	98.354
COST/KWH	$0.0624	$0.0624	$0.0625	$0.0625	$0.0627	$0.0628	$0.0629	$0.0629
G/KWH	376.43	376.58	376.96	377.30	378.22	378.80	379.45	379.80
G/PS-H	274.24	274.35	274.62	274.88	275.55	275.96	276.44	276.70

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 06-08-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,400	3,500	4,000	5,000	5,800
BOILER-TURBINE						
Ambient Air Temp	*F.	90	89	88	88	88
Gas Entering A.H.	*F.	480	480	485	505	535
Gas Leaving A.H.	*F.	368	350	357	377	390
Air Entering A.H.	*F.	90	89	88	88	88
Air Leaving A.H.	*F.	340	335	338	345	360
Circ. Water Inlet	*F.	71.0	72.0	73.0	74.0	74.0
Circ. Water Outlet	*F.	82.0	83.0	84.0	86.0	89.0
Condenser Vacuum	Ig.	29.40	29.10	29.00	28.80	28.60
Barometric Pressure	Ig.	30.18	30.18	30.19	30.19	30.19
Excess O2	%	3.23	2.35	2.02	2.10	1.46
Feedwater Flow (X1000)	Lb/Hr	30	42	48	61	70
Steam Flow (X1000)	Lb/Hr	31	43	50	63	73
Throttle Stm. Press.	PSIG	390	392	392	392	392
Feedwater to Blr.	*F.	305	315	328	340	350
GENERATOR						
Generator Integrator, Start		9665.9	9669.9	9675.4	9681.8	9689.7
Generator Integrator, Stop		9668.3	9673.5	9679.4	9686.9	9695.5
Generator Integrator, Diff.	MWH	2.4	3.6	4.0	5.1	5.8
Generator Volts	V.	11,800	11,800	11,800	11,700	11,400
Generator Amps	A.	153	209	252	305	313
Generator VARS	MVAR	1.9	2.5	3.0	2.9	1.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	917.8	921.2	924.7	928.3	931.9
Aux. KWH Mtr. End (X100)	KWH	920.1	923.5	927.1	930.7	934.4
Aux. Load Indicator	MW	0.23	0.23	0.24	0.24	0.25
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.0	14.0	14.0	15.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	90938283.0	90941765.0	90946510.0	90951724.0	90958268.0
Start Test	Time	0601	0731	0901	1031	1201
F.O. Totalizer-End	Lbs/Hr.	90940360.0	90944706.0	90949731.0	90955914.0	90963127.0
End Test	Time	0701	0831	1001	1131	1301
F.O. Diff.	Lbs/Hr.	2077	2941	3221	4190	4859
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	240	245	245	248	248
F.O. Temp. @ Burner Deck	*F	218	222	222	224	224
Sulfur, Wt. %		1.71				
API Gravity @ 60 *F.	API	12.8				
Higher Heating Value	BTU/Gal	149,833				

TEST BY: G Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-08-01
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.4	3.5	4.0	5.0	5.8
F.O. Temp. *F.	240	245	245	248	248
F.O. Temp. (Corr.)	0.93745	0.9357	0.9357	0.93465	0.93465
F.O. Usage (Lbs./Hr.)	2077.0	2941.0	3221.0	4190.0	4859.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	252.9	358.1	392.2	510.2	591.7
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,400	3,600	4,000	5,100	5,800
KW (Aux.)	230	230	240	240	250
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,833	149,833	149,833	149,833	149,833
HEAT RATE (APPROX.)	15,913	15,022	14,807	15,107	15,404
HEAT RATE (APPROX.)N	17,600	16,047	15,752	15,853	16,098
HEAT RATE (ACTUAL)-G	15,790	14,906	14,692	14,990	15,285
HEAT RATE (ACTUAL)-N	17,464	15,923	15,630	15,730	15,974

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 06-13-01
DATE: 06-08-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	2.4	3.6	4.0	5.1	5.8
HEAT RATE(BTU/MW)G	15,790	14,906	14,692	14,990	15,285
HEAT RATE(BTU/MW)N	17,464	15,923	15,630	15,730	15,974
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.2211	act.			
H.H.V. (BTU/GAL)	149,833	act.			

A, B, C CONSTANTS:

GROSS	A=	19,958.99	NET A=	23,710.28
	B=	(2,407.017)	B=	(3,520.683)
	C=	277.3690	C=	378.8494

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	16,254	16,006	15,675	15,482	15,234	15,097	14,932	14,850	14,769	14,742
HEAT RATE(BTU/MW)N	18,184	17,798	17,276	16,966	16,558	16,324	16,029	15,870	15,689	15,606
GROSS (MBTU)	32.509	35.213	39.188	41.802	45.703	48.310	52.263	54.946	59.075	61.918
NET (MBTU)	36.369	39.156	43.191	45.809	49.674	52.235	56.101	58.720	62.757	65.546
COST/KWH	$0.0651	$0.0641	$0.0628	$0.0620	$0.0611	$0.0605	$0.0598	$0.0595	$0.0592	$0.0591
G/KWH	401.61	395.47	387.29	382.52	376.40	373.00	368.94	366.91	364.90	364.25
G/PS-H	292.58	288.11	282.15	278.68	274.22	271.74	268.78	267.30	265.84	265.36

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	14,744	14,773	14,858	14,943	15,178	15,329	15,502	15,597
HEAT RATE(BTU/MW)N	15,539	15,532	15,578	15,647	15,875	16,035	16,225	16,331
GROSS (MBTU)	66.349	69.434	74.291	77.701	84.997	88.908	93.013	95.142
NET (MBTU)	69.925	73.000	77.890	81.363	88.901	93.002	97.349	99.620
COST/KWH	$0.0591	$0.0592	$0.0595	$0.0599	$0.0608	$0.0614	$0.0621	$0.0625
G/KWH	364.29	365.01	367.11	369.19	375.01	378.74	383.02	385.36
G/PS-H	265.39	265.92	267.45	268.97	273.20	275.92	279.04	280.75

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 01-31-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,000	5,500
BOILER-TURBINE						
Ambient Air Temp	*F.	83	85	87	88	90
Gas Entering A.H.	*F.	505	500	520	540	560
Gas Leaving A.H.	*F.	325	345	360	365	380
Air Entering A.H.	*F.	83	85	87	88	90
Air Leaving A.H.	*F.	350	350	360	370	380
Circ. Water Inlet	*F.	72.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	80.3	83.5	86.2	87.6	89.6
Condenser Vacuum	Ig.	29.10	28.90	28.70	28.50	28.20
Barometric Pressure	Ig.	30.16	30.19	30.20	30.17	30.11
Excess O2	%	2.50	1.60	1.20	1.00	1.10
Feedwater Flow (X1000)	Lb/Hr	29	41	52	59	67
Steam Flow (X1000)	Lb/Hr	30	44	56	62	70
Throttle Stm. Press.	PSIG	390	390	390	390	390
Feedwater to Blr.	*F.	710	745	770	790	810
GENERATOR						
Generator Integrator, Start		8169.2	8173.6	8179.3	8185.5	8191.9
Generator Integrator, Stop		8171.7	8177.2	8183.9	8190.5	8197.5
Generator Integrator, Diff.	MWH	2.5	3.6	4.6	5.0	5.6
Generator Volts	V.	11,500	11,500	11,500	11,500	11,500
Generator Amps	A.	155	200	255	268	278
Generator VARS	MVAR	2.0	2.5	3.2	3.0	2.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	5028.3	5031.8	5035.2	5038.3	5041.3
Aux. KWH Mtr. End (X100)	KWH	5030.4	5034.0	5037.5	5040.7	5043.7
Aux. Load Indicator	MW	0.21	0.22	0.23	0.24	0.24
Aux. Volts	V.					
Aux. Amps	A.	13.0	13.0	14.0	14.0	14.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	81259340.0	81263207.0	81268120.0	81273355.0	81278750.0
Start Test	Time	0720	0855	1025	1145	1300
F.O. Totalizer-End	Lbs/Hr.	81261495.0	81266290.0	81271963.0	81277599.00	81283530.0
End Test	Time	0820	0955	1125	1245	1400
F.O. Diff.	Lbs/Hr.	2155	3083	3843	4244	4780
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	2	2	2
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	200	200	204	202	204
F.O. Temp. @ Burner Deck	*F	204	206	208	207	208
Sulfur, Wt. %		1.87				
API Gravity @ 60 *F.	API	10.6				
Higher Heating Value	BTU/Gal	149,714				

TEST BY: Raymond Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-31-01
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.5	5.0	5.5
F.O. Temp. *F.	200	200	204	202	204
F.O. Temp. (Corr.)	0.95145	0.95145	0.95005	0.95075	0.95005
F.O. Usage (Lbs./Hr.)	2155.0	3083.0	3843.0	4244.0	4780.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	262.4	375.4	468.0	516.8	582.1
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,600	4,600	5,000	5,600
KW (Aux.)	210	220	230	240	240
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,714	149,714	149,714	149,714	149,714
HEAT RATE (APPROX.)	15,850	15,747	15,362	15,608	15,695
HEAT RATE (APPROX.)N	17,304	16,772	16,170	16,394	16,398
HEAT RATE (ACTUAL)-G	15,715	15,613	15,231	15,475	15,562
HEAT RATE (ACTUAL)-N	17,156	16,629	16,033	16,255	16,258

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 02-02-01
DATE: 01-31-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	2.5	3.6	4.6	5.0	5.6
HEAT RATE(BTU/MW)G	15,715	15,613	15,231	15,475	15,562
HEAT RATE(BTU/MW)N	17,156	16,629	16,033	16,255	16,258
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.6781	act.			
H.H.V. (BTU/GAL)	149,714	act.			

A, B, C CONSTANTS:

GROSS	A=	17,226.66	NET A=	20,176.85
	B=	(817.158)	B=	(1,589.464)
	C=	91.6731	C=	158.2004

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,959	15,873	15,757	15,689	15,600	15,550	15,490	15,458	15,425	15,412
HEAT RATE(BTU/MW)N	17,631	17,446	17,192	17,039	16,832	16,711	16,552	16,462	16,350	16,292
GROSS (MBTU)	31.918	34.920	39.392	42.359	46.801	49.762	54.214	57.195	61.699	64.729
NET (MBTU)	35.261	38.381	42.980	46.004	50.497	53.474	57.931	60.908	65.401	68.425
COST/KWH	$0.0804	$0.0800	$0.0794	$0.0790	$0.0786	$0.0783	$0.0780	$0.0779	$0.0777	$0.0776
G/KWH	394.31	392.17	389.31	387.63	385.44	384.21	382.71	381.93	381.11	380.78
G/PS-H	287.26	285.71	283.62	282.40	280.80	279.91	278.81	278.25	277.65	277.41

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,406	15,411	15,433	15,456	15,525	15,571	15,624	15,653
HEAT RATE(BTU/MW)N	16,228	16,201	16,185	16,189	16,237	16,280	16,335	16,368
GROSS (MBTU)	69.326	72.432	77.163	80.373	86.942	90.312	93.744	95.484
NET (MBTU)	73.025	76.145	80.923	84.185	90.927	94.423	98.012	99.843
COST/KWH	$0.0776	$0.0776	$0.0777	$0.0779	$0.0782	$0.0784	$0.0787	$0.0789
G/KWH	380.64	380.77	381.30	381.89	383.59	384.72	386.03	386.75
G/PS-H	277.30	277.40	277.79	278.21	279.46	280.28	281.23	281.76

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 2
DATE: 01-08-01

Gross Load (K1-2) --->	KWH	2,500	3,500	4,500	5,600	6,100
Actual Test Load	KWH	2,500	3,500	4,500	5,600	
BOILER-TURBINE						
Ambient Air Temp	*F.	97	98	100	105	
Gas Entering A.H.	*F.	470	490	520	560	
Gas Leaving A.H.	*F.	320	335	348	370	
Air Entering A.H.	*F.	159	170	177	181	
Air Leaving A.H.	*F.	338	340	350	380	
Circ. Water Inlet	*F.	73.0	73.0	73.0	73.0	
Circ. Water Outlet	*F.	80.0	83.0	86.0	89.0	
Condenser Vacuum	ig.	29.40	29.00	28.80	28.40	
Barometric Pressure	ig.	30.24	30.26	30.31	30.30	
Excess O2	%	3.60	2.50	1.90	2.00	
Feedwater Flow (X1000)	Lb/Hr	29	41	51	66	
Steam Flow (X1000)	Lb/Hr	30	44	54	70	
Throttle Stm. Press.	PSIG	392	391	392	393	
Feedwater to Blr.	*F.	700	740	750	800	
GENERATOR						
Generator Integrator, Start		5467.4	5471.5	5478.5	5487.4	
Generator Integrator, Stop		5469.9	5475.1	5483.0	5493.0	
Generator Integrator, Diff.	MWH	2.5	3.6	4.5	5.6	
Generator Volts	V.	11,800	11,800	12,000	11,900	
Generator Amps	A.	151	215	280	310	
Generator VARS	MVAR	1.9	2.5	2.3	2.3	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start	KWH	3653.8	3657.3	3661.8	3666.3	
Aux. KWH Mtr. End (X100)	KWH	3656.1	3659.8	3664.3	3668.9	
Aux. Load Indicator	MW	0.23	0.25	0.25	0.26	
Aux. Volts	V.					
Aux. Amps	A.	14.0	14.1	15.0	15.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	78993631.0	78997201.0	79003201.0	79010696.0	
Start Test	Time	0601	0732	0921	1110	
F.O. Totalizer-End	Lbs/Hr.	78995780.0	79000258.0	79006960.0	79015423.00	
End Test	Time	0701	0832	1021	1210	
F.O. Diff.	Lbs/Hr.	2149	3057	3759	4727	
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	2	2	2	2	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	200	200	200	202	
F.O. Temp. @ Burner Deck	*F	205	205	205	210	
Sulfur, Wt. %		1.82				
API Gravity @ 60 *F.	API	12.6				
Higher Heating Value	BTU/Gal	149,738				

TEST BY: J.Keliinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-08-01
KPP UNIT NO. 2

	TEST LOADS - MW				
	2.5	3.5	4.5	5.6	0.0
F.O. Temp. *F.	200	200	200	202	0
F.O. Temp. (Corr.)	0.95145	0.95145	0.95145	0.95075	1.02145
F.O. Usage (Lbs./Hr.)	2149.0	3057.0	3759.0	4727.0	0.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	261.7	372.3	457.7	575.6	0.0
PT RATIO	1,000	1,000	1,000	1,000	1,000
KW (Gen.)	2,500	3,600	4,500	5,600	0
KW (Aux.)	230	250	250	260	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,738	149,738	149,738	149,738	149,738
HEAT RATE (APPROX.)	15,806	15,614	15,360	15,521	#DIV/0!
HEAT RATE (APPROX.)N	17,408	16,779	16,263	16,277	#DIV/0!
HEAT RATE (ACTUAL)-G	15,674	15,484	15,232	15,391	#DIV/0!
HEAT RATE (ACTUAL)-N	17,262	16,639	16,127	16,141	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 2 — Fuel Oil Tested: 01-09-01
DATE: 01-08-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	2.5	3.6	4.5	5.6
HEAT RATE(BTU/MW)G	15,674	15,484	15,232	15,391
HEAT RATE(BTU/MW)N	17,262	16,639	16,127	16,141
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$31.6781	act.		
H.H.V. (BTU/GAL)	149,738	act.		

A, B, C CONSTANTS:

GROSS	A=	17,075.71	NET A=	20,255.94
	B=	(750.562)	B=	(1,549.069)
	C=	79.5964	C=	144.6049

PREDICTED VALUES:

GENERATED (MW)	2.0	2.2	2.5	2.7	3.0	3.2	3.5	3.7	4.0	4.2
HEAT RATE(BTU/MW)G	15,893	15,810	15,697	15,629	15,540	15,489	15,424	15,388	15,347	15,327
HEAT RATE(BTU/MW)N	17,736	17,548	17,287	17,128	16,910	16,780	16,606	16,504	16,373	16,301
GROSS (MBTU)	31.786	34.781	39.242	42.200	46.621	49.565	53.983	56.937	61.388	64.375
NET (MBTU)	35.472	38.605	43.218	46.245	50.731	53.695	58.120	61.065	65.493	68.463
COST/KWH	$0.0801	$0.0796	$0.0791	$0.0787	$0.0783	$0.0780	$0.0777	$0.0775	$0.0773	$0.0772
G/KWH	392.68	390.62	387.83	386.16	383.96	382.69	381.08	380.21	379.19	378.70
G/PS-H	286.07	284.58	282.54	281.33	279.73	278.80	277.63	276.99	276.25	275.89

PREDICTED VALUES (CONT.):

GENERATED (MW)	4.5	4.7	5.0	5.2	5.6	5.8	6.0	6.1
HEAT RATE(BTU/MW)G	15,310	15,306	15,313	15,325	15,369	15,400	15,438	15,459
HEAT RATE(BTU/MW)N	16,213	16,170	16,126	16,111	16,116	16,136	16,167	16,187
GROSS (MBTU)	68.895	71.940	76.564	79.690	86.065	89.320	92.627	94.300
NET (MBTU)	72.960	75.997	80.629	83.777	90.249	93.588	97.004	98.743
COST/KWH	$0.0771	$0.0771	$0.0771	$0.0772	$0.0774	$0.0776	$0.0778	$0.0779
G/KWH	378.27	378.18	378.34	378.64	379.72	380.50	381.43	381.95
G/PS-H	275.58	275.51	275.63	275.85	276.64	277.20	277.88	278.26

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 07-22-06

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	8,500	9,500	10,500	12,500		
BOILER-TURBINE							
Ambient Air Temp	*F.	89	91	93	92		
Gas Entering A.H.	*F.	623	652	680	726		
Gas Leaving A.H.	*F.	379	394	408	413		
Air Entering A.H.	*F.	201	197	191	128		
Air Leaving A.H.	*F.	480	492	504	514		
Circ. Water Inlet	*F.	73	73.0	73.0	74.0		
Circ. Water Outlet	*F.	85	86.00	88.00	91.00		
Condenser Vacuum	"Hg.	28.4	28.30	28.20	27.90		
Barometric Pressure	"Hg.	30.3	30.40	30.40	30.40		
Excess O2	%	0.80	0.30	0.10	0.40		
Feedwater Flow (X1000)	Lb/Hr	91.0	104.0	116.0	135.0		
Steam Flow (X1000)	Lb/Hr	87.0	98.0	109.0	131.0		
Throttle Stm. Press.	PSIG	601	601	600	601		
Feedwater to Blr.	*F.	317	320	330	345		
GENERATOR							
Generator Integrator, Start		5769.5	5784.0	5800.6	5823.6		
Generator Integrator, Stop		5777.8	5793.7	5811.3	5836.2		
Generator Integrator, Diff.	MWH	8.3	9.7	10.7	12.6	0.0	
Generator Volts	V.	11,400	11,400	11,400	11,400		
Generator Amps	A.	440	520	570	670		
Generator VARS	MVAR	3.2	4.2	4.2	4.2		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	6216.8	6224.4	6232.2	6242.2		
Aux. KWH Mtr. End (X100)	KWH	6221.3	6229.0	6237.1	6247.4		
Aux. Load Indicator	MW	0.45	0.46	0.49	0.52	0.00	
Aux. KWH Meter Diff.	KWH	4.5	5	5	5		
Aux. Amps	A.	29.0	30.0	31.0	33.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0	
Start Test	Time	0635	0815	0955	1155		
F.O. Totalizer-End	Lbs/Hr.	5809	6626	7367	8625		
End Test	Time	0735	0915	1055	1255		
Difference (X100)	Lbs/Hr.	5,809	6,626	7,367	8,625	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	230	230	230	228		
F.O. Temp. @ Burner Deck	*F	233	232	232	229		
Sulfur, Wt. %							
API Gravity @ 60 *F.	API	15.0					
Higher Heating Value	BTU/Gal	149,690					

TESTED BY: J.Corcino

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 07-22-06
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.5	9.5	10.5	12.5	0.0
F.O. Temp. *F.	230	230	230	228	0
F.O. Temp. (Corr.)	0.94095	0.94095	0.94095	0.94165	1.02145
F.O. Flow (Lbs/Hr.)	5,809	6,626	7,367	8,625	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	665.6	759.2	844.1	989.0	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	8,300	9,700	10,700	12,600	0
KW (Aux.)	450	460	490	520	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,690	149,690	149,690	149,690	149,690
HEAT RATE (APPROX.)	*12,109*	*11,819*	*11,912*	*11,852*	*#DIV/0!*
HEAT RATE (APPROX.)N	12,803	12,407	12,484	12,363	#DIV/0!
HEAT RATE (ACTUAL)-G	12,004	11,716	11,809	11,750	#DIV/0!
HEAT RATE (ACTUAL)-N	12,692	12,300	12,376	12,255	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: K.Nakamatsu
DATE: 07-22-06 — Tested by: 07-25-06

DATA:

GENERATED (MW)	8.3	9.7	10.7	12.6
HEAT RATE(BTU/MW)G	12,004	11,716	11,809	11,750
HEAT RATE(BTU/MW)N	12,692	12,300	12,376	12,255
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$60.8264	act.		
H.H.V. (BTU/GAL)	149,690	act.		

A, B, C CONSTANTS:

GROSS	A=	15,256.02	NET A=	17,020.30
	B=	(621.263)	B=	(810.239)
	C=	27.3100	C=	34.3969

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,208	12,832	12,665	12,512	12,372	12,245	12,133	12,034	11,948	11,877
GENERATED (MW)N	3.550	4.550	5.050	5.550	6.050	6.550	7.050	7.550	8.050	8.550
HEAT RATE(BTU/MW)N	14,330	13,829	13,604	13,397	13,207	13,034	12,878	12,740	12,618	12,514
GROSS (MBTU)	52.832	64.162	69.659	75.070	80.416	85.718	90.995	96.270	101.562	106.891
NET (MBTU)	50.870	62.922	68.703	74.354	79.902	85.373	90.792	96.185	101.578	106.997
COST/KWH	$0.1278	$0.1242	$0.1225	$0.1210	$0.1197	$0.1185	$0.1174	$0.1164	$0.1156	$0.1149
G/KWH	326.33	317.06	312.92	309.13	305.67	302.55	299.77	297.32	295.22	293.44
G/PS-H	237.74	230.98	227.97	225.21	222.69	220.42	218.39	216.61	215.07	213.78

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	11,819	11,774	11,744	11,727	11,723	11,733	11,757	11,795
GENERATED (MW)N	9.050	9.540	10.040	10.510	11.010	11.510	12.010	12.480
HEAT RATE(BTU/MW)N	12,427	12,358	12,305	12,270	12,252	12,251	12,267	12,300
GROSS (MBTU)	112.278	117.744	123.309	128.993	134.817	140.802	146.968	153.335
NET (MBTU)	112.467	117.891	123.543	128.954	134.889	141.004	147.325	153.507
COST/KWH	$0.1143	$0.1139	$0.1136	$0.1135	$0.1134	$0.1135	$0.1138	$0.1141
G/KWH	292.01	290.92	290.16	289.74	289.65	289.90	290.50	291.42
G/PS-H	212.74	211.94	211.39	211.08	211.02	211.20	211.63	212.31

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 05-29-06

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,000	10,000	11,000	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	86.4	85	89	90	90
Gas Entering A.H.	*F.	626	646	68	680	702
Gas Leaving A.H.	*F.	377	386	396	392	400
Air Entering A.H.	*F.	197	192	180	158	146
Air Leaving A.H.	*F.	479	485	495	494	501
Circ. Water Inlet	*F.	72	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	85	87.00	88.00	89.00	90.00
Condenser Vacuum	"Hg.	29.2	28.30	28.10	28.10	27.90
Barometric Pressure	"Hg.	30.41	30.40	30.50	30.50	30.60
Excess O2	%	0.80	0.80	0.70	0.70	0.6
Feedwater Flow (X1000)	Lb/Hr	96.0	108.0	119.0	123.0	134.0
Steam Flow (X1000)	Lb/Hr	92.0	103.0	113.0	117.0	128.0
Throttle Stm. Press.	PSIG	588	599	601	601	600
Feedwater to Blr.	*F.	320	329	335	340	346
GENERATOR						
Generator Integrator, Start		1065.8	1083.5	1099.9	1115.7	1135.6
Generator Integrator, Stop		1074.8	1093.5	1111.0	1127.1	1148.1
Generator Integrator, Diff.	MWH	9.0	10.0	11.1	11.4	12.5
Generator Volts	V.	11,400	11,400	11,400	11,400	11,400
Generator Amps	A.	470	530	580	600	650
Generator VARS	MVAR	3.2	3.5	3.5	3.5	3.7
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	9864.4	9873.0	9880.4	9887.2	9895.5
Aux. KWH Mtr. End (X100)	KWH	9869.0	9877.6	9885.2	9892.0	9900.4
Aux. Load Indicator	MW	0.46	0.46	0.48	0.48	0.49
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.5	29.0	30.0	30.0	32.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0434	0625	0800	0925	1107
F.O. Totalizer-End	Lbs/Hr.	6155	6909	7548	7772	8429
End Test	Time	0534	0725	0900	1025	1207
Difference (X100)	Lbs/Hr.	6,155	6,909	7,548	7,772	8,429
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
		* LO-1 pump on.				
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	232	229	229	230	229
F.O. Temp. @ Burner Deck	*F	234	232	232	232	232
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	14.2				
Higher Heating Value	BTU/Gal	149,738				

TESTED BY: J.Corcino

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-29-06
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.0	10.0	11.0	11.5	12.5
F.O. Temp. *F.	232	229	229	230	229
F.O. Temp. (Corr.)	0.94025	0.9413	0.9413	0.94095	0.9413
F.O. Flow (Lbs/Hr.)	6,155	6,909	7,548	7,772	8,429
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	704.7	791.9	865.2	890.5	966.2
PT RATIO	1	1	1	1	1
KW (Gen.)	9,000	10,000	11,100	11,400	12,500
KW (Aux.)	460	460	480	480	490
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,738	149,738	149,738	149,738	149,738
HEAT RATE (APPROX.)	11,824	11,958	11,770	11,796	11,671
HEAT RATE (APPROX.)N	12,461	12,535	12,302	12,314	12,148
HEAT RATE (ACTUAL)-G	11,725	11,858	11,671	11,697	11,574
HEAT RATE (ACTUAL)-N	12,357	12,430	12,199	12,211	12,046

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 06-01-06
DATE: 05-29-06 — Tested by: rh

DATA:

GENERATED (MW)	9.0	11.1	11.4
HEAT RATE(BTU/MW)G	11,725	11,671	11,697
HEAT RATE(BTU/MW)N	12,357	12,199	12,211
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$57.0714	act.	
H.H.V. (BTU/GAL)	149,738	act.	

A, B, C CONSTANTS:

GROSS A=	16,592.76	NET A=	17,878.71
B=	(958.686)	B=	(1,050.181)
C=	46.4247	C=	48.5119

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	**6.5**	7.0	7.5	8.0	**8.5**	9.0
HEAT RATE(BTU/MW)G	13,501	12,960	12,724	12,512	**12,323**	12,157	12,014	11,894	**11,798**	11,725
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	14,454	13,841	13,570	13,324	**13,102**	12,905	12,731	12,582	**12,457**	12,357
GROSS (MBTU)	54.003	64.800	69.984	75.072	80.098	85.097	90.105	95.156	100.284	105.525
NET (MBTU)	51.168	62.836	68.394	73.815	79.137	84.396	89.627	94.868	100.156	105.525
COST/KWH	$0.1225	$0.1176	$0.1155	$0.1135	$0.1118	$0.1103	$0.1090	$0.1079	$0.1071	$0.1064
G/KWH	333.57	320.21	314.39	309.14	304.46	300.36	296.84	293.88	291.50	289.69
G/PS-H	243.01	233.28	229.04	225.21	221.81	218.82	216.25	214.10	212.37	211.05

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	11,675	11,648	**11,645**	11,665	**11,708**	11,774	11,863	11,976
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	12,280	12,228	**12,200**	12,197	**12,217**	12,262	12,331	12,425
GROSS (MBTU)	110.913	116.484	122.271	128.311	134.637	141.284	148.288	155.683
NET (MBTU)	111.013	116.656	122.490	128.553	134.635	141.261	148.100	155.435
COST/KWH	$0.1059	$0.1057	$0.1057	$0.1059	$0.1062	$0.1068	$0.1077	$0.1087
G/KWH	288.46	287.80	287.72	288.20	289.26	290.90	293.11	295.89
G/PS-H	210.15	209.67	209.61	209.96	210.74	211.93	213.53	215.56

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 05-12-06

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,000	10,000	11,500	12,400	
BOILER-TURBINE						
Ambient Air Temp	*F.	81	87	89	90	
Gas Entering A.H.	*F.	616	646	681	699	
Gas Leaving A.H.	*F.	375	386	403	400	
Air Entering A.H.	*F.	196	193	185	151	
Air Leaving A.H.	*F.	475	482	500	502	
Circ. Water Inlet	*F.	70	70.0	70.0	70.0	
Circ. Water Outlet	*F.	85	87.00	89.00	91.00	
Condenser Vacuum	"Hg.	28.1	29.10	29.00	28.80	
Barometric Pressure	"Hg.	30.41	3042.00	30.42	30.41	
Excess O2	%	0.70	0.70	0.70	0.50	
Feedwater Flow (X1000)	Lb/Hr	97.0	111.0	126.0	136.0	
Steam Flow (X1000)	Lb/Hr	93.0	105.0	120.0	130.0	
Throttle Stm. Press.	PSIG	588	588	586	582	
Feedwater to Blr.	*F.	320	327	337	345	
GENERATOR						
Generator Integrator, Start		7044.1	7059.1	7076.5	7096.7	
Generator Integrator, Stop		7053.1	7069.2	7088.0	7109.1	
Generator Integrator, Diff.	MWH	9.0	10.1	11.5	12.4	0.0
Generator Volts	V.	11,400	11,400	11,400	11,400	11,400
Generator Amps	A.	480	542	610	658	
Generator VARS	MVAR	3.9	4.5	4.2	4.3	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8049.2	8056.8	8064.9	8073.7	
Aux. KWH Mtr. End (X100)	KWH	8053.9	8061.7	8070.0	8078.9	
Aux. Load Indicator	MW	0.47	0.45	0.47	0.49	
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	30.0	32.0	31.8	32.6	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	
Start Test	Time	0700	0836	1015	1158	
F.O. Totalizer-End	Lbs/Hr.	6220	7014	7954	8536	
End Test	Time	0800	0936	1115	1258	
Difference (X100)	Lbs/Hr.	6,220	7,014	7,954	8,536	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	3	3	3	3	
		* LO-1 pump on.				
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	230	229	230	
F.O. Temp. @ Burner Deck	*F	232	230	231	231	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.2				
Higher Heating Value	BTU/Gal	148,643				

TESTED BY: M.Takushi/I.Martin

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-12-06
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.0	10.0	11.5	12.4	0.0
F.O. Temp. *F.	230	230	229	230	0
F.O. Temp. (Corr.)	0.94095	0.94095	0.9413	0.94095	1.02145
F.O. Flow (Lbs/Hr.)	6,220	7,014	7,954	8,536	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	712.7	803.7	911.7	978.1	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,000	10,100	11,500	12,400	0
KW (Aux.)	470	490	510	520	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,643	148,643	148,643	148,643	148,643
HEAT RATE (APPROX.)	11,958	12,015	11,971	11,910	#DIV/0!
HEAT RATE (APPROX.)N	12,616	12,628	12,527	12,432	#DIV/0!
HEAT RATE (ACTUAL)-G	11,771	11,828	11,784	11,725	#DIV/0!
HEAT RATE (ACTUAL)-N	12,419	12,431	12,331	12,238	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 05-15-06
DATE: 05-12-06 — Tested by: rh

DATA:

GENERATED (MW)	10.1	11.5	12.4
HEAT RATE(BTU/MW)G	11,828	11,784	11,725
HEAT RATE(BTU/MW)N	12,431	12,331	12,238
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$57.0714	act.	
H.H.V. (BTU/GAL)	148,643	act.	

A, B, C CONSTANTS:

GROSS	A=	10,338.64	NET A=	11,485.51
	B=	304.148	B=	238.287
	C=	(15.5149)	C=	(14.3248)

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	**6.5**	7.0	7.5	8.0	**8.5**	9.0
HEAT RATE(BTU/MW)G	11,307	11,472	11,542	11,605	**11,660**	11,707	11,747	11,779	**11,803**	11,819
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	12,209	12,319	12,363	12,400	**12,429**	12,452	12,467	12,475	**12,476**	12,470
GROSS (MBTU)	45.228	57.358	63.482	69.630	75.791	81.952	88.103	94.231	100.325	106.373
NET (MBTU)	43.099	55.804	62.185	68.569	74.948	81.309	87.642	93.937	100.182	106.367
COST/KWH	$0.1034	$0.1049	$0.1055	$0.1061	$0.1066	$0.1070	$0.1074	$0.1077	$0.1079	$0.1080
G/KWH	279.37	283.43	285.18	286.73	288.09	289.26	290.24	291.03	291.62	292.02
G/PS-H	203.53	206.49	207.76	208.89	209.88	210.73	211.45	212.02	212.45	212.75

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	11,828	11,829	**11,822**	11,807	**11,784**	11,754	11,716	11,671
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	12,456	12,436	**12,408**	12,373	**12,331**	12,282	12,226	12,162
GROSS (MBTU)	112.364	118.286	124.128	129.877	135.522	141.051	146.454	151.717
NET (MBTU)	*112.482*	*118.514*	*124.206*	*130.044*	*135.522*	*141.122*	*146.466*	*151.786*
COST/KWH	$0.1081	$0.1081	$0.1081	$0.1079	$0.1077	$0.1075	$0.1071	$0.1067
G/KWH	292.24	292.26	292.08	291.72	291.16	290.42	289.48	288.35
G/PS-H	212.90	212.92	212.79	212.53	212.12	211.58	210.89	210.07

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 04-26-06

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,000	10,000	11,000	11,500	12,000
BOILER-TURBINE						
Ambient Air Temp	*F.	89	89	89	90	89
Gas Entering A.H.	*F.	632	647	673	682	682
Gas Leaving A.H.	*F.	382	390	387	388	390
Air Entering A.H.	*F.	198	196	155	146	119
Air Leaving A.H.	*F.	481	488	492	493	496
Circ. Water Inlet	*F.	70	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	86	87.00	88.00	89.00	90.00
Condenser Vacuum	"Hg.	28.3	28.20	28.05	28.90	28.80
Barometric Pressure	"Hg.	30.41	30.40	38.38	30.36	30.35
Excess O2	%	0.91	0.61	0.41	1.60	0.6
Feedwater Flow (X1000)	Lb/Hr	101.0	110.0	121.0	124.0	130.0
Steam Flow (X1000)	Lb/Hr	96.0	104.0	115.0	119.0	127.0
Throttle Stm. Press.	PSIG	600	600	599	586	585
Feedwater to Blr.	*F.	322	327	332	337	340
GENERATOR						
Generator Integrator, Start		2711.4	2725.9	2741.1	2758.0	2778.2
Generator Integrator, Stop		2720.7	2736.0	2752.1	2769.7	2790.3
Generator Integrator, Diff.	MWH	9.3	10.1	11.0	11.7	12.1
Generator Volts	V.	11,400	11,400	11,400	11,400	11,400
Generator Amps	A.	500	530	590	610	630
Generator VARS	MVAR	4.0	4.0	4.0	4.1	4.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	6158.9	6166.2	6173.4	6180.9	6189.5
Aux. KWH Mtr. End (X100)	KWH	6163.6	6171.1	6178.3	6185.9	6194.6
Aux. Load Indicator	MW	0.45	0.45	0.45	0.48	0.48
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	31.0	32.0	32.0	33.0	31.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	665528	665630	665736	665854	665992
Start Test	Time	0900	1032	1200	1330	1513
F.O. Totalizer-End	Lbs/Hr.	665593	665701	665813	665933	666076
End Test	Time	1000	1132	1300	1430	1613
Difference (X100)	Lbs/Hr.	6,500	7,100	7,700	7,900	8,400
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3

* LO-1 pump on.

FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	231	231	230	230
F.O. Temp. @ Burner Deck	*F	232	232	234	232	232
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	13.5				
Higher Heating Value	BTU/Gal	148,810				

TESTED BY: J.Corcino

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-26-06
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.0	10.0	11.0	11.5	12.0
F.O. Temp. *F.	230	231	231	230	230
F.O. Temp. (Corr.)	0.94095	0.9406	0.9406	0.94095	0.94095
F.O. Flow (Lbs/Hr.)	6,500	7,100	7,700	7,900	8,400
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	744.8	813.2	882.0	905.2	962.5
PT RATIO	1	1	1	1	1
KW (Gen.)	9,300	10,100	11,000	11,700	12,100
KW (Aux.)	470	490	490	500	510
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,810	148,810	148,810	148,810	148,810
HEAT RATE (APPROX.)	12,093	12,158	12,107	11,682	12,011
HEAT RATE (APPROX.)N	12,736	12,778	12,671	12,204	12,540
HEAT RATE (ACTUAL)-G	11,917	11,982	11,931	11,513	11,837
HEAT RATE (ACTUAL)-N	12,552	12,593	12,487	12,027	12,358

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 04-28-06
DATE: 04-26-06 — Tested by: rh

DATA:

GENERATED (MW)		10.1	11.0	12.1
HEAT RATE(BTU/MW)G		11,982	11,931	11,837
HEAT RATE(BTU/MW)N		12,593	12,487	12,358
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$56.2311	act.		
H.H.V. (BTU/GAL)	148,810	act.		

A, B, C CONSTANTS:

GROSS	A=	10,917.63	NET A=	13,729.68
	B=	253.765	B=	(108.488)
	C=	(14.6928)	C=	(0.4036)

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	**6.5**	7.0	7.5	8.0	**8.5**	9.0
HEAT RATE(BTU/MW)G	11,698	11,819	11,869	11,911	**11,946**	11,974	11,994	12,007	**12,013**	12,011
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	13,289	13,177	13,121	13,064	**13,007**	12,950	12,893	12,836	**12,778**	12,721
GROSS (MBTU)	46.790	59.096	65.279	71.468	77.651	83.818	89.958	96.059	102.111	108.103
NET (MBTU)	46.911	59.693	65.998	72.245	78.435	84.567	90.640	96.655	102.610	108.507
COST/KWH	$0.1052	$0.1063	$0.1068	$0.1072	$0.1075	$0.1077	$0.1079	$0.1080	$0.1081	$0.1081
G/KWH	289.02	292.02	293.25	294.30	295.16	295.85	296.35	296.67	296.81	296.77
G/PS-H	210.56	212.74	213.64	214.40	215.03	215.53	215.90	216.13	216.24	216.21

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,002	11,986	**11,962**	11,931	**11,893**	11,847	11,794	11,733
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	12,663	12,604	**12,546**	12,487	**12,429**	12,370	12,311	12,251
GROSS (MBTU)	114.023	119.860	125.604	131.243	136.767	142.165	147.424	152.535
NET (MBTU)	114.343	120.120	125.586	131.243	136.840	142.252	147.603	153.017
COST/KWH	$0.1080	$0.1078	$0.1076	$0.1073	$0.1070	$0.1066	$0.1061	$0.1056
G/KWH	296.55	296.14	295.56	294.79	293.84	292.71	291.40	289.90
G/PS-H	216.04	215.75	215.32	214.76	214.07	213.25	212.29	211.20

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 01-07-06

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	9,500	10,500	11,500	12,500		
BOILER-TURBINE							
Ambient Air Temp	*F.	84.5	86	88	89		
Gas Entering A.H.	*F.	603	614	614	643		
Gas Leaving A.H.	*F.	361	361	359	366		
Air Entering A.H.	*F.	186	176	152	144		
Air Leaving A.H.	*F.	466	470	469	475		
Circ. Water Inlet	*F.	73	73.0	73.0	73.0		
Circ. Water Outlet	*F.	85.5	84.20	88.80	90.60		
Condenser Vacuum	"Hg.	29.2	29.20	29.00	28.80		
Barometric Pressure	"Hg.	30.5	30.50	30.50	30.40		
Excess O2	%	1.55	1.20	1.10	0.90		
Feedwater Flow (X1000)	Lb/Hr	101.0	114.0	123.0	136.0		
Steam Flow (X1000)	Lb/Hr	95.0	106.0	117.0	128.0		
Throttle Stm. Press.	PSIG	590	589	589	588		
Feedwater to Blr.	*F.	325	329	340	345		
GENERATOR							
Generator Integrator, Start		4395.5	4411.0	4430.0	4449.7		
Generator Integrator, Stop		4405.0	4421.5	4441.5	4462.3		
Generator Integrator, Diff.	MWH	9.5	10.5	11.5	12.6	0.0	
Generator Volts	V.	11,400	11,400	11,400	11,400		
Generator Amps	A.	490	550	610	665		
Generator VARS	MVAR	2.7	3.5	4.0	4.1		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	3729.4	3736.8	3745.2	3753.4		
Aux. KWH Mtr. End (X100)	KWH	3734.1	3741.6	3750.1	3758.4		
Aux. Load Indicator	MW	0.46	0.48	0.49	0.45	0.00	
Aux. Volts	V.	-	-	-	-	-	
Aux. Amps	A.	29.9	30.1	30.5	31.5		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	64401956	64412368	64425106	64438286		
Start Test	Time	0705	0840	1025	1205		
F.O. Totalizer-End	Lbs/Hr.	64408328	64419404	64432766	64446706		
End Test	Time	0805	0904	1125	1305		
Difference	Lbs/Hr.	6,372	7,036	7,660	8,420	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	No	No	No	No		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	3	3	3	3		

* LO-1 pump on.

FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	229	230	230	
F.O. Temp. @ Burner Deck	*F	232	231	230	231	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.2				
Higher Heating Value	BTU/Gal	149,762				

TESTED BY: M.Ah Yuen

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-07-06
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.5	10.5	11.5	12.5	0.0
F.O. Temp. *F.	230	229	230	230	0
F.O. Temp. (Corr.)	0.94095	0.9413	0.94095	0.94095	1.02145
F.O. Flow (Lbs/Hr.)	6,372	7,036	7,660	8,420	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	775.9	856.8	932.8	1,025.3	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,500	10,500	11,500	12,600	0
KW (Aux.)	470	480	490	500	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,762	149,762	149,762	149,762	149,762
HEAT RATE (APPROX.)	12,333	12,322	12,248	12,288	#DIV/0!
HEAT RATE (APPROX.)N	12,975	12,912	12,793	12,795	#DIV/0!
HEAT RATE (ACTUAL)-G	12,232	12,220	12,147	12,187	#DIV/0!
HEAT RATE (ACTUAL)-N	12,869	12,806	12,688	12,691	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 01-11-06
DATE: 01-07-06 — Tested by: rh

DATA:

GENERATED (MW)	9.5	10.5	11.5	12.6
HEAT RATE(BTU/MW)G	12,333	12,322	12,248	12,288
HEAT RATE(BTU/MW)N	12,975	12,912	12,793	12,795
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$50.4350	act.		
H.H.V. (BTU/GAL)	149,762	act.		

A, B, C CONSTANTS:

GROSS A=	14,095.43	NET A=	15,672.02
B=	(308.453)	B=	(448.237)
C=	13.0443	C=	17.4047

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,070	12,879	12,794	12,714	**12,642**	12,575	12,516	12,463	**12,416**	12,376
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	14,158	13,866	13,733	13,609	**13,494**	13,387	13,289	13,200	**13,119**	13,048
GROSS (MBTU)	52.281	64.396	70.364	76.286	82.170	88.028	93.868	99.701	105.536	111.383
NET (MBTU)	49.976	62.813	69.078	75.259	81.368	87.418	93.423	99.396	105.349	111.297
COST/KWH	$0.1048	$0.1033	$0.1026	$0.1019	$0.1014	$0.1008	$0.1004	$0.0999	$0.0996	$0.0992
G/KWH	322.93	318.21	316.10	314.14	312.34	310.71	309.23	307.92	306.77	305.78
G/PS-H	235.27	231.83	230.28	228.86	227.55	226.36	225.28	224.33	223.49	222.77

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,342	12,315	**12,295**	12,281	**12,273**	12,272	12,278	12,290
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	12,985	12,930	**12,884**	12,847	**12,819**	12,799	12,789	12,786
GROSS (MBTU)	117.253	123.153	129.095	135.089	141.143	147.268	153.474	159.770
NET (MBTU)	117.250	123.224	129.102	135.154	141.138	147.322	153.590	159.829
COST/KWH	$0.0990	$0.0987	$0.0986	$0.0985	$0.0984	$0.0984	$0.0984	$0.0985
G/KWH	304.95	304.28	303.77	303.43	303.24	303.22	303.36	303.66
G/PS-H	222.16	221.68	221.31	221.05	220.92	220.90	221.00	221.22

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 11-25-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,500	10,500	11,500	12,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	87	86	91	92	
Gas Entering A.H.	*F.	582	589	602	615	
Gas Leaving A.H.	*F.	352	358	354	466	
Air Entering A.H.	*F.	103	104	111	112	
Air Leaving A.H.	*F.	457	460	463	466	
Circ. Water Inlet	*F.	73	73.0	73.0	73.0	
Circ. Water Outlet	*F.	85	87.00	89.00	90.00	
Condenser Vacuum	"Hg.	29.2	29.10	29.00	28.90	
Barometric Pressure	"Hg.	30.4	30.40	30.40	30.40	
Excess O2	%	5.60	5.30	5.10	5.10	
Feedwater Flow (X1000)	Lb/Hr	101.0	115.0	123.0	133.0	
Steam Flow (X1000)	Lb/Hr	95.0	106.0	116.0	126.0	
Throttle Stm. Press.	PSIG	587	587	588	586	
Feedwater to Blr.	*F.	482	500	513	530	
GENERATOR						
Generator Integrator, Start		4760.9	4775.5	4792.3	4814.0	
Generator Integrator, Stop		4770.4	4786.1	4803.9	4826.5	
Generator Integrator, Diff.	MWH	9.5	10.6	11.6	12.5	0.0
Generator Volts	V.	11,500	11,450	11,450	11,400	
Generator Amps	A.	495	555	610	660	
Generator VARS	MVAR	3.2	3.7	4.0	4.5	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	9338.6	9345.4	9352.7	9361.6	
Aux. KWH Mtr. End (X100)	KWH	9343.1	9350.1	9357.5	9366.5	
Aux. Load Indicator	MW	0.45	0.47	0.48	0.49	0.00
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	29.0	29.5	30.0	30.5	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	
Start Test	Time	0628	0758	0931	1121	
F.O. Totalizer-End	Lbs/Hr.	6377	7165	7715	8345	
End Test	Time	0728	0858	1031	1221	
Difference	Lbs/Hr.	6,377	7,165	7,715	8,345	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	3	3	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	236	240	234	235	
F.O. Temp. @ Burner Deck	*F	238	238	236	237	
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.5				
Higher Heating Value	BTU/Gal	149,214				

TESTED BY: M.Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-25-05
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.5	10.5	11.5	12.5	0.0
F.O. Temp. *F.	236	240	234	235	0
F.O. Temp. (Corr.)	0.93885	0.93745	0.93955	0.9392	1.02145
F.O. Flow (Lbs/Hr.)	6,377	7,165	7,715	8,345	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	776.5	872.5	939.5	1,016.2	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,500	10,600	11,600	12,500	0
KW (Aux.)	450	470	480	490	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,214	149,214	149,214	149,214	149,214
HEAT RATE (APPROX.)	12,343	12,429	12,229	12,276	#DIV/0!
HEAT RATE (APPROX.)N	12,957	13,006	12,757	12,776	#DIV/0!
HEAT RATE (ACTUAL)-G	12,197	12,282	12,085	12,130	#DIV/0!
HEAT RATE (ACTUAL)-N	12,804	12,852	12,606	12,625	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 11-30-05
DATE: 11-25-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	9.5	11.6	12.5
HEAT RATE(BTU/MW)G	12,343	12,229	12,276
HEAT RATE(BTU/MW)N	12,957	12,757	12,776
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$50.4350	act.	
H.H.V. (BTU/GAL)	149,214	act.	

A, B, C CONSTANTS:

GROSS A=	16,730.15	NET A=	18,129.92
B=	(795.713)	B=	(912.734)
C=	35.1482	C=	38.7567

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	**6.5**	7.0	7.5	8.0	**8.5**	9.0
HEAT RATE(BTU/MW)G	14,110	13,630	13,417	13,221	**13,043**	12,882	12,739	12,614	**12,506**	12,416
GENERATED (MW)N	3.6	4.6	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.6
HEAT RATE(BTU/MW)N	15,099	14,535	14,282	14,049	**13,835**	13,640	13,464	13,308	**13,172**	13,055
GROSS (MBTU)	56.439	68.151	73.793	79.327	84.780	90.177	95.545	100.911	106.301	111.742
NET (MBTU)	53.602	66.135	72.125	77.971	83.699	89.341	94.925	100.479	106.033	111.617
COST/KWH	$0.1136	$0.1097	$0.1080	$0.1064	$0.1050	$0.1037	$0.1025	$0.1015	$0.1006	$0.0999
G/KWH	348.61	336.77	331.50	326.66	322.26	318.29	314.76	311.66	308.99	306.76
G/PS-H	253.97	245.35	241.51	237.98	234.77	231.88	229.31	227.05	225.11	223.48

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,343	12,288	**12,250**	12,230	**12,228**	12,243	12,276	12,326
GENERATED (MW)N	9.1	9.6	10.1	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	12,957	12,878	**12,819**	12,779	**12,759**	12,758	12,776	12,814
GROSS (MBTU)	117.259	122.878	128.628	134.533	140.620	146.915	153.446	160.237
NET (MBTU)	117.259	122.987	128.832	134.567	140.732	146.973	153.446	160.306
COST/KWH	$0.0993	$0.0989	$0.0986	$0.0984	$0.0984	$0.0985	$0.0988	$0.0992
G/KWH	304.96	303.60	302.67	302.18	302.12	302.49	303.30	304.54
G/PS-H	222.17	221.18	220.50	220.14	220.10	220.37	220.96	221.87

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 11-24-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	9,500	10,500	11,500	12,500		
BOILER-TURBINE							
Ambient Air Temp	*F.	88.3	91	94	95		
Gas Entering A.H.	*F.	579	594	603	618		
Gas Leaving A.H.	*F.	350	351	351	357		
Air Entering A.H.	*F.	105	107	111	113		
Air Leaving A.H.	*F.	456	458	460	465		
Circ. Water Inlet	*F.	73	73.0	73.0	73.0		
Circ. Water Outlet	*F.	85	87.00	88.00	90.00		
Condenser Vacuum	"Hg.	29.1	29.10	29.10	28.90		
Barometric Pressure	"Hg.	30.4	30.40	30.40	30.40		
Excess O2	%	5.70	5.20	5.20	4.60		
Feedwater Flow (X1000)	Lb/Hr	105.0	115.0	124.0	137.0		
Steam Flow (X1000)	Lb/Hr	96.0	106.0	115.0	128.0		
Throttle Stm. Press.	PSIG	587	588	588	585		
Feedwater to Blr.	*F.	486	500	511	530		
GENERATOR							
Generator Integrator, Start		4492.7	4507.4	4524.2	4542.8		
Generator Integrator, Stop		4502.3	4517.9	4535.6	4555.5		
Generator Integrator, Diff.	MWH	9.6	10.5	11.4	12.7	0.0	
Generator Volts	V.	11,400	11,450	11,450	11,450		
Generator Amps	A.	500	550	600	655		
Generator VARS	MVAR	3.1	3.2	3.7	3.7		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	9225.0	9231.8	9239.0	9246.7		
Aux. KWH Mtr. End (X100)	KWH	9229.6	9236.4	9243.8	9251.6		
Aux. Load Indicator	MW	0.46	0.46	0.48	0.49	0.00	
Aux. Volts	V.	-	-	-	-	-	
Aux. Amps	A.	28.8	29.6	29.8	30.2		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0		
Start Test	Time	0634	0801	0934	1109		
F.O. Totalizer-End	Lbs/Hr.	6504	7140	7720	8488		
End Test	Time	0734	0901	1034	1209		
Difference	Lbs/Hr.	6,504	7,140	7,720	8,488	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	235	235	233	231		
F.O. Temp. @ Burner Deck	*F	237	240	238	237		
Sulfur, Wt. %							
API Gravity @ 60 *F.	API						
Higher Heating Value	BTU/Gal						

TESTED BY: M.Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-24-05
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.5	10.5	11.5	12.5	0.0
F.O. Temp. *F.	235	235	233	231	0
F.O. Temp. (Corr.)	0.9392	0.9392	0.9399	0.9406	1.02145
F.O. Flow (Lbs/Hr.)	6,504	7,140	7,720	8,488	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	792.0	869.5	940.1	1,033.6	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,600	10,500	11,400	12,700	0
KW (Aux.)	460	460	480	490	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)	12,458	12,504	12,452	12,289	#DIV/0!
HEAT RATE (APPROX.)N	13,085	13,077	12,999	12,783	#DIV/0!
HEAT RATE (ACTUAL)-G	0	0	0	0	#DIV/0!
HEAT RATE (ACTUAL)-N	0	0	0	0	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested:
DATE: 11-24-05 — Tested by:

DATA:

GENERATED (MW)	9.6	10.5	11.4	12.7
HEAT RATE(BTU/MW)G	12,458	12,504	12,452	12,289
HEAT RATE(BTU/MW)N	13,085	13,077	12,999	12,783
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$50.4350	act.		
H.H.V. (BTU/GAL)	151,000	est.		

A, B, C CONSTANTS:

GROSS A=	7,818.53	NET A=	9,252.89
B=	891.375	B=	774.873
C=	(42.4790)	C=	(39.1318)

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	**6.5**	7.0	7.5	8.0	**8.5**	9.0
HEAT RATE(BTU/MW)G	10,704	11,213	11,436	11,638	**11,818**	11,977	12,114	12,231	**12,326**	12,400
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	11,726	12,149	12,331	12,493	**12,636**	12,760	12,863	12,947	**13,012**	13,057
GROSS (MBTU)	42.817	56.067	62.899	69.825	76.815	83.837	90.858	97.847	104.772	111.601
NET (MBTU)	41.511	55.156	62.148	69.213	76.323	83.447	90.557	97.624	104.617	111.507
COST/KWH	$0.0851	$0.0892	$0.0909	$0.0925	$0.0940	$0.0952	$0.0963	$0.0973	$0.0980	$0.0986
G/KWH	264.48	277.06	282.56	287.53	291.99	295.91	299.32	302.19	304.55	306.38
G/PS-H	192.68	201.84	205.85	209.48	212.72	215.58	218.06	220.16	221.87	223.20

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,453	12,484	**12,495**	12,484	**12,452**	12,398	12,323	12,227
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	13,083	13,088	**13,075**	13,042	**12,989**	12,916	12,824	12,713
GROSS (MBTU)	118.302	124.844	131.194	137.321	143.192	148.777	154.042	158.957
NET (MBTU)	118.266	124.864	131.271	137.458	143.136	148.797	154.150	159.039
COST/KWH	$0.0990	$0.0993	$0.0994	$0.0993	$0.0990	$0.0986	$0.0980	$0.0972
G/KWH	307.68	308.46	308.71	308.44	307.65	306.32	304.48	302.11
G/PS-H	224.15	224.72	224.90	224.71	224.13	223.17	221.82	220.09

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 07-20-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	9,000	10,000	11,000	11,500		
BOILER-TURBINE							
Ambient Air Temp	*F.	90	91	91	91		
Gas Entering A.H.	*F.	617	636	666	671		
Gas Leaving A.H.	*F.	365	376	389	393		
Air Entering A.H.	*F.	176	173	176	163		
Air Leaving A.H.	*F.	472	480	492	496		
Circ. Water Inlet	*F.	73	73.0	73.0	73.0		
Circ. Water Outlet	*F.	86	87.90	89.70	90.40		
Condenser Vacuum	"Hg.	28.9	29.00	28.80	28.80		
Barometric Pressure	"Hg.	29.94	29.94	29.91	29.90		
Excess O2	%	1.40	1.20	1.00	1.00		
Feedwater Flow (X1000)	Lb/Hr	101.3	113.9	127.3	130.0		
Steam Flow (X1000)	Lb/Hr	97.4	108.1	120.3	126.1		
Throttle Stm. Press.	PSIG	588	589	588	588		
Feedwater to Blr.	*F.	338	345	352	355		
GENERATOR							
Generator Integrator, Start		9817.5	9833.7	9854.1	9870.7		
Generator Integrator, Stop		9826.5	9843.7	9865.1	9882.2		
Generator Integrator, Diff.	MWH	9.0	10.0	11.0	11.5	0.0	
Generator Volts	V.	11,200	11,200	11,200	11,200		
Generator Amps	A.	475	530	580	610		
Generator VARS	MVAR	3.5	3.9	3.8	4.1		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	8221.7	8229.8	8239.3	8246.7		
Aux. KWH Mtr. End (X100)	KWH	8226.3	8234.5	8244.1	8251.6		
Aux. Load Indicator	MW	0.46	0.47	0.48	0.49	0.00	
Aux. Volts	V.	-	-	-	-	-	
Aux. Amps	A.	29.0	30.0	30.5	31.5		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	40030496	40042284	40056994	40068972		
Start Test	Time	0630	0815	1015	1145		
F.O. Totalizer-End	Lbs/Hr.	40036970	40049416	40064826	40077200		
End Test	Time	0730	0925	1115	1245		
Difference	Lbs/Hr.	6,474	7,132	7,832	8,228	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	220	217	217	217		
F.O. Temp. @ Burner Deck	*F	240	238	236	237		
Sulfur, Wt. %							
API Gravity @ 60 *F.	API	11.8					
Higher Heating Value	BTU/Gal	150,310					

TESTED BY: Sakuma

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 07-20-05
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.0	10.0	11.0	11.5	0.0
F.O. Temp. *F.	220	217	217	217	0
F.O. Temp. (Corr.)	0.94445	0.9455	0.9455	0.9455	1.02145
F.O. Flow (Lbs/Hr.)	6,474	7,132	7,832	8,228	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	788.4	868.5	953.7	1,001.9	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,000	10,000	11,000	11,500	0
KW (Aux.)	460	470	480	490	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,310	150,310	150,310	150,310	150,310
HEAT RATE (APPROX.)	13,227	13,114	13,092	13,156	#DIV/0!
HEAT RATE (APPROX.)N	13,939	13,761	13,689	13,742	#DIV/0!
HEAT RATE (ACTUAL)-G	13,166	13,054	13,032	13,096	#DIV/0!
HEAT RATE (ACTUAL)-N	13,876	13,698	13,627	13,679	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 07-26-05
DATE: 07-20-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	9.0	10.0	11.0	11.5
HEAT RATE(BTU/MW)G	13,166	13,054	13,032	13,096
HEAT RATE(BTU/MW)N	13,876	13,698	13,627	13,679

NUMBER OF TESTS 4
PRICE OF FUEL/BBL $47.2159 act.
H.H.V. (BTU/GAL) 150,310 act.

A, B, C CONSTANTS:

GROSS	A=	19,740.43	NET A=	22,014.86
	B=	(1,276.700)	B=	(1,546.618)
	C=	60.7253	C=	71.3973

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,605	14,875	14,556	14,266	14,008	13,779	13,581	13,413	13,276	13,169
GENERATED (MW)N	3.54	4.54	5.04	5.54	6.04	6.54	7.04	7.54	8.04	8.54
HEAT RATE(BTU/MW)N	16,971	16,067	15,668	15,305	14,978	14,687	14,431	14,211	14,027	13,878
GROSS (MBTU)	62.421	74.375	80.055	85.598	91.049	96.454	101.857	107.306	112.845	118.520
NET (MBTU)	60.076	72.943	78.968	84.792	90.469	96.053	101.597	107.154	112.778	118.522
COST/KWH	$0.1167	$0.1113	$0.1089	$0.1067	$0.1048	$0.1031	$0.1016	$0.1003	$0.0993	$0.0985
G/KWH	385.57	367.53	359.63	352.49	346.09	340.45	335.55	331.41	328.01	325.37
G/PS-H	280.89	267.75	262.00	256.79	252.14	248.02	244.46	241.44	238.97	237.04

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,092	13,046	13,030	13,044	13,089	13,164	13,270	13,406
GENERATED (MW)N	9.04	9.53	10.03	10.52	11.01	11.51	12.01	12.51
HEAT RATE(BTU/MW)N	13,766	13,688	13,647	13,641	13,671	13,737	13,838	13,975
GROSS (MBTU)	124.376	130.460	136.815	143.489	150.527	157.974	165.875	174.277
NET (MBTU)	124.441	130.451	136.879	143.505	150.518	158.109	166.194	174.827
COST/KWH	$0.0979	$0.0976	$0.0975	$0.0976	$0.0979	$0.0985	$0.0992	$0.1003
G/KWH	323.48	322.33	321.94	322.30	323.40	325.26	327.87	331.23
G/PS-H	235.66	234.83	234.54	234.80	235.61	236.96	238.86	241.31

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 06-22-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	9,200	10,000	11,000	12,000		
BOILER-TURBINE							
Ambient Air Temp	*F.	89	90	89	89		
Gas Entering A.H.	*F.	616	635	655	682		
Gas Leaving A.H.	*F.	366	379	388	400		
Air Entering A.H.	*F.	106	110	108	104		
Air Leaving A.H.	*F.	473	481	491	501		
Circ. Water Inlet	*F.	70	71.0	72.0	73.0		
Circ. Water Outlet	*F.	87	88.00	90.00	91.00		
Condenser Vacuum	"Hg.	28	28.00	28.00	28.00		
Barometric Pressure	"Hg.	30	30.00	30.00	30.00		
Excess O2	%	40.00	50.00	52.00	51.00		
Feedwater Flow (X1000)	Lb/Hr	104.0	114.0	125.0	137.0		
Steam Flow (X1000)	Lb/Hr	99.0	110.0	119.0	131.0		
Throttle Stm. Press.	PSIG	588	588	588	587		
Feedwater to Blr.	*F.	340	344	350	360		
GENERATOR							
Generator Integrator, Start		2209.0	2225.6	2243.0	2261.8		
Generator Integrator, Stop		2218.1	2235.7	2253.9	2273.8		
Generator Integrator, Diff.	MWH	9.1	10.1	10.9	12.0	0.0	
Generator Volts	V.	11,200	11,200	11,200	11,200		
Generator Amps	A.	480	540	580	625		
Generator VARS	MVAR	3.2	4.1	3.8	3.8		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	4887.5	4895.6	4903.7	4911.9		
Aux. KWH Mtr. End (X100)	KWH	4892.1	4900.4	4908.6	4917.0		
Aux. Load Indicator	MW	0.46	0.48	0.49	0.51	0.00	
Aux. Volts	V.	-	-	-	-	-	
Aux. Amps	A.	29.0	30.0	31.0	34.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	34550220	34562052	34574372	34587692		
Start Test	Time	0640	0825	1005	1145		
F.O. Totalizer-End	Lbs/Hr.	34556748	34569212	34582104	34596188		
End Test	Time	0740	0925	1105	1245		
Difference	Lbs/Hr.	6,528	7,160	7,732	8,496	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	230	230	230	230		
F.O. Temp. @ Burner Deck	*F	232	233	234	234		
Sulfur, Wt. %							
API Gravity @ 60 *F.	API	10.3					
Higher Heating Value	BTU/Gal	151,595					

TESTED BY: Joey

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-22-05
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.2	10.0	11.0	12.0	0.0
F.O. Temp. *F.	230	230	230	230	0
F.O. Temp. (Corr.)	0.94095	0.94095	0.94095	0.94095	1.02145
F.O. Flow (Lbs/Hr.)	6,528	7,160	7,732	8,496	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	794.9	871.9	941.5	1,034.6	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,100	10,100	10,900	12,000	0
KW (Aux.)	460	480	490	510	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,595	151,595	151,595	151,595	151,595
HEAT RATE (APPROX.)	13,191	13,035	13,043	13,019	#DIV/0!
HEAT RATE (APPROX.)N	13,893	13,686	13,657	13,596	#DIV/0!
HEAT RATE (ACTUAL)-G	13,243	13,087	13,095	13,070	#DIV/0!
HEAT RATE (ACTUAL)-N	13,948	13,740	13,711	13,650	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 06-24-05
DATE: 06-22-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	9.1	10.1	10.9	12.0
HEAT RATE(BTU/MW)G	13,243	13,087	13,095	13,070
HEAT RATE(BTU/MW)N	13,948	13,740	13,711	13,650
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$42.5625	act.		
H.H.V. (BTU/GAL)	151,595	act.		

A, B, C CONSTANTS:

GROSS A=	17,505.05	NET A=	19,172.55	
B=	(783.907)	B=	(937.046)	
C=	34.5739	C=	39.7829	

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,923	14,450	14,239	14,046	13,870	13,712	13,571	13,447	13,340	13,250
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	16,061	15,482	15,222	14,982	14,763	14,563	14,382	14,222	14,082	13,962
GROSS (MBTU)	59.690	72.249	78.317	84.278	90.158	95.983	101.779	107.572	113.388	119.253
NET (MBTU)	56.856	70.288	76.720	83.003	89.166	95.239	101.253	107.236	113.219	119.232
COST/KWH	$0.0998	$0.0966	$0.0952	$0.0939	$0.0927	$0.0917	$0.0907	$0.0899	$0.0892	$0.0886
G/KWH	368.70	357.02	351.82	347.05	342.70	338.78	335.29	332.23	329.59	327.38
G/PS-H	268.61	260.10	256.31	252.83	249.67	246.81	244.27	242.04	240.12	238.51

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,178	13,123	13,086	13,066	13,063	13,077	13,108	13,157
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	13,861	13,780	13,720	13,679	13,658	13,657	13,676	13,714
GROSS (MBTU)	125.193	131.234	137.401	143.721	150.219	156.922	163.855	171.044
NET (MBTU)	125.304	131.465	137.471	143.764	150.372	156.916	163.970	171.291
COST/KWH	$0.0881	$0.0877	$0.0875	$0.0873	$0.0873	$0.0874	$0.0876	$0.0880
G/KWH	325.60	324.25	323.32	322.82	322.74	323.09	323.87	325.08
G/PS-H	237.21	236.22	235.54	235.18	235.13	235.38	235.95	236.83

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 02-02-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,000	12,400
BOILER-TURBINE						
Ambient Air Temp	*F.	107	109	109	111	110
Gas Entering A.H.	*F.		573	593	615	636
Gas Leaving A.H.	*F.	315	323	334	348	360
Air Entering A.H.	*F.	110	103	104	107	105
Air Leaving A.H.	*F.		436	442	455	467
Circ. Water Inlet	*F.	71	71.0	71.0	71.0	72.0
Circ. Water Outlet	*F.	83	85.00	87.00	89.00	92.00
Condenser Vacuum	"Hg.	29	29.00	29.00	28.70	27.40
Barometric Pressure	"Hg.	1008	1001.00	1001.00	1001.00	29.49
Excess O2	%	22.00	22.00	37.00	73.00	1.1
Feedwater Flow (X1000)	Lb/Hr	89.0	98.000	114.000	124.000	139.000
Steam Flow (X1000)	Lb/Hr	83.0	94.000	108.000	119.000	133.000
Throttle Stm. Press.	PSIG	595	588	588	588	587
Feedwater to Blr.	*F.	325	330	343	350	358
GENERATOR						
Generator Integrator, Start		4394.9	4408.5	4423.7	4441.1	4473.9
Generator Integrator, Stop		4402.8	4417.3	4433.9	4452.1	4486.2
Generator Integrator, Diff.	MWH	7.9	8.8	10.2	11.0	12.3
Generator Volts	V.	11,500	11,500	11,500	11,500	11,200
Generator Amps	A.					640
Generator VARS	MVAR	3.5	3.5	3.7	3.8	3.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8361.3	8368.8	8376.5	8384.6	8398.6
Aux. KWH Mtr. End (X100)	KWH	8365.7	8373.4	8381.3	8389.5	8403.7
Aux. Load Indicator	MW	0.44	0.46	0.48	0.49	0.51
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.0	29.0	30.0	32.0	31.7
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	7663170	7672741	7683521	7695700	7718177
Start Test	*Time*	*0705*	*0845*	*1025*	*1205*	*1451*
F.O. Totalizer-End	Lbs/Hr.	7668670	7678865	7690600	7703390	7726700
End Test	Time	0805	0945	1125	1305	1551
Difference	Lbs/Hr.	5,500	6,124	7,079	7,690	8,523
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	5	5	5	5	0.5 turn
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	223	230	227	227
F.O. Temp. @ Burner Deck	*F	209	216	232	230	228
Sulfur, Wt. %						
API Gravity @ 60 *F.	API	15.5				
Higher Heating Value	BTU/Gal	148,762				

TESTED BY: JC

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-02-05
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	12.4
F.O. Temp. *F.	230	223	230	227	227
F.O. Temp. (Corr.)	0.94095	0.9434	0.94095	0.942	0.942
F.O. Flow (Lbs/Hr.)	5,500	6,124	7,079	7,690	8,523
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	669.8	745.7	862.0	936.4	1,037.9
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	8,800	10,200	11,000	12,300
KW (Aux.)	440	460	480	490	510
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,762	148,762	148,762	148,762	148,762
HEAT RATE (APPROX.)	12,802	12,796	12,761	12,855	12,741
HEAT RATE (APPROX.)N	13,557	13,502	13,392	13,454	13,293
HEAT RATE (ACTUAL)-G	12,612	12,607	12,572	12,664	12,552
HEAT RATE (ACTUAL)-N	13,356	13,302	13,193	13,255	13,095

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 02-04-05
DATE: 02-02-05 — Tested by: K.Okuyama

DATA:

GENERATED (MW)	7.9	8.8	10.2	11.0
HEAT RATE(BTU/MW)G	12,612	12,607	12,572	12,664
HEAT RATE(BTU/MW)N	13,356	13,302	13,193	13,255
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$34.6990	act.		
H.H.V. (BTU/GAL)	148,762	act.		

A, B, C CONSTANTS:

GROSS A=	14,695.22	NET A=	16,126.61	
B=	(457.596)	B=	(570.878)	
C=	24.7110	C=	28.0499	

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,260	13,025	12,926	12,839	12,765	12,703	12,653	12,616	12,591	12,578
GENERATED (MW)N	3.6	4.6	5.1	5.6	6.1	6.6	7.1	7.6	8.1	8.5
HEAT RATE(BTU/MW)N	14,292	13,973	13,835	13,711	13,601	13,505	13,423	13,355	13,301	13,261
GROSS (MBTU)	53.041	65.125	71.093	77.035	82.972	88.920	94.899	100.928	107.024	113.206
NET (MBTU)	50.879	63.719	70.007	76.234	82.422	88.592	94.765	100.962	107.204	113.247
COST/KWH	$0.0736	$0.0723	$0.0718	$0.0713	$0.0709	$0.0705	$0.0703	$0.0701	$0.0699	$0.0699
G/KWH	327.63	321.82	319.37	317.23	315.39	313.86	312.63	311.71	311.09	310.78
G/PS-H	238.68	234.45	232.67	231.11	229.77	228.65	227.76	227.09	226.64	226.41

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,578	12,590	12,615	12,652	12,701	12,762	12,836	12,923
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5
HEAT RATE(BTU/MW)N	13,235	13,223	13,225	13,241	13,271	13,315	13,373	13,446
GROSS (MBTU)	119.493	125.904	132.456	139.169	146.060	153.150	160.455	167.994
NET (MBTU)	119.642	126.146	132.513	139.163	146.115	153.259	160.347	167.936
COST/KWH	$0.0699	$0.0699	$0.0701	$0.0703	$0.0705	$0.0709	$0.0713	$0.0718
G/KWH	310.78	311.08	311.68	312.59	313.81	315.33	317.15	319.29
G/PS-H	226.41	226.63	227.07	227.73	228.62	229.72	231.05	232.61

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 11-11-04

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,000	12,000
BOILER-TURBINE						
Ambient Air Temp	*F.	108	109	111	112	113
Gas Entering A.H.	*F.	525	540	560	585	600
Gas Leaving A.H.	*F.	335	340	355	367	379
Air Entering A.H.	*F.	110	113	120	120	120
Air Leaving A.H.	*F.	390	380	400	410	415
Circ. Water Inlet	*F.	71	71.0	71.0	71.0	72.0
Circ. Water Outlet	*F.	84	86.00	88.00	89.00	90.00
Condenser Vacuum	"Hg.	29	29.00	29.00	28.70	28.50
Barometric Pressure	"Hg.	29.85	29.85	29.85	29.85	29.85
Excess O2	%	0.80	0.70	0.70	0.60	0.6
Feedwater Flow (X1000)	Lb/Hr	86.1	90.300	107.700	118.000	127.000
Steam Flow (X1000)	Lb/Hr	88.0	78.000	111.000	122.000	132.000
Throttle Stm. Press.	PSIG	600	600	600	599	599
Feedwater to Blr.	*F.	323	334	345	354	358
GENERATOR						
Generator Integrator, Start		1052.3	1065.5	1081.9	1097.5	1113.5
Generator Integrator, Stop		1060.3	1074.5	1092.0	1108.6	1125.5
Generator Integrator, Diff.	MWH	8.0	9.0	10.1	11.1	12.0
Generator Volts	V.	11,200	11,300	11,300	11,300	113
Generator Amps	A.	440	520	530	618	650
Generator VARS	MVAR	4.0	5.3	5.2	5.5	5.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	2057.1	2064.2	2072.2	2079.3	2086.2
Aux. KWH Mtr. End (X100)	KWH	2061.5	2068.7	2077.0	2084.2	2091.2
Aux. Load Indicator	MW	0.44	0.45	0.48	0.49	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.2	29.8	30.0	30.0	31.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0630	0805	0950	1120	1245
F.O. Totalizer-End	Lbs/Hr.	5663.10	6338.00	7119.63	7801.12	8395.50
End Test	Time	0730	0905	1050	1220	1345
Difference	Lbs/Hr.	5,663.1	6,338.0	7,119.6	7,801.1	8,395.5
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	226	225	226	225	224
F.O. Temp. @ Burner Deck	*F	228	227	223	220	220
Sulfur, Wt. %		1.65				
API Gravity @ 60 *F.	API	15.2				
Higher Heating Value	BTU/Gal	149,595				

TESTED BY: Joey

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-11-04
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	12.0
F.O. Temp. *F.	226	225	226	225	224
F.O. Temp. (Corr.)	0.94235	0.9427	0.94235	0.9427	0.94305
F.O. Flow (Lbs/Hr.)	5,663	6,338	7,120	7,801	8,396
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	689.6	771.8	867.0	950.0	1,022.3
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	9,000	10,100	11,100	12,000
KW (Aux.)	440	450	480	490	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,595	149,595	149,595	149,595	149,595
HEAT RATE (APPROX.)	13,016	12,949	12,962	12,923	12,865
HEAT RATE (APPROX.)N	13,774	13,631	13,609	13,520	13,424
HEAT RATE (ACTUAL)-G	12,895	12,829	12,841	12,803	12,745
HEAT RATE (ACTUAL)-N	13,646	13,504	13,482	13,394	13,299

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 11-22-04
DATE: 11-11-04 — Tested by: E.Wong

DATA:

GENERATED (MW)	*8.0*	*9.0*	*10.1*	*11.1*	*12.0*
HEAT RATE(BTU/MW)G	12,895	12,829	12,841	12,803	12,745
HEAT RATE(BTU/MW)N	13,646	13,504	13,482	13,394	13,299
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$34.3907	act.			
H.H.V. (BTU/GAL)	149,595	act.			

A, B, C CONSTANTS:

GROSS A=	12,857.45	NET A=	14,312.73
B=	26.512	B=	(89.936)
C=	(2.9277)	C=	0.5361

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	12,917	12,917	12,915	12,911	12,906	12,900	12,892	12,882	12,871	12,859
HEAT RATE(BTU/MW)N	13,962	13,876	13,834	13,792	13,751	13,709	13,668	13,628	13,587	13,547
GROSS (MBTU)	51.667	64.584	71.031	77.467	83.890	90.297	96.687	103.057	109.406	115.730
NET (MBTU)	55.846	69.382	76.089	82.754	89.380	95.966	102.513	109.020	115.490	121.921
COST/KWH	$0.0707	$0.0707	$0.0707	$0.0707	$0.0706	$0.0706	$0.0706	$0.0705	$0.0705	$0.0704
G/KWH	319.14	319.14	319.09	319.00	318.88	318.72	318.52	318.29	318.02	317.71
G/PS-H	232.50	232.50	232.46	232.40	232.31	232.19	232.05	231.88	231.68	231.46

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,845	12,830	12,813	12,795	12,775	12,754	12,731	12,707
HEAT RATE(BTU/MW)N	13,507	13,467	13,427	13,388	13,349	13,311	13,272	13,234
GROSS (MBTU)	122.028	128.298	134.537	140.743	146.914	153.048	159.142	165.195
NET (MBTU)	*128.314*	*134.670*	*140.989*	*147.271*	*153.518*	*159.728*	*165.904*	*172.044*
COST/KWH	$0.0703	$0.0702	$0.0701	$0.0700	$0.0699	$0.0698	$0.0697	$0.0696
G/KWH	317.37	316.99	316.58	316.13	315.64	315.12	314.56	313.97
G/PS-H	231.21	230.94	230.63	230.31	229.95	229.57	229.17	228.73

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 09-17-04

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	9,000	10,000	11,000	12,000		
BOILER-TURBINE							
Ambient Air Temp	*F.	110	109	111	109		
Gas Entering A.H.	*F.	545	570	595	619		
Gas Leaving A.H.	*F.	360	370	372	400		
Air Entering A.H.	*F.	110	110	112	113		
Air Leaving A.H.	*F.	410	399	410	419		
Circ. Water Inlet	*F.	75	75.0	75.0	75.0		
Circ. Water Outlet	*F.	86	87.60	89.10	90.80		
Condenser Vacuum	"Hg.	28.8	28.80	28.70	28.70		
Barometric Pressure	"Hg.	29.88	29.88	29.88	29.88		
Excess O2	%	0.49	0.54	0.52	0.52		
Feedwater Flow (X1000)	Lb/Hr	95.6	106.200	117.190	128.840		
Steam Flow (X1000)	Lb/Hr	98.0	109.220	120.060	132.100		
Throttle Stm. Press.	PSIG	599	599	599	598		
Feedwater to Blr.	*F.	334	345	352	357		
GENERATOR							
Generator Integrator, Start		6119.9	6134.7	6153.3	6171.7		
Generator Integrator, Stop		6129.0	6144.8	6164.3	6183.7		
Generator Integrator, Diff.	MWH	9.1	10.1	11.0	12.0	0.0	
Generator Volts	V.	11,200	11,200	11,300	11,300		
Generator Amps	A.	500	550	641	680		
Generator VARS	MVAR	4.3	4.6	6.9	6.5		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	5604.8	5612.2	5620.7	5628.8		
Aux. KWH Mtr. End (X100)	KWH	5609.5	5616.9	5625.7	5633.9		
Aux. Load Indicator	MW	0.47	0.47	0.50	0.51	0.00	
Aux. Volts	V.	-	-	-	-	-	
Aux. Amps	A.	29.0	30.0	31.0	31.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0	
Start Test	Time	0700	0835	1022	1200		
F.O. Totalizer-End	Lbs/Hr.	6400.75	7110.13	7770.50	8508.25		
End Test	Time	0800	0935	1122	1300		
Difference	Lbs/Hr.	6,401	7,110	7,771	8,508	0.00	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	228	227	226	225		
F.O. Temp. @ Burner Deck	*F	230	225	228	227		
Sulfur, Wt. %		1.90					
API Gravity @ 60 *F.	API	14.3					
Higher Heating Value	BTU/Gal	149,214					

TESTED BY: Kevin Kong

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-17-04
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.0	10.0	11.0	12.0	0.0
F.O. Temp. *F.	228	227	226	225	0
F.O. Temp. (Corr.)	0.94165	0.942	0.94235	0.9427	1.02145
F.O. Flow (Lbs/Hr.)	6,401	7,110	7,771	8,508	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	779.4	865.8	946.2	1,036.1	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	9,100	10,100	11,000	12,000	0
KW (Aux.)	470	470	500	510	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,214	149,214	149,214	149,214	149,214
HEAT RATE (APPROX.)	12,934	12,944	12,989	13,037	*#DIV/0!*
HEAT RATE (APPROX.)N	13,638	13,576	13,608	13,616	#DIV/0!
HEAT RATE (ACTUAL)-G	12,781	12,791	12,836	12,883	#DIV/0!
HEAT RATE (ACTUAL)-N	13,477	13,416	13,447	13,455	#DIV/0!

FUEL CORRECTION: 1

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 09-23-04
DATE: 09-17-04 — Tested by: E.Wong

DATA:

GENERATED (MW)	9.1	10.1	11.0	12.0
HEAT RATE(BTU/MW)G	12,781	12,791	12,836	12,883
HEAT RATE(BTU/MW)N	13,477	13,416	13,447	13,455
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$34.4559	act.		
H.H.V. (BTU/GAL)	149,214	act.		

A, B, C CONSTANTS:

GROSS A=	13,499.60	NET A=	15,489.26
B=	(166.997)	B=	(387.056)
C=	9.6474	C=	18.1647

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	12,986	12,906	12,873	12,845	12,822	12,803	12,790	12,781	12,777	12,778
HEAT RATE(BTU/MW)N	14,232	14,008	13,910	13,821	13,741	13,670	13,608	13,555	13,512	13,477
GROSS (MBTU)	51.944	64.529	70.801	77.070	83.341	89.623	95.923	102.248	108.606	115.003
NET (MBTU)	56.927	70.040	76.505	82.925	89.316	95.690	102.061	108.443	114.849	121.294
COST/KWH	$0.0714	$0.0710	$0.0708	$0.0706	$0.0705	$0.0704	$0.0703	$0.0703	$0.0702	$0.0703
G/KWH	320.85	318.87	318.06	317.37	316.79	316.34	316.00	315.79	315.69	315.71
G/PS-H	233.75	232.30	231.71	231.21	230.79	230.46	230.22	230.06	229.99	230.01

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,784	12,794	12,810	12,830	12,855	12,885	12,920	12,959
HEAT RATE(BTU/MW)N	13,452	13,435	13,428	13,430	13,440	13,460	13,489	13,527
GROSS (MBTU)	121.446	127.944	134.502	141.130	147.833	154.618	161.494	168.468
NET (MBTU)	127.790	134.352	140.992	147.725	154.565	161.524	168.616	175.856
COST/KWH	$0.0703	$0.0703	$0.0704	$0.0705	$0.0707	$0.0708	$0.0710	$0.0712
G/KWH	315.86	316.12	316.50	317.00	317.61	318.35	319.21	320.19
G/PS-H	230.11	230.30	230.58	230.94	231.39	231.93	232.55	233.26

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 05-27-04

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	8,000	9,000	10,000	11,000		
BOILER-TURBINE							
Ambient Air Temp	*F.	110	110	113	113		
Gas Entering A.H.	*F.	540	560	585	610		
Gas Leaving A.H.	*F.	347	352	357	365		
Air Entering A.H.	*F.	196	174	154	146		
Air Leaving A.H.	*F.	402	400	410	420		
Circ. Water Inlet	*F.	74	74.0	74.0	74.0		
Circ. Water Outlet	*F.	833	85.10	86.90	88.60		
Condenser Vacuum	"Hg.	29.2	29.20	29.00	28.80		
Barometric Pressure	"Hg.	30	30.03	30.05	30.03		
Excess O2	%	0.70	0.72	0.75	0.70		
Feedwater Flow (X1000)	Lb/Hr	82	94.00	105.00	116.00		
Steam Flow (X1000)	Lb/Hr	83	96.00	108.00	120.00		
Throttle Stm. Press.	PSIG	600	600	600	600		
Feedwater to Blr.	*F.	324	330	342	350		
GENERATOR							
Generator Integrator, Start		6222.6	6236.9	6253.1	6273.7		
Generator Integrator, Stop		6230.3	6245.7	6263.0	6284.6		
Generator Integrator, Diff.	MWH	7.7	8.8	9.9	10.9	0.0	
Generator Volts	V.	11,200	11,200	11,200	11,200		
Generator Amps	A.	425	480	540	585		
Generator VARS	MVAR	4.5	4.1	4.8	4.3		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	2624.2	2631.7	2639.5	2648.7		
Aux. KWH Mtr. End (X100)	KWH	2628.4	2636.0	2644.0	2653.4		
Aux. Load Indicator	MW	0.42	0.43	0.45	0.47	0.00	
Aux. Volts	V.	-	-	-	-	-	
Aux. Amps	A.	26.5	28.0	28.5	29.8		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0	
Start Test	Time	0600	0745	0930	1130		
F.O. Totalizer-End	Lbs/Hr.	5482.75	6249.88	6992.25	7694.00		
End Test	Time	0700	0845	1030	1230		
Difference	Lbs/Hr.	5,483	6,250	6,992	7,694	0.00	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	*F	235	234	232	230		
F.O. Temp. @ Burner Deck	*F	235	235	233	231		
Sulfur, Wt. %		1.74					
API Gravity @ 60 *F.	API	14.8					
Higher Heating Value	BTU/Gal	149,643					

TESTED BY: Kevin Kong

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-27-04
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	0.0
F.O. Temp. *F.	235	234	232	230	0
F.O. Temp. (Corr.)	0.9392	0.93955	0.94025	0.94095	1.02145
F.O. Flow (Lbs/Hr.)	5,483	6,250	6,992	7,694	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	667.7	761.1	851.5	936.9	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	7,700	8,800	9,900	10,900	0
KW (Aux.)	420	430	450	470	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,643	149,643	149,643	149,643	149,643
HEAT RATE (APPROX.)	13,093	13,059	12,987	12,979	#DIV/0!
HEAT RATE (APPROX.)N	13,848	13,730	13,605	13,564	#DIV/0!
HEAT RATE (ACTUAL)-G	12,975	12,942	12,870	12,863	#DIV/0!
HEAT RATE (ACTUAL)-N	13,724	13,607	13,483	13,442	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 06-04-04
DATE: 05-27-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.7	8.8	9.9	10.9
HEAT RATE(BTU/MW)G	12,975	12,942	12,870	12,863
HEAT RATE(BTU/MW)N	13,724	13,607	13,483	13,442
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$28.3161	act.		
H.H.V. (BTU/GAL)	149,643	act.		

A, B, C CONSTANTS:

GROSS	A=	13,656.97	NET A=	15,653.19
	B=	(122.922)	B=	(362.617)
	C=	4.5459	C=	14.6199

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	**6.5**	7.0	7.5	8.0	**8.5**	9.0
HEAT RATE(BTU/MW)G	13,238	13,156	13,118	13,083	**13,050**	13,019	12,991	12,965	**12,941**	12,919
HEAT RATE(BTU/MW)N	14,437	14,206	14,101	14,004	**13,914**	13,831	13,756	13,688	**13,627**	13,574
GROSS (MBTU)	52.952	65.780	72.151	78.499	84.825	91.135	97.431	103.716	109.995	116.270
NET (MBTU)	57.747	71.028	77.556	84.023	90.440	96.819	103.170	109.503	115.832	122.165
COST/KWH	$0.0596	$0.0593	$0.0591	$0.0589	$0.0588	$0.0587	$0.0585	$0.0584	$0.0583	$0.0582
G/KWH	327.08	325.05	324.12	323.25	322.43	321.67	320.97	320.32	319.73	319.19
G/PS-H	238.28	236.81	236.13	235.50	234.90	234.35	233.83	233.36	232.93	232.54

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	**10.5**	11.0	**11.5**	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,899	12,882	**12,867**	12,855	**12,845**	12,837	12,831	12,827
HEAT RATE(BTU/MW)N	13,528	13,489	**13,458**	13,433	**13,417**	13,407	13,405	13,410
GROSS (MBTU)	122.545	128.823	135.108	141.404	147.712	154.038	160.384	166.754
NET (MBTU)	128.514	134.890	141.304	147.768	154.291	160.885	167.560	174.329
COST/KWH	$0.0581	$0.0580	$0.0580	$0.0579	$0.0579	$0.0578	$0.0578	$0.0578
G/KWH	318.71	318.29	317.92	317.61	317.36	317.16	317.01	316.93
G/PS-H	232.19	231.88	231.61	231.39	231.20	231.06	230.95	230.89

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 02-09-04

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,500	9,500	10,400	11,500	
BOILER-TURBINE						
Ambient Air Temp	*F.	94	94.5	100	103	
Gas Entering A.H.	*F.	935	555	570	590	
Gas Leaving A.H.	*F.	335	344	350	355	
Air Entering A.H.	*F.	186	181	182	162	
Air Leaving A.H.	*F.	390	394	404	410	
Circ. Water Inlet	*F.	71	73.0	74.0	75.0	
Circ. Water Outlet	*F.	89.4	91.70	87.80	89.40	
Condenser Vacuum	"Hg.	28.8	28.70	28.90	28.70	
Barometric Pressure	"Hg.	29.99	29.99	30.01	30.00	
Excess O2	%	1.44	1.32	1.15	0.97	
Feedwater Flow (X1000)	Lb/Hr	90	103.00	109.00	121.00	
Steam Flow (X1000)	Lb/Hr	91	104.00	112.00	123.00	
Throttle Stm. Press.	PSIG	600	600	597	600	
Feedwater to Blr.	*F.	324	337	343	350	
GENERATOR						
Generator Integrator, Start		7441.0	7452.9	7469.7	7486.3	
Generator Integrator, Stop		7449.5	7462.4	7480.1	7497.8	
Generator Integrator, Di	MWH	8.5	9.5	10.4	11.5	0.0
Generator Volts	V.	11,200	11,200	11,200	11,200	
Generator Amps	A.	500	538	579	639	
Generator VARS	MVAR	5.2	5.0	5.1	5.4	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	153.8	159.3	167.2	174.5	
Aux. KWH Mtr. End (X100)	KWH	157.8	163.8	171.8	179.4	
Aux. Load Indicator	MW	0.40	0.45	0.46	0.49	0.00
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	25.7	29.8	30.0	30.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	0	0	0	0
Start Test	Time	0642	0804	0947	1121	
F.O. Totalizer-End	Lbs/Hr.	6068.0	6903.0	7388.0	8090.0	
End Test	Time	0742	0904	1047	1221	
Difference	Lbs/Hr.	6,068.0	6,903.0	7,388.0	8,090.0	0.00
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	2	2	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	231	228	226	
F.O. Temp. @ Burner Deck	*F	232	229	229	226	
Sulfur, Wt. %		1.82				
API Gravity @ 60 *F.	API	11.5				
Higher Heating Value	BTU/Gal	151,643				

TESTED BY: Hokoana

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-09-04
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.5	9.5	10.4	11.5	0.0
F.O. Temp. *F.	230	231	228	226	0
F.O. Temp. (Corr.)	0.94095	0.9406	0.94165	0.94235	1.02145
F.O. Flow (Lbs/Hr.)	6,068	6,903	7,388	8,090	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	738.9	840.6	899.7	985.1	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	8,500	9,500	10,400	11,500	0
KW (Aux.)	400	450	460	490	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,643	151,643	151,643	151,643	151,643
HEAT RATE (APPROX.)	13,127	13,361	13,062	12,935	#DIV/0!
HEAT RATE (APPROX.)N	13,775	14,025	13,667	13,511	#DIV/0!
HEAT RATE (ACTUAL)-G	13,183	13,418	13,118	12,990	#DIV/0!
HEAT RATE (ACTUAL)-N	13,834	14,085	13,725	13,569	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 02-11-04
DATE: 02-09-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	9.5	10.4	11.5
HEAT RATE(BTU/MW)G	14,025	13,667	13,511
HEAT RATE(BTU/MW)N	13,418	13,118	12,990
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$28.3161	act.	
H.H.V. (BTU/GAL)	151,643	act.	

A, B, C CONSTANTS:

GROSS	A=	30,497.93	NET A=	27,325.02
	B=	(2,953.856)	B=	(2,496.609)
	C=	128.4119	C=	108.7064

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	20,737	18,939	18,136	17,398	16,723	16,113	15,567	15,085	14,668	14,315
HEAT RATE(BTU/MW)N	19,078	17,560	16,882	16,259	15,690	15,175	14,715	14,309	13,958	13,661
GROSS (MBTU)	82.948	94.695	99.749	104.386	108.701	112.792	116.754	120.684	124.677	128.831
NET (MBTU)	76.312	87.798	92.851	97.553	101.984	106.228	110.364	114.475	118.642	122.947
COST/KWH	$0.0922	$0.0842	$0.0806	$0.0773	$0.0744	$0.0716	$0.0692	$0.0671	$0.0652	$0.0636
G/KWH	512.36	467.93	448.10	429.85	413.19	398.11	384.63	372.72	362.41	353.68
G/PS-H	373.27	340.90	326.45	313.16	301.02	290.04	280.21	271.54	264.02	257.66

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	14,025	13,801	13,640	13,543	13,511	13,543	13,639	13,799
HEAT RATE(BTU/MW)N	13,418	13,230	13,096	13,016	12,990	13,019	13,103	13,240
GROSS (MBTU)	133.242	138.006	143.218	148.977	155.377	162.516	170.489	179.392
NET (MBTU)	127.471	132.296	137.503	143.174	149.390	156.233	163.785	172.126
COST/KWH	$0.0624	$0.0614	$0.0606	$0.0602	$0.0601	$0.0602	$0.0606	$0.0614
G/KWH	346.53	340.98	337.01	334.62	333.82	334.61	336.99	340.95
G/PS-H	252.46	248.41	245.52	243.78	243.20	243.77	245.50	248.39

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 12-17-03

Gross Load (K3-4) --->	KWH	*7,000*	*9,000*	*10,000*	*12,000*	*13,500*
Actual Test Load	KWH	8,000	9,000	10,000	11,000	
BOILER-TURBINE						
Ambient Air Temp	*F.	77	75	75	75	
Gas Entering A.H.	*F.	505	520	530	550	
Gas Leaving A.H.	*F.	322	330	336	340	
Air Entering A.H.	*F.	203	192	187	175	
Air Leaving A.H.	*F.	375	378	385	392	
Circ. Water Inlet	*F.	73	73.0	73.0	73.0	
Circ. Water Outlet	*F.	88	89.90	86.40	88.30	
Condenser Vacuum	"Hg.	28.4	28.30	28.40	28.30	
Barometric Pressure	"Hg.	29.95	29.99	29.99	29.98	
Excess O2	%	0.90	0.85	0.94	0.81	
Feedwater Flow (X1000)	Lb/Hr	88	99.00	109.90	122.00	
Steam Flow (X1000)	Lb/Hr	87	98.00	108.00	120.00	
Throttle Stm. Press.	PSIG	600	600	599	599	
Feedwater to Blr.	*F.	323	330	338	345	
GENERATOR						
Generator Integrator, Start		3093.2	3107.0	3122.3	3140.8	
Generator Integrator, Stop		3101.2	3116.1	3132.3	3151.9	
Generator Integrator, Di	MWH	8.0	9.1	10.0	11.1	0.0
Generator Volts	V.	11,100	11,100	11,200	11,200	
Generator Amps	A.	419	480	530	590	
Generator VARS	MVAR	3.1	3.2	4.0	4.2	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	3992.5	3999.2	4006.2	4014.6	
Aux. KWH Mtr. End (X100)	KWH	3996.5	4003.4	4010.8	4019.3	
Aux. Load Indicator	MW	0.40	0.42	0.46	0.47	0.00
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	26.0	27.0	29.5	30.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	0	0	0	0
Start Test	Time	0630	0810	0948	1135	
F.O. Totalizer-End	Lbs/Hr.	5617	6353.00	6920.50	7605.50	
End Test	Time	0730	0910	1048	1235	
Difference	Lbs/Hr.	5,617	6,353.00	6,920.50	7,605.50	0.00
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	2	2	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	229	226	227	
F.O. Temp. @ Burner Deck	*F	225	227	227	227	
Sulfur, Wt. %		1.72				
API Gravity @ 60 *F.	API	15.0				
Higher Heating Value	BTU/Gal	149,952				

TESTED BY: Martin Ah Yuen

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-17-03
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	0.0
F.O. Temp. *F.	225	229	226	227	0
F.O. Temp. (Corr.)	0.9427	0.9413	0.94235	0.942	1.02145
F.O. Flow (Lbs/Hr.)	5,617	6,353	6,921	7,606	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	684.0	773.6	842.7	926.1	0.0
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	9,100	10,000	11,100	0
KW (Aux.)	400	420	460	470	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,952	149,952	149,952	149,952	149,952
HEAT RATE (APPROX.)	12,910	12,837	12,725	12,599	#DIV/0!
HEAT RATE (APPROX.)N	13,590	13,458	13,339	13,156	#DIV/0!
HEAT RATE (ACTUAL)-G	12,821	12,748	12,637	12,511	#DIV/0!
HEAT RATE (ACTUAL)-N	13,496	13,365	13,246	13,065	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 12-22-03
DATE: 12-17-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	8.0	9.1	10.0	11.1
HEAT RATE(BTU/MW)G	12,821	12,748	12,637	12,511
HEAT RATE(BTU/MW)N	13,496	13,365	13,246	13,065
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$29.6225	act.		
H.H.V. (BTU/GAL)	149,952	act.		

A, B, C CONSTANTS:

GROSS	A=	12,576.78	NET A=	13,578.91
	B=	126.378	B=	81.709
	C=	(11.9384)	C=	(11.5276)

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	12,891	12,910	12,911	12,905	12,894	12,876	12,853	12,824	12,788	12,747
HEAT RATE(BTU/MW)N	13,721	13,699	13,680	13,654	13,623	13,586	13,543	13,495	13,441	13,381
GROSS (MBTU)	51.565	64.551	71.009	77.432	83.810	90.135	96.398	102.590	108.702	114.725
NET (MBTU)	54.885	68.496	75.238	81.925	88.549	95.102	101.575	107.959	114.245	120.425
COST/KWH	$0.0606	$0.0607	$0.0607	$0.0607	$0.0606	$0.0606	$0.0605	$0.0603	$0.0602	$0.0600
G/KWH	318.51	318.98	318.99	318.86	318.57	318.14	317.57	316.84	315.97	314.95
G/PS-H	232.04	232.38	232.39	232.29	232.09	231.78	231.36	230.83	230.19	229.45

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,700	12,647	12,588	12,522	12,451	12,374	12,291	12,202
HEAT RATE(BTU/MW)N	13,315	13,243	13,166	13,083	12,994	12,899	12,799	12,693
GROSS (MBTU)	120.649	126.467	132.169	137.746	143.190	148.490	153.639	158.627
NET (MBTU)	126.490	132.432	138.242	143.912	149.431	154.793	159.989	165.008
COST/KWH	$0.0597	$0.0595	$0.0592	$0.0589	$0.0586	$0.0582	$0.0578	$0.0574
G/KWH	313.78	312.47	311.01	309.40	307.64	305.73	303.68	301.48
G/PS-H	228.60	227.64	226.58	225.40	224.12	222.74	221.24	219.64

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 10-15-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,000	11,000	12,100
BOILER-TURBINE						
Ambient Air Temp	*F.		105	105	106	102
Gas Entering A.H.	*F.		575	580	612	640
Gas Leaving A.H.	*F.		353	355	360	365
Air Entering A.H.	*F.		190	171	150	137
Air Leaving A.H.	*F.		418	420	420	425
Circ. Water Inlet	*F.		74.0	74.0	74.0	74.0
Circ. Water Outlet	*F.		85.50	86.90	88.65	90.32
Condenser Vacuum	"Hg.		28.50	28.40	28.20	28.00
Barometric Pressure	"Hg.		30.05	30.06	30.08	30.06
Excess O2	%		0.90	0.99	0.95	0.9
Feedwater Flow (X1000)	Lb/Hr		98.18	106.74	118.40	129.10
Steam Flow (X1000)	Lb/Hr		97.88	107.23	119.40	131.54
Throttle Stm. Press.	PSIG		605	602	601	601
Feedwater to Blr.	*F.		333	340	348	355
GENERATOR						
Generator Integrator, Start			4592.7	4609.2	4627.4	4647.3
Generator Integrator, Stop			4601.8	4619.2	4638.4	4659.4
Generator Integrator, Di	MWH	0.0	9.1	10.0	11.0	12.1
Generator Volts	V.		11,400	11,300	11,400	11,300
Generator Amps	A.		500	595	670	680
Generator VARS	MVAR		4.5	6.5	7.5	6.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH		87.1	95.2	103.5	112.1
Aux. KWH Mtr. End (X100)	KWH		91.7	99.9	108.4	117.1
Aux. Load Indicator	MW	0.00	0.46	0.47	0.49	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.		28.0	29.0	31.0	31.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	0	0	0	0
Start Test	Time		0600	0745	0930	1115
F.O. Totalizer-End	Lbs/Hr.		6404.25	7001.15	7742.38	8460.00
End Test	Time		0700	0845	1030	1215
Difference	Lbs/Hr.	0	6,404.25	7,001.15	7,742.38	8,460.00
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F		225	223	223	223
F.O. Temp. @ Burner Deck	*F		222	221	221	220
Sulfur, Wt. %		1.83				
API Gravity @ 60 *F.	API	14.5				
Higher Heating Value	BTU/Gal	149,929				

TESTED BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 10-15-03
KPP UNIT NO. 3

	TEST LOADS - MW				
	0.0	9.0	10.0	11.0	12.1
F.O. Temp. *F.	0	225	223	223	223
F.O. Temp. (Corr.)	1.02145	0.9427	0.9434	0.9434	0.9434
F.O. Flow (Lbs/Hr.)	-	6,404	7,001	7,742	8,460
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	0.0	779.9	852.6	942.8	1,030.2
PT RATIO	1	1	1	1	1
KW (Gen.)	0	9,100	10,000	11,000	12,100
KW (Aux.)	-	460	470	490	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,929	149,929	149,929	149,929	149,929
HEAT RATE (APPROX.)	#DIV/0!	12,941	12,874	12,942	12,856
HEAT RATE (APPROX.)N	#DIV/0!	13,630	13,508	13,546	13,410
HEAT RATE (ACTUAL)-G	#DIV/0!	12,849	12,782	12,850	12,765
HEAT RATE (ACTUAL)-N	#DIV/0!	13,533	13,413	13,450	13,315

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 10-29-03
DATE: 10-15-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	9.1	10.0	12.1
HEAT RATE(BTU/MW)G	12,849	12,782	12,765
HEAT RATE(BTU/MW)N	13,533	13,413	13,315
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$31.2975 act.		
H.H.V. (BTU/GAL)	149,929 act.		

A, B, C CONSTANTS:

GROSS	A=	15,519.28	NET A=	17,397.62
	B=	(493.153)	B=	(689.532)
	C=	21.9443	C=	29.1026

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,898	13,602	13,471	13,350	13,241	13,142	13,055	12,978	12,913	12,858
HEAT RATE(BTU/MW)N	15,105	14,678	14,486	14,308	14,145	13,997	13,863	13,744	13,639	13,549
GROSS (MBTU)	55.591	68.011	74.089	80.102	86.066	91.997	97.912	103.828	109.760	115.726
NET (MBTU)	60.421	73.388	79.671	85.849	91.944	97.979	103.974	109.951	115.934	121.942
COST/KWH	$0.0691	$0.0676	$0.0670	$0.0664	$0.0658	$0.0653	$0.0649	$0.0645	$0.0642	$0.0639
G/KWH	343.38	336.07	332.83	329.85	327.15	324.72	322.56	320.67	319.05	317.70
G/PS-H	250.16	244.84	242.47	240.31	238.34	236.56	234.99	233.61	232.43	231.45

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,815	12,782	12,761	12,750	12,750	12,761	12,784	12,817
HEAT RATE(BTU/MW)N	13,474	13,413	13,366	13,334	13,317	13,314	13,326	13,352
GROSS (MBTU)	121.741	127.822	133.986	140.248	146.627	153.137	159.796	166.619
NET (MBTU)	127.999	134.126	140.344	146.676	153.144	159.768	166.572	173.577
COST/KWH	$0.0637	$0.0635	$0.0634	$0.0634	$0.0634	$0.0634	$0.0635	$0.0637
G/KWH	316.62	315.82	315.28	315.02	315.02	315.30	315.85	316.67
G/PS-H	230.67	230.08	229.69	229.50	229.50	229.71	230.11	230.70

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 08-20-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,000	11,500	12,300
BOILER-TURBINE						
Ambient Air Temp	*F.		97	108	110	112
Gas Entering A.H.	*F.		570	600	625	649
Gas Leaving A.H.	*F.		353	365	375	370
Air Entering A.H.	*F.		190	170	140	140
Air Leaving A.H.	*F.		415	419	425	430
Circ. Water Inlet	*F.		73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.		84.90	86.60	88.90	90.10
Condenser Vacuum	"Hg.		28.60	28.50	28.20	28.10
Barometric Pressure	"Hg.		30.10	30.20	30.25	30.20
Excess O2	%		1.20	1.08	0.60	0.6
Feedwater Flow (X1000)	Lb/Hr		95	107	122	130
Steam Flow (X1000)	Lb/Hr		96	107	124	133
Throttle Stm. Press.	PSIG		605	603	602	600
Feedwater to Blr.	*F.		330	337	350	355
GENERATOR						
Generator Integrator, Start			9342.8	9361.7	9380.4	9400.9
Generator Integrator, Stop			9351.7	9371.7	9391.9	9413.1
Generator Integrator, Di	MWH	0.0	8.9	10.0	11.5	12.2
Generator Volts	V.		11,300	11,300	11,300	11,200
Generator Amps	A.		520	580	650	670
Generator VARS	MVAR		5.5	6.0	6.5	5.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH		3542.3	3551.5	3559.9	3568.5
Aux. KWH Mtr. End (X100)	KWH		3546.8	3556.1	3564.8	3573.5
Aux. Load Indicator	MW	0.00	0.45	0.46	0.49	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.		29.0	29.0	30.0	31.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	67289600	67302400	67315200	67331200
Start Test	Time		0644	0844	1030	1215
F.O. Totalizer-End	Lbs/Hr.		67296000	67310400	67323200	67339200
End Test	Time		0744	0944	1130	1315
Difference	Lbs/Hr.	0	6,385	7,141	8,204	8,692
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F		223	223	223	220
F.O. Temp. @ Burner Deck	*F		222	222	220	220
Sulfur, Wt. %		1.67				
API Gravity @ 60 *F.	API	9.5				
Higher Heating Value	BTU/Gal	151,952				

TESTED BY:

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-20-03
KPP UNIT NO. 3

	TEST LOADS - MW				
	0.0	9.0	10.0	11.5	12.3
F.O. Temp. *F.	0	223	223	223	220
F.O. Temp. (Corr.)	1.02145	0.9434	0.9434	0.9434	0.94445
F.O. Flow (Lbs/Hr.)	-	6,385	7,141	8,204	8,692
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	0.0	777.6	869.6	999.0	1,058.4
PT RATIO	1	1	1	1	1
KW (Gen.)	0	8,900	10,000	11,500	12,200
KW (Aux.)	-	450	460	490	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,952	151,952	151,952	151,952	151,952
HEAT RATE (APPROX.)	#DIV/0!	13,192	13,131	13,118	13,100
HEAT RATE (APPROX.)N	#DIV/0!	13,895	13,764	13,701	13,660
HEAT RATE (ACTUAL)-G	#DIV/0!	13,276	13,214	13,200	13,183
HEAT RATE (ACTUAL)-N	#DIV/0!	13,983	13,851	13,788	13,746

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 08-22-03
DATE: 08-20-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		8.9	10.0	11.5	12.2
HEAT RATE(BTU/MW)G		13,276	13,214	13,200	13,183
HEAT RATE(BTU/MW)N		13,983	13,851	13,788	13,746
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$27.5723	act.			
H.H.V. (BTU/GAL)	151,952	act.			

A, B, C CONSTANTS:

GROSS	A=	14,504.21	NET A=	16,390.39
	B=	(220.803)	B=	(419.456)
	C=	9.2594	C=	16.6739

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,769	13,632	13,570	13,513	13,460	13,412	13,369	13,330	13,296	13,267
HEAT RATE(BTU/MW)N	14,979	14,710	14,588	14,474	14,368	14,271	14,182	14,102	14,030	13,966
GROSS (MBTU)	55.077	68.158	74.634	81.076	87.491	93.886	100.268	106.643	113.019	119.403
NET (MBTU)	59.917	73.550	80.233	86.843	93.395	99.898	106.368	112.815	119.252	125.693
COST/KWH	$0.0595	$0.0589	$0.0586	$0.0584	$0.0582	$0.0579	$0.0578	$0.0576	$0.0574	$0.0573
G/KWH	340.20	336.80	335.28	333.87	332.57	331.38	330.31	329.36	328.52	327.79
G/PS-H	247.84	245.37	244.26	243.23	242.28	241.42	240.64	239.95	239.33	238.81

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,242	13,222	13,207	13,196	13,190	13,188	13,191	13,199
HEAT RATE(BTU/MW)N	13,910	13,863	13,824	13,794	13,772	13,758	13,752	13,755
GROSS (MBTU)	125.801	132.221	138.670	145.153	151.680	158.255	164.887	171.582
NET (MBTU)	132.149	138.632	145.156	151.733	158.375	165.095	171.906	178.819
COST/KWH	$0.0572	$0.0571	$0.0571	$0.0570	$0.0570	$0.0570	$0.0570	$0.0570
G/KWH	327.18	326.68	326.30	326.03	325.88	325.84	325.91	326.10
G/PS-H	238.36	238.00	237.72	237.52	237.41	237.38	237.44	237.57

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 05-30-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,700	11,400	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	106	110	112	112	112
Gas Entering A.H.	*F.	540	560	595	620	640
Gas Leaving A.H.	*F.	300	311	325	335	347
Air Entering A.H.	*F.	112	115	115	115	114
Air Leaving A.H.	*F.	410	410	425	440	450
Circ. Water Inlet	*F.	73.0	73.0	74.0	74.0	74.0
Circ. Water Outlet	*F.	83.00	85.00	87.00	88.00	90.00
Condenser Vacuum	Hg.	28.80	28.70	28.50	28.40	28.20
Barometric Pressure	Hg.	30.15	30.15	30.15	30.13	30.12
Excess O2	%	1.10	1.00	1.00	0.80	0.8
Feedwater Flow (X1000)	Lb/Hr	88	98	116	125	137
Steam Flow (X1000)	Lb/Hr	82	92	110	119	600
Throttle Stm. Press.	PSIG	600	600	600	600	350
Feedwater to Blr.	*F.	320	325	340	345	
GENERATOR						
Generator Integrator, Start		7003.3	7016.4	7032.2	7049.4	7065.9
Generator Integrator, Stop		7011.3	7025.4	7042.9	7060.8	7078.4
Generator Integrator, Di	MWH	8.0	9.0	10.7	11.4	12.5
Generator Volts	V.	11,400	11,400	11,400	11,500	11,400
Generator Amps	A.	420	520	580	660	680
Generator VARS	MVAR	4.0	5.5	6.0	7.0	6.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	3952.8	3959.8	3967.4	3974.9	3981.9
Aux. KWH Mtr. End (X100)	KWH	3957.2	3964.2	3972.1	3979.8	3986.9
Aux. Load Indicator	MW	0.44	0.44	0.47	0.49	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	27.9	28.1	29.5	30.0	30.2
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0640	0815	0955	1130	1255
F.O. Totalizer-End	Lbs/Hr.	5484	6156	7238	7758	8502
End Test	Time	0740	0915	1055	1230	1355
Difference	Lbs/Hr.	5,484	6,156	7,238	7,758	8,502
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	220	220	220	219	218
F.O. Temp. @ Burner Deck	*F	223	224	224	222	221
Sulfur, Wt. %		1.65				
API Gravity @ 60 *F.	API	13.2				
Higher Heating Value	BTU/Gal	149,095				

TESTED BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-30-03
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.7	11.4	12.5
F.O. Temp. *F.	220	220	220	219	218
F.O. Temp. (Corr.)	0.94445	0.94445	0.94445	0.9448	0.94515
F.O. Flow (Lbs/Hr.)	5,484	6,156	7,238	7,758	8,502
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	667.8	749.6	881.4	944.7	1,035.3
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	9,000	10,700	11,400	12,500
KW (Aux.)	440	440	470	490	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,095	149,095	149,095	149,095	149,095
HEAT RATE (APPROX.)	12,605	12,577	12,438	12,513	12,506
HEAT RATE (APPROX.)N	13,338	13,224	13,010	13,074	13,027
HEAT RATE (ACTUAL)-G	12,446	12,419	12,281	12,355	12,348
HEAT RATE (ACTUAL)-N	13,170	13,057	12,845	12,910	12,863

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 06-03-03
DATE: 05-30-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	8.0	9.0	10.7	11.4	12.5
HEAT RATE(BTU/MW)G	12,446	12,419	12,281	12,355	12,348
HEAT RATE(BTU/MW)N	13,170	13,057	12,845	12,910	12,863
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$29.8895	act.			
H.H.V. (BTU/GAL)	149,095	act.			

A, B, C CONSTANTS:

GROSS	A=	14,038.29	NET A=	15,806.93
	B=	(308.146)	B=	(495.427)
	C=	13.8495	C=	20.8438

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,027	12,844	12,762	12,688	12,620	12,560	12,506	12,459	12,420	12,387
HEAT RATE(BTU/MW)N	14,159	13,851	13,713	13,585	13,467	13,360	13,264	13,178	13,102	13,036
GROSS (MBTU)	52.109	64.219	70.193	76.128	82.033	87.919	93.797	99.676	105.567	111.481
NET (MBTU)	56.635	69.254	75.419	81.508	87.537	93.522	99.478	105.420	111.365	117.328
COST/KWH	$0.0622	$0.0613	$0.0609	$0.0606	$0.0602	$0.0600	$0.0597	$0.0595	$0.0593	$0.0591
G/KWH	321.87	317.34	315.33	313.49	311.82	310.32	309.00	307.84	306.86	306.05
G/PS-H	234.49	231.19	229.72	228.38	227.17	226.08	225.11	224.27	223.55	222.96

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,361	12,342	12,330	12,324	12,326	12,335	12,350	12,373
HEAT RATE(BTU/MW)N	12,982	12,937	12,903	12,879	12,866	12,863	12,871	12,889
GROSS (MBTU)	117.428	123.418	129.461	135.569	141.751	148.018	154.380	160.848
NET (MBTU)	123.325	129.370	135.481	141.673	147.960	154.360	160.887	167.557
COST/KWH	$0.0590	$0.0589	$0.0589	$0.0588	$0.0588	$0.0589	$0.0590	$0.0591
G/KWH	305.40	304.93	304.63	304.51	304.55	304.76	305.15	305.70
G/PS-H	222.49	222.15	221.93	221.84	221.87	222.03	222.31	222.71

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 01-16-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	7,900	8,900	10,000	11,000	12,000
BOILER-TURBINE						
Ambient Air Temp	*F.	98	102	108	111	113
Gas Entering A.H.	*F.	525	550	570	600	620
Gas Leaving A.H.	*F.	338	343	355	361	365
Air Entering A.H.	*F.	142	142	138	138	136
Air Leaving A.H.	*F.	390	390	400	415	420
Circ. Water Inlet	*F.	72.0	72.0	72.0	72.0	72.0
Circ. Water Outlet	*F.	83.00	84.00	86.00	88.00	89.00
Condenser Vacuum	Hg.	28.50	28.40	28.30	28.20	28.00
Barometric Pressure	Hg.	30.06	30.09	30.10	30.06	30.05
Excess O2	%	0.90	0.90	0.88	0.88	0.7
Feedwater Flow (X1000)	Lb/Hr	87	97	108	119	130
Steam Flow (X1000)	Lb/Hr	84	94	106	117	128
Throttle Stm. Press.	PSIG	600	600	600	600	600
Feedwater to Blr.	*F.	317	324	333	341	346
GENERATOR						
Generator Integrator, Start		1521.2	1534.1	1547.9	1563.3	1579.2
Generator Integrator, Stop		1529.1	1543.0	1557.9	1574.3	1591.2
Generator Integrator, Di	MWH	7.9	8.9	10.0	11.0	12.0
Generator Volts	V.	11,400	11,400	11,400	11,400	11,400
Generator Amps	A.	440	520	560	650	680
Generator VARS	MVAR	4.8	5.8	6.1	7.0	7.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	8585.3	8592.3	8599.0	8605.9	8612.6
Aux. KWH Mtr. End (X100)	KWH	8589.7	8596.7	8603.5	8610.6	8617.5
Aux. Load Indicator	MW	0.44	0.44	0.45	0.47	0.49
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.1	28.2	28.6	30.0	30.1
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0645	0820	0950	1120	1245
F.O. Totalizer-End	Lbs/Hr.	5601	6257	6972	7640	8310
End Test	Time	0745	0920	1050	1220	1345
Difference	Lbs/Hr.	5,601	6,257	6,972	7,640	8,310
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	220	222	222	221	220
F.O. Temp. @ Burner Deck	*F	230	230	226	225	224
Sulfur, Wt. %		1.60				
API Gravity @ 60 *F.	API	13.5				
Higher Heating Value	BTU/Gal	150,143				

TESTED BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-16-03
KPP UNIT NO. 3

	TEST LOADS - MW				
	7.9	8.9	10.0	11.0	12.0
F.O. Temp. *F.	220	222	222	221	220
F.O. Temp. (Corr.)	0.94445	0.94375	0.94375	0.9441	0.94445
F.O. Flow (Lbs/Hr.)	5,601	6,257	6,972	7,640	8,310
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	682.1	761.9	849.0	930.3	1,011.9
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	8,900	10,000	11,000	12,000
KW (Aux.)	440	440	450	470	490
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,143	150,143	150,143	150,143	150,143
HEAT RATE (APPROX.)	13,037	12,927	12,820	12,771	12,733
HEAT RATE (APPROX.)N	13,806	13,600	13,424	13,341	13,276
HEAT RATE (ACTUAL)-G	12,963	12,854	12,747	12,699	12,661
HEAT RATE (ACTUAL)-N	13,727	13,522	13,348	13,265	13,200

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 01-20-03
DATE: 01-16-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.9	8.9	10.0	11.0	12.0
HEAT RATE(BTU/MW)G	12,963	12,854	12,747	12,699	12,661
HEAT RATE(BTU/MW)N	13,727	13,522	13,348	13,265	13,200
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$28.8636	act.			
H.H.V. (BTU/GAL)	150,143	act.			

A, B, C CONSTANTS:

GROSS	A=	14,805.94	NET A=	17,064.52
	B=	(338.173)	B=	(617.016)
	C=	13.2935	C=	24.6097

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,666	13,447	13,348	13,255	13,169	13,090	13,017	12,951	12,892	12,839
HEAT RATE(BTU/MW)N	14,990	14,595	14,415	14,248	14,094	13,951	13,821	13,703	13,598	13,505
GROSS (MBTU)	54.664	67.237	73.415	79.533	85.602	91.631	97.631	103.611	109.581	115.552
NET (MBTU)	59.961	72.973	79.285	85.490	91.609	97.659	103.659	109.627	115.582	121.543
COST/KWH	$0.0626	$0.0616	$0.0611	$0.0607	$0.0603	$0.0599	$0.0596	$0.0593	$0.0590	$0.0588
G/KWH	337.65	332.25	329.80	327.51	325.38	323.42	321.63	319.99	318.53	317.22
G/PS-H	245.99	242.05	240.27	238.60	237.05	235.62	234.31	233.12	232.05	231.10

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,793	12,754	12,721	12,695	12,675	12,662	12,656	12,656
HEAT RATE(BTU/MW)N	13,424	13,355	13,299	13,255	13,223	13,204	13,197	13,202
GROSS (MBTU)	121.534	127.536	133.568	139.640	145.763	151.946	158.199	164.532
NET (MBTU)	127.527	133.553	139.640	145.806	152.070	158.450	164.964	171.631
COST/KWH	$0.0586	$0.0584	$0.0582	$0.0581	$0.0580	$0.0580	$0.0579	$0.0579
G/KWH	316.08	315.11	314.30	313.65	313.17	312.85	312.70	312.71
G/PS-H	230.27	229.56	228.97	228.50	228.15	227.92	227.81	227.81

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 12-16-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,000	12,000
BOILER-TURBINE						
Ambient Air Temp	*F.	77	79	80	80	80
Gas Entering A.H.	*F.	535	555	575	600	642
Gas Leaving A.H.	*F.	335	348	357	366	375
Air Entering A.H.	*F.	144	147	148	147	146
Air Leaving A.H.	*F.	390	395	410	420	430
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0	71.0
Circ. Water Outlet	*F.	89.00	91.00	86.00	88.00	89.00
Condenser Vacuum	Hg.	28.40	28.30	28.60	28.40	28.20
Barometric Pressure	Hg.	30.21	30.23	30.24	30.21	30.16
Excess O2	%	1.40	1.20	1.10	1.00	0.8
Feedwater Flow (X1000)	Lb/Hr	86.00	97.00	105.00	116.00	126.00
Steam Flow (X1000)	Lb/Hr	85.00	98.00	107.00	118.00	129.00
Throttle Stm. Press.	PSIG	608	604	602	601	600
Feedwater to Blr.	*F.	318	327	335	343	350
GENERATOR						
Generator Integrator, Start		3097.7	3109.3	3126.4	3140.2	3155.9
Generator Integrator, Stop		3105.5	3118.4	3136.4	3151.2	3167.9
Generator Integrator, Di	MWH	7.8	9.1	10.0	11.0	12.0
Generator Volts	V.	11,400	11,400	11,400	11,400	11,400
Generator Amps	A.	460	540	610	655	670
Generator VARS	MVAR	5.2	6.1	7.3	7.3	6.2
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	4988.7	4994.6	5003.1	5009.5	5016.4
Aux. KWH Mtr. End (X100)	KWH	4992.7	4999.2	5007.9	5014.4	5021.5
Aux. Load Indicator	MW	0.40	0.46	0.48	0.49	0.51
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	26.0	30.0	30.0	31.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time					
F.O. Totalizer-End	Lbs/Hr.	5,484	6,212	6,928	7,624	8300
End Test	Time					
Difference	Lbs/Hr.	5,484	6,212	6,928	7,624	8,300
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	222	224	221	222	220
F.O. Temp. @ Burner Deck	*F	227	227	225	226	225
Sulfur, Wt. %		1.46				
API Gravity @ 60 *F.	API	14.8				
Higher Heating Value	BTU/Gal	149,595				

TESTED BY: J.Kealiinohumoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-16-02
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	12.0
F.O. Temp. *F.	222	224	221	222	220
F.O. Temp. (Corr.)	0.94375	0.94305	0.9441	0.94375	0.94445
F.O. Flow (Lbs/Hr.)	5,484	6,212	6,928	7,624	8,300
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	667.8	756.5	843.6	928.4	1,010.7
PT RATIO	1	1	1	1	1
KW (Gen.)	7,800	9,100	10,000	11,000	12,000
KW (Aux.)	400	460	480	490	510
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,595	149,595	149,595	149,595	149,595
HEAT RATE (APPROX.)	12,928	12,552	12,739	12,744	12,718
HEAT RATE (APPROX.)N	13,627	13,220	13,381	13,339	13,283
HEAT RATE (ACTUAL)-G	12,808	12,435	12,621	12,626	12,600
HEAT RATE (ACTUAL)-N	13,500	13,097	13,257	13,214	13,159

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 12-19-02
DATE: 12-16-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.8	9.1	10.0	11.0	12.0
HEAT RATE(BTU/MW)G	12,808	12,435	12,621	12,626	12,600
HEAT RATE(BTU/MW)N	13,500	13,097	13,257	13,214	13,159
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.5767	act.			
H.H.V. (BTU/GAL)	149,595	act.			

A, B, C CONSTANTS:

GROSS	A=	16,350.36	NET A=	17,073.42
	B=	(742.914)	B=	(727.817)
	C=	36.1916	C=	33.7733

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,958	13,541	13,359	13,196	13,051	12,923	12,814	12,723	12,650	12,596
HEAT RATE(BTU/MW)N	14,703	14,279	14,092	13,922	13,770	13,634	13,515	13,412	13,327	13,259
GROSS (MBTU)	55.831	67.703	73.475	79.175	84.828	90.463	96.107	101.786	107.529	113.361
NET (MBTU)	58.810	71.393	77.506	83.534	89.502	95.435	101.359	107.299	113.280	119.328
COST/KWH	$0.0701	$0.0681	$0.0671	$0.0663	$0.0656	$0.0649	$0.0644	$0.0639	$0.0636	$0.0633
G/KWH	344.86	334.55	330.07	326.03	322.45	319.30	316.61	314.36	312.56	311.21
G/PS-H	251.24	243.73	240.46	237.52	234.91	232.62	230.66	229.02	227.71	226.72

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,559	12,540	12,540	12,557	12,593	12,647	12,719	12,809
HEAT RATE(BTU/MW)N	13,207	13,173	13,155	13,154	13,170	13,203	13,253	13,320
GROSS (MBTU)	119.310	125.404	131.669	138.132	144.822	151.764	158.986	166.515
NET (MBTU)	125.468	131.726	138.126	144.694	151.456	158.436	165.660	173.154
COST/KWH	$0.0631	$0.0630	$0.0630	$0.0631	$0.0633	$0.0636	$0.0639	$0.0644
G/KWH	310.30	309.84	309.83	310.26	311.15	312.47	314.25	316.47
G/PS-H	226.06	225.73	225.72	226.03	226.68	227.65	228.94	230.56

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 09-09-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,000	11,500
BOILER-TURBINE						
Ambient Air Temp	*F.	108	110	112	112	112
Gas Entering A.H.	*F.	510	530	555	571	580
Gas Leaving A.H.	*F.	376	335	344	351	354
Air Entering A.H.	*F.	154	154	155	153	152
Air Leaving A.H.	*F.	390	390	400	411	418
Circ. Water Inlet	*F.	70.0	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	82.98	84.53	85.92	87.49	88.16
Condenser Vacuum	Hg.	28.80	28.75	28.60	28.50	28.40
Barometric Pressure	Hg.	30.10	30.11	30.12	30.12	30.10
Excess O2	%	1.01	0.96	0.98	0.74	0.5
Feedwater Flow (X1000)	Lb/Hr	81.59	92.89	101.83	112.32	117.38
Steam Flow (X1000)	Lb/Hr	80.37	92.43	102.39	113.30	118.32
Throttle Stm. Press.	PSIG	601	601	602	601	601
Feedwater to Blr.	*F.	318	322	330	340	343
GENERATOR						
Generator Integrator, Start		6400.6	6412.8	6426.6	6441.9	6458.6
Generator Integrator, Stop		6408.4	6421.8	6436.6	6452.9	6470.1
Generator Integrator, Di	MWH	7.8	9.0	10.0	11.0	11.5
Generator Volts	V.	11,400	11,400	11,400	11,500	11,500
Generator Amps	A.	452	520	580	640	665
Generator VARS	MVAR	5.0	5.5	6.5	6.8	7.1
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	3481.4	3488.3	3495.6	3502.7	3510.0
Aux. KWH Mtr. End (X100)	KWH	3485.9	3493.3	3500.3	3507.6	3515.0
Aux. Load Indicator	MW	0.45	0.50	0.47	0.49	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.5	32.0	30.0	30.0	31.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0630	0800	0930	1100	1230
F.O. Totalizer-End	Lbs/Hr.	5,464	6,253	6,879	7,569	7920
End Test	Time	0730	0900	1030	1200	1330
Difference	Lbs/Hr.	5,464	6,253	6,879	7,569	7,920
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	221	221	224	223	223
F.O. Temp. @ Burner Deck	*F	229	230	230	230	230
Sulfur, Wt. %		1.80				
API Gravity @ 60 *F.	API	11.9				
Higher Heating Value	BTU/Gal	150,643				

TESTED BY: Glenn A. Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-09-02
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	11.5
F.O. Temp. *F.	221	221	224	223	223
F.O. Temp. (Corr.)	0.9441	0.9441	0.94305	0.9434	0.9434
F.O. Flow (Lbs/Hr.)	5,464	6,253	6,879	7,569	7,920
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	665.4	761.4	837.7	921.7	964.4
PT RATIO	1	1	1	1	1
KW (Gen.)	7,800	9,000	10,000	11,000	11,500
KW (Aux.)	450	500	470	490	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,643	150,643	150,643	150,643	150,643
HEAT RATE (APPROX.)	12,881	12,775	12,649	12,652	12,663
HEAT RATE (APPROX.)N	13,669	13,526	13,272	13,242	13,239
HEAT RATE (ACTUAL)-G	12,850	12,745	12,619	12,622	12,633
HEAT RATE (ACTUAL)-N	13,637	13,494	13,241	13,211	13,208

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 09-12-02
DATE: 09-09-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.8	9.0	10.0	11.0	11.5
HEAT RATE(BTU/MW)G	12,850	12,745	12,619	12,622	12,633
HEAT RATE(BTU/MW)N	13,637	13,494	13,241	13,211	13,208
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$28.5273	act.			
H.H.V. (BTU/GAL)	150,643	act.			

A, B, C CONSTANTS:

GROSS	A=	15,403.01	NET A=	16,891.10
	B=	(504.843)	B=	(610.705)
	C=	22.9106	C=	25.1325

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,750	13,452	13,319	13,199	13,090	12,992	12,905	12,831	12,767	12,715
HEAT RATE(BTU/MW)N	14,850	14,466	14,292	14,132	13,983	13,848	13,725	13,614	13,516	13,430
GROSS (MBTU)	55.001	67.258	73.257	79.192	85.082	90.942	96.791	102.644	108.521	114.437
NET (MBTU)	59.402	72.329	78.609	84.790	90.892	96.934	102.934	108.912	114.885	120.874
COST/KWH	$0.0620	$0.0607	$0.0601	$0.0595	$0.0590	$0.0586	$0.0582	$0.0579	$0.0576	$0.0573
G/KWH	339.73	332.35	329.09	326.11	323.41	320.99	318.86	317.01	315.44	314.16
G/PS-H	247.50	242.13	239.75	237.58	235.61	233.85	232.30	230.95	229.81	228.87

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,675	12,646	12,628	12,622	12,627	12,644	12,672	12,712
HEAT RATE(BTU/MW)N	13,358	13,297	13,250	13,214	13,192	13,182	13,184	13,199
GROSS (MBTU)	120.410	126.456	132.595	138.841	145.213	151.728	158.403	165.255
NET (MBTU)	126.897	132.973	139.120	145.358	151.705	158.181	164.803	171.591
COST/KWH	$0.0571	$0.0570	$0.0569	$0.0569	$0.0569	$0.0570	$0.0571	$0.0573
G/KWH	313.16	312.44	312.01	311.86	311.99	312.40	313.10	314.08
G/PS-H	228.14	227.62	227.31	227.19	227.29	227.59	228.10	228.82

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 08-15-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,500	9,000	9,500	10,500	11,500
BOILER-TURBINE						
Ambient Air Temp	*F.	110	111	114	115	115
Gas Entering A.H.	*F.	540	545	560	580	590
Gas Leaving A.H.	*F.	322	315	320	327	337
Air Entering A.H.	*F.	123	124	127	129	128
Air Leaving A.H.	*F.	380	380	380	390	400
Circ. Water Inlet	*F.	72.0	74.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	84.7	85.3	86.3	87.8	89.5
Condenser Vacuum	Hg.	28.40	28.50	28.30	28.20	28
Barometric Pressure	*Hg.*	*30.08*	*30.09*	*31.10*	*30.08*	*30.04*
Excess O2	%	1.83	1.18	0.90	0.80	0.7
Feedwater Flow (X1000)	Lb/Hr	87.7	92.9	99.6	110.0	120.7
Steam Flow (X1000)	Lb/Hr	89.7	94.6	101.5	112.5	124.1
Throttle Stm. Press.	PSIG	605	602	601	601	601
Feedwater to Blr.	*F.	320	325	330	340	348
GENERATOR						
Generator Integrator, Start		2524.8	2536.2	2549.1	2566.3	2582.5
Generator Integrator, Stop		2533.3	2545.1	2558.6	2576.9	2594.2
Generator Integrator, Di	MWH	8.5	8.9	9.5	10.6	11.7
Generator Volts	V.	11,400	11,300	11,300	11,300	11,800
Generator Amps	A.	498	540	560	600	645
Generator VARS	MVAR	5.3	5.5	5.8	6.0	5.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	1596.3	1602.3	1608.3	1616.9	1624.0
Aux. KWH Mtr. End (X100)	KWH	1600.8	1606.9	1613.4	1621.6	1628.9
Aux. Load Indicator	MW	0.45	0.46	0.51	0.47	0.49
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.0	30.0	30.0	30.0	31.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0630	0750	0915	1100	1230
F.O. Totalizer-End	Lbs/Hr.	5,945	6,247	6,683	7,373	8091
End Test	Time	0730	0850	1015	1200	1330
Difference	Lbs/Hr.	5,945	6,247	6,683	7,373	8,091
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	221	222	221	220	220
F.O. Temp. @ Burner Deck	*F	227	228	226	225	225
Sulfur, Wt. %		1.73				
API Gravity @ 60 *F.	API	12.9				
Higher Heating Value	BTU/Gal	149,024				

TESTED BY: Glenn A. Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-15-02
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.5	9.0	9.5	10.5	11.5
F.O. Temp. *F.	221	222	221	220	220
F.O. Temp. (Corr.)	0.9441	0.94375	0.9441	0.94445	0.94445
F.O. Flow (Lbs/Hr.)	5,945	6,247	6,683	7,373	8,091
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	723.9	760.7	813.8	897.8	985.3
PT RATIO	1	1	1	1	1
KW (Gen.)	*8,500*	*8,900*	*9,500*	*10,600*	*11,700*
KW (Aux.)	450	460	510	470	490
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,024	149,024	149,024	149,024	149,024
HEAT RATE (APPROX.)	12,861	12,907	12,935	12,790	12,716
HEAT RATE (APPROX.)N	13,580	13,610	13,669	13,383	13,272
HEAT RATE (ACTUAL)-G	12,692	12,738	12,766	12,622	12,549
HEAT RATE (ACTUAL)-N	13,402	13,432	13,490	13,208	13,098

FUEL CORRECTION: 1

CA-IR-73
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 08/20/02
DATE: 08-15-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		9.5	10.6	11.7
HEAT RATE(BTU/MW)G		12,766	12,622	12,549
HEAT RATE(BTU/MW)N		13,490	13,208	13,098
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$27.3036 act.			
H.H.V. (BTU/GAL)	149,024 act.			

A, B, C CONSTANTS:

GROSS	A=	16,935.27	NET A=	23,078.52
	B=	(715.282)	B=	(1,684.040)
	C=	29.0958	C=	71.0256

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,540	14,086	13,881	13,691	13,515	13,354	13,207	13,075	12,958	12,854
HEAT RATE(BTU/MW)N	17,479	16,434	15,965	15,531	15,133	14,770	14,443	14,152	13,896	13,675
GROSS (MBTU)	58.159	70.431	76.348	82.146	87.849	93.478	99.055	104.601	110.139	115.690
NET (MBTU)	69.915	82.170	87.807	93.187	98.365	103.393	108.326	113.215	118.114	123.077
COST/KWH	$0.0634	$0.0614	$0.0606	$0.0597	$0.0590	$0.0583	$0.0576	$0.0570	$0.0565	$0.0561
G/KWH	359.24	348.04	342.97	338.27	333.93	329.94	326.32	323.05	320.15	317.60
G/PS-H	261.71	253.55	249.86	246.44	243.27	240.37	237.73	235.35	233.24	231.38

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,766	12,692	12,633	12,588	12,557	12,542	12,540	12,554
HEAT RATE(BTU/MW)N	13,490	13,341	13,227	13,148	13,105	13,098	13,126	13,189
GROSS (MBTU)	121.277	126.920	132.643	138.465	144.411	150.500	156.756	163.199
NET (MBTU)	128.157	133.407	138.880	144.630	150.710	157.173	164.072	171.461
COST/KWH	$0.0557	$0.0554	$0.0551	$0.0549	$0.0548	$0.0547	$0.0547	$0.0548
G/KWH	315.42	313.59	312.12	311.01	310.26	309.87	309.84	310.17
G/PS-H	229.79	228.46	227.39	226.58	226.03	225.75	225.73	225.97

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 05-09-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,000	10,000	10,500	11,000	11,500
BOILER-TURBINE						
Ambient Air Temp	*F.	105	104	105	104	105
Gas Entering A.H.	*F.	540	560	570	585	600
Gas Leaving A.H.	*F.	346	356	358	364	372
Air Entering A.H.	*F.	157	158	158	157	158
Air Leaving A.H.	*F.	400	410	415	425	430
Circ. Water Inlet	*F.	73.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	89.0	86.0	87.0	88.0	89.0
Condenser Vacuum	Hg.	28.30	28.40	28.30	28.20	28.1
Barometric Pressure	Hg.	30.06	30.05	30.05	30.04	30.03
Excess O2	%	0.90	0.60	0.80	0.70	0.8
Feedwater Flow (X1000)	Lb/Hr	95.6	104.6	108.6	113.0	119.7
Steam Flow (X1000)	Lb/Hr	95.4	105.2	110.0	115.3	122.1
Throttle Stm. Press.	PSIG	601	601	601	601	601
Feedwater to Blr.	*F.	326	334	336	340	346
GENERATOR		0816	0846	0956	1129	1250
Generator Integrator, Start		5740.2	5754.2	5766.0	5782.4	5797.4
Generator Integrator, Stop		5749.3	5764.1	5776.5	5793.4	5809.1
Generator Integrator, Di	MWH	9.1	9.9	10.5	11.0	11.7
Generator Volts	V.	11,400	11,400	11,400	11,400	11,400
Generator Amps	A.	530	570	595	625	660
Generator VARS	MVAR	6.0	6.0	6.0	6.2	6.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	82.1	88.4	93.8	101.1	107.5
Aux. KWH Mtr. End (X100)	KWH	86.2	93.0	98.5	105.8	112.4
Aux. Load Indicator	MW	0.41	0.46	0.47	0.47	0.49
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	26.2	29.8	30.0	30.0	30.1
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0715	0845	0955	1126	1249
F.O. Totalizer-End	Lbs/Hr.	6,320	6,991	7,264	7,584	8004
End Test	Time	0815	0945	1055	1226	1349
Difference	Lbs/Hr.	6,320	6,991	7,264	7,584	8,004
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	230	230	230	230
F.O. Temp. @ Burner Deck	*F	236	235	235	236	235
Sulfur, Wt. %		1.73				
API Gravity @ 60 *F.	API	13.5				
Higher Heating Value	BTU/Gal	149,643				

TESTED BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 05-09-02
KPP UNIT NO. 3

	TEST LOADS - MW				
	9.0	10.0	10.5	11.0	11.5
F.O. Temp. *F.	230	230	230	230	230
F.O. Temp. (Corr.)	0.94095	0.94095	0.94095	0.94095	0.94095
F.O. Flow (Lbs/Hr.)	6,320	6,991	7,264	7,584	8,004
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	769.5	851.3	884.5	923.5	974.6
PT RATIO	1	1	1	1	1
KW (Gen.)	9,100	9,900	10,500	11,000	11,700
KW (Aux.)	410	460	470	470	490
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,643	149,643	149,643	149,643	149,643
HEAT RATE (APPROX.)	12,769	12,984	12,720	12,677	12,579
HEAT RATE (APPROX.)N	13,372	13,617	13,317	13,243	13,129
HEAT RATE (ACTUAL)-G	12,655	12,867	12,606	12,563	12,466
HEAT RATE (ACTUAL)-N	13,252	13,494	13,197	13,124	13,011

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 05-13-02
DATE: 05-09-02 — Tested by: E.Wong/S.Oshiro

DATA:

GENERATED (MW)	9.9		11.0	11.7
HEAT RATE(BTU/MW)G	12,867		12,563	12,466
HEAT RATE(BTU/MW)N	13,494		13,124	13,011
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$21.9131	act.		
H.H.V. (BTU/GAL)	149,643	act.		

A, B, C CONSTANTS:

GROSS A=	23,948.26	NET A=	27,446.78
B=	(1,877.625)	B=	(2,374.502)
C=	76.5993	C=	97.4908

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	17,663	16,475	15,938	15,440	14,980	14,558	14,175	13,830	13,523	13,254
HEAT RATE(BTU/MW)N	19,509	18,012	17,336	16,709	16,131	15,602	15,122	14,690	14,307	13,973
GROSS (MBTU)	70.653	82.376	87.661	92.641	97.370	101.908	106.311	110.637	114.943	119.288
NET (MBTU)	78.034	90.058	95.349	100.257	104.855	109.216	113.414	117.521	121.611	125.757
COST/KWH	$0.0616	$0.0574	$0.0556	$0.0538	$0.0522	$0.0508	$0.0494	$0.0482	$0.0471	$0.0462
G/KWH	436.42	407.06	393.80	381.49	370.12	359.70	350.22	341.69	334.11	327.48
G/PS-H	317.94	296.55	286.89	277.92	269.64	262.05	255.15	248.93	243.41	238.58

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,024	12,832	12,678	12,563	12,486	12,447	12,447	12,484
HEAT RATE(BTU/MW)N	13,688	13,451	13,263	13,124	13,033	12,991	12,998	13,054
GROSS (MBTU)	123.727	128.319	133.122	138.192	143.587	149.365	155.582	162.297
NET (MBTU)	130.032	134.508	139.260	144.360	149.881	155.897	162.480	169.704
COST/KWH	$0.0454	$0.0447	$0.0442	$0.0438	$0.0435	$0.0434	$0.0434	$0.0435
G/KWH	321.79	317.04	313.25	310.40	308.49	307.54	307.52	308.46
G/PS-H	234.43	230.97	228.21	226.13	224.74	224.05	224.04	224.72

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 01-02-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,500	12,100
BOILER-TURBINE						
Ambient Air Temp	*F.	102	103	103	105	105
Gas Entering A.H.	*F.	500	515	520	550	560
Gas Leaving A.H.	*F.	326	330	337	345	350
Air Entering A.H.	*F.	148	150	153	152	150
Air Leaving A.H.	*F.	380	381	381	391	400
Circ. Water Inlet	*F.	72.0	72.0	72.0	73.0	73.0
Circ. Water Outlet	*F.	82.6	84.3	85.6	88.0	88.8
Condenser Vacuum	Hg.	28.60	28.50	28.50	28.40	28.7
Barometric Pressure	Hg.	30.05	30.05	30.08	130.04	30.00
Excess O2	%	1.82	1.41	1.00	1.30	0.9
Feedwater Flow (X1000)	Lb/Hr	80.8	90.8	101.1	115.7	122.4
Steam Flow (X1000)	Lb/Hr	80.8	92.1	101.4	117.9	123.8
Throttle Stm. Press.	PSIG	608	602	602	601	601
Feedwater to Blr.	*F.	315	320	325	340	345
GENERATOR						
Generator Integrator, Start		2351.9	2366.0	2380.5	2396.0	2413.7
Generator Integrator, Stop		2359.9	2375.1	2390.5	2407.5	2425.8
Generator Integrator, Di	MWH	8.0	9.1	10.0	11.5	12.1
Generator Volts	V.	11,600	11,600	11,600	11,200	11,200
Generator Amps	A.	450	500	550	610	640
Generator VARS	MVAR	4.5	4.5	5.0	4.1	4.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	5511.3	5519.1	5526.6	5533.7	5541.3
Aux. KWH Mtr. End (X100)	KWH	5515.9	5523.9	5531.3	5538.7	5546.3
Aux. Load Indicator	MW	0.46	0.48	0.47	0.50	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	30.0	29.0	28.0	31.0	32.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0600	0742	0915	1045	1216
F.O. Totalizer-End	Lbs/Hr.	5,464	6,202	6,800	7,755	8177
End Test	Time	0700	0842	1015	1145	1316
Difference	Lbs/Hr.	5,464	6,202	6,800	7,755	8,177
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	222	225	220	218
F.O. Temp. @ Burner Deck	*F	231	230	230	225	225
Sulfur, Wt. %		1.84				
API Gravity @ 60 *F.	API	13.2				
Higher Heating Value	BTU/Gal	149,595				

TESTED BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-02-02
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.5	12.1
F.O. Temp. *F.	225	222	225	220	218
F.O. Temp. (Corr.)	0.9427	0.94375	0.9427	0.94445	0.94515
F.O. Flow (Lbs/Hr.)	5,464	6,202	6,800	7,755	8,177
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	665.4	755.2	828.1	944.3	995.7
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	9,100	10,000	11,500	12,100
KW (Aux.)	460	480	470	500	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,595	149,595	149,595	149,595	149,595
HEAT RATE (APPROX.)	12,559	12,532	12,504	12,400	12,426
HEAT RATE (APPROX.)N	13,325	13,230	13,120	12,963	12,962
HEAT RATE (ACTUAL)-G	12,442	12,415	12,387	12,284	12,311
HEAT RATE (ACTUAL)-N	13,201	13,107	12,998	12,843	12,841

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 01-08-02
DATE: 01-02-02 — Tested by: E.Wong

DATA:

GENERATED (MW)	8.0	9.1	10.0	11.5	12.1
HEAT RATE(BTU/MW)G	12,442	12,415	12,387	12,284	12,311
HEAT RATE(BTU/MW)N	13,201	13,107	12,998	12,843	12,841
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$21.7599	act.			
H.H.V. (BTU/GAL)	149,595	act.			

A, B, C CONSTANTS:

GROSS	A=	12,632.84	NET A=	14,470.20
	B=	(13.202)	B=	(199.381)
	C=	(1.2470)	C=	5.2287

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	12,560	12,536	12,523	12,509	12,494	12,479	12,464	12,447	12,431	12,413
HEAT RATE(BTU/MW)N	13,756	13,604	13,532	13,462	13,395	13,331	13,269	13,210	13,153	13,099
GROSS (MBTU)	50.240	62.678	68.874	75.052	81.213	87.355	93.478	99.579	105.659	111.717
NET (MBTU)	55.025	68.020	74.425	80.773	87.068	93.315	99.517	105.678	111.802	117.894
COST/KWH	$0.0435	$0.0434	$0.0434	$0.0433	$0.0433	$0.0432	$0.0432	$0.0431	$0.0431	$0.0430
G/KWH	310.33	309.72	309.40	309.06	308.70	308.33	307.95	307.54	307.13	306.69
G/PS-H	226.08	225.64	225.41	225.16	224.90	224.63	224.35	224.05	223.75	223.43

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,395	12,376	12,357	12,337	12,316	12,295	12,273	12,250
HEAT RATE(BTU/MW)N	13,048	12,999	12,953	12,910	12,869	12,831	12,795	12,762
GROSS (MBTU)	117.751	123.761	129.746	135.704	141.635	147.538	153.412	159.256
NET (MBTU)	123.956	129.993	136.008	142.007	147.991	153.967	159.937	165.905
COST/KWH	$0.0429	$0.0429	$0.0428	$0.0427	$0.0427	$0.0426	$0.0425	$0.0424
G/KWH	306.25	305.78	305.30	304.81	304.30	303.77	303.23	302.68
G/PS-H	223.11	222.77	222.42	222.06	221.69	221.31	220.91	220.51

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 11-08-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	7,500	9,000	10,000	11,000	11,500
BOILER-TURBINE						
Ambient Air Temp	*F.	100	100	100	100	99
Gas Entering A.H.	*F.	530	570	590	620	640
Gas Leaving A.H.	*F.	367	375	380	390	395
Air Entering A.H.	*F.	166	161	160	160	160
Air Leaving A.H.	*F.	410	420	430	440	450
Circ. Water Inlet	*F.	72.0	72.0	72.0	72.0	72.0
Circ. Water Outlet	*F.	82.0	84.0	86.0	88.0	88.0
Condenser Vacuum	Hg.	28.80	28.60	28.50	28.40	28.2
Barometric Pressure	Hg.	30.14	30.16	30.17	30.14	30.10
Excess O2	%	1.80	1.30	0.60	0.00	0.0
Feedwater Flow (X1000)	Lb/Hr	77.0	93.0	103.0	114.0	120.0
Steam Flow (X1000)	Lb/Hr	76.0	94.0	104.0	115.0	121.0
Throttle Stm. Press.	PSIG	605	602	601	601	601
Feedwater to Blr.	*F.	315	330	336	345	350
GENERATOR						
Generator Integrator, Start		8188.3	8201.1	8214.2	8229.2	8241.8
Generator Integrator, Stop		8195.8	8210.1	8224.2	8240.2	8253.4
Generator Integrator, Di	MWH	7.5	9.0	10.0	11.0	11.6
* Generator Volts	V.	11,200	11,200	11,200	11,200	11,200
Generator Amps	A.	425	510	565	620	640
Generator VARS	MVAR	4.7	5.0	5.4	6.0	5.7
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	3552.2	3560.7	3567.8	3575.4	3581.5
Aux. KWH Mtr. End (X100)	KWH	3557.6	3565.9	3572.9	3580.8	3586.8
Aux. Load Indicator	MW	0.54	0.52	0.51	0.54	0.53
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	30.0	31.9	32.1	33.9	34.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0702	0840	1005	1133	1241
F.O. Totalizer-End	Lbs/Hr.	5,222	6,412	7,082	7,794	8236
End Test	Time	0802	0940	1105	1233	1341
Difference	Lbs/Hr.	5,222	6,412	7,082	7,794	8,236
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	240	242	238	239	240
F.O. Temp. @ Burner Deck	*F	244	245	245	242	245
Sulfur, Wt. %						
API Gravity @ 60 *F.	API					
Higher Heating Value	BTU/Gal					

TESTED BY: J.Kealiinohomoku
* Gen.volts should be 11.7KV

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-08-01
KPP UNIT NO. 3

	TEST LOADS - MW				
	7.5	9.0	10.0	11.0	11.5
F.O. Temp. *F.	240	242	238	239	240
F.O. Temp. (Corr.)	0.93745	0.93675	0.93815	0.9378	0.93745
F.O. Flow (Lbs/Hr.)	5,222	6,412	7,082	7,794	8,236
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	635.9	780.8	862.4	949.1	1,002.9
PT RATIO	1	1	1	1	1
KW (Gen.)	7,500	9,000	10,000	11,000	11,600
KW (Aux.)	540	520	510	540	530
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)	12,803	13,100	13,022	13,029	13,055
HEAT RATE (APPROX.)N	13,796	13,904	13,722	13,701	13,680
HEAT RATE (ACTUAL)-G	0	0	0	0	0
HEAT RATE (ACTUAL)-N	0	0	0	0	0

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 Fuel Oil Tested:
DATE: 11-08-01 Tested by:

DATA:

GENERATED (MW)		9.0	10.0	11.0	11.6
HEAT RATE(BTU/MW)G		13,100	13,022	13,029	13,055
HEAT RATE(BTU/MW)N		13,904	13,722	13,701	13,680
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$26.3348	act.			
H.H.V. (BTU/GAL)	151,000	est.			

A, B, C CONSTANTS:

GROSS A=	16,996.86	NET A=	19,834.19	
B=	(756.642)	B=	(1,109.346)	
C=	35.9518	C=	49.9795	

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,546	14,112	13,923	13,751	13,598	13,462	13,344	13,245	13,163	13,099
HEAT RATE(BTU/MW)N	16,196	15,537	15,245	14,977	14,735	14,518	14,325	14,158	14,016	13,898
GROSS (MBTU)	58.182	70.562	76.576	82.508	88.385	94.234	100.083	105.957	111.885	117.893
NET (MBTU)	64.786	77.685	83.846	89.864	95.778	101.624	107.441	113.265	119.134	125.086
COST/KWH	$0.0604	$0.0586	$0.0578	$0.0571	$0.0565	$0.0559	$0.0554	$0.0550	$0.0547	$0.0544
G/KWH	359.38	348.68	344.00	339.76	335.96	332.61	329.70	327.24	325.22	323.65
G/PS-H	261.82	254.02	250.61	247.52	244.76	242.32	240.20	238.40	236.93	235.79

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,053	13,026	13,016	13,024	13,050	13,094	13,156	13,236
HEAT RATE(BTU/MW)N	13,806	13,739	13,696	13,679	13,687	13,719	13,777	13,859
GROSS (MBTU)	124.007	130.256	136.666	143.264	150.076	157.131	164.454	172.073
NET (MBTU)	131.158	137.387	143.811	150.468	157.395	164.629	172.208	180.170
COST/KWH	$0.0542	$0.0541	$0.0540	$0.0541	$0.0542	$0.0544	$0.0546	$0.0550
G/KWH	322.52	321.83	321.59	321.79	322.43	323.52	325.06	327.04
G/PS-H	234.96	234.46	234.28	234.43	234.90	235.70	236.81	238.25

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 09-20-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	7,500	9,000	10,000	11,500	12,200
BOILER-TURBINE						
* Ambient Air Temp	*F.	104	106	108	108	107
Gas Entering A.H.	*F.	540	560	580	620	640
Gas Leaving A.H.	*F.	365	370	378	390	395
Air Entering A.H.	*F.	163	162	162	160	159
Air Leaving A.H.	*F.	420	418	420	435	450
Circ. Water Inlet	*F.	72.0	72.0	72.0	72.0	72.0
Circ. Water Outlet	*F.	840.0	84.6	86.1	88.4	89.3
Condenser Vacuum	Hg.	28.40	28.60	28.50	28.35	28.3
Barometric Pressure	Hg.	30.09	30.10	30.10	30.10	30.10
Excess O2	%	1.78	0.82	0.54	0.14	0.2
Feedwater Flow (X1000)	Lb/Hr	78.0	91.0	101.0	117.0	123.0
Steam Flow (X1000)	Lb/Hr	78.0	91.0	102.0	118.0	125.0
Throttle Stm. Press.	PSIG	604	601	602	602	602
Feedwater to Blr.	*F.	318	325	335	347	352
GENERATOR						
Generator Integrator, Start		4872.4	4884.2	4898.1	4913.6	4931.1
Generator Integrator, Stop		4879.8	4893.2	4908.0	1925.0	4943.2
Generator Integrator, Di	MWH	7.4	9.0	9.9	11.4	12.1
Generator Volts	V.	11,500	11,500	11,500	11,500	11,500
Generator Amps	A.	425	530	610	655	680
Generator VARS	MVAR	4.5	5.8	6.8	6.0	6.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	7779.0	7785.6	7792.4	7799.4	7806.6
Aux. KWH Mtr. End (X100)	KWH	7783.3	7790.1	7797.0	7804.2	7811.6
Aux. Load Indicator	MW	0.43	0.45	0.46	0.48	0.50
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.0	29.0	30.0	31.0	32.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0600	0731	0900	1030	1200
F.O. Totalizer-End	Lbs/Hr.	5,244	6,170	6,831	7,901	8341
End Test	Time	0700	0831	1000	1130	1300
Difference	Lbs/Hr.	5,244	6,170	6,831	7,901	8,341
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	248	245	240	240	243
F.O. Temp. @ Burner Deck	*F	250	250	245	245	246
Sulfur, Wt. %		1.82				
API Gravity @ 60 *F.	API	15.9				
Higher Heating Value	BTU/Gal	147,738				

TESTED BY: G Graf
* 4th floor air intake.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-20-01
KPP UNIT NO. 3

	TEST LOADS - MW				
	7.5	9.0	10.0	11.5	12.2
F.O. Temp. *F.	248	245	240	240	243
F.O. Temp. (Corr.)	0.93465	0.9357	0.93745	0.93745	0.9364
F.O. Flow (Lbs/Hr.)	5,244	6,170	6,831	7,901	8,341
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	638.6	751.3	831.8	962.1	1,015.7
PT RATIO	1	1	1	1	1
KW (Gen.)	7,400	9,000	9,900	11,400	12,100
KW (Aux.)	430	450	460	480	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	147,738	147,738	147,738	147,738	147,738
HEAT RATE (APPROX.)	13,030	12,606	12,688	12,744	12,675
HEAT RATE (APPROX.)N	13,834	13,269	13,306	13,304	13,222
HEAT RATE (ACTUAL)-G	12,749	12,333	12,413	12,469	12,402
HEAT RATE (ACTUAL)-N	13,535	12,983	13,018	13,017	12,936

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 09-21-01
DATE: 09-20-01 — Tested by: E.Wong

DATA:

GENERATED (MW)	7.4	9.0	9.9	11.4	12.1
HEAT RATE(BTU/MW)G	12,749	12,333	12,413	12,469	12,402
HEAT RATE(BTU/MW)N	13,535	12,983	13,018	13,017	12,936
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.4008	act.			
H.H.V. (BTU/GAL)	147,738	act.			

A, B, C CONSTANTS:

GROSS	A=	16,674.39	NET A=	18,690.33
	B=	(828.303)	B=	(1,063.875)
	C=	39.6826	C=	49.0427

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,996	13,525	13,319	13,133	12,967	12,821	12,694	12,588	12,501	12,434
HEAT RATE(BTU/MW)N	15,220	14,597	14,323	14,073	13,847	13,646	13,470	13,318	13,191	13,088
GROSS (MBTU)	55.984	67.625	73.255	78.799	84.286	89.745	95.207	100.701	106.258	111.906
NET (MBTU)	60.878	72.985	78.774	84.436	90.007	95.524	101.024	106.545	112.121	117.791
COST/KWH	$0.0573	$0.0554	$0.0545	$0.0538	$0.0531	$0.0525	$0.0520	$0.0515	$0.0512	$0.0509
G/KWH	345.81	334.17	329.08	324.49	320.38	316.77	313.64	311.01	308.87	307.21
G/PS-H	251.93	243.45	239.74	236.40	233.41	230.77	228.50	226.58	225.02	223.81

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,387	12,360	12,352	12,365	12,397	12,449	12,521	12,613
HEAT RATE(BTU/MW)N	13,010	12,956	12,927	12,922	12,942	12,986	13,055	13,148
GROSS (MBTU)	117.675	123.596	129.698	136.011	142.565	149.389	156.513	163.967
NET (MBTU)	123.591	129.559	135.729	142.141	148.829	155.832	163.185	170.926
COST/KWH	$0.0507	$0.0506	$0.0506	$0.0506	$0.0507	$0.0510	$0.0513	$0.0516
G/KWH	306.05	305.37	305.19	305.50	306.30	307.58	309.36	311.63
G/PS-H	222.96	222.47	222.34	222.56	223.14	224.08	225.38	227.03

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 06-14-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	7,500	8,500	10,000	11,500	12,000
BOILER-TURBINE						
* Ambient Air Temp	*F.	85	87	88	89	90
Gas Entering A.H.	*F.	525	540	575	620	630
Gas Leaving A.H.	*F.	380	382	385	389	390
Air Entering A.H.	*F.	155	158	155	156	155
Air Leaving A.H.	*F.	420	410	415	440	448
Circ. Water Inlet	*F.	70.0	71.0	72.0	72.0	72.0
Circ. Water Outlet	*F.	82.7	83.3	86.1	88.2	88.9
Condenser Vacuum	Hg.	28.40	28.60	28.35	28.10	28
Barometric Pressure	Hg.	30.09	30.10	30.10	30.10	30.10
Excess O2	%	2.40	1.40	0.70	0.34	0.0
Feedwater Flow (X1000)	Lb/Hr	78.0	87.0	105.0	124.0	128.0
Steam Flow (X1000)	Lb/Hr	75.0	85.0	103.0	123.0	127.0
Throttle Stm. Press.	PSIG	600	600	600	600	600
Feedwater to Blr.	*F.	315	320	335	345	350
GENERATOR						
Generator Integrator, Start		8611.5	8621.5	8634.1	8649.3	8666.0
Generator Integrator, Stop		8618.8	8629.9	8644.2	8661.0	8678.0
Generator Integrator, Di	MWH	7.3	8.4	10.1	11.7	12.0
Generator Volts	V.	11,100	11,000	11,000	11,000	11,000
Generator Amps	A.	428	506	601	680	645
Generator VARS	MVAR	5.5	5.8	6.2	6.2	6.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	6482.2	6487.9	6494.2	6501.0	6507.8
Aux. KWH Mtr. End (X100)	KWH	6486.5	6492.2	6498.8	6505.8	6512.7
Aux. Load Indicator	MW	0.43	0.43	0.46	0.48	0.49
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	28.0	28.0	29.0	31.0	31.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0650	0810	0937	1105	1230
F.O. Totalizer-End	Lbs/Hr.	5,213	5,874	7,016	8,259	8482
End Test	Time	0750	0810	1037	1205	1330
Difference	Lbs/Hr.	5,213	5,874	7,016	8,259	8,482
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	231	230	229	229
F.O. Temp. @ Burner Deck	*F	236	236	236	234	233
Sulfur, Wt. %		1.85				
API Gravity @ 60 *F.	API	11.7				
Higher Heating Value	BTU/Gal	149,643				

TESTED BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-14-01
KPP UNIT NO. 3

	TEST LOADS - MW				
	7.5	8.5	10.0	11.5	12.0
F.O. Temp. *F.	230	231	230	229	229
F.O. Temp. (Corr.)	0.94095	0.9406	0.94095	0.9413	0.9413
F.O. Flow (Lbs/Hr.)	5,213	5,874	7,016	8,259	8,482
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	634.8	715.3	854.4	1,005.7	1,032.8
PT RATIO	1	1	1	1	1
KW (Gen.)	7,300	8,400	10,100	11,700	12,000
KW (Aux.)	430	430	460	480	490
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,643	149,643	149,643	149,643	149,643
HEAT RATE (APPROX.)	13,130	12,858	12,774	12,980	12,996
HEAT RATE (APPROX.)N	13,952	13,552	13,383	13,535	13,550
HEAT RATE (ACTUAL)-G	13,012	12,742	12,659	12,863	12,879
HEAT RATE (ACTUAL)-N	13,827	13,430	13,263	13,413	13,428

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 06-18-01
DATE: 06-14-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	7.3	8.4	10.1	11.7	12.0
HEAT RATE(BTU/MW)G	13,012	12,742	12,659	12,863	12,879
HEAT RATE(BTU/MW)N	13,827	13,430	13,263	13,413	13,428
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.2211	act.			
H.H.V. (BTU/GAL)	149,643	act.			

A, B, C CONSTANTS:

GROSS	A=	17,971.92	NET A=	20,190.16
	B=	(1,082.123)	B=	(1,359.543)
	C=	54.9813	C=	66.5170

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,523	13,936	13,683	13,459	13,261	13,091	12,949	12,834	12,746	12,686
HEAT RATE(BTU/MW)N	15,816	15,055	14,725	14,428	14,163	13,933	13,735	13,571	13,440	13,342
GROSS (MBTU)	58.093	69.679	75.259	80.751	86.197	91.638	97.115	102.670	108.343	114.177
NET (MBTU)	63.265	75.277	80.986	86.565	92.063	97.529	103.014	108.567	114.239	120.079
COST/KWH	$0.0583	$0.0559	$0.0549	$0.0540	$0.0532	$0.0525	$0.0520	$0.0515	$0.0511	$0.0509
G/KWH	358.83	344.32	338.08	332.53	327.65	323.45	319.93	317.09	314.93	313.45
G/PS-H	261.42	250.85	246.30	242.25	238.70	235.64	233.08	231.01	229.43	228.35

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,654	12,649	12,671	12,721	12,799	12,904	13,036	13,196
HEAT RATE(BTU/MW)N	13,278	13,246	13,248	13,284	13,352	13,454	13,589	13,757
GROSS (MBTU)	120.211	126.488	133.049	139.934	147.186	154.845	162.953	171.550
NET (MBTU)	126.138	132.464	139.109	146.121	153.551	161.449	169.864	178.847
COST/KWH	$0.0508	$0.0508	$0.0508	$0.0510	$0.0514	$0.0518	$0.0523	$0.0530
G/KWH	312.64	312.52	313.08	314.31	316.23	318.82	322.09	326.04
G/PS-H	227.77	227.68	228.08	228.98	230.38	232.27	234.65	237.53

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 3
DATE: 01-10-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,000	12,000
BOILER-TURBINE						
Ambient Air Temp	*F.	83	83	84	87	88
Gas Entering A.H.	*F.	500	510	530	550	570
Gas Leaving A.H.	*F.	345	350	360	370	380
Air Entering A.H.	*F.	157	162	166	170	172
Air Leaving A.H.	*F.	390	390	390	400	410
Circ. Water Inlet	*F.	72.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	83.0	84.0	86.0	87.0	89.0
Condenser Vacuum	Hg.	28.90	28.80	28.60	28.40	28.2
Barometric Pressure	Hg.	30.15	30.15	30.15	30.10	30.08
Excess O2	%	3.10	2.50	2.10	2.10	2.1
Feedwater Flow (X1000)	Lb/Hr	81.0	92.0	105.0	115.0	125.0
Steam Flow (X1000)	Lb/Hr	79.0	90.0	102.0	113.0	124.0
Throttle Stm. Press.	PSIG	600	600	600	600	600
Feedwater to Blr.	*F.	310	315	325	332	339
GENERATOR						
Generator Integrator, Start		7197.2	7209.2	7223.9	7241.2	7261.2
Generator Integrator, Stop		7205.0	7218.2	7234.0	7252.3	7273.2
Generator Integrator, Di	MWH	7.8	9.0	10.1	11.1	12.0
Generator Volts	V.	11,500	11,500	11,500	11,500	11,500
Generator Amps	A.	450	520	582	630	670
Generator VARS	MVAR	5.0	5.5	6.4	6.5	6.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	8559.4	8566.1	8573.4	8581.4	8590.0
Aux. KWH Mtr. End (X100)	KWH	8563.9	8570.7	8578.2	8586.2	8595.0
Aux. Load Indicator	MW	0.44	0.45	0.46	0.47	0.49
Aux. Volts	V.	-	-	-	-	-
Aux. Amps	A.	29.0	29.5	29.9	30.1	30.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	-	-	-	-	-
Start Test	Time	0615	0745	0920	1100	1245
F.O. Totalizer-End	Lbs/Hr.	5,422	6,175	6,960	7,575	8216
End Test	Time	0715	0845	1020	1200	1345
Difference	Lbs/Hr.	5,422	6,175	6,960	7,575	8,216
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	232	232	232	230	230
F.O. Temp. @ Burner Deck	*F	244	241	241	238	237
Sulfur, Wt. %		1.77				
API Gravity @ 60 *F.	API	12.6				
Higher Heating Value	BTU/Gal	149,595				

TESTED BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-10-01
KPP UNIT NO. 3

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	12.0
F.O. Temp. *F.	232	232	232	230	230
F.O. Temp. (Corr.)	0.94025	0.94025	0.94025	0.94095	0.94095
F.O. Flow (Lbs/Hr.)	5,422	6,175	6,960	7,575	8,216
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	660.3	751.9	847.6	922.4	1,000.4
PT RATIO	1	1	1	1	1
KW (Gen.)	7,800	9,000	10,100	11,100	12,000
KW (Aux.)	450	460	480	480	500
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,595	149,595	149,595	149,595	149,595
HEAT RATE (APPROX.)	12,782	12,616	12,672	12,548	12,589
HEAT RATE (APPROX.)N	13,564	13,295	13,304	13,115	13,136
HEAT RATE (ACTUAL)-G	12,663	12,498	12,554	12,431	12,472
HEAT RATE (ACTUAL)-N	13,438	13,172	13,180	12,993	13,014

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 3 — Fuel Oil Tested: 01-12-01
DATE: 01-10-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	7.8	9.0	10.1	11.1	12.0
HEAT RATE(BTU/MW)G	12,663	12,498	12,554	12,431	12,472
HEAT RATE(BTU/MW)N	13,438	13,172	13,180	12,993	13,014
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.6781	act.			
H.H.V. (BTU/GAL)	149,595	act.			

A, B, C CONSTANTS:

GROSS	A=	14,253.27	NET A=	16,123.25
	B=	(310.988)	B=	(506.967)
	C=	13.5030	C=	20.6020

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,225	13,036	12,951	12,873	12,802	12,738	12,680	12,630	12,585	12,548
HEAT RATE(BTU/MW)N	14,425	14,103	13,958	13,823	13,698	13,584	13,480	13,386	13,303	13,229
GROSS (MBTU)	52.901	65.180	71.232	77.241	83.215	89.166	95.103	101.036	106.976	112.933
NET (MBTU)	57.700	70.517	76.770	82.939	89.040	95.088	101.099	107.088	113.071	119.064
COST/KWH	$0.0667	$0.0657	$0.0653	$0.0649	$0.0645	$0.0642	$0.0639	$0.0637	$0.0635	$0.0633
G/KWH	326.77	322.08	319.99	318.07	316.31	314.72	313.30	312.04	310.95	310.03
G/PS-H	238.06	234.65	233.12	231.72	230.44	229.28	228.25	227.33	226.54	225.87

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,518	12,494	12,477	12,466	12,463	12,466	12,476	12,492
HEAT RATE(BTU/MW)N	13,166	13,114	13,071	13,039	13,018	13,006	13,005	13,014
GROSS (MBTU)	118.916	124.937	131.004	137.129	143.321	149.590	155.947	162.402
NET (MBTU)	125.081	131.138	137.250	143.434	149.704	156.076	162.565	169.187
COST/KWH	$0.0631	$0.0630	$0.0629	$0.0629	$0.0628	$0.0629	$0.0629	$0.0630
G/KWH	309.28	308.69	308.27	308.01	307.92	308.00	308.24	308.66
G/PS-H	225.32	224.89	224.58	224.39	224.33	224.39	224.56	224.86

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-31-06

Gross Load (K3-4) —>	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,900	10,000	11,700	12,600	
BOILER-TURBINE						
Ambient Air Temp	°F.	89	90	89	89	
Gas Entering A.H.	°F.	615	633	665	684	
Gas Leaving A.H.	°F.	399	416	431	441	
Air Entering A.H.	°F.	165	166	152	143	
Air Leaving A.H.	°F.	358	359	350	350	
Circ. Water Inlet	°F.	70	70	70	70	
Circ. Water Outlet	°F.	84.9	86	88.6	90.3	
Condenser Vacuum	Hg.	28.7	28.6	28.3	28.2	
Barometric Pressure	Hg.	29.57	29.57	29.57	29.49	
Excess O2	%	0.7	0.3	0.3	0.3	
Feedwater Flow (X1000)	Lb/Hr	93.6	106.8	123.4	127.1	
Steam Flow (X1000)	Lb/Hr	87.1	101.3	119	128.8	
Throttle Stm. Press.	PSIG	589	587	58.8	586	
Feedwater to Blr.	°F.	315	325	335	340	
GENERATOR						
Generator Integrator, Start		346.4	360.8	376.4	397.5	
Generator Integrator, Stop		355.3	370.8	388.1	410.1	
Generator Integrator, Diff.	MWH	8.9	10.0	11.7	12.6	0.0
Generator Volts	V.	11600	11600	11600	11600	
Generator Amps	A.	440	500	620	650	
Generator VARS	MVAR	3.2	4	5.8	5.5	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	800.1	808.9	817.3	827.6	
Aux. KWH Mtr. End (X100)	KWH	805.7	814.5	823.1	833.5	
Aux. Integrator, Diff.	KWH	5.60	5.60	5.80	5.90	0.00
Aux. Load Indicator	MW	0.58	0.60	0.60	0.61	
Aux. Amps	A.	36	33.0	34.0	35.0	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0640	0815	0945	1130	
F.O. Totalizer-End	Lbs/Hr.	6308	7086	8300	8960	
End Test	Time	0740	0915	1045	1230	
Difference	Lbs/Hr.	6308	7086	8300	8960	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	3	3	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	234	233	233	230	
F.O. Temp. @ Burner Deck	°F	220	220	220	221	
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	15.2				
Higher Heating Value	BTU/Gal	149,500				

TESTED BY: V.Sahm

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-31-06
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.9	10	11.7	12.6	0
F.O. Temp. °F.	234	233	233	230	0
F.O. Temp. (Corr.)	0.93955	0.9399	0.9399	0.94095	1.02145
F.O. Usage (Lbs.)	6,308.0	7,086.0	8,300.0	8,960.0	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	768.1	862.9	1,010.7	1,091.1	-
PT RATIO	1	1	1	1	1
KW (Gen.)	8,900	10,000	11,700	12,600	-
KW (Aux.)	580	580	580	590	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,500	149,500	149,500	149,500	149,500
HEAT RATE (APPROX.)	13,033	13,030	13,044	13,076	#DIV/0!
HEAT RATE (APPROX.)N	13,908	13,802	13,725	13,718	#DIV/0!
HEAT RATE (ACTUAL)-G	12,903	12,900	12,915	12,946	#DIV/0!
HEAT RATE (ACTUAL)-N	13,769	13,665	13,588	13,582	#DIV/0!

FUEL CORRECTION. 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested: 09-01-06
DATE: 08-31-06 Tested by: K Nakamatsu

DATA:

GENERATED (MW)	8.9	10.0	11.7	12.6
HEAT RATE(BTU/MW)G	12,903	12,900	12,915	12,946
HEAT RATE(BTU/MW)N	13,769	13,665	13,588	13,582
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$58 7187 act.			
H H V. (BTU/GAL)	149,500 act.			

A, B, C CONSTANTS:

GROSS A=	13,548.30	NET A=	16,049.47
B=	(131.098)	B=	(401.674)
C=	8.5998	C=	16 3405

PREDICTED VALUES										
GENERATED (MW)G	4.0	5 0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,130	13,058	13,027	12,999	12,975	12,954	12,936	12,922	12,911	12,903
GENERATED (MW)N	3 4	4 4	4 9	5 4	5.9	6.4	6.9	7.4	7.9	8.4
HEAT RATE(BTU/MW)N	14,704	14,450	14,335	14,228	14,129	14,038	13,956	13,882	13,816	13,758
GROSS (MBTU)	52.5	65.3	71.6	78.0	84.3	90.7	97.0	103 4	109 7	116 1
NET (MBTU)	50 6	64 2	70 8	77 4	83.9	90 4	96 9	103.3	109.7	116.1
COST/KWH	0.1228	0.1221	0.1218	0.1216	0.1213	0.1211	0.1210	0.1208	0.1207	0.1207
G/KWH	324.40	322.63	321.86	321.18	320.58	320.06	319 62	319 27	318 99	318 80
G/PS-H	236 33	235 04	234 48	233 99	233.55	233.17	232.85	232.59	232.39	232.25

PREDICTED VALUES (CONT.)								
GENERATED (MW)G	9 5	10.0	10.5	11.0	11.5	12.0	12.5	13 0
HEAT RATE(BTU/MW)G	12,898	12,897	12,899	12,905	12,913	12,925	12,941	12,959
GENERATED (MW)N	8 9	9.4	9 9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	13,708	13,667	13,633	13,608	13,591	13,582	13,582	13,589
GROSS (MBTU)	122.5	129 0	135 4	142.0	148.5	155.1	161.8	168 5
NET (MBTU)	122 6	129 0	135.5	142.1	148.7	155.1	161.9	168.6
COST/KWH	0.1206	0.1206	0.1206	0.1207	0.1208	0.1209	0.1210	0.1212
G/KWH	318.69	318 66	318 71	318 84	319 06	319.36	319.73	320.19
G/PS-H	232.17	232.15	232.19	232.29	232.44	232.66	232.93	233.27

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
8 9	79 21	704 969	6274 2241	12903 09604	114837.555	1022054 2	
10	100	1000	10000	12900.1096	129001.096	1290011	
11.7	136.89	1601.613	18738.8721	12914.70477	151102.046	1767893 9	
12 6	158.76	2000 376	25204.7376	12945.82454	163117.369	2055279 1	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
43 2	474 86	5306.958	60217.8338	51683.73495	558056.066	6135238 2	

a=	33 2	C=	6.599775381
b=	7911.789917	B=	-131.098026
d=	358.9931971	A=	13548.30008
e=	713 88		
f=	15379 3158		

WORKSHEET(NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
8.9	79 21	704.969	6274.224	13769 49	122548 5	1090681	
10	100	1000	10000	13665 37	136653.7	1366537	
11.7	136 89	1601 613	18738.67	13588.31	158983.3	1860104	
12.6	158 76	2000 376	25204.74	13581.8	171130 6	2156248	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
43.2	474 86	5306.958	60217.83	54804.97	589316.1	6473569	

a=	33 2	C=	16.34048
b=	-35441 859	B=	-401.674
d=	-1670.4453	A=	16049 47
e=	713.88		
f=	15379 316		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 04-15-06

Gross Load (K3-4) -->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	9,000	10,000	11,500	12,800		
BOILER-TURBINE							
Ambient Air Temp	°F.	82.4	84.5	84.8	84.9		
Gas Entering A.H.	°F.	627	642	677	698		
Gas Leaving A.H.	°F.	403	410	432	452		
Air Entering A.H.	°F.	150	143	140	146		
Air Leaving A.H.	°F.	350	143	342	352		
Circ. Water Inlet	°F.	70	70	70	70		
Circ. Water Outlet	°F.	84	85	87.7	88.8		
Condenser Vacuum	Hg.	28.7	28.7	28.4	28.3		
Barometric Pressure	Hg.	30.44	30.46	30.49	30.49		
Excess O2	%	0.4	0.3	0.2	0.1		
Feedwater Flow (X1000)	Lb/Hr	86.5	94.8	111	122.3		
Steam Flow (X1000)	Lb/Hr	89.4	98.8	116.4	126.7		
Throttle Stm. Press.	PSIG	588	589	587	592		
Feedwater to Blr.	°F.	320	325	340	348		
GENERATOR							
Generator Integrator, Start		8435.1	8451.3	8470.3	8488		
Generator Integrator, Stop		8444.1	8461.3	8481.8	8500.6		
Generator Integrator, Diff.	MWH	9.0	10.0	11.5	12.6	0.0	
Generator Volts	V.	11800	11600	11800	11600		
Generator Amps	A	450	490	570	630		
Generator VARS	MVAR	3.2	3.8	3.9	4.1		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	5899.0	5908.1	5917.7	5925.9		
Aux. KWH Mtr. End (X100)	KWH	5904.2	5913.4	5923.1	5931.5		
Aux. Integrator, Diff.	KWH	5.20	5.30	5.40	5.60	0.00	
Aux. Load Indicator	MW	0.62	0.57	0.58	0.59		
Aux. Amps	A.	36	33.0	34.0	34.0		
FUEL OIL							
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0	
Start Test	Time	0546	0730	0918	1048		
F.O. Totalizer-End	Lbs/Hr.	6477	7047	8299	8941		
End Test	Time	0646	0830	1018	1148		
Difference	Lbs/Hr.	6477	7047	8299	8941	0	
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No		
Circulating Pumps	Number	3	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	°F	238	235	233	232		
F.O. Temp. @ Burner Deck	°F	235	232	231	228		
Sulfur, Wt. %							
API Gravity @ 60 °F.	API	12.4					
Higher Heating Value	BTU/Gal	151,405					

TESTED BY: M.Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-15-06
KPP UNIT NO. 4

	TEST LOADS - MW				
	9	10	11.5	12.6	0
F.O. Temp. °F.	238	235	233	232	0
F.O. Temp. (Corr.)	0.93815	0.9392	0.9399	0.94025	1.02145
F.O. Usage (Lbs.)	6,477.0	7,047.0	8,299.0	8,941.0	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O. Temp					
F.O. Used (Gals.)	788.7	858.1	1,010.6	1,088.8	-
PT RATIO	1	1	1	1	1
KW (Gen.)	9,000	10,000	11,500	12,600	-
KW (Aux.)	520	530	540	560	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,405	151,405	151,405	151,405	151,405
HEAT RATE (APPROX.)	13,233	12,958	13,270	13,048	#DIV/0!
HEAT RATE (APPROX.)N	14,044	13,683	13,923	13,655	#DIV/0!
HEAT RATE (ACTUAL)-G	13,269	12,993	13,305	13,083	#DIV/0!
HEAT RATE (ACTUAL)-N	14,082	13,720	13,961	13,691	#DIV/0!

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested 04-20-06
DATE: 04-15-06 Tested by: rh

DATA.

GENERATED (MW)	9.0	10.0	11.5	12.6
HEAT RATE(BTU/MW)G	13,269	12,993	13,305	13,083
HEAT RATE(BTU/MW)N	14,082	13,720	13,961	13,691
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$56.2311	act.		
H.H.V. (BTU/GAL)	151,405	act.		

A, B, C CONSTANTS

GROSS A=	14,082.57	NET A=	16,331.36
B=	(159.952)	B=	(394.227)
C=	8.8066	C=	15.0838

PREDICTED VALUES.

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,552	13,453	13,409	13,368	13,330	13,296	13,266	13,239	13,215	13,194
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	14,996	14,737	14,619	14,509	14,408	14,311	14,223	14,143	14,070	14,005
GROSS (MBTU)	54.2	67.3	73.7	80.2	86.6	93.1	99.5	105.9	112.3	118.7
NET (MBTU)	52.2	66.0	72.8	79.5	86.1	92.7	99.3	105.8	112.3	118.8
COST/KWH	0.1198	0.1190	0.1186	0.1182	0.1179	0.1176	0.1173	0.1171	0.1169	0.1167
G/KWH	334.83	332.39	331.30	330.29	329.36	328.52	327.76	327.09	326.50	326.00
G/PS-H	243.93	242.15	241.38	240.62	239.95	239.34	238.78	238.29	237.87	237.50

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,177	13,164	13,154	13,147	13,143	13,143	13,147	13,154
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.4
HEAT RATE(BTU/MW)N	13,948	13,897	13,855	13,820	13,793	13,773	13,760	13,756
GROSS (MBTU)	125.2	131.8	138.1	144.6	151.1	157.7	164.3	171.0
NET (MBTU)	125.2	131.6	138.1	144.7	151.2	157.8	164.6	171.1
COST/KWH	0.1165	0.1164	0.1163	0.1163	0.1162	0.1162	0.1163	0.1163
G/KWH	325.58	325.24	324.99	324.82	324.74	324.74	324.82	324.99
G/PS-H	237.19	236.95	236.76	236.64	236.58	236.58	236.64	236.76

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
9	81	729	6561	13268.5047	119416.542	1074748.9	
10	100	1000	10000	12992.564	129925.64	1299256.4	
11.5	132.25	1520.875	17490.0625	13305.1115	153006.782	1759601	
12.6	158.76	2000.376	25204.7376	13082.9639	164845.345	2077051.4	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
43.1	472.01	5250.251	59255.8001	52649.1441	567196.31	6210657.8	

a=	30.43	C=	8.80658347
b=	-8291.99902	B=	-159.951885
d=	-392.871654	A=	14082.5737
e=	657.373		
f=	14229.7603		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
9	81	729	6561	14082.14	126739.3	1140653	
10	100	1000	10000	13719.71	137197.1	1371971	
11.5	132.25	1520.875	17490.06	13960.66	160547.5	1846297	
12.6	158.76	2000.376	25204.74	13691.47	172512.6	2173658	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
43.1	472.01	5250.251	59255.8	55453.98	596998.4	8532579	

a=	30.43	C=	15.08382
b=	-44514.934	B=	-394.227
d=	-2060.8266	A=	16331.36
e=	657.373		
f=	14229.76		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 01-21-06

Gross Load (K3-4) —>	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,500	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	°F.		87.9	88	87.8	90.1
Gas Entering A.H.	°F.		631.7	648.9	671.1	693
Gas Leaving A.H.	°F.		402.3	408.8	422.5	437
Air Entering A.H.	°F.		152.9	141	127	133.8
Air Leaving A.H.	°F.		351.4	344.6	337.1	341.8
Circ. Water Inlet	°F.		70	70	70	70
Circ. Water Outlet	°F.		85	86.3	88	89.5
Condenser Vacuum	Hg		28.6	28.5	28.3	28.2
Barometric Pressure	Hg.		30.3	30.5	30.3	30.3
Excess O2	%		0.5	0.5	0.4	0.5
Feedwater Flow (X1000)	Lb/Hr		89.8	99.7	110.2	123.1
Steam Flow (X1000)	Lb/Hr		95	104.2	116.4	127.5
Throttle Stm. Press	PSIG		590	589	585	582
Feedwater to Blr.	°F.		328	335	345	351
GENERATOR						
Generator Integrator, Start			4418.8	4433.4	4455.8	4478.3
Generator Integrator, Stop			4428.1	4443.9	4467.3	4490.9
Generator Integrator, Diff.	MWH	0.0	9.5	10.5	11.5	12.6
Generator Volts	V.		11600	11600	11600	11600
Generator Amps	A.		480	500	570	630
Generator VARS	MVAR		2.4	2.8	3.7	4.2
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		4594.6	4602.9	4814.4	4625.1
Aux. KWH Mtr. End (X100)	KWH		4600.1	4608.5	4620.0	4630.9
Aux. Integrator, Diff.	KWH	0.00	5.50	5.60	5.60	5.80
Aux. Load Indicator	MW		0.65	0.59	0.60	0.66
Aux. Amps	A.		38.0	37.0	38.0	39.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time		0559	0730	0933	1126
F.O. Totalizer-End	Lbs/Hr.		6719	7343	8232	8818
End Test	Time		0659	0830	1033	1226
Difference	Lbs/Hr.	0	6719	7343	8232	8818
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F		237	236	232	228
F.O. Temp. @ Burner Deck	°F		223	224	223	221
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	13.6				
Higher Heating Value	BTU/Gal	150,357				

TESTED BY: M.Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-21-06
KPP UNIT NO. 4

	TEST LOADS - MW				
	0	9.5	10.5	11.5	12.5
F.O. Temp. °F.	0	237	236	232	228
F.O. Temp. (Corr.)	1.02145	0.9385	0.93885	0.94025	0.94165
F.O. Usage (Lbs.)	-	6,719.0	7,343.0	8,232.0	8,818.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	-	818.2	894.2	1,002.4	1,073.8
PT RATIO	1	1	1	1	1
KW (Gen.)	-	9,500	10,500	11,500	12,600
KW (Aux.)	0	550	560	560	580
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,357	150,357	150,357	150,357	150,357
HEAT RATE (APPROX.)	#DIV/0!	13,005	12,859	13,182	12,868
HEAT RATE (APPROX.)N	#DIV/0!	13,804	13,584	13,836	13,489
HEAT RATE (ACTUAL)-G	#DIV/0!	12,950	12,804	13,108	12,814
HEAT RATE (ACTUAL)-N	#DIV/0!	13,745	13,526	13,777	13,432

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by. Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested: 01-25-06
DATE: 01-21-06 Tested by. rh

DATA:

GENERATED (MW)		9.5	10.5		12.6
HEAT RATE(BTU/MW)G		12,950	12,804		12,814
HEAT RATE(BTU/MW)N		13,745	13,526		13,432
NUMBER OF TESTS	3				
PRICE OF FUEL/BBL	$54 3922	act.			
H H.V. (BTU/GAL)	150,357	act.			

A, B, C CONSTANTS

GROSS A=	19,143.27	NET A=	21,460.88	
B=	(1,110 476)	B=	(1,348.282)	
C=	48.2643	C=	56.4341	

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,474	14,797	14,496	14,218	13,964	13,735	13,530	13,348	13,191	13,058
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	16,971	16,130	15,752	15.403	15,081	14,788	14,523	14,286	14,078	13,898
GROSS (MBTU)	61.9	74.0	79.7	85 3	90.8	96.1	101.5	106 8	112.1	117.5
NET (MBTU)	58.5	71.8	78.0	83.9	89.7	95.4	100.9	106.4	111.9	117.4
COST/KWH	0 1333	0.1275	0.1249	0 1225	0.1203	0.1183	0.1165	0.1150	0 1136	0.1125
G/KWH	382.31	365.61	358.15	351 29	345 02	339.35	334 28	329 80	325 92	322.64
G/PS-H	278 52	266.35	260.92	255.92	251.36	247.23	243.53	240.27	237 44	235.05

PREDICTED VALUES (CONT.)

GENERATED (MW)G	9 5	10 0	10.5	11 0	11 5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,950	12,865	12,804	12,768	12,756	12,768	12,804	12,864
GENERATED (MW)N	9 0	9 5	9.9	10.4	10.9	11 4	11.9	12.4
HEAT RATE(BTU/MW)N	13,745	13,621	13,526	13,458	13,419	13,408	13,425	13,471
GROSS (MBTU)	123.0	128.6	134 4	140 4	146 7	153 2	160 0	167.2
NET (MBTU)	123 0	128.7	134 4	140.5	146.8	153 4	160 3	167.3
COST/KWH	0 1115	0.1108	0.1103	0 1100	0.1099	0.1100	0.1103	0.1108
G/KWH	319 95	317 86	316.38	315 47	315.16	315 48	316 34	317.83
G/PS-H	233 09	231.57	230.48	229.82	229 80	229 82	230 46	231.55

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	0
9 5	90.25	857.375	8145 0625	12949 59421	123021.145	1168700.9	
10.5	110 25	1157.625	12155 0625	12804 40354	134446 237	1411685 5	
0	0	0	0	0	0	0	0
12.6	158 76	2000.376	25204 7376	12813.70358	161452 665	2034303.6	
0	0	0	0	0	0	0	0
32.6	359.26	4015.376	45504.8626	38567.70133	418920.047	4614689.9	

a=	15.02	C=	48.26427601
b=	-11762.536	B=	-1110 476188
d=	-546 92156	A=	19143.26709
e=	334.252		
f=	7446.8402		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	0
9 5	90.25	857.375	8145.063	13745.38	130581.1	1240520	
10.5	110.25	1157.625	12155 06	13525 78	142020.7	1491217	
0	0	0	0	0	0	0	0
12.6	158.76	2000.376	25204.74	13432	169243.2	2132465	
0	0	0	0	0	0	0	0
32 6	359 26	4015 376	45504.86	40703.16	441845	4864202	

a=	15.02	C=	56.43405
b=	-30410.582	B=	-1348 28
d=	-1388.0006	A=	21480 88
e=	334 252		
f=	7446.8402		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 12-22-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,600	10,400	11,500	12,500	
BOILER-TURBINE						
Ambient Air Temp	°F.	81.8	83.7	90	94.8	
Gas Entering A.H.	°F.	628.3	640	667.6	685.6	
Gas Leaving A.H.	°F.	403.6	408.3	422.1	431.6	
Air Entering A.H.	°F.	149.7	140.6	129	130.2	
Air Leaving A.H.	°F.	348.2	341.5	335.7	335.4	
Circ. Water Inlet	°F.	70	70	70	70	
Circ. Water Outlet	°F.	85.2	86	87.9	89.1	
Condenser Vacuum	Hg.	28.7	28.7	28.5	28.4	
Barometric Pressure	Hg	30.44	30.47	30.46	30.43	
Excess O2	%	0.9	0.9	0.85	0.9	
Feedwater Flow (X1000)	Lb/Hr	93.9	98.8	109.5	122.6	
Steam Flow (X1000)	Lb/Hr	97.1	103	115.9	124.7	
Throttle Stm. Press.	PSIG	589	589	585	585	
Feedwater to Blr.	°F.	330	335	345	350	
GENERATOR						
Generator Integrator, Start		5544.2	5560.3	5581	5598.9	
Generator Integrator, Stop		5553.9	5570.6	5592.5	5611.4	
Generator Integrator, Diff.	MWH	9.7	10.3	11.5	12.5	0.0
Generator Volts	V.	11500	11500	11500	11500	
Generator Amps	A.	470	510	580	620	
Generator VARS	MVAR	2.9	3.6	3.1	3.9	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	426.0	435.0	445.9	454.7	
Aux. KWH Mtr. End (X100)	KWH	431.5	440.6	451.7	460.6	
Aux. Integrator, Diff.	KWH	5.50	5.60	5.80	5.90	0.00
Aux. Load Indicator	MW	0.65	0.59	0.67	0.62	
Aux. Amps	A.	37	34.0	39.0	35.5	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	
Start Test	Time	0649	0825	1021	1152	
F.O. Totalizer-End	Lbs/Hr.	6750	7199	8049	8753	
End Test	Time	0749	0925	1121	1252	
Difference	Lbs/Hr.	6750	7199	8049	8753	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	No	No	No	No	
Circulating Pumps	Number	3	3	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	241	239	232	232	
F.O. Temp. @ Burner Deck	°F	224	225	223	222	
Sulfur, Wt. %						
API Gravity @ 60 °F.	API					
Higher Heating Value	BTU/Gal					

TESTED BY. M.Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-22-05
KPP UNIT NO. 4

	TEST LOADS - MW				
	9.6	10.4	11.5	12.5	0
F.O. Temp. °F.	241	239	232	232	0
F.O. Temp. (Corr.)	0.9371	0.9378	0.94025	0.94025	1.02145
F.O. Usage (Lbs.)	6,750.0	7,199.0	8,049.0	8,753.0	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	822.0	876.6	980.2	1,065.9	-
PT RATIO	1	1	1	1	1
KW (Gen.)	9,700	10,300	11,500	12,500	-
KW (Aux.)	550	560	580	590	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	-	-	-	-	-
HEAT RATE (APPROX.)	12,796	12,852	12,870	12,876	#DIV/0!
HEAT RATE (APPROX.)N	13,585	13,591	13,553	13,514	#DIV/0!
HEAT RATE (ACTUAL)-G	-	-	-	-	#DIV/0!
HEAT RATE (ACTUAL)-N	-	-	-	-	#DIV/0!

FUEL CORRECTION. 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested.
DATE: 12-22-05 Tested by:

DATA.

GENERATED (MW)	9.7		11.5	12.5
HEAT RATE(BTU/MW)G	12,796		12,870	12,876
HEAT RATE(BTU/MW)N	13,565		13,553	13,514
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$54 4066	act.		
H.H.V. (BTU/GAL)	151,000	est.		

A, B, C CONSTANTS.

GROSS A=	10,992.24	NET A=	12,295.17
B=	307 941	B=	246 593
C=	(12.5804)	C=	(11.9290)

PREDICTED VALUES.

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	12,023	12,217	12,305	12,387	12,462	12,531	12,594	12,651	12,701	12,745
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	13,091	13,230	13,291	13,345	13,394	13,437	13,474	13,504	13,529	13,548
GROSS (MBTU)	48.1	61.1	67.7	74.3	81.0	87.7	94 5	101.2	108.0	114.7
NET (MBTU)	45 2	58.9	65 8	72.7	79 7	86.7	93.6	100.6	107.6	114.5
COST/KWH	0.1031	0.1048	0.1056	0.1063	0.1069	0.1075	0.1080	0.1085	0.1090	0.1093
G/KWH	297.05	301.86	304.03	306 05	307.91	309 62	311.17	312.56	313.80	314 89
G/PS-H	216 41	219 91	221.50	222 97	224 32	225.57	226.69	227.71	228.61	229 40

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9 5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,782	12,814	12,839	12,857	12,870	12,876	12,876	12,869
GENERATED (MW)N	9 0	9 5	9 9	10.4	10 9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	13,561	13,568	13,569	13,564	13,553	13,537	13,514	13,485
GROSS (MBTU)	121.4	128.1	134 8	141.4	148 0	154.5	160 9	167 3
NET (MBTU)	121.4	128 2	134 9	141 6	148 3	154.6	160.9	167.3
COST/KWH	0.1097	0.1099	0.1101	0.1103	0.1104	0.1105	0.1105	0.1104
G/KWH	315.82	316.59	317.21	317.67	317 98	318.13	318 13	317.97
G/PS-H	230.08	230 65	231.10	231.43	231.66	231.77	231.76	231 65

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
9 7	94.09	912.673	8852.9281	12795.582	124117.146	1203936.3	
0	0	0	0	0	0	0	
11.5	132 25	1520 875	17490 0625	12669 8088	148002 801	1702032.2	
12.5	156.25	1953.125	24414.0625	12875.8208	160947.759	2011847	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
33 7	382.59	4386.673	50757.0531	38541.2115	433067.706	4917815.5	

a=	12.08	C=	-12.580389
b=	7964 419193	B=	307.941332
d=	364 2885471	A=	10992.2399
e=	266.736		
f=	5896.0512		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
9.7	94.09	912 673	8852 928	13564.72	131577.7	1276304	
0	0	0	0	0	0	0	
11.5	132 25	1520.875	17490.06	13553.37	155863 8	1792433	
12.5	156 25	1953.125	24414 06	13513 67	168920 8	2111510	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
33 7	382 59	4386 673	50757.05	40631.75	456362 3	5180248	

a=	12.08	C=	-11.929
b=	-4559 0831	B=	246.5926
d=	-203.06473	A=	12295.17
e=	266 736		
f=	5896.0512		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-27-05

Gross Load (K3-4) —>	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,000	11,000	12,500
BOILER-TURBINE						
Ambient Air Temp	°F.		88.7	93.2	94.6	96.7
Gas Entering A.H.	°F.		614	629.7	651.9	683.1
Gas Leaving A.H.	°F.		401.4	414.1	425.1	440.9
Air Entering A.H.	°F.		151.1	155.1	150.8	136.4
Air Leaving A.H.	°F.		344.8	347.4	343.2	340
Circ. Water Inlet	°F.		70	70	70	70
Circ. Water Outlet	°F.		84.7	86	87.5	89.8
Condenser Vacuum	Hg.		28.6	28.5	28.4	28.1
Barometric Pressure	Hg.		30.4	30.4	30.3	30.3
Excess O2	%		0.44	0.24	0.2	0.2
Feedwater Flow (X1000)	Lb/Hr		85	96	104	124
Steam Flow (X1000)	Lb/Hr		91.27	103	113	130
Throttle Stm. Press	PSIG		590	590	590	585
Feedwater to Blr.	°F.		325	330	340	350
GENERATOR						
Generator Integrator, Start			2710	2735.8	2753.2	2770.4
Generator Integrator, Stop			2718.9	2746	2764.2	2783.7
Generator Integrator, Diff	MWH	0.0	8.9	10.2	11.0	13.3
Generator Volts	V.		11600	11600	11600	11600
Generator Amps	A.		438	530	570	640
Generator VARS	MVAR		4.5	5	4.7	4.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		4896.9	4912.0	4921.3	4929.7
Aux. KWH Mtr. End (X100)	KWH		4902.2	4917.6	4926.9	4935.9
Aux. Integrator, Diff.	KWH	0.00	5.30	5.60	5.60	6.20
Aux. Load Indicator	MW					
Aux. Amps	A.		33.0	37.0	34.0	35.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.		22352400	22378800	22383600	22396000
Start Test	Time		0732	1021	1201	1331
F.O. Totalizer-End	Lbs/Hr.		22358800	22386400	22391800	22405200
End Test	Time		0832	1121	1301	1431
Difference	Lbs/Hr.	0	6400	7600	8000	9200
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		Yes	Yes	Yes	Yes
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS			LO-1 Pump On			
F.O. Temp. @ Heater	°F		230	240	230	228
F.O. Temp @ Burner Deck	°F		226	230	224	215
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	15.6				
Higher Heating Value	BTU/Gal	148,905				

TESTED BY: Paulette Sierman

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-27-05
KPP UNIT NO. 4

	TEST LOADS - MW				
	0	9	10	11	12.5
F.O. Temp. °F.	0	230	240	230	228
F.O. Temp. (Corr.)	1.02145	0.94095	0.93745	0.94095	0.94165
F.O. Usage (Lbs.)	-	6,400.0	7,600.0	8,000.0	9,200.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	-	779.3	925.5	974.2	1,120.3
PT RATIO	1	1	1	1	1
KW (Gen.)	-	8,900	10,200	11,000	13,300
KW (Aux.)	0	530	560	560	620
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,905	148,905	148,905	148,905	148,905
HEAT RATE (APPROX.)	#DIV/0!	13,223	13,701	13,373	12,719
HEAT RATE (APPROX.)N	#DIV/0!	14,060	14,497	14,090	13,341
HEAT RATE (ACTUAL)-G	#DIV/0!	13,039	13,511	13,187	12,543
HEAT RATE (ACTUAL)-N	#DIV/0!	13,865	14,295	13,895	13,156

FUEL CORRECTION 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested: 09-07-05
DATE: 08-27-05 Tested by: K.Okuyama

DATA:

GENERATED (MW)			10 2	11 0	13.3
HEAT RATE(BTU/MW)G			13,511	13,187	12,543
HEAT RATE(BTU/MW)N			14,295	13,895	13,156
NUMBER OF TESTS	3				
PRICE OF FUEL/BBL	$38.9801	act.			
H.H.V. (BTU/GAL)	148,905	act.			

A, B, C CONSTANTS.

GROSS A=	22,112 68	NET A=	25,910.31	
B=	(1,250 718)	B=	(1,730.173)	
C=	*39.9384*	*C=*	*57.9859*	

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	17,749	16,858	16,442	16,046	15,670	15,315	14,979	14,663	14,367	14,091
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	19,917	18,709	18,148	17,617	17,114	16,640	16,196	15,780	15,393	15,036
GROSS (MBTU)	71.0	84.3	90.4	96.3	101.9	107.2	112.3	117.3	122.1	126.8
NET (MBTU)	69.1	83.6	90.2	96.4	102.2	107.7	112.9	117.9	122.7	127.4
COST/KWH	0.1106	0.1051	0.1025	0.1000	0.0977	0.0955	0.0934	0.0914	0.0895	0.0878
G/KWH	438.53	416.51	406.24	396.46	387.18	378.39	370.09	362.29	354.98	348.18
G/PS-H	319.48	303.44	295.95	288.83	282.07	275.66	269.62	263.93	258.61	253.64

PREDICTED VALUES (CONT.)

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,835	13,599	13,383	13,187	13,011	12,855	12,719	12,603
GENERATED (MW)N	9.0	9.5	9.9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,707	14,407	14,136	13,895	13,682	13,498	13,343	13,218
GROSS (MBTU)	131.4	136.0	140.5	145.1	149.6	154.3	159.0	163.8
NET (MBTU)	131.9	136.4	140.5	145.1	149.7	154.4	159.3	164.4
COST/KWH	0.0862	0.0848	0.0834	0.0822	0.0811	0.0801	0.0793	0.0786
G/KWH	341.84	336.01	330.67	325.83	321.48	317.62	314.26	311.39
G/PS-H	249.04	244.79	240.90	237.37	234.20	231.39	228.94	226.85

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10 2	104 04	1061.208	10824.3216	13510 55116	137807 622	1405637.7
11	121	1331	14641	13187.33223	145060.655	1595667.2
13.3	176.89	2352.637	31290.0721	12542.83855	166819.753	2218702.7
0	0	0	0	0	0	0
34.5	401.93	4744.845	56755.3937	39240 72194	449688.029	5220007.7

a=	15.54	C=	39.93839206
b=	-112000 408	B=	-1250 71757
d=	-4740 81969	A=	22112.68007
e=	387.95		
f=	8718.4562		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10 2	104.04	1061 208	10824.32	14295 4	145813	1487293
11	121	1331	14641	13894.7	152841.7	1681259
13.3	176.89	2352.637	31290.07	13156.13	174978.6	2327188
0	0	0	0	0	0	0
34.5	401.93	4744 845	56755.39	41346 23	473631.3	5495740

a=	15.54	C=	57.98587
b=	-131089 75	B=	-1730 17
d=	-5550.9819	A=	25910.31
e=	387.95		
f=	8718 4562		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 05-24-05

Gross Load (K3-4) -->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,000	11,000	12,500
BOILER-TURBINE						
Ambient Air Temp	°F.		109	110	111	110
Gas Entering A.H.	°F.		540	560	550	600
Gas Leaving A.H.	°F.		380	390	400	410
Air Entering A.H.	°F.		140	140	140	130
Air Leaving A.H.	°F.		330	340	340	330
Circ. Water Inlet	°F.		70	70	70	70
Circ. Water Outlet	°F.		85	86	88	89
Condenser Vacuum	Hg.		28.8	28.6	28.5	28.2
Barometric Pressure	Hg.					
Excess O2	%		51	53	54	54
Feedwater Flow (X1000)	Lb/Hr		88	96	106	121
Steam Flow (X1000)	Lb/Hr		90	98	111	125
Throttle Stm. Press.	PSIG		592	592	588	588
Feedwater to Blr.	°F.		325	335	340	350
GENERATOR						
Generator Integrator, Start			5191.5	5206.2	5225.7	5246
Generator Integrator, Stop			5200.8	5218.3	5236.8	5258.5
Generator Integrator, Diff.	MWH	0.0	9.3	10.1	11.1	12.5
Generator Volts	V.		11600	11600	11600	11600
Generator Amps	A.		460	520	580	640
Generator VARS	MVAR		3	5	5.0	5.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		2007.9	2017.2	2026.4	2036.3
Aux. KWH Mtr. End (X100)	KWH		2013.1	2022.6	2031.9	2042.0
Aux. Integrator, Diff.	KWH	0.00	5.20	5.40	5.50	5.70
Aux. Load Indicator	MW					
Aux. Amps	A.		33.0	33.0	34.0	35.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr		82566192	82577940	82590044	82604232
Start Test	Time		0615	0800	0940	1125
F.O. Totalizer-End	Lbs/Hr.		82572760	82584956	82597828	82612932
End Test	Time		0715	0900	1040	1225
Difference	Lbs/Hr.	0	6568	7016	7784	8700
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F		220	216	210	206
F.O. Temp. @ Burner Deck	°F		229	227	222	215
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	14.5				
Higher Heating Value	BTU/Gal	149,381				

TESTED BY. J.C.

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject. Heat Rate Testing
DATE: 05-24-05
KPP UNIT NO. 4

TEST LOADS - MW

	0	9	10	11	12.5
F.O. Temp. °F.	0	220	216	210	206
F.O. Temp. (Corr.)	1.02145	0.94445	0.94585	0.94795	0.94935
F.O. Usage (Lbs.)	-	6,568.0	7,016.0	7,784.0	8,700.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	-	799.8	854.4	947.9	1,059.4
PT RATIO	1	1	1	1	1
KW (Gen.)	-	9,300	10,100	11,100	12,500
KW (Aux.)	0	520	540	550	570
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,381	149,381	149,381	149,381	149,381
HEAT RATE (APPROX.)	#DIV/0!	12,986	12,773	12,695	12,798
HEAT RATE (APPROX.)N	#DIV/0!	13,755	13,495	13,567	13,409
HEAT RATE (ACTUAL)-G	#DIV/0!	12,847	12,636	12,756	12,661
HEAT RATE (ACTUAL)-N	#DIV/0!	13,606	13,350	13,421	13,266

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by. Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested: 06-02-05
DATE: 05-24-05 Tested by: K Okuyama

DATA

GENERATED (MW)		9.3	10.1	11.1	12.5
HEAT RATE(BTU/MW)G		12,847	12,636	12,756	12,661
HEAT RATE(BTU/MW)N		13,608	13,350	13,421	13,266
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$38.9801 act.				
H H V. (BTU/GAL)	149,381 act.				

A, B, C CONSTANTS:

GROSS A=	15,594.77	NET A=	17,214.86
B=	(493.232)	B=	(618.337)
C=	20.7921	C=	24.3048

PREDICTED VALUES.

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,955	13,648	13,511	13,384	13,267	13,161	13,065	12,980	12,905	12,840
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	15,130	14,731	14,549	14,380	14,223	14,077	13,944	13,824	13,715	13,618
GROSS (MBTU)	55.8	68.2	74.3	80.3	86.2	92.1	98.0	103.8	109.7	115.6
NET (MBTU)	52.7	66.0	72.5	78.8	85.1	91.2	97.3	103.4	109.4	115.5
COST/KWH	0.0867	0.0848	0.0839	0.0832	0.0824	0.0818	0.0812	0.0806	0.0802	0.0798
G/KWH	344.78	337.22	333.82	330.68	327.80	325.17	322.81	320.69	318.84	317.24
G/PS-H	251.18	245.67	243.20	240.91	238.81	236.90	235.17	233.63	232.28	231.12

PREDICTED VALUES (CONT.)

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,786	12,742	12,708	12,685	12,672	12,670	12,678	12,697
GENERATED (MW)N	9.0	9.5	10.0	10.5	11.0	11.5	11.9	12.4
HEAT RATE(BTU/MW)N	13,534	13,462	13,402	13,354	13,318	13,295	13,283	13,284
GROSS (MBTU)	121.5	127.4	133.4	139.5	145.7	152.0	158.5	165.1
NET (MBTU)	121.5	127.6	133.5	139.7	145.8	152.2	158.5	165.1
COST/KWH	0.0794	0.0792	0.0790	0.0788	0.0787	0.0787	0.0788	0.0789
G/KWH	315.90	314.81	313.99	313.42	313.10	313.04	313.24	313.70
G/PS-H	230.14	229.35	228.75	228.33	228.10	228.06	228.21	228.54

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	0
9.3	86.49	804.357	7480.5201	12846.8448	119475.657	1111123.8	
10.1	102.01	1030.301	10406.0401	12636.1418	127625.032	1289012.8	
11.1	123.21	1367.631	15180.7041	12756.3413	141595.389	1571708.8	
12.5	156.25	1953.125	24414.0625	12660.636	158257.95	1978224.4	
0	0	0	0	0	0	0	0
43	467.96	5155.414	57481.3268	50899.964	546954.026	5950069.8	

a=	22.84	C=	20.792116
b=	-18868.6348	B=	-493.23218
d=	-882.338771	A=	15594.767
e=	499.376		
f=	10938.7456		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	0
9.3	86.49	804.357	7480.52	13607.71	126551.7	1178930	
10.1	102.01	1030.301	10406.04	13349.9	134834	1361823	
11.1	123.21	1367.631	15180.7	13421.36	148977.1	1653646	
12.5	156.25	1953.125	24414.06	13265.54	165819.3	2072741	
0	0	0	0	0	0	0	0
43	467.96	5155.414	57481.33	53644.51	576182.1	6265141	

a=	22.84	C=	24.30455
b=	-42921.345	B=	-618.337
d=	-1985.707	A=	17214.86
e=	499.376		
f=	10938.746		

MAUI ELECTRIC CO , LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE. 04-13-05

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,500	12,500	13,000
BOILER-TURBINE						
Ambient Air Temp	°F.	109	111	113	111	110
Gas Entering A.H.	°F.	633	648	684	706	736
Gas Leaving A.H.	°F.	414	419	441	451	464
Air Entering A.H.	°F.	155	158	158	136	124
Air Leaving A H	°F.	364	365	362	355	350
Circ. Water Inlet	°F.	70	70	70	70	70
Circ. Water Outlet	°F.	84 9	86	88	90	92
Condenser Vacuum	Hg	28 3	28 2	27 8	27 6	27 3
Barometric Pressure	Hg.	29.71	29 72	29.72	29.72	29.69
Excess O2	%	0 6	0 3	0.25	0.25	0.2
Feedwater Flow (X1000)	Lb/Hr	84	89	106	118	130
Steam Flow (X1000)	Lb/Hr	91.5	96	116	128	140
Throttle Stm. Press.	PSIG	575	576	572	572	570
Feedwater to Blr.	°F.	327	333	345	354	360
GENERATOR						
Generator Integrator, Start		713.7	728.9	744.8	762.3	779 6
Generator Integrator, Stop		722.1	737 8	755.4	773 8	792.1
Generator Integrator, Diff.	MWH	8 4	8 9	10 6	11.5	12.5
Generator Volts	V.	11600	11600	11600	11600	11600
Generator Amps	A.	420	475	550	595	640
Generator VARS	MVAR	3	4 8	4.8	5.0	4.7
AUX TRANSFORMER						
Aux KWH Mtr. Start (X100)	KWH	9842 6	9852.3	9861.6	9870.8	9879 4
Aux. KWH Mtr. End (X100)	KWH	9848.0	9857.7	9867 3	9876 6	9885.3
Aux. Integrator, Diff.	KWH	5.40	5.40	5.70	5.80	5 90
Aux. Load Indicator	MW	0.58	0 65	0.61	0.61	0 62
Aux. Amps	A.	33	37.0	34.0	35.0	38.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0630	0816	0956	1132	1300
F.O. Totalizer-End	Lbs/Hr.	6321	6739	8081	8830	9679
End Test	Time	0730	0916	1016	1232	1400
Difference	Lbs/Hr.	6321	6739	8081	8830	9679
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F O. Temp @ Heater	°F	275	253	252	243	236
F.O. Temp @ Burner Deck	°F	258	247	245	237	237
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	11				
Higher Heating Value	BTU/Gal	151,214				

TESTED BY. MT

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject Heat Rate Testing
DATE: 04-13-05
KPP UNIT NO. 4

	TEST LOADS - MW				
	0	9	10.5	12.5	13
F.O. Temp. °F.	275	253	252	243	236
F.O. Temp. (Corr.)	0.9252	0.9329	0.93325	0 9364	0 93885
F.O. Usage (Lbs.)	6,321.0	6,739 0	8,081.0	8,830 0	9,679 0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals)	769.7	820 6	984 0	1,075.3	1,178.6
PT RATIO	1	1	1	1	1
KW (Gen.)	8,400	8,900	10,600	11,500	12,500
KW (Aux.)	540	540	570	580	590
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,214	151,214	151,214	151,214	151,214
HEAT RATE (APPROX.)	13,837	13,923	14,018	14,119	14,238
HEAT RATE (APPROX.)N	14,787	14,822	14,815	14,868	14,943
HEAT RATE (ACTUAL)-G	13,856	13,943	14,038	14,139	14,258
HEAT RATE (ACTUAL)-N	14,808	14,843	14,836	14,890	14,965

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested 04-18-05
DATE: 04-13-05 Tested by: K.Okuyama

DATA.

GENERATED (MW)		8.9	10.6	11.5	12.5
HEAT RATE(BTU/MW)G		13,943	14,036	14,139	14,258
HEAT RATE(BTU/MW)N		14,843	14,836	14,890	14,965
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$35.7939 act.				
H.H.V. (BTU/GAL)	151,214 act.				

A, B, C CONSTANTS:

GROSS A=	14,849.55	NET A=	16,618.64
B=	(237.600)	B=	(366.208)
C=	*15.2372*	*C=*	*18.7236*

PREDICTED VALUES.

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,143	14,042	14,004	13,972	13,949	13,933	13,925	13,924	13,931	13,945
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	15,453	15,256	15,171	15,095	15,029	14,973	14,925	14,887	14,859	14,839
GROSS (MBTU)	56.6	70.2	77.0	83.8	90.7	97.5	104.4	111.4	118.4	125.5
NET (MBTU)	53.5	68.0	75.2	82.4	89.6	96.7	103.9	111.1	118.3	125.5
COST/KWH	0.0797	0.0791	0.0789	0.0787	0.0786	0.0785	0.0785	0.0785	0.0785	0.0786
G/KWH	349.44	346.95	346.00	345.22	344.64	344.25	344.04	344.02	344.20	344.55
G/PS-H	254.57	252.76	252.07	251.50	251.08	250.79	250.64	250.63	250.76	251.02

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,968	13,997	14,035	14,080	14,132	14,193	14,260	14,336
GENERATED (MW)N	9.0	9.5	10.0	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,829	14,829	14,838	14,856	14,883	14,920	14,967	15,022
GROSS (MBTU)	132.7	140.0	147.4	154.9	162.5	170.3	178.3	186.4
NET (MBTU)	132.9	140.3	147.8	154.9	162.5	170.4	178.3	186.4
COST/KWH	0.0787	0.0789	0.0791	0.0794	0.0796	0.0800	0.0804	0.0808
G/KWH	345.10	345.84	346.76	347.87	349.17	350.66	352.34	354.20
G/PS-H	251.42	251.95	252.62	253.43	254.38	255.47	256.69	258.05

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
8.9	79.21	704.969	6274.2241	13942.7786	124090.73	1104407.5
10.6	112.36	1191.016	12624.7696	14037.9316	148802.08	1577302
11.5	132.25	1520.875	17490.0625	14138.611	162594.03	1869831.3
12.5	156.25	1953.125	24414.0625	14258.1887	178227.36	2227842
0	0	0	0	0	0	0
43.5	480.07	5369.985	60803.1187	58377.5099	613714.19	6779382.8

a=	28.03	C=	15.2371954
b=	52379.9271	B=	-237.59998
d=	2435.07627	A=	14849.5472
e=	596.895		
f=	12745.2699		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
8.9	79.21	704.969	6274.224	14843.39	132106.2	1175745
10.6	112.36	1191.016	12624.77	14835.7	157258.4	1666939
11.5	132.25	1520.875	17490.06	14889.56	171230	1969145
12.5	156.25	1953.125	24414.06	14964.51	187056.4	2338205
0	0	0	0	0	0	0
43.5	480.07	5369.985	60803.12	59533.17	647651	7150034

a=	28.03	C=	18.72357
b=	20049.446	B=	-366.208
d=	911.20528	A=	16618.64
e=	596.895		
f=	12745.27		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 02-17-05

Gross Load (K3-4) —>	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,500	12,500	13,000
BOILER-TURBINE						
Ambient Air Temp	°F.		102	99	102	102
Gas Entering A.H.	°F.		634	665	711	726
Gas Leaving A.H.	°F.		411	425	448	456
Air Entering A.H.	°F.		148	152	130	123
Air Leaving A.H.	°F.		358	359	350	348
Circ. Water Inlet	°F.		70	70	70	70
Circ. Water Outlet	°F.		85	88	91	92
Condenser Vacuum	Hg.		28.4	28.2	27.7	27.6
Barometric Pressure	Hg		29.87	29.9	29.9	29.88
Excess O2	%		0.6	0.2	0.3	0.2
Feedwater Flow (X1000)	Lb/Hr		87	102	128	135
Steam Flow (X1000)	Lb/Hr		95	113	136	141
Throttle Stm. Press.	PSIG		575	572	568	570
Feedwater to Str.	°F.		334	344	362	365
GENERATOR						
Generator Integrator, Start			4569.5	4587.8	4611.1	4632.5
Generator Integrator, Stop			4578.4	4598.3	4623.6	4645.4
Generator Integrator, Diff.	MWH	0.0	8.9	10.5	12.5	12.9
Generator Volts	V.		11600	11630	11610	11650
Generator Amps	A		475	543	640	660
Generator VARS	MVAR		4.8	5.0	5.0	5.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		2031.1	2042.1	2054.3	2064.7
Aux. KWH Mtr. End (X100)	KWH		2036.8	2047.9	2060.5	2070.8
Aux. Integrator, Diff.	KWH	0.00	5.70	5.80	6.20	6.10
Aux. Load Indicator	MW		0.60	0.67	0.68	0.70
Aux. Amps	A		34.5	39.0	39.8	36.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.		0	0	0	0
Start Test	Time		0601	0758	1000	1142
F.O. Totalizer-End	Lbs/Hr.		6725	7755	9310	9749
End Test	Time		0701	0858	1100	1242
Difference	Lbs/Hr.	0	6725	7755	9310	9749
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F		260	243	232	230
F.O. Temp. @ Burner Deck	°F		240	230	227	226
Sulfur, Wt. %						
API Gravity @ 60 °F.	API	15.4				
Higher Heating Value	BTU/Gal	148,310				

TESTED BY: MT

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-17-05
KPP UNIT NO. 4

	TEST LOADS-MW				
	0	9	10.5	12.5	13
F.O. Temp. °F.	0	260	243	232	230
F.O. Temp. (Corr.)	1.02145	0.93045	0.9364	0.94025	0.94095
F.O. Usage (Lbs.)	-	6,725.0	7,755.0	9,310.0	9,749.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O Temp					
F.O. Used (Gals.)	-	818.9	944.3	1,133.7	1,187.2
PT RATIO	1	1	1	1	1
KW (Gen.)	-	8,900	10,500	12,500	12,900
KW (Aux.)	0	570	580	620	610
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,310	148,310	148,310	148,310	148,310
HEAT RATE (APPROX.)	#DIV/0!	13,894	13,581	13,695	13,896
HEAT RATE (APPROX.)N	#DIV/0!	14,845	14,375	14,410	14,586
HEAT RATE (ACTUAL)-G	#DIV/0!	13,647	13,339	13,451	13,649
HEAT RATE (ACTUAL)-N	#DIV/0!	14,580	14,119	14,153	14,326

FUEL CORRECTION. 1

CALCULATIONS FOR HEAT RATE CURVE
by. Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested 02-18-05
DATE: 02-17-05 Tested by. K.Okuyama

DATA:

GENERATED (MW)		8.9	10.5	12.5	12.9
HEAT RATE(BTU/MW)G		13,894	13,581	13,695	13,896
HEAT RATE(BTU/MW)N		14,845	14,375	14,410	14,586
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$34.6990 act.				
H H V. (BTU/GAL)	146,310 act.				

A, B, C CONSTANTS.

GROSS A=	23,603.54	NET A=	26,628.14
B=	(1,835.560)	B=	(2,186.205)
C=	*83.7403*	C=	*96.9399*

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	17,601	16,519	16,041	15,605	15,210	14,858	14,547	14,278	14,052	13,866
GENERATED (MW)N	3.4	4.4	4.9	5.4	5.9	6.4	6.9	7.4	7.9	8.4
HEAT RATE(BTU/MW)N	19,434	18,121	17,536	17,001	16,514	16,075	15,684	15,343	15,049	14,804
GROSS (MBTU)	70.4	82.6	88.2	93.6	98.9	104.0	109.1	114.2	119.4	124.8
NET (MBTU)	66.7	80.3	86.5	92.3	97.9	103.4	108.7	114.0	119.3	124.8
COST/KWH	0.0980	0.0920	0.0894	0.0869	0.0847	0.0828	0.0810	0.0795	0.0783	0.0772
G/KWH	434.88	408.15	396.34	385.56	375.81	367.10	359.43	352.78	347.18	342.61
G/PS-H	318.82	297.35	288.74	280.89	273.79	267.44	261.85	257.01	252.93	249.60

PREDICTED VALUES (CONT.).

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,723	13,622	13,563	13,545	13,569	13,635	13,743	13,893
GENERATED (MW)N	8.9	9.4	9.9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,606	14,460	14,361	14,310	14,307	14,353	14,447	14,590
GROSS (MBTU)	130.4	136.2	142.4	149.0	156.0	163.6	171.8	180.6
NET (MBTU)	130.4	136.4	142.5	149.1	156.2	163.9	171.6	180.8
COST/KWH	0.0764	0.0759	0.0756	0.0755	0.0756	0.0760	0.0766	0.0774
G/KWH	339.07	336.56	335.10	334.66	335.26	336.90	339.57	343.27
G/PS-H	247.02	245.20	244.13	243.81	244.25	245.44	247.38	250.08

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
8.9	79.21	704.969	6274.2241	13894.09579	123657.453	1100551.3
10.5	110.25	1157.625	12155.0625	13560.64853	142596.81	1497266.5
12.5	156.25	1953.125	24414.0625	13695.17779	171189.722	2139871.5
12.9	166.41	2146.689	27692.2881	13896.27393	179261.934	2312478.9
0	0	0	0	0	0	0
44.8	512.12	5962.408	70535.6372	55066.19604	616705.918	7050168.3

a=	41.44	C=	83.74034635
b=	172.8944971	B=	-1835.559781
d=	-141.909868	A=	23603.54201
e=	906.656		
f=	19875.6544		

WORKSHEE(NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
8.9	79.21	704.969	6274.224	14844.83	132119	1175859
10.5	110.25	1157.625	12155.06	14374.68	150934.1	1584808
12.5	156.25	1953.125	24414.06	14409.91	180123.9	2251548
12.9	166.41	2146.689	27692.29	14588	188159.4	2427256
0	0	0	0	0	0	0
44.8	512.12	5962.408	70535.84	58215.42	651336.4	7439472

a=	41.44	C=	96.93985
b=	-55392.763	B=	-2186.2
d=	-2705.2312	A=	26628.14
e=	906.656		
f=	19875.654		

MAUI ELECTRIC CO , LTD
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 12-16-04

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500	
Actual Test Load	KWH	8,000	10,000	11,000	12,500		
BOILER-TURBINE							
Ambient Air Temp	°F.	90	91	101	104		
Gas Entering A.H.	°F.	604.5	626	647.1	677.9		
Gas Leaving A.H.	°F.	379.5	transmitter broken				
Air Entering A.H.	°F.	111.3	100	108.5	115.5		
Air Leaving A.H.	°F.	327.8	308	316.6	325.3		
Circ. Water Inlet	°F.	70	70	70	70		
Circ. Water Outlet	°F.	87	86.5	88	90.74		
Condenser Vacuum	Hg.	28.4	28.3	28.2	27.9		
Barometric Pressure	Hg	29.9	29.9	29.95	29.93		
Excess O2	%	1.2	0.4	0.2	0.2		
Feedwater Flow (X1000)	Lb/Hr	80	100	110	128		
Steam Flow (X1000)	Lb/Hr	84	105	117	137		
Throttle Stm. Press.	PSIG	580	575	575	570		
Feedwater to Blr.	°F.	320	340	350	360		
GENERATOR							
Generator Integrator, Start		5965.5	5983	6000.2	6023.2		
Generator Integrator, Stop		5973.5	5993	6011.2	6035.7		
Generator Integrator, Diff.	MWH	8.0	10.0	11.0	12.5		0.0
Generator Volts	V.	11600	11600	11600	11600		
Generator Amps	A.	400	500	560	650		
Generator VARS	MVAR	3	4	4.5	5		
AUX. TRANSFORMER							
Aux. KWH Mtr. Start (X100)	KWH	2988.3	2999.0	3008.6	3020.4		
Aux. KWH Mtr. End (X100)	KWH	2993.5	3004.8	3014.5	3026.5		
Aux. Integrator, Diff.	KWH	5.20	5.80	5.90	6.10		0.00
Aux. Load Indicator	MW	0.62	0.6	0.6	0.63		
Aux. Amps	A	32	34	35	36		
FUEL Oil.							
F.O. Totalizer-Start	Lbs/Hr.	33006374	33019118	33032930	33049716		0
Start Test	Time	0606	0800	0950	1150		
F.O. Totalizer-End	Lbs/Hr.	33012248	33026364	33040912	33058932		
End Test	Time	0700	0900	1050	1250		
Difference	Lbs/Hr.	5874	7248	7982	9216		0
EQUIPMENT STATUS							
Boiler Blowdown-Open	%	0	0	0	0		
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes		
Circulating Pumps	Number	2	3	3	3		
FUEL OIL ANALYSIS							
F.O. Temp. @ Heater	°F	270	250	235	225		
F.O. Temp. @ Burner Deck	°F	270	250	235	225		
Sulfur, Wt. %		1.86					
API Gravity @ 60 °F.	API	15.3					
Higher Heating Value	BTU/Gal	139,786					

TESTED BY: Daryl

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-16-04
KPP UNIT NO. 4

	TEST LOADS-MW				
	8	10	11	12.5	0
F.O. Temp. °F.	270	250	235	225	0
F.O. Temp. (Corr.)	0.92685	0.93395	0.9392	0.9427	1.02145
F.O. Usage (Lbs.)	5,874.0	7,248.0	7,982.0	9,216.0	-
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	715.3	882.6	972.0	1,122.3	-
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	10,000	11,000	12,500	-
KW (Aux.)	520	580	590	610	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	139,786	139,786	139,786	139,786	139,786
HEAT RATE (APPROX.)	13,501	13,327	13,343	13,557	#DIV/0!
HEAT RATE (APPROX.)N	14,440	14,148	14,099	14,252	#DIV/0!
HEAT RATE (ACTUAL)-G	12,498	12,338	12,352	12,550	#DIV/0!
HEAT RATE (ACTUAL)-N	13,367	13,097	13,052	13,194	#DIV/0!

FUEL CORRECTION 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested, 12-16-04
DATE: 12-16-04 Tested by: rh

DATA:

GENERATED (MW)	8.0	10.0	11.0	12.5
HEAT RATE(BTU/MW)G	13,501	13,327	13,343	13,557
HEAT RATE(BTU/MW)N	14,440	14,148	14,099	14,252
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$39.5024	act.		
H.H.V. (BTU/GAL)	139,786	act.		

A, B, C CONSTANTS:

GROSS A=	17,535.29	NET A=	19,214.89
B=	(834.069)	B=	(950.839)
C=	41.2488	C=	44.2821

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,859	14,396	14,196	14,016	13,857	13,718	13,600	13,503	13,426	13,370
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	16,120	15,568	15,325	15,104	14,905	14,729	14,574	14,442	14,332	14,244
GROSS (MBTU)	59.4	72.0	78.1	84.1	90.1	96.0	102.0	108.0	114.1	120.3
NET (MBTU)	56.1	69.7	76.3	82.8	89.1	95.4	101.7	108.0	114.4	120.8
COST/KWH	0.1000	0.0969	0.0955	0.0943	0.0932	0.0923	0.0915	0.0909	0.0903	0.0900
G/KWH	367.13	355.69	350.74	346.30	342.36	338.94	336.02	333.62	331.72	330.33
G/PS-H	267.46	259.13	255.52	252.28	249.42	246.92	244.80	243.05	241.67	240.66

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,334	13,319	13,325	13,352	13,399	13,466	13,555	13,663
GENERATED (MW)N	9.0	9.4	9.9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,178	14,135	14,113	14,114	14,137	14,181	14,248	14,338
GROSS (MBTU)	126.7	133.2	139.9	146.9	154.1	161.6	169.4	177.6
NET (MBTU)	127.3	133.1	140.0	146.9	154.2	161.8	169.4	177.6
COST/KWH	0.0897	0.0896	0.0897	0.0898	0.0902	0.0906	0.0912	0.0919
G/KWH	329.46	329.09	329.23	329.88	331.05	332.72	334.90	337.59
G/PS-H	240.02	239.75	239.85	240.33	241.18	242.39	243.98	245.94

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
8	64	512	4096	13501.1873	108009.498	864075.99	
10	100	1000	10000	13327.4233	133274.233	1332742.3	
11	121	1331	14641	13342.8021	146770.823	1614479.1	
12.5	156.25	1953.125	24414.0625	13556.9021	169461.276	2118266	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
41.5	441.25	4796.125	53151.0625	53728.3148	557515.83	5929563.3	

a=	42.75	C=	41.2487851
b=	10634.3946	B=	-834.069291
d=	338.258923	A=	17535.291
e=	872.625		
f=	17902.6875		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
8	64	512	4096	14439.77	115518.2	924145.4	
10	100	1000	10000	14148.01	141480.1	1414801	
11	121	1331	14641	14099.02	155089.2	1705982	
12.5	156.25	1953.125	24414.06	14252.42	178155.3	2226941	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
41.5	441.25	4796.125	53151.06	56939.22	590242.8	8271869	

a=	42.75	C=	44.28206
b=	-36957.755	B=	-950.839
d=	-2006.7226	A=	19214.89
e=	872.625		
f=	17902.688		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-12-04

Gross Load (K3-4) -->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9500	11000	12500	13000
BOILER-TURBINE						
Ambient Air Temp	°F.	111	113	106	105	103
Gas Entering A H	°F.	590	608	635	663	673
Gas Leaving A H.	°F.	385	390	414	427	432
Air Entering A.H.	°F.	160	149	156	144	139
Air Leaving A H.	°F.	340	332	342	336	336
Circ. Water Inlet	°F.	70	70	70	70	70
Circ. Water Outlet	°F.	88.2	90	87.4	89.8	90.8
Condenser Vacuum	Hg.	28.5	28.3	28.3	28	29.9
Barometric Pressure	Hg	29.9	29.85	29.83	29.82	29.83
Excess O2	%	0.7	0	0.2	0.2	0.2
Feedwater Flow (X1000)	Lb/Hr	77	91	108	124	131
Steam Flow (X1000)	Lb/Hr	80	97	114	131	136
Throttle Stm. Press.	PSIG	580	580	575	573	573
Feedwater to Bir.	°F.	320	333	342	556	560
GENERATOR						
Generator Integrator, Start		9422.7	9436.6	9460.3	9480.6	9504.2
Generator Integrator, Stop		9430.6	9446	9471.3	9492.9	9517.1
Generator Integrator, Diff.	MWH	7.9	9.4	11	12.3	12.9
Generator Volts	V.	11.5	11.8	11.6	11.6	11.6
Generator Amps	A.	425	480	560	610	635
Generator VARS	MVAR	4.9	4.9	4.8	4	3.8
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	5295.1	5303.9	5316.8	5327	5336.1
Aux. KWH Mtr. End (X100)	KWH	5300.4	5309.2	5322.5	5332.8	5344.1
Aux. Integrator, Diff	KWH	5.3	5.3	5.7	5.8	6
Aux. Load Indicator	MW	0.5	0.53	6	0.61	0.62
Aux. Amps	A.	31	35	35	35	36
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	1035	1215	1437	1622	1815
F.O. Totalizer-End	Lbs/Hr.	5947	6969	7980.1	8975	9461.3
End Test	Time	1135	1315	1537	1722	1915
Difference	Lbs/Hr.	5947	6969	7980.1	8975	9461.3
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	135	135	235	232	232
F.O. Temp. @ Burner Deck	°F	235	235	223	222	223
Sulfur, Wt. %		1.8				
API Gravity @ 60 °F.	API	14.1				
Higher Heating Value	BTU/Gal	148833.3				

TESTED BY: Daryl/Mike Tanii

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-12-04
KPP UNIT NO. 4

	TEST LOADS - MW				
	8	9.5	11	12.5	13
F.O. Temp. °F.	135	135	235	232	232
F.O. Temp. (Corr.)	0.9742	0.9742	0.9392	0.94025	0.94025
F.O. Usage (Lbs.)	5947	6969	7980.1	8975	9461.3
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	724.1841	848.6361	971.7808	1092.913	1152.131
PT RATIO	1	1	1	1	1
KW (Gen.)	7900	9400	11000	12300	12900
KW (Aux.)	530	530	570	580	600
BTU/gal (Approx.)	151000	151000	151000	151000	151000
BTU/gal (Test Lab)	148833.3	148833.3	148833.3	148833.3	148833.3
HEAT RATE (APPROX.)	13842	13632.35	13339.63	13417.06	13486.18
HEAT RATE (APPROX.)N	14637.42	14446.91	14068.64	14061.04	14144.05
HEAT RATE (ACTUAL)-G	13643.38	13436.74	13148.22	13224.54	13292.67
HEAT RATE (ACTUAL)-N	14624.52	14239.61	13866.77	13879	13941.1

FUEL CORRECTION 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by; Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Tested 08-19-04
DATE: 08-12-04 Tested by. E.Wong

DATA:

GENERATED (MW)	7.9	9.4	11	12.3	12.9
HEAT RATE(BTU/MW)G	13,643	13,437	13,148	13,225	13,293
HEAT RATE(BTU/MW)N	14,625	14,240	13,867	13,879	13,941
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	31.5719 act.				
H.H.V. (BTU/GAL)	148,833 act.				

A, B, C CONSTANTS.

GROSS A=	17,944.71	NET A=	20,634 42
B=	(823.831)	B=	(1,133.542)
C=	35.7897	C=	47.5400

PREDICTED VALUES:

GENERATED (MW)G	4 0	5 0	5 5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,222	14,720	14,496	14,290	14,102	13,932	13,779	13,645	13,528	13,429
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7 5	8 0	8.5
HEAT RATE(BTU/MW)N	16,881	16,155	15,838	15,545	15,275	15,029	14,807	14,609	14,434	14,283
GROSS (MBTU)	60.89	73.60	79.73	85.74	91 66	97.52	103.34	109.16	114.99	120.86
NET (MBTU)	58.5	72.2	78.7	85.0	91.2	97.2	103 2	109.1	115.0	121.0
COST/KWH	0 077	0.074	0.073	0 072	0.071	0.070	0 070	0 069	0 068	0 068
G/KWH	376 098	363.701	358 166	353 073	348 423	344 214	340.448	337.124	334 241	331.801
G/PS-H	273 996	264.965	260.933	257.223	253.835	250.769	248.025	245 603	243.503	241.726

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.50	10.00	10.50	11 00	11.50	12.00	12.50	13 00
HEAT RATE(BTU/MW)G	13,348	13,285	13,240	13,213	13,204	13,212	13,239	13,283
GENERATED (MW)N	9 0	9.5	10.0	10 4	10.9	11.4	11.9	12 4
HEAT RATE(BTU/MW)N	14,156	14,053	13,974	13,918	13,886	13,878	13,893	13,933
GROSS (MBTU)	126 81	132.85	139.02	145 34	151.84	158.55	165 49	172 68
NET (MBTU)	127.0	133.1	139 3	145 2	151.8	158.6	165 6	172 8
COST/KWH	0.067	0.067	0.067	0 067	0.067	0.067	0.067	0.067
G/KWH	329 804	328.248	327.134	326 483	326.233	326 446	327.101	328.198
G/PS-H	240 270	239.137	238.325	237.836	237.669	237.824	238.301	239 101

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
7.9	82 41	493 039	3895 0081	13643 38439	107782.7366	851483.6195
9.4	88.36	830.584	7807.4896	13436 73892	126305.3458	1187270.251
11	121	1331	14641	13148.21861	144630 4047	1590934.452
12.3	151.29	1860.867	22888 6841	13224 54119	162661.6566	2000740.837
12.9	166.41	2146.689	27692.2881	13292.67452	171475.5013	2212033.987
0	0	0	0	0	0	0
53.5	589 47	6662.179	76924 4499	66745 55762	712855.8451	7842463.125

a=	85 1	C=	35.78973787
b=	-132188 225	B=	-823 8313707
d=	-6608.10723	A=	17944.71183
e=	1774 25		
f=	37147.3686		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
7 9	82 41	493.039	3895 008	14624.52	115533.7	912716.5
9 4	88.36	830.584	7807.49	14239 81	133852.3	1258212
11	121	1331	14641	13866.77	152534.5	1677879
12.3	151.29	1860.867	22888 66	13879	170711.7	2099754
12.9	166 41	2146.689	27692.29	13941.1	179840.2	2319938
0	0	0	0	0	0	0
53.5	589.47	6662.179	76924 45	70551	752472 4	8268499

a=	85.1	C=	47.53999
b=	-245201.0576	B=	-1133.54
d=	-12116.58236	A=	20634.42
e=	1774.25		
f=	37147.3686		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-07-04

Gross Load (K3-4) --->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9400	10800	12200	13500
BOILER-TURBINE						
Ambient Air Temp	°F.	110	114	117	117	119
Gas Entering A.H.	°F.	590	604	625	649	664
Gas Leaving A.H.	°F.	384	387	398	410	426
Air Entering A.H.	°F.	158	152	140	131	126
Air Leaving A.H.	°F.	339	334	328	323	317
Circ. Water Inlet	°F.	70	70	70	70	70
Circ. Water Outlet	°F.	88	90.4	87.1	89.6	90.9
Condenser Vacuum	Hg.	28.5	28.3	28.4	28.2	27.8
Barometric Pressure	Hg.	29.8	29.8	29.8	29.8	29.82
Excess O2	%	1.8	1.3	1.2	1.1	1.1
Feedwater Flow (X1000)	Lb/Hr	76.6	89.5	102	123	139
Steam Flow (X1000)	Lb/Hr	79.8	96.7	110	127	142.9
Throttle Stm. Press.	PSIG	601	601	601	601	59
Feedwater to Blr.	°F.	318	333	340	354	365
GENERATOR						
Generator Integrator, Start		7926.9	7943.5	7963.2	7986.2	8007.7
Generator Integrator, Stop		7934.8	7952.9	7973.8	7998.4	8021.2
Generator Integrator, Diff.	MWH	7.9	9.4	10.6	12.2	13.5
Generator Volts	V.					
Generator Amps	A.	128	116	122	131	135
Generator VARS	MVAR	5.9	3	3.2	3.5	3.1
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	4558.4	4568.7	4579.4	4591	4601.1
Aux. KWH Mtr. End (X100)	KWH	4563.5	4573.9	4585	4596.9	4607.1
Aux. Integrator, Diff.	KWH	5.1	5.2	5.6	5.9	6
Aux. Load Indicator	MW	0.55	0.56	0.65	0.6	0.62
Aux. Amps	A.	31	31	37	35	31
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0626	0827	1026	1228	1410
F.O. Totalizer-End	Lbs/Hr.	5818	6689	7571.4	8759.1	9769
End Test	Time	0726	0927	1126	1328	1510
Difference	Lbs/Hr.	5818	6689	7571.4	8759.1	9769
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	255	259	250	238	225
F.O. Temp. @ Burner Deck	°F	235	243	235	230	217
Sulfur, Wt. %		1.86				
API Gravity @ 60 °F.	API	14				
Higher Heating Value	BTU/Gal	149071.4				

TESTED B Mike Tanji

MAUI ELECTRIC COMPANY, INC

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-07-04
KPP UNIT NO. 4

TEST LOADS - MW

	8	9.4	10.8	12.2	13.5
F.O. Temp °F.	255	259	250	238	225
F.O. Temp. (Corr.)	0.9322	0.9308	0.93395	0.93815	0.9427
F.O. Usage (Lbs.)	5818	6689	7571.4	8759.1	9769
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	708.4754	814.5397	921.9922	1066.622	1189.601
PT RATIO	1	1	1	1	1
KW (Gen.)	7900	9400	10600	12200	13500
KW (Aux.)	510	520	560	590	600
BTU/gal (Approx.)	151000	151000	151000	151000	151000
BTU/gal (Test Lab)	149071.4	149071.4	149071.4	149071.4	149071.4
HEAT RATE (APPROX.)	13541.75	13084.63	13134.04	13201.63	13305.9
HEAT RATE (APPROX.)N	14476.29	13850.84	13866.62	13872.52	13924.78
HEAT RATE (ACTUAL)-G	13368.78	12917.51	12966.29	13033.02	13135.96
HEAT RATE (ACTUAL)-N	14291.4	13673.94	13689.51	13695.34	13746.93

FUEL CORRECTION 1

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by. Rodney Jung 0

KPP UNIT NO. 4 Fuel Oil Test 08-19-04
DATE: 08-07-04 Tested by: E.Wong

DATA:

GENERATED (MW)	7.9	9.4	10.6	12.2	13.5
HEAT RATE(BTU/MW)G	13,369	12,918	12,966	13,033	13,136
HEAT RATE(BTU/MW)N	14,291	13,674	13,690	13,695	13,747
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	31.5719 act.				
H.H.V. (BTU/GAL)	149071.429 act.				

A, B, C CONSTANTS.

GROSS A=	18017.4054	NET A=	20148.1659
B=	-925.61799	B=	-1140.208
C=	41.9838975	C=	49.596679

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,987	14,439	14,197	13,975	13,775	13,595	13,437	13,299	13,183	13,088
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	16,381	15,687	15,377	15,092	14,832	14,597	14,386	14,201	14,040	13,904
GROSS (MBTU)	59.95	72.19	78.08	83.85	89.54	95.17	100.78	106.40	112.06	117.79
NET (MBTU)	57.2	70.4	76.7	82.9	88.8	94.7	100.6	106.4	112.2	118.0
COST/KWH	0.0756	0.0728	0.0716	0.0705	0.0695	0.0686	0.0678	0.0671	0.0665	0.0660
G/KWH	370.2827	356.7489	350.7600	345.2897	340.3381	335.9051	331.9908	328.5952	325.7182	323.3599
G/PS-H	269.7602	259.9004	255.5373	251.5521	247.9447	244.7152	241.8636	239.3898	237.2938	235.5757

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,013	12,960	12,927	12,916	12,925	12,956	13,007	13,080
GENERATED (MW)N	9.0	9.5	10.0	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	13,792	13,706	13,644	13,607	13,595	13,608	13,645	13,707
GROSS (MBTU)	123.62	129.60	135.73	142.07	148.64	155.47	162.59	170.04
NET (MBTU)	123.9	129.9	136.2	142.1	148.7	155.7	162.5	170.1
COST/KWH	0.0656	0.0654	0.0652	0.0651	0.0652	0.0653	0.0656	0.0660
G/KWH	321.5202	320.1992	319.3969	319.1132	319.3481	320.1018	321.3740	323.1650
G/PS-H	234.2355	233.2731	232.6885	232.4819	232.6530	233.2021	234.1290	235.4337

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.9	62.41	493.039	3895.0081	13368.7899	105613.44	834346.178	
9.4	88.36	830.584	7807.4896	12917.5103	121424.596	1141391.21	
10.6	112.36	1191.016	12624.7696	12966.292	137442.695	1456892.57	
12.2	148.84	1815.848	22153.3456	13033.0219	159002.868	1939834.99	
13.5	182.25	2460.375	33215.0625	13135.9599	177335.459	2394028.69	
0	0	0	0	0	0	0	
53.6	594.22	6790.862	79695.6754	65421.574	700819.058	7766493.63	

a=	98.14	C=	41.9838975
b=	-42339.552	B=	-925.81799
d=	-2501.0757	A=	18017.4054
e=	2104.118		
f=	45380.9686		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.9	62.41	493.039	3895.008	14291.4	112902.1	891928.2	
9.4	88.36	830.584	7807.49	13673.94	128535	1208229	
10.6	112.36	1191.016	12624.77	13689.51	145108.8	1538154	
12.2	148.84	1815.848	22153.35	13695.34	167083.1	2038414	
13.5	182.25	2460.375	33215.06	13746.93	185583.6	2505379	
0	0	0	0	0	0	0	
53.6	594.22	6790.862	79695.68	69097.12	739212.7	8182102	

a=	98.14	C=	49.59668
b=	-148382.73	B=	-1140.21
d=	-7542.5564	A=	20148.17
e=	2104.118		
f=	45380.9686		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-02-04

Note. Using 70 deg Cohen tps.

Gross Load (K3-4) -->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9000	10000	11500	12700
BOILER-TURBINE						
Ambient Air Temp	°F.	112	114	114	118	117
Gas Entering A.H.	°F.	577	593	606	632	649
Gas Leaving A.H.	°F.	387	391	397	416	428
Air Entering A.H.	°F.	157	156	149	147	149
Air Leaving A.H.	°F.	338	333	330	332	335
Circ. Water Inlet	°F.	69	69	69	70	70
Circ. Water Outlet	°F.	88	90	86	88	90
Condenser Vacuum	Hg.	28.6	28.4	28.6	28.3	28.1
Barometric Pressure	Hg.	29.87	29.89	29.9	29.89	29.88
Excess O2	%	0.75	0.95	0.85	0.75	0.45
Feedwater Flow (X1000)	Lb/Hr	78	86	94	109	130
Steam Flow (X1000)	Lb/Hr	80	92	101	119	132
Throttle Stm. Press.	PSIG	589	589	590	590	590
Feedwater to Blr.	°F.	317	330	335	350	357
GENERATOR						
Generator Integrator, Start		8503.9	8518.1	8528.4	8545.6	8563.8
Generator Integrator, Stop		8511.9	8525.1	8538.3	8557.1	8576.5
Generator Integrator, Diff.	MWH	8	9	9.9	11.5	12.7
Generator Volts	V.	11400	11500	11700	11500	11800
Generator Amps	A.	478	465	510	590	640
Generator VARS	MVAR	4	4.3	4.7	5	4.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	3852.6	3859.9	3866.9	3876.1	3884.6
Aux. KWH Mtr. End (X100)	KWH	3857.5	3865	3872.4	3881.8	3890.8
Aux. Integrator, Diff	KWH	4.9	5.1	5.5	5.7	6
Aux. Load Indicator	MW	0.55	0.58	0.61	0.61	0.62
Aux. Amps	A	29.5	30	34	33	35
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0610	0739	0900	1040	1212
F.O. Totalizer-End	Lbs/Hr.	5927	6505	7087	8233	9210
End Test	Time	0710	0839	1000	1140	1312
Difference	Lbs/Hr.	5927	6505	7087	8233	9210
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	243	252	250	235	229
F.O. Temp. @ Burner Deck	°F	233	238	235	225	217
Sulfur, Wt. %		1.67				
API Gravity @ 60 °F.	API	14.0				
Higher Heating Value	BTU/Gal	149,357				

TESTED B Martin Ah Yuen

MAUI ELECTRIC COMPANY, INC

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-02-04
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.0	11.5	12.7
F.O. Temp. °F.	243	252	250	235	229
F.O. Temp. (Corr.)	0.9364	0.93325	0.93395	0.9392	0.9413
F.O. Usage (Lbs.)	5927	6505	7087	8233	9210
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	721.7487	792.1335	863.0054	1002.557	1121.529
PT RATIO	1	1	1	1	1
KW (Gen.)	8000	9000	9900	11500	12700
KW (Aux.)	490	510	550	570	600
BTU/gal (Approx.)	151000	151000	151000	151000	151000
BTU/gal (Test Lab)	149357.1	149357.1	149357.1	149357.1	149357.1
HEAT RATE (APPROX.)	13623.01	13290.24	13163.01	13164.01	13334.72
HEAT RATE (APPROX.)N	14511.86	14088.59	13937.31	13850.52	13995.95
HEAT RATE (ACTUAL)-G	13474.79	13145.64	13019.8	13020.79	13189.64
HEAT RATE (ACTUAL)-N	14353.97	13935.31	13785.67	13699.82	13843.67

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note. Using 70 deg. Cohen tps

KPP UNIT NO. 4
DATE: 08-02-04

Fuel Oil Test 08-12-04
Tested by. E.Wong

DATA.

GENERATED (MW)	8.0	9.0	9.9	11.5	12.7
HEAT RATE(BTU/MW)G	13,475	13,146	13,020	13,021	13,190
HEAT RATE(BTU/MW)N	14,354	13,935	13,786	13,700	13,844
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	31.5719 act.				
H.H.V. (BTU/GAL)	149357.143 act.				

A, B, C CONSTANTS:

GROSS A=	20345.1622	NET A=	22228.6977
B=	(1367.61)	B=	(1543.48)
C=	63.3858883	C=	69.6051718

PREDICTED VALUES

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,689	15,092	14,741	14,421	14,134	13,878	13,654	13,461	13,300	13,171
GENERATED (MW)N	3.51	4.51	5.01	5.51	6.01	6.51	7.01	7.51	8.01	8.49
HEAT RATE(BTU/MW)N	17,168	16,251	15,845	15,474	15,137	14,835	14,568	14,336	14,138	13,975
GROSS (MBTU)	63.56	75.46	81.07	86.53	91.87	97.14	102.40	107.69	113.05	118.54
NET (MBTU)	60.3	73.3	79.4	85.3	91.0	96.6	102.1	107.7	113.2	118.7
COST/KWH	0.0600	0.0760	0.0742	0.0726	0.0711	0.0698	0.0687	0.0677	0.0669	0.0663
G/KWH	392.5744	372.8792	364.2061	356.3161	349.2092	342.8853	337.3445	332.5867	328.6120	325.4204
G/PS-H	286.0002	271.6517	265.3332	259.5851	254.4076	249.8005	245.7638	242.2977	239.4020	237.0768

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,073	13,008	12,974	12,971	13,000	13,061	13,154	13,278
GENERATED (MW)N	9.0	9.5	10.0	10.5	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	13,848	13,754	13,696	13,673	13,684	13,730	13,811	13,927
GROSS (MBTU)	124.20	130.08	136.22	142.68	149.51	156.74	164.43	172.62
NET (MBTU)	124.5	130.0	136.3	142.9	149.6	156.9	164.6	172.7
COST/KWH	0.0658	0.0655	0.0653	0.0653	0.0654	0.0657	0.0662	0.0668
G/KWH	323.0117	321.3862	320.5437	320.4842	321.2078	322.7145	325.0042	328.0769
G/PS-H	235.3221	234.1378	233.5240	233.4807	234.0079	235.1055	236.7736	239.0122

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
8	64	512	4096	13474.7897	107798.318	862386.542	
9	81	729	6561	13145.8434	116310.791	1064797.12	
9.9	98.01	970.299	9605.9601	13019.7994	128896.015	1276070.54	
11.5	132.25	1520.875	17490.0625	13020.7899	149739.084	1721999.47	
12.7	161.29	2048.383	26014.4641	13189.6407	167508.437	2127357.15	
0	0	0	0	0	0	0	
51.1	536.55	5780.557	63767.4867	65850.8632	672252.844	7052610.82	

a=	71.54	C=	63.3858883
b=	-69119.25	B=	-1367.6095
d=	-3705.6696	A=	20345.1622
e=	1485.08		
f=	30951.531		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
8	64	512	4096	14353.97	114831.8	918654.1	
9	81	729	6561	13935.31	125417.8	1128760	
9.9	98.01	970.299	9605.96	13785.67	136478.1	1351134	
11.5	132.25	1520.875	17490.06	13699.82	157548	1811802	
12.7	161.29	2048.383	26014.46	13843.67	175814.6	2232846	
0	0	0	0	0	0	0	
51.1	536.55	5780.557	63767.49	69618.45	710090.3	7443196	

a=	71.54	C=	69.60517
b=	-137800.77	B=	-1543.48
d=	-7051.1241	A=	22228.7
e=	1485.08		
f=	30951.531		

MAUI ELECTRIC CO , LTD
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 07-28-04

Note. Using EPT tips.

Gross Load (K3-4) --->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9000	10000	11500	12500
BOILER-TURBINE						
Ambient Air Temp	°F.	112	113	114	111	112
Gas Entering A.H	°F.	580	592	605	631	647
Gas Leaving A.H.	°F.	388	395	401	418	427
Air Entering A H	°F.	156	159	155	149	144
Air Leaving A.H.	°F.	33.6	339	336	334	330
Circ. Water Inlet	°F.	70	70	70	70	70
Circ. Water Outlet	°F.	89	90	86	88	90
Condenser Vacuum	Hg.	28.5	28.4	28.6	28.3	28.1
Barometric Pressure	Hg.	29.86	29.86	29.86	29.85	29.84
Excess O2	%	1.68	0.95	0.86	0.85	0.87
Feedwater Flow (X1000)	Lb/Hr	72	84	95	110	126
Steam Flow (X1000)	Lb/Hr	80	92	101	117	130
Throttle Stm. Press.	PSIG	580	580	590	590	590
Feedwater to Blr.	°F.	326	329	335	349	355
GENERATOR						
Generator Integrator, Start		5070	5082.3	5098.2	5115.8	5129.7
Generator Integrator, Stop		5077.9	5091.3	5108.2	5127.3	5142.2
Generator Integrator, Diff.	MWH	7.9	9	10	11.5	12.5
Generator Volts	V.	11500	11500	11500	11500	11500
Generator Amps	A.	390	460	500	580	630
Generator VARS	MVAR	3.1	4	4.1	4.1	4.4
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X10	KWH	3174.7	3182	3190.8	3200.3	3207.1
Aux. KWH Mtr. End (X100	KWH	3179.6	3187	3196.3	3206	3212.9
Aux. Integrator, Diff.	KWH	4.9	5	5.5	5.7	5.8
Aux. Load Indicator	MW	0.55	0.56	0.59	0.6	0.61
Aux. Amps	A.	28	30	35	34	34
FUEL OIL						
F.O Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0645	0815	0957	1139	1251
F.O Totalizer-End	Lbs/Hr.	5747	6451	7008	8113	8947
End Test	Time	0745	0915	1057	1239	1351
Difference	Lbs/Hr.	5747	6451	7008	8113	8947
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	254	260	255	242	235
F.O. Temp. @ Burner Dec	°F	237	242	237	229	225
Sulfur, Wt. %		1.89				
API Gravity @ 60 °F.	API	14.6				
Higher Heating Value	BTU/Gal	149,619				

TESTED B Martin Ah Yuen

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject. Heat Rate Testing
DATE: 07-28-04
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.0	11.5	12.5
F.O. Temp. °F.	254	260	255	242	235
F.O. Temp. (Corr.)	0.93255	0.93045	0.9322	0.93675	0.9392
F.O. Usage (Lbs.)	5747	6451	7008	8113	8947
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	699.8	785.6	853.4	987.9	1089.5
PT RATIO	1	1	1	1	1
KW (Gen.)	7900	9000	10000	11500	12500
KW (Aux.)	490	500	550	570	580
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,619	149,619	149,619	149,619	149,619
HEAT RATE (APPROX.)	13,378	13,180	12,886	12,972	13,161
HEAT RATE (APPROX.)N	14,261	13,955	13,636	13,649	13,802
HEAT RATE (ACTUAL)-G	13,254	13,059	12,768	12,854	13,041
HEAT RATE (ACTUAL)-N	14,131	13,826	13,511	13,524	13,675

FUEL CORRECTION. 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note. Using EPT bps.

KPP UNIT NO. 4
DATE: 07-28-04

Fuel Oil Test 08-12-04
Tested by: E.Wong

DATA:

GENERATED (MW)	7.90	9.00	10.00	11.50	12.50
HEAT RATE(BTU/MW)G	13,254	13,059	12,768	12,854	13,041
HEAT RATE(BTU/MW)N	14,131	13,828	13,511	13,524	13,675
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	31.5719 act.				
H.H.V. (BTU/GAL)	149619.048 act.				

A, B, C CONSTANTS:

GROSS A=	20113.27	NET A=	21991.31
B=	(1375.976)	B=	(1553.054)
C=	64.7609	C=	70.9945

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,646	14,852	14,504	14,189	13,906	13,655	13,436	13,250	13,096	12,975
GENERATED (MW)N	*3.5*	*4.5*	*5.0*	*5.5*	*6.0*	*6.5*	*7.0*	*7.5*	*8.0*	*8.5*
HEAT RATE(BTU/MW)N	16,915	16,001	15,597	15,229	14,896	14,599	14,337	14,111	13,920	13,764
GROSS (MBTU)	62.58	74.26	79.77	85.13	90.39	95.58	100.77	106.00	111.32	116.78
NET (MBTU)	59.4	72.2	78.1	83.9	89.5	95.0	100.5	106.0	111.5	117.0
COST/KWH	0.0786	0.0748	0.0729	0.0713	0.0699	0.0686	0.0675	0.0666	0.0658	0.0652
G/KWH	386.5616	366.9655	358.3674	350.5694	343.5715	337.3736	331.9757	327.3778	323.5800	320.5823
G/PS-H	281.6197	267.3434	261.0798	255.3985	250.3003	245.7850	241.8525	238.5029	235.7361	233.5521

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.50	10.00	10.50	11.00	11.50	12.00	12.50	13.00
HEAT RATE(BTU/MW)G	12,866	12,830	12,805	12,814	12,854	12,927	13,032	13,170
GENERATED (MW)N	9.0	9.5	10.0	10.5	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	13,645	13,560	13,511	13,498	13,520	13,578	13,671	13,800
GROSS (MBTU)	122.42	128.30	134.46	140.95	147.82	155.13	162.91	171.21
NET (MBTU)	122.8	128.1	134.4	141.1	147.8	155.2	163.0	171.4
COST/KWH	0.0647	0.0645	0.0643	0.0644	0.0646	0.0649	0.0655	0.0662
G/KWH	318.3846	316.9869	316.3892	316.5916	317.5941	319.3965	321.9990	325.4016
G/PS-H	231.9510	230.9328	230.4974	230.6448	231.3751	232.6883	234.5843	237.0631

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.9	62.41	493.039	3895.0081	13254.1552	104707.826	827191.825	
9	81	729	6561	13059.3776	117534.398	1057809.58	
10	100	1000	10000	12768.2694	127682.694	1276826.94	
11.5	132.25	1520.875	17490.0625	12853.5053	147815.311	1699876.08	
12.5	156.25	1953.125	24414.0625	13040.8341	163010.426	2037630.33	
0	0	0	0	0	0	0	
50.9	531.91	5696.039	62360.1331	64976.1416	660750.655	6899334.75	

a=	68.74	C=	64.760894
b=	-64785.695	B=	-1375.976
d=	-3532.3268	A=	20113.2707
e=	1405.976		
f=	28872.4174		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.9	62.41	493.039	3895.008	14130.61	111631.8	881891.4	
9	81	729	6561	13827.58	124448.2	1120034	
10	100	1000	10000	13511.4	135114	1351140	
11.5	132.25	1520.875	17490.06	13523.82	155523.9	1788525	
12.5	156.25	1953.125	24414.06	13675.37	170942.1	2138777	
0	0	0	0	0	0	0	
50.9	531.91	5696.039	62360.13	68668.77	697680	7278366	

a=	68.74	C=	70.99447
b=	-133774.97	B=	-1553.05
d=	-6940.4253	A=	21991.31
e=	1405.976		
f=	28872.4174		

MAUI ELECTRIC CO., LTD
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 06-08-04

Note LO1 addd to F.O.

Gross Load (K3-4) --->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9000	10000	11500	12500
BOILER-TURBINE						
Ambient Air Temp	°F	80	82	82	81	81
Gas Entering A.H.	°F.	608	626	650	690	720
Gas Leaving A.H.	°F.	420	430	440	460	475
Air Entering A.H	°F	415	420	426	440	450
Air Leaving A.H.	°F.	156	155	142	140	145
Circ. Water Inlet	°F.	69	69	69	69	69
Circ. Water Outlet	°F.	88	89.4	85.9	86.2	89.8
Condenser Vacuum	Hg.	27.7	27.5	27.7	27.3	27.1
Barometric Pressure	Hg.	29.98	29.99	29.99	29.98	29.96
Excess O2	%	1.9	1.6	1.6	1.6	1.5
Feedwater Flow (X1000)	Lb/Hr	80	90	102	120	134
Steam Flow (X1000)	Lb/Hr	85	97	109	126	139
Throttle Stm. Press.	PSIG	589	587	586	583	598
Feedwater to Blr.	°F.	528	540	558	580	580
GENERATOR						
Generator Integrator, Start		1275.3	1288.9	1300.9	1315.6	1331.3
Generator Integrator, Stop		1283.2	1292.8	1310.9	1327.1	1343.7
Generator Integrator, Diff	MWH	7.9	3.9	10	11.5	12.4
Generator Volts	V.	11600	11500	11600	11600	11600
Generator Amps	A.	420	480	560	625	660
Generator VARS	MVAR	4.1	4.8	6.2	6.2	5.7
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100	KWH	1032.5	1041	1048	1056.2	1064.3
Aux. KWH Mtr. End (X100)	KWH	1037.6	1046.2	1053.7	1062.2	1070.5
Aux. Integrator, Dif.	KWH	5.1	5.2	5.7	6	6.2
Aux. Load Indicator	MW	0.55	0.56	0.6	0.69	0.7
Aux. Amps	A.	31	32	38	39	40
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0641	0820	0939	1105	1226
F.O. Totalizer-End	Lbs/Hr.	6096	6679	7533	8780	9621
End Test	Time	0741	0920	1039	1205	1326
Difference	Lbs/Hr.	6096	6679	7533	8780	9621
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	2	2	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	242	245	234	225	
F.O. Temp. @ Burner Deck	°F	260	259	225	221	
Sulfur, Wt. %		1.85				
API Gravity @ 60 °F.	API	15.4				
Higher Heating Value	BTU/Gal	148,619				

TESTED BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Tesang
DATE: 06-08-04
KPP UNIT NO. 4

	TEST LOADS-MW				
	8.0	9.0	10.0	11.5	12.5
F.O. Temp. °F.	242	245	234	225	0
F.O. Temp. (Corr.)	0.93675	0.9357	0.93955	0.9427	1.02145
F.O. Usage (Lbs.)	6096	6679	7533	8780	9621
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	742.3283	813.321968	917.316123	1069.16707	1171.57818
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	3,900	10,000	11,500	12,400
KW (Aux.)	510	520	570	600	620
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,619	148,619	148,619	148,619	148,619
HEAT RATE (APPROX.)	14,189	31,490	13,851	14,039	14,267
HEAT RATE (APPROX.)N	15,168	36,335	14,689	14,611	15,018
HEAT RATE (ACTUAL)-G	13,965	30,994	13,633	13,817	14,042
HEAT RATE (ACTUAL)-N	14,929	35,782	14,457	14,578	14,781

FUEL CORRECTION. 1

CALCULATIONS FOR HEAT RATE CURVE
by. Rodney Jung — Note. LO1 addd to F.O.

KPP UNIT NO. 4 — Fuel Oil Test 06-11-04
DATE: 06-08-04 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.9	10.0	11.5	12.4
HEAT RATE(BTU/MW)G	13,965	13,633	13,817	14,042
HEAT RATE(BTU/MW)N	14,929	14,457	14,578	14,781
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	31.2753 act.			
H.H.V. (BTU/GAL)	148819.048 act.			

A, B, C CONSTANTS:

GROSS A=	20806.4293	NET A=	22848.2201
B=	(1430.54)	B=	(1622.05)
C=	71.4239	C=	78.3938

PREDICTED VALUES.

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	16,227	15,439	15,099	14,794	14,526	14,292	14,095	13,933	13,807	13,717
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	17,614	16,698	16,298	15,938	15,617	15,335	15,093	14,889	14,725	14,600
GROSS (MBTU)	64.91	77.20	83.04	88.77	94.42	100.05	105.71	111.47	117.36	123.45
NET (MBTU)	61.5	75.0	81.3	87.5	93.5	99.5	105.5	111.5	117.7	124.0
COST/KWH	0.0813	0.0774	0.0757	0.0741	0.0728	0.0716	0.0706	0.0698	0.0692	0.0687
G/KWH	400.9298	381.4672	373.0594	365.5340	358.8910	353.1303	348.2519	344.2560	341.1423	338.9110
G/PS-H	292.0873	277.9083	271.7831	266.3006	261.4610	257.2642	253.7102	250.7990	248.5306	246.9051

PREDICTED VALUES (CONT.).

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,662	13,643	13,660	13,713	13,801	13,925	14,085	14,280
GENERATED (MW)N	9.0	9.4	9.9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,514	14,467	14,460	14,491	14,562	14,672	14,822	15,010
GROSS (MBTU)	129.79	136.43	143.43	150.84	158.71	167.10	176.06	185.64
NET (MBTU)	130.5	136.4	143.6	151.1	158.7	167.3	176.1	185.8
COST/KWH	0.0685	0.0684	0.0684	0.0687	0.0691	0.0698	0.0706	0.0715
G/KWH	337.5621	337.0955	337.5113	338.8094	340.9898	344.0527	347.9978	352.8253
G/PS-H	245.9223	245.5824	245.8853	246.8310	248.4196	250.6509	253.5250	257.0420

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.9	62.41	493.039	3895.0081	13965.0791	110324.125	871560.587	
0	0	0	0	0	0	0	
10	100	1000	10000	13633.0649	136330.649	1363306.49	
11.5	132.25	1520.875	17490.0625	13817.2689	158898.592	1827333.81	
12.4	153.76	1906.624	23642.1376	14041.8414	174118.833	2159073.53	
0	0	0	0	0	0	0	
41.8	448.42	4920.538	55027.2082	55457.2542	579672.199	6221274.41	

a=	46.44	C=	71.4239055
b=	16955.7104	B=	-1430.5352
d=	575.56835	A=	20806.4293
e=	938.196		
f=	19028.3364		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.9	62.41	493.039	3895.008	14928.84	117937.8	931708.9	
0	0	0	0	0	0	0	
10	100	1000	10000	14457.12	144571.2	1445712	
11.5	132.25	1520.875	17490.06	14577.85	167645.3	1927921	
12.4	153.76	1906.824	23642.14	14780.89	183283	2272709	
0	0	0	0	0	0	0	
41.8	448.42	4920.538	55027.21	58744.7	613437.3	6578051	

a=	46.44	C=	78.39376
b=	-30094.009	B=	-1622.05
d=	-1779.0931	A=	22848.22
e=	938.196		
f=	19028.3364		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 06-07-04

Note. LO-1 added to F.O. system.

Gross Load (K3-4) --->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9000	10000	11500	
BOILER-TURBINE						
Ambient Air Temp	°F.	80	82	83	82	
Gas Entering A.H.	°F.	610	620	648	692	
Gas Leaving A.H	°F.	420	428	440	460	
Air Entering A.H.	°F.	156	156	153	147	
Air Leaving A.H.	°F.	416	420	428	435	
Circ. Water Inlet	°F.	69	69	69	69	
Circ. Water Outlet	°F.	87.9	89.3	85.8	88.1	
Condenser Vacuum	Hg.	27.7	27.6	27.7	27.4	
Barometric Pressure	Hg	29.99	30.01	30.01	30	
Excess O2	%	2.3	1.8	1.6	1.5	
Feedwater Flow (X1000)	Lb/Hr	78	91	100	119	
Steam Flow (X1000)	Lb/Hr	84	97	108	126	
Throttle Stm. Press.	PSIG	590	588	586	582	
Feedwater to Blr.	°F.	528	540	556	580	
GENERATOR						
Generator Integrator, Start		998.2	1012.8	1027.7	1046.7	
Generator Integrator, Stop		1006	1021.7	1037.6	1058.1	
Generator Integrator, Diff.	MWH	7.8	8.9	9.9	11.4	0
Generator Volts	V.	11600	11600	11600	11600	
Generator Amps	A.	420	415	545	610	
Generator VARS	MVAR	5.3	5.5	5.9	5.8	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	886.1	895.4	904.3	915	
Aux. KWH Mtr. End (X100)	KWH	891.2	900.7	910.1	920.9	
Aux. Integrator, Diff.	KWH	5.1	5.3	5.8	5.9	0
Aux. Load Indicator	MW	0.56	0.57	0.81	0.69	
Aux. Amps	A	32	32	35	39	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0605	0754	0930	1119	
F.O. Totalizer-End	Lbs/Hr.	8068	6635	7433	10067	
End Test	Time	0705	0854	1030	1219	
Difference	Lbs/Hr.	8068	6635	7433	10067	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	2	2	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	242	245	234	225	
F.O. Temp. @ Burner Deck	°F	250	259	225	221	
Sulfur, Wt. %						
API Gravity @ 60 °F.	API					
Higher Heating Value	BTU/Gal					

TESTED BY: J Kealinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-07-04
KPP UNIT NO. 4

TEST LOADS - MW

	8.0	9.0	10.0	11.5	0.0
F.O. Temp. °F.	242	245	234	225	0
F.O. Temp. (Corr.)	0.93675	0.9357	0.93955	0.9427	1.02145
F.O. Usage (Lbs.)	8068	6635	7433	10067	0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	738.9187	807.964	905.1388	1225.689	0
PT RATIO	1	1	1	1	1
KW (Gen.)	7800	8900	9900	11400	0
KW (Aux.)	510	530	580	590	0
BTU/gal (Approx.)	151000	151000	151000	151000	151000
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)	14304.71	13708.15	13805.65	16237.85	#DIV/0!
HEAT RATE (APPROX.)N	15305.45	14576.17	14664.8	17123.89	#DIV/0!
HEAT RATE (ACTUAL)-G	0	0	0	0	#DIV/0!
HEAT RATE (ACTUAL)-N	0	0	0	0	#DIV/0!

FUEL CORRECTION. 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: LO-1 added to F.O. system.

KPP UNIT NO. 4
DATE: 06-07-04

Fuel Oil Tested.
Tested by:

DATA:

GENERATED (MW)	7.8	8.9	9.9
HEAT RATE(BTU/MW)G	14,305	13,708	13,806
HEAT RATE(BTU/MW)N	15,305	14,576	14,665
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	31.2753 act.		
H.H.V. (BTU/GAL)	151000 est.		

A, B, C CONSTANTS

GROSS A=	39685.5364	NET A=	45322.7488
B=	-5630.4371	B=	-6640.0649
C=	304.677516	C=	357.90936

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	22,039	19,150	17,935	16,871	15,960	15,202	14,595	14,141	13,840	13,690
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	24,489	21,070	19,629	18,367	17,284	16,380	15,655	15,108	14,741	14,553
GROSS (MBTU)	88.15	95.75	98.64	101.23	103.74	106.41	109.47	113.13	117.64	123.21
NET (MBTU)	85.5	94.6	97.9	100.8	103.5	106.3	109.4	113.2	117.8	123.3
COST/KWH	0.1087	0.0944	0.0884	0.0832	0.0787	0.0750	0.0720	0.0697	0.0683	0.0675
G/KWH	544.5186	473.1551	443.1192	416.8471	394.3390	375.5948	360.6145	349.3981	341.9457	338.2571
G/PS-H	396.6953	344.7052	322.8233	303.6835	287.2858	273.6302	262.7166	254.5452	249.1159	246.4287

PREDICTED VALUES (CONT.):

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,694	13,849	14,157	14,617	15,229	15,994	16,911	17,980
GENERATED (MW)N	9.0	9.4	9.9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,543	14,713	15,062	15,589	16,296	17,181	18,245	19,489
GROSS (MBTU)	130.09	138.49	148.64	160.78	175.13	191.93	211.39	233.74
NET (MBTU)	130.5	138.6	149.4	162.4	177.8	196.0	217.3	241.9
COST/KWH	*0.0675*	*0.0683*	*0.0696*	*0.0721*	*0.0751*	*0.0789*	*0.0834*	*0.0887*
G/KWH	338.3324	342.1716	349.7747	361.1418	376.2727	395.1676	417.8263	444.2490
G/PS-H	246.4835	249.2805	254.8196	263.1007	274.1240	287.8894	304.3968	323.6464

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.8	60.84	474.552	3701.5056	14304.7073	111576.717	870298.393	
8.9	79.21	704.969	6274.2241	13708.1525	122002.557	1085822.76	
9.9	98.01	970.299	9605.9601	13805.6527	136675.962	1353092.02	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
26.6	238.06	2149.82	19581.6898	41818.5125	370255.236	3309213.18	

a=	6.62	C=	304.677516
b=	-27675.568	B=	-5630.4371
d=	-1806.7247	A=	39685.5364
e=	117.064		
f=	2072.5058		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.8	60.84	474.552	3701.506	15305.45	119382.5	931183.5	
8.9	79.21	704.969	6274.224	14576.17	129727.9	1154579	
9.9	98.01	970.299	9605.96	14664.8	145181.5	1437297	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
26.6	238.06	2149.82	19581.69	44546.42	394292	3523059	

a=	6.62	C=	357.9094
b=	-35543.332	B=	-6640.06
d=	-2058.9283	A=	45322.75
e=	117.064		
f=	2072.5058		

MAUI ELECTRIC CO., LTD
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 02-20-04

Note. EPT tps

Gross Load (K3-4) --->	KWH	7000	9000	10000	12000	13500
Actual Test Load	KWH	8000	9500	11000	12500	
BOILER-TURBINE						
Ambient Air Temp	°F.	96	102	112	112	
Gas Entering A.H.	°F.	580	620	670	700	
Gas Leaving A.H.	°F.	395	410	430	450	
Air Entering A.H.	°F.	160	160	140	150	
Air Leaving A.H.	°F.	425	430	490	460	
Circ. Water Inlet	°F.	68	68	69	69	
Circ. Water Outlet	°F.	83.1	85	87.6	89.9	
Condenser Vacuum	Hg.	28.3	28.1	27.8	27.6	
Barometric Pressure	Hg.	30.1	30.1	30.1	30.1	
Excess O2	%	1.5	1.8	1.8	1.7	
Feedwater Flow (X1000)	Lb/Hr	81	96	115	135	
Steam Flow (X1000)	Lb/Hr	81	100	119	139	
Throttle Stm. Press.	PSIG	600	600	600	600	
Feedwater to Bir.	°F.	320	335	350	360	
GENERATOR						
Generator Integrator, Start		169.9	184.4	201	220.1	
Generator Integrator, Stop		177.7	193.9	212	232.6	
Generator Integrator, Diff.	MWH	7.8	9.5	11	12.5	0
Generator Volts	V.	11600	11600	11600	11700	
Generator Amps	A.	430	520	600	680	
Generator VARS	MVAR	5	5.9	8.1	7	
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	5691.6	5701.2	5710.7	5720.7	
Aux. KWH Mtr. End (X100)	KWH	5697.1	5706.9	5716.6	5726.9	
Aux. Integrator, Diff.	KWH	5.5	5.7	5.9	6.2	0
Aux. Load Indicator	MW	0.65	0.6	0.61	0.64	
Aux. Amps	A.	37	34	35	37	
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0	0	0	0	0
Start Test	Time	0635	0820	1000	1140	
F.O. Totalizer-End	Lbs/Hr.	6056.63	7087	8424.75	9604.75	
End Test	Time	0735	0920	1100	1240	
Difference	Lbs/Hr.	6056.63	7087	8424.75	9604.75	0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	
Circulating Pumps	Number	3	3	3	3	
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	°F	242	250	234	230	
F.O. Temp. @ Burner Deck	°F	227	232	224	220	
Sulfur, Wt. %		1.9				
API Gravity @ 60 °F.	API	11.7				
Higher Heating Value	BTU/Gal	151,095				

TESTED B Raymond K Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject. Heat Rate Testing
DATE. 02-20-04
KPP UNIT NO. 4

	TEST LOADS-MW				
	8.0	9.5	11.0	12.5	0.0
F.O. Temp. °F.	242	250	234	230	0
F.O. Temp. (Corr.)	0.93675	0.93395	0.93955	0.94095	1.02145
F.O. Usage (Lbs.)	6056.63	7087	8424.75	9604.75	0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	*737.534096*	*863.005358*	*1025.90721*	*1169.59937*	*0*
PT RATIO	1	1	1	1	1
KW (Gen.)	7800	9500	11000	12500	0
KW (Aux.)	550	570	590	620	0
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,095	151,095	151,095	151,095	151,095
HEAT RATE (APPROX.)	14,278	13,717	14,083	14,129	#DIV/0!
HEAT RATE (APPROX.)N	15,361	14,593	14,881	14,866	#DIV/0!
HEAT RATE (ACTUAL)-G	14,287	13,726	14,092	14,138	#DIV/0!
HEAT RATE (ACTUAL)-N	15,371	14,602	14,890	14,875	#DIV/0!

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by Rodney Jung — Note. EPT 8ps

KPP UNIT NO. 4 — Fuel Oil Test 02-24-04
DATE: 02-20-04 — Tested by: K Nakamatsu

DATA:

GENERATED (MW)	7.8	9.5	11	12.5
HEAT RATE(BTU/MW)G	14,287	13,726	14,092	14,138
HEAT RATE(BTU/MW)N	15,371	14,602	14,890	14,875
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	28.3161 act.			
H H V. (BTU/GAL)	151095.236 act.			

A, B, C CONSTANTS:

GROSS A=	20,468.48	NET A=	23,429.38
B=	(1293.258)	B=	(1640.044)
C=	63.3452	C=	76.8898

PREDICTED VALUES.

GENERATED (MW)G	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	16,309	15,586	15,272	14,989	14,739	14,520	14,332	14,177	14,052	13,960
GENERATED (MW)N	3.5	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
HEAT RATE(BTU/MW)N	18,099	17,151	16,735	16,357	16,018	15,717	15,454	15,230	15,044	14,897
GROSS (MBTU)	65.24	77.93	83.99	89.94	95.80	101.64	107.49	113.41	119.45	125.64
NET (MBTU)	62.4	78.3	82.8	89.1	95.3	101.4	107.4	113.5	119.6	125.9
COST/KWH	0.0728	0.0695	0.0681	0.0669	0.0658	0.0648	0.0640	0.0633	0.0627	0.0623
G/KWH	402.9532	385.0860	377.3262	370.3490	364.1543	358.7421	354.1125	350.2655	347.2010	344.9191
G/PS-H	293.561418	280.5447	274.891501	269.808409	265.295423	261.352544	257.979772	255.177107	252.944548	251.282096

PREDICTED VALUES (CONT.).

GENERATED (MW)G	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,899	13,870	13,873	13,907	13,973	14,071	14,200	14,361
GENERATED (MW)N	8.9	9.4	9.9	10.4	10.9	11.4	11.9	12.4
HEAT RATE(BTU/MW)N	14,788	14,716	14,686	14,693	14,738	14,821	14,943	15,103
GROSS (MBTU)	132.04	138.70	145.67	152.98	160.69	168.85	177.51	186.70
NET (MBTU)	132.1	138.8	145.8	152.9	160.8	169.1	177.5	187.0
COST/KWH	0.0620	0.0619	0.0619	0.0621	0.0623	0.0628	0.0634	0.0641
G/KWH	343.4197	342.7028	342.7685	343.6168	345.2476	347.6609	350.8569	354.8353
G/PS-H	250.1898	249.6675	249.7154	250.3334	251.5214	253.2796	255.6079	258.5063

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.8	60.84	474.552	3701.5056	14286.909	111437.89	869215.541	
9.5	90.25	857.375	8145.0625	13725.8947	130396	1238762	
11	121	1331	14641	14091.7904	155009.694	1705106.63	
12.5	156.25	1953.125	24414.0625	14137.6716	176720.895	2209011.18	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
40.8	428.34	4616.052	50901.6308	56242.2657	573564.479	6022095.36	

a=	48.72	C=	63.3451861
b=	-2430.8264	B=	-1293.25766
d=	-426.52358	A=	20468.4753
e=	987.936		
f=	20131.3668		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
7.8	60.84	474.552	3701.506	15370.74	119891.8	935158	
9.5	90.25	857.375	8145.063	14602.02	138719.1	1317832	
11	121	1331	14641	14890.46	163795.1	1801746	
12.5	156.25	1953.125	24414.06	14875.5	185943.7	2324296	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
40.8	428.34	4616.052	50901.83	59738.72	608349.7	6379030	

a=	48.72	C=	76.8898
b=	-72361.742	B=	-1640.04
d=	-3940.7422	A=	23429.38
e=	987.936		
f=	20131.3668		

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 12-11-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	82	85	86	87	88
Gas Entering A.H.	*F.	602	615	648	671	692
Gas Leaving A.H.	*F.	432	435	452	458	465
Air Entering A.H.	*F.	152	147	132	124	115
Air Leaving A.H.	*F.	356	362	367	369	370
Circ. Water Inlet	*F.	71	71	71	71	71
Circ. Water Outlet	*F.	82.9	84	86	88	89
Condenser Vacuum	Hg.	28.3	28.2	28.0	27.8	27.6
Barometric Pressure	Hg.	30.2	30.2	30.2	30.2	30.1
Excess O2	%	1.7	1.8	1.9	1.9	1.8
Feedwater Flow (X1000)	Lb/Hr	82	89	105	116	130
Steam Flow (X1000)	Lb/Hr	82	93	111	120	133
Throttle Stm. Press.	PSIG	599	598	595	592	590
Feedwater to Blr.	*F.	323	333	348	355	362
GENERATOR						
Generator Integrator, Start		329.6	343.0	355.2	369.4	384.4
Generator Integrator, Stop		337.5	351.9	365.7	380.8	396.9
Generator Integrator, Diff.	MWH	7.9	8.9	10.5	11.4	12.5
Generator Volts	V.	11,600	11,700	11,700	11,700	11,600
Generator Amps	A.	435	500	565	600	650
Generator VARS	MVAR	4.6	5.8	6.0	5.6	5.4
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	5951.8	5961.0	5968.7	5976.6	5984.6
Aux. KWH Mtr. End (X100)	KWH	5957.4	5966.7	5974.6	5982.7	5990.9
Aux. Integrator, Diff.	KWH	5.6	5.7	5.9	6.1	6.3
Aux. Load Indicator	MW	0.60	0.60	0.61	0.63	0.65
Aux. Amps	A.	34.0	35.0	35.5	36.5	37.5
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0646	0825	0945	1105	1223
F.O. Totalizer-End	Lbs/Hr.	6257	6719	7902	8510	9385
End Test	Time	0746	0925	1045	1205	1323
Difference	Lbs/Hr.	6257	6719	7902	8510	9385
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	242	250	242	232	233
F.O. Temp. @ Burner Deck	*F	231	240	230	228	229
Sulfur, Wt. %		1.73				
API Gravity @ 60 *F.	API	15.1				
Higher Heating Value	BTU/Gal	149,048				

TESTED BY:

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-11-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.5	11.5	12.5
F.O. Temp. *F.	242	250	242	232	233
F.O. Temp. (Corr.)	0.93675	0.93395	0.93675	0.94025	0.9399
F.O. Usage (Lbs.)	6257.0	6719.0	7902.0	8510.0	9385.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	761.9	818.2	962.3	1,036.3	1,142.8
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	8,900	10,500	11,400	12,500
KW (Aux.)	560	570	590	610	630
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,048	149,048	149,048	149,048	149,048
HEAT RATE (APPROX.)	14,564	13,882	13,838	13,726	13,806
HEAT RATE (APPROX.)N	15,675	14,832	14,662	14,502	14,538
HEAT RATE (ACTUAL)-G	14,375	13,702	13,659	13,549	13,627
HEAT RATE (ACTUAL)-N	15,472	14,640	14,472	14,315	14,350

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 12-18-03
DATE: 12-11-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.9	8.9	10.5	11.4	12.5
HEAT RATE(BTU/MW)G	14,375	13,702	13,659	13,549	13,627
HEAT RATE(BTU/MW)N	15,472	14,640	14,472	14,315	14,350
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$29.6225	act.			
H.H.V. (BTU/GAL)	149,048	act.			

A, B, C CONSTANTS:

GROSS	A=	22,690.95	NET A=	25,871.76
	B=	(1,651.051)	B=	(2,034.335)
	C=	74.3226	C=	89.2959

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	17,276	16,294	15,858	15,460	15,099	14,775	14,489	14,239	14,027	13,852
HEAT RATE(BTU/MW)N	19,163	17,932	17,384	16,880	16,421	16,007	15,637	15,312	15,032	14,796
GROSS (MBTU)	69.104	81.469	87.221	92.762	98.145	103.428	108.665	113.913	119.228	124.665
NET (MBTU)	76.653	89.662	95.613	101.282	106.739	112.048	117.279	122.496	127.768	133.161
COST/KWH	$0.0818	$0.0771	$0.0750	$0.0732	$0.0715	$0.0699	$0.0686	$0.0674	$0.0664	$0.0655
G/KWH	426.84	402.58	391.82	381.98	373.06	365.06	357.98	351.81	346.57	342.24
G/PS-H	310.97	293.29	285.45	278.28	271.79	265.96	260.80	256.31	252.48	249.33

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,714	13,613	13,549	13,522	13,533	13,581	13,666	13,788
HEAT RATE(BTU/MW)N	14,605	14,458	14,356	14,299	14,286	14,318	14,395	14,516
GROSS (MBTU)	130.279	136.127	142.264	148.747	155.630	162.969	170.821	179.241
NET (MBTU)	138.743	144.580	150.739	157.288	164.292	171.820	179.938	188.713
COST/KWH	$0.0649	$0.0644	$0.0641	$0.0640	$0.0640	$0.0643	$0.0647	$0.0652
G/KWH	338.83	336.34	334.76	334.10	334.37	335.55	337.65	340.66
G/PS-H	246.84	245.03	243.88	243.40	243.59	244.45	245.98	248.18

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 11-14-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	83	90	97	92	91
Gas Entering A.H.	*F.	596	608	639	656	681
Gas Leaving A.H.	*F.	423	427	440	447	458
Air Entering A.H.	*F.	150	145	133	124	113
Air Leaving A.H.	*F.	346	349	352	393	359
Circ. Water Inlet	*F.	71	71	71	71	71
Circ. Water Outlet	*F.	82	84	86	87	90
Condenser Vacuum	Hg.	28.3	28.2	28.0	27.8	275.0
Barometric Pressure	Hg.	30.1	30.1	30.1	30.1	30.1
Excess O2	%	2.1	1.7	1.8	1.8	1.9
Feedwater Flow (X1000)	Lb/Hr	78	88	103	116	131
Steam Flow (X1000)	Lb/Hr	80	92	109	119	134
Throttle Stm. Press.	PSIG	599	598	595	593	290
Feedwater to Blr.	*F.	322	333	346	353	363
GENERATOR						
Generator Integrator, Start		2425.9	2439.4	2454.9	2474.4	2488.9
Generator Integrator, Stop		2433.8	2448.3	2465.3	2485.7	2501.5
Generator Integrator, Diff.	MWH	7.9	8.9	10.4	11.3	12.6
Generator Volts	V.	140	150	172	191	205
Generator Amps	A.	435	480	595	640	700
Generator VARS	MVAR	4.3	5.1	6.9	7.4	7.8
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	2059.2	2068.3	2078.1	2089.1	2096.7
Aux. KWH Mtr. End (X100)	KWH	2064.8	2074.2	2084.1	2095.0	2103.0
Aux. Integrator, Diff.	KWH	5.6	5.9	6.0	5.9	6.3
Aux. Load Indicator	MW	0.60	0.61	0.61	0.62	0.63
Aux. Amps	A.	29.0	30.0	34.0	32.0	33.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0615	0755	0935	1125	1241
F.O. Totalizer-End	Lbs/Hr.	6169	6707	7852	8498	9537
End Test	Time	0715	0855	1035	1225	1341
Difference	Lbs/Hr.	6169	6707	7852	8498	9537
EQUIPMENT STATUS		* LO-1 injection rate 37				
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	243	252	240	242	240
F.O. Temp. @ Burner Deck	*F	235	240	232	233	233
Sulfur, Wt. %		1.77				
API Gravity @ 60 *F.	API	13.9				
Higher Heating Value	BTU/Gal	150,000				

TESTED BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-14-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.5	11.5	12.5
F.O. Temp. *F.	243	252	240	242	240
F.O. Temp. (Corr.)	0.9364	0.93325	0.93745	0.93675	0.93745
F.O. Usage (Lbs.)	6169.0	6707.0	7852.0	8498.0	9537.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	751.2	816.7	956.2	1,034.8	1,161.3
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	8,900	10,400	11,300	12,600
KW (Aux.)	560	590	600	590	630
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,000	150,000	150,000	150,000	150,000
HEAT RATE (APPROX.)	14,359	13,857	13,883	13,828	13,918
HEAT RATE (APPROX.)N	15,454	14,841	14,733	14,590	14,650
HEAT RATE (ACTUAL)-G	14,264	13,765	13,791	13,737	13,826
HEAT RATE (ACTUAL)-N	15,352	14,742	14,635	14,493	14,553

FUEL CORRECTION: 1

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 11-19-03
DATE: 11-14-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.9	8.9	10.4	11.3	12.6
HEAT RATE(BTU/MW)G	14,264	13,765	13,791	13,737	13,826
HEAT RATE(BTU/MW)N	15,352	14,742	14,635	14,493	14,553
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$30.3720	act.			
H.H.V. (BTU/GAL)	150,000	act.			

A, B, C CONSTANTS:

GROSS A=	20,173.22	NET A=	23,005.98
B=	(1,187.992)	B=	(1,496.921)
C=	54.4954	C=	65.7159

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	16,293	15,596	15,288	15,007	14,754	14,528	14,329	14,157	14,013	13,895
HEAT RATE(BTU/MW)N	18,070	17,164	16,761	16,390	16,052	15,748	15,476	15,236	15,030	14,857
GROSS (MBTU)	65.173	77.978	84.083	90.043	95.899	101.693	107.465	113.256	119.107	125.059
NET (MBTU)	72.279	85.821	92.185	98.341	104.341	110.233	116.067	121.891	127.756	133.710
COST/KWH	$0.0785	$0.0752	$0.0737	$0.0723	$0.0711	$0.0700	$0.0691	$0.0683	$0.0676	$0.0670
G/KWH	402.56	385.33	377.72	370.79	364.53	358.94	354.02	349.78	346.22	343.32
G/PS-H	293.28	280.72	275.18	270.13	265.57	261.50	257.92	254.83	252.23	250.12

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,806	13,743	13,707	13,699	13,718	13,765	13,838	13,939
HEAT RATE(BTU/MW)N	14,716	14,608	14,533	14,491	14,482	14,506	14,563	14,652
GROSS (MBTU)	131.152	137.428	143.928	150.692	157.761	165.176	172.978	181.208
NET (MBTU)	139.803	146.084	152.602	159.406	166.547	174.072	182.032	190.476
COST/KWH	$0.0666	$0.0663	$0.0661	$0.0660	$0.0661	$0.0664	$0.0667	$0.0672
G/KWH	341.10	339.55	338.68	338.47	338.95	340.09	341.91	344.40
G/PS-H	248.50	247.37	246.73	246.59	246.93	247.76	249.09	250.90

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-25-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		10,500	11,500	12,500	13,400
BOILER-TURBINE						
Ambient Air Temp	*F.		108	110	110	111
Gas Entering A.H.	*F.		624	637	664	682
Gas Leaving A.H.	*F.		417	423	436	445
Air Entering A.H.	*F.		156	149	137	128
Air Leaving A.H.	*F.		368	366	372	368
Circ. Water Inlet	*F.		70	70	70	70
Circ. Water Outlet	*F.		86	88	89	91
Condenser Vacuum	Hg.		27.9	27.7	27.6	27.5
Barometric Pressure	Hg.		30.1	30.1	30.1	30.1
Excess O2	%		1.4	1.2	1.2	1.2
Feedwater Flow (X1000)	Lb/Hr		103	116	128	140
Steam Flow (X1000)	Lb/Hr		107	117	128	139
Throttle Stm. Press.	PSIG		600	600	600	600
Feedwater to Blr.	*F.		345	350	360	365
GENERATOR						
Generator Integrator, Start			8578.3	8596.2	8615.7	8639.2
Generator Integrator, Stop			8588.7	8607.5	8628.1	8652.5
Generator Integrator, Diff.	MWH	0.0	10.4	11.3	12.4	13.3
Generator Volts	V.		11,600	11,600	11,700	11,800
Generator Amps	A.		530	610	700	730
Generator VARS	MVAR		4.0	6.0	7.5	7.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		543.1	552.4	562.0	572.8
Aux. KWH Mtr. End (X100)	KWH		548.6	558.1	567.8	578.8
Aux. Integrator, Diff.	KWH	0.0	5.5	5.7	5.8	6.0
Aux. Load Indicator	MW		0.56	0.60	0.61	0.67
Aux. Amps	A.		33.0	34.0	35.0	39.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	########	########	########	########
Start Test	Time		0630	0810	0950	1140
F.O. Totalizer-End	Lbs/Hr.		########	########	########	########
End Test	Time		0730	0910	1050	1240
Difference	Lbs/Hr.	0	7200	8000	8800	9600
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F		249	249	250	243
F.O. Temp. @ Burner Deck	*F		235	235	235	233
Sulfur, Wt. %		1.84				
API Gravity @ 60 *F.	API	15.5				
Higher Heating Value	BTU/Gal	149,619				

TESTED BY: Kevin Kong

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-25-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	0.0	10.5	11.5	12.5	13.4
F.O. Temp. *F.	0	249	249	250	243
F.O. Temp. (Corr.)	1.02145	0.9343	0.9343	0.93395	0.9364
F.O. Usage (Lbs.)	0.0	7200.0	8000.0	8800.0	9600.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	0.0	876.8	974.2	1,071.6	1,169.0
PT RATIO	1	1	1	1	1
KW (Gen.)	0	10,400	11,300	12,400	13,300
KW (Aux.)	0	550	570	580	600
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,619	149,619	149,619	149,619	149,619
HEAT RATE (APPROX.)	#DIV/0!	12,730	13,018	13,049	13,272
HEAT RATE (APPROX.)N	#DIV/0!	13,441	13,709	13,690	13,899
HEAT RATE (ACTUAL)-G	#DIV/0!	12,614	12,899	12,930	13,151
HEAT RATE (ACTUAL)-N	#DIV/0!	13,318	13,584	13,564	13,772

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 08-27-03
DATE: 08-25-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	11.3	12.4	13.3
HEAT RATE(BTU/MW)G	12,899	12,930	13,151
HEAT RATE(BTU/MW)N	13,584	13,564	13,772

NUMBER OF TESTS 3
PRICE OF FUEL/BBL $27.5723 act.
H.H.V. (BTU/GAL) 149,619 act.

A, B, C CONSTANTS:

GROSS A=	27,790.39	NET A=	31,204.19
B=	(2,544.627)	B=	(2,964.104)
C=	108.5653	C=	124.3183

PREDICTED VALUES:

	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
GENERATED (MW)										
HEAT RATE(BTU/MW)G	19,349	17,781	17,079	16,431	15,837	15,298	14,812	14,382	14,005	13,683
HEAT RATE(BTU/MW)N	21,337	19,492	18,662	17,895	17,190	16,547	15,966	15,448	14,991	14,597
GROSS (MBTU)	77.396	88.907	93.935	98.586	102.942	107.084	111.094	115.052	119.042	123.143
NET (MBTU)	85.347	97.458	102.642	107.370	111.735	115.829	119.747	123.582	127.426	131.373
COST/KWH	$0.0849	$0.0780	$0.0749	$0.0721	$0.0695	$0.0671	$0.0650	$0.0631	$0.0614	$0.0600
G/KWH	478.06	439.33	421.98	405.97	391.30	377.97	365.98	355.33	346.03	338.06
G/PS-H	348.28	320.06	307.42	295.76	285.07	275.36	266.62	258.87	252.09	246.29

PREDICTED VALUES (CONT.):

	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
GENERATED (MW)								
HEAT RATE(BTU/MW)G	13,414	13,201	13,041	12,936	12,885	12,888	12,946	13,058
HEAT RATE(BTU/MW)N	14,265	13,995	13,787	13,642	13,558	13,537	13,578	13,681
GROSS (MBTU)	127.437	132.006	136.932	142.295	148.177	154.659	161.823	169.751
NET (MBTU)	135.517	139.950	144.765	150.057	155.918	162.441	169.720	177.848
COST/KWH	$0.0589	$0.0579	$0.0572	$0.0568	$0.0565	$0.0565	$0.0568	$0.0573
G/KWH	331.44	326.15	322.21	319.61	318.35	318.44	319.86	322.62
G/PS-H	241.46	237.61	234.74	232.85	231.93	231.99	233.03	235.04

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-11-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,500	12,000	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.		99	101	101	101
Gas Entering A.H.	*F.		599.6	624	651.3	681.2
Gas Leaving A.H.	*F.		412.5	422.2	433.6	447.1
Air Entering A.H.	*F.		168.4	156.8	146.7	132.9
Air Leaving A.H.	*F.		368.3	370	374.1	370.6
Circ. Water Inlet	*F.		68	68	68	68
Circ. Water Outlet	*F.		84	86	88	91
Condenser Vacuum	Hg.		28.1	27.9	27.7	27.4
Barometric Pressure	Hg.		30.4	30.5	30.5	30.3
Excess O2	%		1.3	1.4	1.4	1.2
Feedwater Flow (X1000)	Lb/Hr		83	100	118	139
Steam Flow (X1000)	Lb/Hr		88	105	120	139
Throttle Stm. Press.	PSIG		600	601	600	600
Feedwater to Blr.	*F.		331	340	355	365
GENERATOR						
Generator Integrator, Start			4452.0	4470.2	4490.3	4511.8
Generator Integrator, Stop			4460.9	4480.7	4502.2	4525.3
Generator Integrator, Diff.	MWH	0.0	8.9	10.5	11.9	13.5
Generator Volts	V.		11,600	11,600	11,600	11,600
Generator Amps	A.		460	550	640	690
Generator VARS	MVAR		9.0	5.2	6.2	5.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		8554.9	8565.7	8576.3	8586.4
Aux. KWH Mtr. End (X100)	KWH		8560.5	8571.5	8582.1	8592.5
Aux. Integrator, Diff.	KWH	0.0	5.6	5.8	5.8	6.1
Aux. Load Indicator	MW		0.62	0.59	0.60	0.62
Aux. Amps	A.		36.5	34.0	35.0	37.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time		0625	0821	1011	1155
F.O. Totalizer-End	Lbs/Hr.		6493	7512	8558	9801
End Test	Time		0725	0921	1111	1255
Difference	Lbs/Hr.	0	6493	7512	8558	9801
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F		239	233	230	229
F.O. Temp. @ Burner Deck	*F		227	225	223	220
Sulfur, Wt. %		1.83				
API Gravity @ 60 *F.	API	15.9				
Higher Heating Value	BTU/Gal	149,333				

TESTED BY: Mark Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-11-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	0.0	9.0	10.5	12.0	12.5
F.O. Temp. *F.	0	239	233	230	229
F.O. Temp. (Corr.)	1.02145	0.9378	0.9399	0.94095	0.9413
F.O. Usage (Lbs.)	0.0	6492.5	7511.8	8558.2	9800.7
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	0.0	790.6	914.7	1,042.2	1,193.5
PT RATIO	1	1	1	1	1
KW (Gen.)	0	8,900	10,500	11,900	13,500
KW (Aux.)	0	560	590	580	610
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,333	149,333	149,333	149,333	149,333
HEAT RATE (APPROX.)	#DIV/0!	13,414	13,155	13,224	13,349
HEAT RATE (APPROX.)N	#DIV/0!	14,314	13,924	13,902	13,981
HEAT RATE (ACTUAL)-G	#DIV/0!	13,266	13,010	13,078	13,202
HEAT RATE (ACTUAL)-N	#DIV/0!	14,156	13,770	13,748	13,826

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 08-14-03
DATE: 08-11-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		8.9	10.5	11.9	13.5
HEAT RATE(BTU/MW)G		13,266	13,010	13,078	13,202
HEAT RATE(BTU/MW)N		14,156	13,770	13,748	13,826
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$27.5723	act.			
H.H.V. (BTU/GAL)	149,333	act.			

A, B, C CONSTANTS:

GROSS A=	18,083.32	NET A=	20,556.25	
B=	(894.799)	B=	(1,151.019)	
C=	39.5636	C=	48.3945	

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,137	14,598	14,359	14,139	13,939	13,758	13,598	13,457	13,336	13,235
HEAT RATE(BTU/MW)N	16,726	16,011	15,690	15,392	15,119	14,870	14,646	14,445	14,269	14,117
GROSS (MBTU)	60.549	72.992	78.973	84.833	90.601	96.308	101.983	107.656	113.356	119.113
NET (MBTU)	66.906	80.055	86.293	92.354	98.275	104.093	109.844	115.563	121.287	127.053
COST/KWH	$0.0665	$0.0642	$0.0631	$0.0622	$0.0613	$0.0605	$0.0598	$0.0592	$0.0586	$0.0582
G/KWH	374.00	360.69	354.77	349.33	344.39	339.93	335.97	332.49	329.50	327.00
G/PS-H	272.47	262.77	258.46	254.50	250.90	247.65	244.76	242.23	240.05	238.23

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,153	13,092	13,050	13,028	13,025	13,043	13,080	13,137
HEAT RATE(BTU/MW)N	13,989	13,886	13,806	13,751	13,720	13,713	13,730	13,772
GROSS (MBTU)	124.957	130.917	137.023	143.305	149.792	156.515	163.502	170.783
NET (MBTU)	132.897	138.855	144.964	151.259	157.777	164.554	171.627	179.032
COST/KWH	$0.0578	$0.0576	$0.0574	$0.0573	$0.0573	$0.0573	$0.0575	$0.0578
G/KWH	324.99	323.46	322.43	321.88	321.82	322.26	323.18	324.59
G/PS-H	236.76	235.65	234.90	234.50	234.46	234.77	235.44	236.47

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-09-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH		9,000	10,500	12,000	13,500
BOILER-TURBINE						
Ambient Air Temp	*F.		98	99	100	100
Gas Entering A.H.	*F.		600.7	624.1	647.9	677.6
Gas Leaving A.H.	*F.		414.7	424.8	435.1	448
Air Entering A.H.	*F.		166.2	155.5	145.3	132.4
Air Leaving A.H.	*F.		370.1	368	371.8	370.9
Circ. Water Inlet	*F.		68	68	68	68
Circ. Water Outlet	*F.		84	87	89	91
Condenser Vacuum	Hg.		29.2	27.9	27.7	27.4
Barometric Pressure	Hg.		30.8	31.0	31.0	30.8
Excess O2	%		1.5	1.7	1.5	1.3
Feedwater Flow (X1000)	Lb/Hr		84	102	117	140
Steam Flow (X1000)	Lb/Hr		88	107	121	140
Throttle Stm. Press.	*PSIG*		*600*	*600*	*601*	*601*
Feedwater to Blr.	*F.		330	345	357	365
GENERATOR						
Generator Integrator, Start			3888.3	3904.1	3924.4	3946.9
Generator Integrator, Stop			3897.1	3914.7	3936.4	3960.4
Generator Integrator, Diff.	MWH	0.0	8.8	10.6	12.0	13.5
Generator Volts	V.		11,600	11,600	11,600	11,600
Generator Amps	A.		460	555	620	698
Generator VARS	MVAR		4.4	5.1	6.2	5.3
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH		8278.9	8288.2	8298.8	8309.6
Aux. KWH Mtr. End (X100)	KWH		8284.4	8294.0	8304.7	8315.8
Aux. Integrator, Diff.	KWH	0.0	5.5	5.8	5.9	6.2
Aux. Load Indicator	MW		0.58	0.60	0.61	0.63
Aux. Amps	A.		34.0	34.5	35.2	37.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time		0649	0830	1020	1208
F.O. Totalizer-End	Lbs/Hr.		6572	7649	8647	9901
End Test	Time		0749	0930	1120	1308
Difference	Lbs/Hr.	0	6572	7649	8647	9901
EQUIPMENT STATUS						
Boiler Blowdown-Open	%		0	0	0	0
Supplying Stn Aux Stm	Yes/No		No	No	No	No
Circulating Pumps	Number		3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F		248	247	247	240
F.O. Temp. @ Burner Deck	*F		233	232	232	227
Sulfur, Wt. %		1.84				
API Gravity @ 60 *F.	API	15.9				
Higher Heating Value	BTU/Gal	149,690				

TESTED BY: Mark Takushi

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-09-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	0.0	9.0	10.5	12.0	13.5
F.O. Temp. *F.	0	248	247	247	240
F.O. Temp. (Corr.)	1.02145	0.93465	0.935	0.935	0.93745
F.O. Usage (Lbs.)	0.0	6572.1	7648.9	8647.0	9900.5
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	0.0	800.3	931.4	1,053.0	1,205.6
PT RATIO	1	1	1	1	1
KW (Gen.)	0	8,800	10,600	12,000	13,500
KW (Aux.)	0	550	580	590	620
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,690	149,690	149,690	149,690	149,690
HEAT RATE (APPROX.)	#DIV/0!	13,732	13,268	13,250	13,485
HEAT RATE (APPROX.)N	#DIV/0!	14,648	14,037	13,935	14,134
HEAT RATE (ACTUAL)-G	#DIV/0!	13,613	13,153	13,135	13,368
HEAT RATE (ACTUAL)-N	#DIV/0!	14,521	13,915	13,814	14,012

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 08-14-03
DATE: 08-09-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)		8.8	10.6	12.0	13.5
HEAT RATE(BTU/MW)G		13,732	13,268	13,250	13,485
HEAT RATE(BTU/MW)N		14,648	14,037	13,935	14,134
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$27.5723	act.			
H.H.V. (BTU/GAL)	149,690	act.			

A, B, C CONSTANTS:

GROSS	A=	22,310.63	NET A=	24,841.02
	B=	(1,577.478)	B=	(1,843.213)
	C=	68.4471	C=	77.8023

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	17,096	16,134	15,705	15,310	14,949	14,622	14,330	14,071	13,847	13,658
HEAT RATE(BTU/MW)N	18,713	17,570	17,057	16,583	16,147	15,751	15,393	15,075	14,795	14,554
GROSS (MBTU)	68.383	80.672	86.378	91.859	97.168	102.355	107.473	112.571	117.703	122.918
NET (MBTU)	74.852	87.850	93.813	99.496	104.957	110.256	115.450	120.597	125.757	130.987
COST/KWH	$0.0750	$0.0708	$0.0689	$0.0671	$0.0656	$0.0641	$0.0628	$0.0617	$0.0607	$0.0599
G/KWH	422.40	398.64	388.03	378.27	369.35	361.28	354.05	347.67	342.13	337.44
G/PS-H	307.73	290.42	282.69	275.58	269.08	263.20	257.93	253.29	249.25	245.84

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,502	13,381	13,293	13,240	13,222	13,237	13,287	13,371
HEAT RATE(BTU/MW)N	14,352	14,189	14,065	13,980	13,933	13,926	13,957	14,028
GROSS (MBTU)	128.268	133.806	139.581	145.645	152.050	158.847	166.088	173.823
NET (MBTU)	136.345	141.891	147.682	153.777	160.234	167.112	174.468	182.362
COST/KWH	$0.0592	$0.0587	$0.0583	$0.0581	$0.0580	$0.0581	$0.0583	$0.0586
G/KWH	333.60	330.60	328.45	327.14	326.68	327.06	328.29	330.36
G/PS-H	243.03	240.85	239.28	238.33	237.99	238.27	239.17	240.68

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 06-02-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,300	9,000	10,000	11,000	11,800
BOILER-TURBINE						
Ambient Air Temp	*F.	110	112	116	120	122
Gas Entering A.H.	*F.	600	610	640	660	680
Gas Leaving A.H.	*F.	325	350	385	340	345
Air Entering A.H.	*F.	150	150	140	140	135
Air Leaving A.H.	*F.	450	455	460	470	475
Circ. Water Inlet	*F.	72	73	73	73	74
Circ. Water Outlet	*F.	85	86	88	90	91
Condenser Vacuum	Hg.	27.8	27.7	27.5	27.2	27.0
Barometric Pressure	Hg.	30.1	30.1	30.1	30.1	30.1
Excess O2	%	1.3	1.0	1.0	1.0	1.0
Feedwater Flow (X1000)	Lb/Hr	88	92	106	117	127
Steam Flow (X1000)	Lb/Hr	86	95	108	119	128
Throttle Stm. Press.	PSIG	600	600	600	600	600
Feedwater to Blr.	*F.	345	350	360	369	375
GENERATOR						
Generator Integrator, Start		7059.8	7072.6	7088.1	7103.7	7123.4
Generator Integrator, Stop		7068.1	7081.6	7098.1	7114.7	7135.2
Generator Integrator, Diff.	MWH	8.3	9.0	10.0	11.0	11.8
Generator Volts	V.	11,800	11,800	11,800	11,800	11,800
Generator Amps	A.	470	500	560	640	660
Generator VARS	MVAR	5.5	6.0	6.5	8.0	8.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	4802.4	4810.4	4819.5	4827.9	4837.9
Aux. KWH Mtr. End (X100)	KWH	4807.7	4815.8	4825.0	4833.6	4843.8
Aux. Integrator, Diff.	KWH	5.3	5.4	5.5	5.7	5.9
Aux. Load Indicator	MW	0.57	0.58	0.59	0.60	0.61
Aux. Amps	A.	33.0	33.0	34.0	35.0	36.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0605	0735	0915	1045	1230
F.O. Totalizer-End	Lbs/Hr.	6355	6763	7639	8310	8922
End Test	Time	0705	0835	1015	1145	1330
Difference	Lbs/Hr.	6355	6763	7639	8310	8922
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	230	240	230	230	225
F.O. Temp. @ Burner Deck	*F	213	220	215	210	205
Sulfur, Wt. %		1.70				
API Gravity @ 60 *F.	API	16.2				
Higher Heating Value	BTU/Gal	148,762				

TESTED BY: Raymond K. Ross

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 06-02-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.3	9.0	10.0	11.0	11.8
F.O. Temp. *F.	230	240	230	230	225
F.O. Temp. (Corr.)	0.94095	0.93745	0.94095	0.94095	0.9427
F.O. Usage (Lbs.)	6355.4	6763.0	7638.5	8310.0	8921.8
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	773.9	823.6	930.2	1,011.9	1,086.4
PT RATIO	1	1	1	1	1
KW (Gen.)	8,300	9,000	10,000	11,000	11,800
KW (Aux.)	530	540	550	570	590
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	148,762	148,762	148,762	148,762	148,762
HEAT RATE (APPROX.)	14,080	13,817	14,045	13,891	13,903
HEAT RATE (APPROX.)N	15,040	14,699	14,863	14,650	14,634
HEAT RATE (ACTUAL)-G	13,871	13,613	13,837	13,685	13,697
HEAT RATE (ACTUAL)-N	14,817	14,481	14,643	14,433	14,417

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 06-04-03
DATE: 06-02-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	8.3	9.0	10.0	11.0	11.8
HEAT RATE(BTU/MW)G	13,871	13,613	13,837	13,685	13,697
HEAT RATE(BTU/MW)N	14,817	14,481	14,643	14,433	14,417
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$29.8895	act.			
H.H.V. (BTU/GAL)	148,762	act.			

A, B, C CONSTANTS:

GROSS	A=	14,974.47	NET A=	17,550.32
	B=	(220.821)	B=	(511.600)
	C=	9.5923	C=	20.9187

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,245	14,110	14,050	13,995	13,944	13,899	13,858	13,822	13,791	13,764
HEAT RATE(BTU/MW)N	15,839	15,515	15,369	15,234	15,109	14,994	14,890	14,796	14,713	14,640
GROSS (MBTU)	56.979	70.551	77.276	83.969	90.639	97.291	103.934	110.574	117.220	123.876
NET (MBTU)	63.354	77.576	84.531	91.403	98.207	104.959	111.675	118.371	125.061	131.763
COST/KWH	$0.0681	$0.0675	$0.0672	$0.0669	$0.0667	$0.0665	$0.0663	$0.0661	$0.0660	$0.0658
G/KWH	351.95	348.63	347.14	345.78	344.53	343.40	342.39	341.50	340.73	340.07
G/PS-H	256.40	253.98	252.90	251.91	251.00	250.18	249.44	248.79	248.23	247.75

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,742	13,725	13,713	13,706	13,704	13,706	13,713	13,725
HEAT RATE(BTU/MW)N	14,578	14,526	14,485	14,454	14,433	14,423	14,424	14,435
GROSS (MBTU)	130.553	137.255	143.991	150.767	157.591	164.471	171.413	178.424
NET (MBTU)	138.491	145.262	152.090	158.993	165.984	173.081	180.298	187.652
COST/KWH	$0.0657	$0.0657	$0.0656	$0.0656	$0.0656	$0.0656	$0.0656	$0.0657
G/KWH	339.54	339.12	338.82	338.64	338.58	338.64	338.81	339.11
G/PS-H	247.36	247.06	246.84	246.71	246.66	246.71	246.83	247.05

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 04-17-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	96	100	101	100	100
Gas Entering A.H.	*F.	634.3	643	686.9	723.1	740.1
Gas Leaving A.H.	*F.	345.9	347.8	359.9	368.8	373.1
Air Entering A.H.	*F.	165.6	165.1	152.4	143.2	140.1
Air Leaving A.H.	*F.	409.2	405.1	416	428.2	433.9
Circ. Water Inlet	*F.	70	70.0	70.0	71.0	71.0
Circ. Water Outlet	*F.	84.6	85.7	88.40	90.4	91.6
Condenser Vacuum	Hg.	27.9	27.80	27.60	27.30	27.1
Barometric Pressure	Hg.	30.1	30.12	30.15	30.15	30.15
Excess O2	%	2.0	1.30	1.12	1.35	1.3
Feedwater Flow (X1000)	Lb/Hr	84.06	91.9	111.4	125.2	131.4
Steam Flow (X1000)	Lb/Hr	81.44	92.2	110.6	123.7	131.1
Throttle Stm. Press.	PSIG	615.00	612	611	610	610.0
Feedwater to Blr.	*F.	338.0	348	360	372	375
GENERATOR						
Generator Integrator, Start		4031.3	4042.1	4055.8	4071.7	4089.3
Generator Integrator, Stop		4039.2	4051.0	4066.2	4083.2	4101.5
Generator Integrator, Diff.	MWH	7.9	8.9	10.4	11.5	12.2
Generator Volts	V.	11,800	11,800	11,800	11,900	11,900
Generator Amps	A.	435	500	600	655	680
Generator VARS	MVAR	5.0	6.5	7.4	7.8	7.9
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8254.7	8262.1	8270.5	8279.3	8288.3
Aux. KWH Mtr. End (X100)	KWH	8260.3	8267.8	8276.4	8285.3	8294.5
Aux. Integrator, Diff.	KWH	5.6	5.7	5.9	6.0	6.2
Aux. Load Indicator	MW	0.64	0.60	0.66	0.62	0.63
Aux. Amps	A.	37.0	34.0	37.0	37.0	37.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0625	0745	0915	1045	1215
F.O. Totalizer-End	Lbs/Hr.	6071	6654	7826	8670	9143
End Test	Time	0725	0845	1015	1145	1315
Difference	Lbs/Hr.	6071	6654	7826	8670	9143
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	242	241	240	238	237
F.O. Temp. @ Burner Deck	*F	220	221	216	215	216
Sulfur, Wt. %		1.57				
API Gravity @ 60 *F.	API	11.4				
Higher Heating Value	BTU/Gal	151,405				

TESTED BY: Glen_Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-17-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.5	11.5	12.5
F.O. Temp. *F.	242	241	240	238	237
F.O. Temp. (Corr.)	0.93675	0.9371	0.93745	0.93815	0.9385
F.O. Usage (Lbs.)	6070.8	6654.2	7826.3	8669.8	9142.8
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	739.3	810.3	953.0	1,055.7	1,113.3
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	8,900	10,400	11,500	12,200
KW (Aux.)	560	570	590	600	620
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,405	151,405	151,405	151,405	151,405
HEAT RATE (APPROX.)	14,130	13,748	13,837	13,862	13,780
HEAT RATE (APPROX.)N	15,208	14,689	14,669	14,625	14,518
HEAT RATE (ACTUAL)-G	14,168	13,785	13,874	13,900	13,817
HEAT RATE (ACTUAL)-N	15,249	14,728	14,709	14,665	14,557

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 04-22-03
DATE: 04-17-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.9	8.9	10.4	11.5	12.2
HEAT RATE(BTU/MW)G	14,168	13,785	13,874	13,900	13,817
HEAT RATE(BTU/MW)N	15,249	14,728	14,709	14,665	14,557
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.6169	act.			
H.H.V. (BTU/GAL)	151,405	act.			

A, B, C CONSTANTS:

GROSS	A=	17,955.79	NET A=	20,852.16
	B=	(772.506)	B=	(1,102.276)
	C=	35.9500	C=	48.5086

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,441	14,992	14,794	14,615	14,453	14,310	14,184	14,077	13,987	13,915
HEAT RATE(BTU/MW)N	17,219	16,553	16,257	15,985	15,737	15,513	15,314	15,138	14,988	14,861
GROSS (MBTU)	61.764	74.960	81.370	87.690	93.947	100.169	106.381	112.612	118.888	125.237
NET (MBTU)	68.877	82.767	89.414	95.909	102.290	108.592	114.853	121.108	127.394	133.748
COST/KWH	$0.0768	$0.0745	$0.0736	$0.0727	$0.0719	$0.0711	$0.0705	$0.0700	$0.0695	$0.0692
G/KWH	381.51	370.41	365.53	361.10	357.11	353.56	350.46	347.80	345.58	343.81
G/PS-H	277.94	269.86	266.30	263.07	260.16	257.58	255.32	253.38	251.76	250.47

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,861	13,826	13,808	13,808	13,826	13,863	13,917	13,989
HEAT RATE(BTU/MW)N	14,758	14,680	14,626	14,597	14,591	14,610	14,653	14,721
GROSS (MBTU)	131.684	138.257	144.984	151.890	159.003	166.350	173.958	181.854
NET (MBTU)	140.205	146.803	153.576	160.563	167.799	175.321	183.165	191.367
COST/KWH	$0.0689	$0.0687	$0.0687	$0.0687	$0.0687	$0.0689	$0.0692	$0.0696
G/KWH	342.48	341.60	341.16	341.17	341.61	342.51	343.85	345.63
G/PS-H	249.51	248.86	248.54	248.55	248.87	249.53	250.50	251.80

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 04-14-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	88	98	97	100	99
Gas Entering A.H.	*F.	643.4	658.8	703.3	736.1	762.1
Gas Leaving A.H.	*F.	338.7	344	356.6	361.5	373.5
Air Entering A.H.	*F.	153.8	150.7	137.2	134.3	140.4
Air Leaving A.H.	*F.	402.1	403.3	415	426	440.1
Circ. Water Inlet	*F.	70	70.0	70.0	71.0	71.0
Circ. Water Outlet	*F.	84.88	85.7	88.30	89.9	91.6
Condenser Vacuum	Hg.	28.1	28.00	27.70	27.50	27.3
Barometric Pressure	Hg.	30.3	30.31	30.32	30.32	30.29
Excess O2	%	1.2	0.82	0.94	0.55	0.7
Feedwater Flow (X1000)	Lb/Hr	81.76	91.0	105.0	120.4	130.4
Steam Flow (X1000)	Lb/Hr	81.77	91.2	109.3	120.4	131.2
Throttle Stm. Press.	PSIG	612.00	615	612	611	610.0
Feedwater to Blr.	*F.	340.0	350	360	370	375
GENERATOR						
Generator Integrator, Start		3188.6	3199.5	3215.0	3228.3	3245.0
Generator Integrator, Stop		3196.6	3208.4	3225.6	3236.9	3257.3
Generator Integrator, Diff.	MWH	8.0	8.9	10.6	8.6	12.3
Generator Volts	V.	11,700	11,800	11,900	11,800	11,900
Generator Amps	A.	412	520	590	630	670
Generator VARS	MVAR	5.0	7.0	7.0	7.0	7.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	7820.6	7828.0	7837.4	7844.8	7853.3
Aux. KWH Mtr. End (X100)	KWH	7826.1	7833.6	7843.3	7849.3	7859.6
Aux. Integrator, Diff.	KWH	5.5	5.6	5.9	4.5	6.3
Aux. Load Indicator	MW	0.59	0.60	0.61	0.62	0.70
Aux. Amps	A.	33.0	34.0	38.0	37.0	41.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0630	0750	0930	1045	1210
F.O. Totalizer-End	Lbs/Hr.	6233	6718	7920	6567	9387
End Test	Time	0730	0850	1030	1145	1310
Difference	Lbs/Hr.	6233	6718	7920	6567	9387
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	236	238	238	238	237
F.O. Temp. @ Burner Deck	*F	216	218	218	216	216
Sulfur, Wt. %		1.54				
API Gravity @ 60 *F.	API	11.5				
Higher Heating Value	BTU/Gal	150,119				

TESTED BY: Glen Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-14-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.5	11.5	12.5
F.O. Temp. *F.	236	238	238	238	237
F.O. Temp. (Corr.)	0.93885	0.93815	0.93815	0.93815	0.9385
F.O. Usage (Lbs.)	6232.8	6718.0	7920.4	6566.6	9386.9
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	759.0	818.1	964.5	799.6	1,143.1
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	8,900	10,600	8,600	12,300
KW (Aux.)	550	560	590	450	630
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,119	150,119	150,119	150,119	150,119
HEAT RATE (APPROX.)	14,326	13,880	13,739	14,040	14,033
HEAT RATE (APPROX.)N	15,383	14,812	14,549	14,815	14,790
HEAT RATE (ACTUAL)-G	14,242	13,799	13,659	13,958	13,951
HEAT RATE (ACTUAL)-N	15,294	14,725	14,464	14,729	14,704

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 04-21-03
DATE: 04-14-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	8.0	8.9	10.6		12.3
HEAT RATE(BTU/MW)G	14,242	13,799	13,659		13,951
HEAT RATE(BTU/MW)N	15,294	14,725	14,464		14,704
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$31.6169	act.			
H.H.V. (BTU/GAL)	150,119	act.			

A, B, C CONSTANTS:

GROSS	A=	24,506.93	NET A=	27,692.98
	B=	(2,085.779)	B=	(2,483.062)
	C=	99.8804	C=	116.1117

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	17,762	16,575	16,057	15,588	15,169	14,801	14,482	14,213	13,994	13,825
HEAT RATE(BTU/MW)N	19,619	18,180	17,549	16,975	16,459	16,001	15,601	15,260	14,976	14,750
GROSS (MBTU)	71.048	82.875	88.311	93.528	98.601	103.604	108.614	113.704	118.950	124.427
NET (MBTU)	78.474	90.902	96.517	101.848	106.982	112.007	117.010	122.077	127.296	132.754
COST/KWH	$0.0891	$0.0831	$0.0805	$0.0782	$0.0761	$0.0742	$0.0726	$0.0713	$0.0702	$0.0693
G/KWH	438.85	409.53	396.72	385.14	374.80	365.69	357.81	351.17	345.76	341.59
G/PS-H	319.71	298.35	289.02	280.58	273.05	266.41	260.67	255.83	251.90	248.85

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,706	13,637	13,618	13,649	13,730	13,860	14,041	14,272
HEAT RATE(BTU/MW)N	14,583	14,474	14,422	14,429	14,494	14,616	14,797	15,036
GROSS (MBTU)	130.209	136.372	142.990	150.138	157.891	166.324	175.513	185.531
NET (MBTU)	138.538	144.735	151.432	158.717	166.676	175.396	184.964	195.469
COST/KWH	$0.0687	$0.0684	$0.0683	$0.0684	$0.0688	$0.0695	$0.0704	$0.0716
G/KWH	338.65	336.94	336.47	337.23	339.22	342.45	346.92	352.61
G/PS-H	246.71	245.47	245.13	245.68	247.13	249.49	252.74	256.89

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 01-15-03

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	90	88	85	90	85
Gas Entering A.H.	*F.	635	656	689	709	741
Gas Leaving A.H.	*F.	345	348	357	364	376
Air Entering A.H.	*F.	151	147	139	135	128
Air Leaving A.H.	*F.	409	413	423	430	445
Circ. Water Inlet	*F.	71.0	71.0	71.0	71.0	71.0
Circ. Water Outlet	*F.	84.0	86.0	88.00	89.0	91.0
Condenser Vacuum	Hg.	28.00	27.80	27.60	27.50	27.2
Barometric Pressure	Hg.	30.00	30.00	29.99	29.98	29.93
Excess O2	%	1.80	1.30	1.00	1.00	0.9
Feedwater Flow (X1000)	Lb/Hr	82.0	92.0	104.0	115.0	129.0
Steam Flow (X1000)	Lb/Hr	81.0	91.0	109.0	119.0	133.0
Throttle Stm. Press.	PSIG	616	615	612	610	610.0
Feedwater to Blr.	*F.	335	346	360	368	373
GENERATOR						
Generator Integrator, Start		7364.1	7375.9	7392.3	7406.6	7422.9
Generator Integrator, Stop		7372.2	7384.9	7402.9	7418.1	7435.6
Generator Integrator, Diff.	MWH	8.1	9.0	10.6	11.5	12.7
Generator Volts	V.	11,700	11,700	11,700	11,800	11,900
Generator Amps	A.	455	545	640	675	730
Generator VARS	MVAR	5.2	7.2	8.0	8.2	8.6
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	5288.2	5295.8	5305.4	5312.8	5320.8
Aux. KWH Mtr. End (X100)	KWH	5293.5	5301.3	5311.0	5318.5	5326.7
Aux. Integrator, Diff.	KWH	5.3	5.5	5.6	5.7	5.9
Aux. Load Indicator	MW	0.42	0.41	0.35	0.35	0.37
Aux. Amps	A.	33.0	34.0	34.0	35.0	36.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0636	0800	0945	1105	1229
F.O. Totalizer-End	Lbs/Hr.	6075	6855	7735	8426	9352
End Test	Time	0736	0900	1045	1205	1329
Difference	Lbs/Hr.	6075	6855	7735	8426	9352
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	225	218	219	215	215
F.O. Temp. @ Burner Deck	*F	226	220	220	217	216
Sulfur, Wt. %		1.45				
API Gravity @ 60 *F.	API	13.5				
Higher Heating Value	BTU/Gal	149,738				

TESTED BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-15-03
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.5	11.5	12.5
F.O. Temp. *F.	225	218	219	215	215
F.O. Temp. (Corr.)	0.9427	0.94515	0.9448	0.9462	0.9462
F.O. Usage (Lbs.)	6075.0	6855.0	7735.0	8426.0	9352.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	739.8	834.8	941.9	1,026.1	1,138.8
PT RATIO	1	1	1	1	1
KW (Gen.)	8,100	9,000	10,600	11,500	12,700
KW (Aux.)	530	550	560	570	590
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,738	149,738	149,738	149,738	149,738
HEAT RATE (APPROX.)	13,791	14,005	13,418	13,473	13,540
HEAT RATE (APPROX.)N	14,756	14,917	14,166	14,175	14,200
HEAT RATE (ACTUAL)-G	13,676	13,888	13,306	13,360	13,427
HEAT RATE (ACTUAL)-N	14,633	14,792	14,048	14,057	14,081

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 01-14-03
DATE: 01-15-03 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	8.1	9.0	10.6	11.5	12.7
HEAT RATE(BTU/MW)G	13,676	13,888	13,306	13,360	13,427
HEAT RATE(BTU/MW)N	14,633	14,792	14,048	14,057	14,081
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$28.8636	act.			
H.H.V. (BTU/GAL)	149,738	act.			

A, B, C CONSTANTS:

GROSS A=	17,169.72	NET A=	19,522.31
B=	(620.983)	B=	(856.155)
C=	25.4061	C=	33.3642

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,092	14,700	14,523	14,358	14,207	14,068	13,941	13,828	13,727	13,639
HEAT RATE(BTU/MW)N	16,632	16,076	15,823	15,586	15,367	15,164	14,978	14,808	14,656	14,519
GROSS (MBTU)	60.369	73.500	79.876	86.151	92.344	98.474	104.561	110.623	116.679	122.749
NET (MBTU)	66.526	80.378	87.025	93.519	99.885	106.149	112.334	118.467	124.572	130.675
COST/KWH	$0.0693	$0.0675	$0.0667	$0.0659	$0.0652	$0.0646	$0.0640	$0.0635	$0.0630	$0.0626
G/KWH	372.89	363.20	358.82	354.76	351.01	347.58	344.46	341.65	339.16	336.98
G/PS-H	271.66	264.60	261.41	258.45	255.72	253.22	250.95	248.90	247.09	245.50

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,563	13,500	13,450	13,413	13,388	13,376	13,377	13,391
HEAT RATE(BTU/MW)N	14,400	14,297	14,211	14,142	14,089	14,053	14,034	14,031
GROSS (MBTU)	128.851	135.005	141.229	147.543	153.966	160.517	167.214	174.077
NET (MBTU)	136.800	142.972	149.216	155.558	162.023	168.635	175.419	182.401
COST/KWH	$0.0622	$0.0620	$0.0617	$0.0616	$0.0614	$0.0614	$0.0614	$0.0615
G/KWH	335.11	333.56	332.33	331.40	330.79	330.50	330.52	330.85
G/PS-H	244.14	243.01	242.11	241.43	240.99	240.78	240.79	241.03

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 11-27-02

Note: No LO-1 added during test.

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	12,000	13,500
BOILER-TURBINE						
Ambient Air Temp	*F.	84	102	109	114	117
Gas Entering A.H.	*F.	609.4	628.6	646.7	693.8	729.8
Gas Leaving A.H.	*F.	338.4	343.5	349.7	364.1	374.4
Air Entering A.H.	*F.	170.9	166	159	145.6	104.5
Air Leaving A.H.	*F.	409	414.8	419	431.1	448.5
Circ. Water Inlet	*F.	70.0	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	83.8	85.2	86.39	89.7	92.5
Condenser Vacuum	Hg.	28.00	27.90	27.80	27.50	27.2
Barometric Pressure	Hg.	30.00	30.00	30.03	30.02	30.01
Excess O2	%	1.45	1.01	1.03	1.06	1.2
Feedwater Flow (X1000)	Lb/Hr	79.2	89.1	97.7	118.7	139.5
Steam Flow (X1000)	Lb/Hr	78.0	89.9	100.0	122.5	139.6
Throttle Stm. Press.	PSIG	616	615	615	612	610.0
Feedwater to Blr.	*F.	335	345	355	370	375
GENERATOR						
Generator Integrator, Start		4104.3	4116.6	4130.5	4146.2	4164.7
Generator Integrator, Stop		4112.2	4125.6	4140.5	4158.2	4178.2
Generator Integrator, Diff.	MWH	7.9	9.0	10.0	12.0	13.5
Generator Volts	V.	11,800	11,800	11,800	11,800	11,900
Generator Amps	A.	480	530	580	680	740
Generator VARS	MVAR	6.8	6.9	7.3	8.0	8.0
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8602.9	8611.0	8619.3	8627.8	8636.7
Aux. KWH Mtr. End (X100)	KWH	8608.3	8616.6	8625.0	8633.7	8642.9
Aux. Integrator, Diff.	KWH	5.4	5.6	5.7	5.9	6.2
Aux. Load Indicator	MW	0.58	0.59	0.59	0.61	0.65
Aux. Amps	A.	35.0	35.0	35.0	36.0	37.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0630	0800	0930	1100	1230
F.O. Totalizer-End	Lbs/Hr.	5977.1	6713.3	7260.0	8685.5	9852.5
End Test	Time	0730	0900	1030	1200	1330
Difference	Lbs/Hr.	5977.1	6713.3	7260.0	8685.5	9852.5
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	248	238	230	228	225
F.O. Temp. @ Burner Deck	*F	228	222	220	215	213
Sulfur, Wt. %		1.55				
API Gravity @ 60 *F.	API	11.7				
Higher Heating Value	BTU/Gal	149,857				

TESTED BY: G.A.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 11-27-02
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.0	12.0	13.5
F.O. Temp. *F.	248	238	230	228	225
F.O. Temp. (Corr.)	0.93465	0.93815	0.94095	0.94165	0.9427
F.O. Usage (Lbs.)	5977.1	6713.3	7260.0	8685.5	9852.5
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	727.9	817.5	884.1	1,057.7	1,199.8
PT RATIO	1	1	1	1	1
KW (Gen.)	7,900	9,000	10,000	12,000	13,500
KW (Aux.)	540	560	570	590	620
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,857	149,857	149,857	149,857	149,857
HEAT RATE (APPROX.)	13,912	13,716	13,349	13,309	13,420
HEAT RATE (APPROX.)N	14,933	14,626	14,156	13,997	14,066
HEAT RATE (ACTUAL)-G	13,807	13,612	13,248	13,208	13,318
HEAT RATE (ACTUAL)-N	14,820	14,515	14,049	13,891	13,959

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: No LO-1 added during test.

KPP UNIT NO. 4 — Fuel Oil Tested: 12-05-02
DATE: 11-27-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	7.9	9.0	10.0	12.0	13.5
HEAT RATE(BTU/MW)G	13,807	13,612	13,248	13,208	13,318
HEAT RATE(BTU/MW)N	14,820	14,515	14,049	13,891	13,959
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$29.8788	act.			
H.H.V. (BTU/GAL)	149,857	act.			

A, B, C CONSTANTS:

GROSS A=	19,202.38	NET A=	21,754.24
B=	(1,022.435)	B=	(1,291.399)
C=	43.4595	C=	52.8957

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,808	15,177	14,894	14,632	14,393	14,175	13,979	13,804	13,652	13,521
HEAT RATE(BTU/MW)N	17,435	16,620	16,252	15,910	15,595	15,306	15,044	14,808	14,599	14,416
GROSS (MBTU)	63.232	75.883	81.915	87.794	93.553	99.224	104.840	110.434	116.039	121.686
NET (MBTU)	69.740	83.098	89.384	95.461	101.367	107.144	112.831	118.467	124.092	129.746
COST/KWH	$0.0750	$0.0720	$0.0707	$0.0695	$0.0683	$0.0673	$0.0664	$0.0655	$0.0648	$0.0642
G/KWH	390.58	374.98	367.98	361.53	355.61	350.22	345.38	341.07	337.30	334.06
G/PS-H	284.54	273.18	268.09	263.38	259.07	255.15	251.62	248.48	245.73	243.37

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,411	13,324	13,258	13,214	13,192	13,191	13,212	13,255
HEAT RATE(BTU/MW)N	14,260	14,130	14,026	13,949	13,899	13,874	13,877	13,905
GROSS (MBTU)	127.409	133.240	139.211	145.356	151.707	158.296	165.156	172.320
NET (MBTU)	135.468	141.298	147.276	153.442	159.834	166.493	173.459	180.771
COST/KWH	$0.0637	$0.0633	$0.0629	$0.0627	$0.0626	$0.0626	$0.0627	$0.0629
G/KWH	331.36	329.20	327.58	326.49	325.94	325.92	326.45	327.51
G/PS-H	241.41	239.83	238.65	237.86	237.45	237.44	237.82	238.60

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 08-12-02

Note: No LO-1 added during test.

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,500	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	96	108	111	113	114
Gas Entering A.H.	*F.	606.3	625.3	656.5	668.7	697.3
Gas Leaving A.H.	*F.	322.2	326.6	334.1	340.2	347.3
Air Entering A.H.	*F.	164.3	160.8	151.7	146.8	139
Air Leaving A.H.	*F.	416	419.2	429	432.2	442.7
Circ. Water Inlet	*F.	71.0	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	84.2	85.9	87.71	87.2	91.2
Condenser Vacuum	Hg.	28.10	27.90	27.70	27.60	27.4
Barometric Pressure	Hg.	30.00	30.02	30.04	30.01	30.00
Excess O2	%	2.19	2.24	2.07	1.84	1.9
Feedwater Flow (X1000)	Lb/Hr	82.4	92.9	104.0	114.9	128.0
Steam Flow (X1000)	Lb/Hr	81.0	91.4	106.9	118.5	132.0
Throttle Stm. Press.	PSIG	615	619	615	613	612
Feedwater to Blr.	*F.	338	348	361	368	374
GENERATOR						
Generator Integrator, Start		7281.6	7294.2	7312.8	7328.9	7346.6
Generator Integrator, Stop		7289.8	7303.3	7323.2	7340.4	7359.4
Generator Integrator, Diff.	MWH	8.2	9.1	10.4	11.5	12.8
Generator Volts	V.	11,800	11,800	11,800	11,800	11,900
Generator Amps	A.	462	523	600	675	735
Generator VARS	MVAR	6.1	6.7	7.8	8.3	8.6
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	4579.0	4586.8	4597.2	4605.4	4613.9
Aux. KWH Mtr. End (X100)	KWH	4584.2	4592.2	4602.7	4611.0	4619.8
Aux. Integrator, Diff.	KWH	5.2	5.4	5.5	5.6	5.9
Aux. Load Indicator	MW	0.55	0.56	0.58	0.59	0.61
Aux. Amps	A.	34.0	36.0	38.0	39.0	36.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0620	0750	0945	1115	1245
F.O. Totalizer-End	Lbs/Hr.	5993.0	6688.0	7442.0	8206.0	9105.0
End Test	Time	0720	0850	1045	1215	1345
Difference	Lbs/Hr.	5993.0	6688.0	7442.0	8206.0	9105.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	248	238	226	220	220
F.O. Temp. @ Burner Deck	*F	230	225	218	210	210
Sulfur, Wt. %		1.77				
API Gravity @ 60 *F.	API	13.1				
Higher Heating Value	BTU/Gal	150,024				

TESTED BY: G.A.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 08-12-02
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.5	11.5	12.5
F.O. Temp. *F.	248	238	226	220	220
F.O. Temp. (Corr.)	0.93465	0.93815	0.94235	0.94445	0.94445
F.O. Usage (Lbs.)	5993.0	6688.0	7442.0	8206.0	9105.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	729.8	814.4	906.2	999.3	1,108.7
PT RATIO	1	1	1	1	1
KW (Gen.)	8,200	9,100	10,400	11,500	12,800
KW (Aux.)	520	540	550	560	590
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,024	150,024	150,024	150,024	150,024
HEAT RATE (APPROX.)	13,439	13,514	13,158	13,121	13,080
HEAT RATE (APPROX.)N	14,349	14,366	13,893	13,792	13,712
HEAT RATE (ACTUAL)-G	13,352	13,427	13,073	13,036	12,995
HEAT RATE (ACTUAL)-N	14,256	14,274	13,803	13,703	13,623

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: No LO-1 added during test.

KPP UNIT NO. 4 — Fuel Oil Tested: 08/19/02
DATE: 08-12-02 — Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	8.2	9.1	10.4	11.5	12.8
HEAT RATE(BTU/MW)G	13,352	13,427	13,073	13,036	12,995
HEAT RATE(BTU/MW)N	14,256	14,274	13,803	13,703	13,623
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$27.3036	act.			
H.H.V. (BTU/GAL)	150,024	act.			

A, B, C CONSTANTS:

GROSS A=	15,424.14	NET A=	17,638.47
B=	(339.939)	B=	(560.264)
C=	11.6156	C=	19.1232

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,250	14,015	13,906	13,803	13,705	13,614	13,528	13,448	13,374	13,306
HEAT RATE(BTU/MW)N	15,703	15,315	15,135	14,965	14,805	14,654	14,512	14,380	14,258	14,145
GROSS (MBTU)	57.001	70.074	76.482	82.816	89.084	95.296	101.460	107.584	113.678	119.750
NET (MBTU)	62.814	76.576	83.245	89.792	96.231	102.576	108.841	115.042	121.192	127.306
COST/KWH	$0.0617	$0.0607	$0.0603	$0.0598	$0.0594	$0.0590	$0.0586	$0.0583	$0.0580	$0.0577
G/KWH	352.09	346.27	343.58	341.03	338.62	336.36	334.24	332.27	330.43	328.75
G/PS-H	256.50	252.27	250.31	248.45	246.70	245.05	243.50	242.06	240.73	239.50

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,243	13,186	13,135	13,090	13,051	13,018	12,990	12,968
HEAT RATE(BTU/MW)N	14,042	13,948	13,864	13,789	13,724	13,669	13,623	13,587
GROSS (MBTU)	125.809	131.863	137.922	143.993	150.087	156.210	162.373	168.584
NET (MBTU)	133.397	139.482	145.572	151.684	157.831	164.029	170.290	176.629
COST/KWH	$0.0574	$0.0571	$0.0569	$0.0567	$0.0566	$0.0564	$0.0563	$0.0562
G/KWH	327.20	325.80	324.54	323.43	322.46	321.63	320.95	320.41
G/PS-H	238.37	237.35	236.44	235.63	234.92	234.32	233.82	233.42

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 04-26-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	11,000	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	80	82	87	93	93
Gas Entering A.H.	*F.	590	603.3	619.3	643.7	668.2
Gas Leaving A.H.	*F.	318.5	321.7	326	331.9	339.5
Air Entering A.H.	*F.	175.5	174.1	169.3	162.9	156.8
Air Leaving A.H.	*F.	414	417.7	421	427.9	434
Circ. Water Inlet	*F.	70.0	70.0	90.0	70.0	70.0
Circ. Water Outlet	*F.	83.5	85.1	86.42	87.6	89.6
Condenser Vacuum	Hg.	28.20	28.10	28.00	27.90	27.7
Barometric Pressure	Hg.	30.12	30.13	30.13	30.15	30.12
Excess O2	%	2.07	1.67	1.23	1.45	1.3
Feedwater Flow (X1000)	Lb/Hr	80.5	92.0	99.8	108.3	126.1
Steam Flow (X1000)	Lb/Hr	77.9	88.0	96.9	108.7	124.6
Throttle Stm. Press.	PSIG	620	615	615	613	612
Feedwater to Blr.	*F.	335	342	350	360	375
GENERATOR						
Generator Integrator, Start		5687.0	5698.9	5712.8	5729.8	5751.0
Generator Integrator, Stop		5695.0	5708.0	5722.8	5740.8	5763.5
Generator Integrator, Diff.	MWH	8.0	9.1	10.0	11.0	12.5
Generator Volts	V.	11,800	11,800	11,700	11,700	11,700
Generator Amps	A.	440	500	520	605	650
Generator VARS	MVAR	5.0	5.8	5.0	6.7	5.5
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	9729.6	9737.1	9745.4	9754.5	9764.8
Aux. KWH Mtr. End (X100)	KWH	9734.8	9742.6	9750.9	9760.1	9770.5
Aux. Integrator, Diff.	KWH	5.2	5.5	5.5	5.6	5.7
Aux. Load Indicator	MW	0.55	0.60	0.57	0.61	0.62
Aux. Amps	A.	34.0	35.0	34.0	36.0	37.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0603	0730	0900	1040	1230
F.O. Totalizer-End	Lbs/Hr.	5935.6	6620.8	7166.4	7788.9	8847.0
End Test	Time	0703	0830	1000	1140	1330
Difference	Lbs/Hr.	5935.6	6620.8	7166.4	7788.9	8847.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	240	239	230	230	230
F.O. Temp. @ Burner Deck	*F	225	223	220	217	216
Sulfur, Wt. %		1.80				
API Gravity @ 60 *F.	API	10.6				
Higher Heating Value	BTU/Gal	151,976				

TESTED BY: G.A.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-26-02
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.0	11.0	12.5
F.O. Temp. *F.	240	239	230	230	230
F.O. Temp. (Corr.)	0.93745	0.9378	0.94095	0.94095	0.94095
F.O. Usage (Lbs.)	5935.6	6620.8	7166.4	7788.9	8847.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	722.8	806.2	872.7	948.5	1,077.3
PT RATIO	1	1	1	1	1
KW (Gen.)	8,000	9,100	10,000	11,000	12,500
KW (Aux.)	520	550	550	560	570
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,976	151,976	151,976	151,976	151,976
HEAT RATE (APPROX.)	13,643	13,378	13,177	13,020	13,014
HEAT RATE (APPROX.)N	14,591	14,239	13,944	13,718	13,636
HEAT RATE (ACTUAL)-G	13,731	13,465	13,263	13,104	13,098
HEAT RATE (ACTUAL)-N	14,686	14,331	14,034	13,807	13,724

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 04-30-02
DATE: 04-26-02 — Tested by: E.Wong/S.Oshiro

DATA:

GENERATED (MW)	8.0	9.1	10.0	11.0	12.5
HEAT RATE(BTU/MW)G	13,731	13,465	13,263	13,104	13,098
HEAT RATE(BTU/MW)N	14,686	14,331	14,034	13,807	13,724
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$20.1779	act.			
H.H.V. (BTU/GAL)	151,976	act.			

A, B, C CONSTANTS:

GROSS A=	18,816.01	NET A=	21,016.46
B=	(946.360)	B=	(1,152.983)
C=	39.0534	C=	45.4919

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,655	15,061	14,792	14,544	14,315	14,105	13,915	13,745	13,594	13,462
HEAT RATE(BTU/MW)N	17,132	16,389	16,051	15,736	15,444	15,175	14,928	14,704	14,503	14,324
GROSS (MBTU)	62.622	75.303	81.358	87.263	93.045	98.736	104.363	109.956	115.545	121.159
NET (MBTU)	68.530	81.944	88.282	94.418	100.387	106.223	111.960	117.633	123.275	128.920
COST/KWH	$0.0495	$0.0476	$0.0468	$0.0460	$0.0453	$0.0446	$0.0440	$0.0434	$0.0430	$0.0426
G/KWH	386.81	372.11	365.48	359.34	353.68	348.50	343.81	339.59	335.86	332.61
G/PS-H	281.80	271.09	266.26	261.79	257.66	253.89	250.47	247.40	244.68	242.32

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,350	13,258	13,185	13,132	13,098	13,083	13,089	13,113
HEAT RATE(BTU/MW)N	14,169	14,036	13,926	13,838	13,773	13,732	13,712	13,716
GROSS (MBTU)	126.827	132.577	138.441	144.447	150.623	157.001	163.608	170.474
NET (MBTU)	134.603	140.358	146.219	152.220	158.395	164.778	171.404	178.306
COST/KWH	$0.0422	$0.0419	$0.0417	$0.0415	$0.0414	$0.0414	$0.0414	$0.0415
G/KWH	329.85	327.57	325.76	324.45	323.61	323.26	323.39	324.00
G/PS-H	240.30	238.64	237.33	236.37	235.76	235.50	235.59	236.04

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 04-11-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,500	9,000	10,000	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	110	110	113	114	117
Gas Entering A.H.	*F.	615.1	630	652.3	682.2	700.2
Gas Leaving A.H.	*F.	337.6	335.1	345.6	356.9	364.5
Air Entering A.H.	*F.	179.6	163.6	163.8	160.4	158.5
Air Leaving A.H.	*F.	426.9	422.3	430	443.7	453.4
Circ. Water Inlet	*F.	70.0	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	84.8	85.9	87.60	89.4	90.6
Condenser Vacuum	Hg.	27.90	27.80	27.60	27.40	27.3
Barometric Pressure	Hg.	30.15	30.18	30.19	30.19	30.15
Excess O2	%	1.50	1.06	0.84	0.90	1.0
Feedwater Flow (X1000)	Lb/Hr	86.1	94.4	105.8	119.1	127.2
Steam Flow (X1000)	Lb/Hr	86.7	97.8	109.2	121.9	129.3
Throttle Stm. Press.	PSIG	620	618	615	613	611
Feedwater to Blr.	*F.	343	352	360	370	374
GENERATOR						
Generator Integrator, Start		3194.0	3208.7	3223.3	3239.3	3258.0
Generator Integrator, Stop		3202.5	3218.1	3233.7	3250.9	3270.2
Generator Integrator, Diff.	MWH	8.5	9.4	10.4	11.6	12.2
Generator Volts	V.	11,800	11,600	11,600	11,600	11,500
Generator Amps	A.	458	498	590	630	660
Generator VARS	MVAR	5.0	4.8	5.8	6.1	6.7
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	8537.7	8546.5	8554.7	8562.9	8571.8
Aux. KWH Mtr. End (X100)	KWH	8543.0	8551.9	8560.1	8568.5	8577.6
Aux. Integrator, Diff.	KWH	5.3	5.4	5.4	5.6	5.8
Aux. Load Indicator	MW	0.60	0.56	0.61	0.62	0.60
Aux. Amps	A.	35.0	33.0	36.0	37.0	35.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0600	0740	0910	1040	1215
F.O. Totalizer-End	Lbs/Hr.	6293.0	6819.0	7563.0	8428.0	8912.0
End Test	Time	0700	0840	1010	1140	1315
Difference	Lbs/Hr.	6293.0	6819.0	7563.0	8428.0	8912.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	250	251	242	240	240
F.O. Temp. @ Burner Deck	*F	233	235	227	225	225
Sulfur, Wt. %		1.72				
API Gravity @ 60 *F.	API	9.4				
Higher Heating Value	BTU/Gal	152,333				

TESTED BY: G.A.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-11-02
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.5	9.0	10.0	11.5	12.5
F.O. Temp. *F.	250	251	242	240	240
F.O. Temp. (Corr.)	0.93395	0.9336	0.93675	0.93745	0.93745
F.O. Usage (Lbs.)	6293.0	6819.0	7563.0	8428.0	8912.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	766.3	830.4	921.0	1,026.3	1,085.2
PT RATIO	1	1	1	1	1
KW (Gen.)	8,500	9,400	10,400	11,600	12,200
KW (Aux.)	530	540	540	560	580
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	152,333	152,333	152,333	152,333	152,333
HEAT RATE (APPROX.)	13,613	13,339	13,372	13,360	13,432
HEAT RATE (APPROX.)N	14,519	14,152	14,104	14,037	14,103
HEAT RATE (ACTUAL)-G	13,734	13,457	13,490	13,478	13,551
HEAT RATE (ACTUAL)-N	14,647	14,277	14,229	14,161	14,227

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 04-15-02
DATE: 04-11-02 — Tested by: E.Wong

DATA:

GENERATED (MW)	8.5	9.4	10.4	11.6	12.2
HEAT RATE(BTU/MW)G	13,734	13,457	13,490	13,478	13,551
HEAT RATE(BTU/MW)N	14,647	14,277	14,229	14,161	14,227
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$20.1779	act.			
H.H.V. (BTU/GAL)	152,333	act.			

A, B, C CONSTANTS:

GROSS A=	19,905.03	NET A=	22,945.89
B=	(1,210.103)	B=	(1,589.497)
C=	56.5581	C=	71.7606

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,970	15,268	14,960	14,681	14,429	14,206	14,011	13,844	13,705	13,595
HEAT RATE(BTU/MW)N	17,736	16,792	16,374	15,992	15,646	15,336	15,061	14,823	14,620	14,453
GROSS (MBTU)	63.878	76.342	82.282	88.083	93.788	99.440	105.080	110.751	116.497	122.358
NET (MBTU)	70.944	83.962	90.059	95.954	101.699	107.350	112.959	118.581	124.269	130.077
COST/KWH	$0.0504	$0.0482	$0.0472	$0.0463	$0.0455	$0.0448	$0.0442	$0.0437	$0.0432	$0.0429
G/KWH	394.57	377.25	369.63	362.72	356.50	350.99	346.17	342.05	338.63	335.91
G/PS-H	287.45	274.83	269.29	264.25	259.72	255.70	252.19	249.19	246.70	244.72

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,513	13,460	13,434	13,437	13,469	13,528	13,616	13,732
HEAT RATE(BTU/MW)N	14,322	14,227	14,168	14,144	14,157	14,205	14,290	14,410
GROSS (MBTU)	128.377	134.598	141.062	147.812	154.889	162.338	170.199	178.516
NET (MBTU)	136.060	142.270	148.762	155.589	162.806	170.465	178.622	187.330
COST/KWH	$0.0426	$0.0424	$0.0424	$0.0424	$0.0425	$0.0427	$0.0429	$0.0433
G/KWH	333.88	332.56	331.93	332.00	332.78	334.25	336.42	339.28
G/PS-H	243.24	242.28	241.82	241.87	242.44	243.51	245.09	247.18

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 02-06-02

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,500	9,000	10,000	11,500	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	104	105	112	115	115
Gas Entering A.H.	*F.	580	595	610	650	680
Gas Leaving A.H.	*F.	308	310	325	340	350
Air Entering A.H.	*F.	170	170	160	150	150
Air Leaving A.H.	*F.	445	448	452	465	470
Circ. Water Inlet	*F.	70.0	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	84.0	85.0	86.00	89.0	90.0
Condenser Vacuum	Hg.	280.00	279.00	27.80	27.50	27.3
Barometric Pressure	Hg.	30.14	30.16	30.15	30.13	30.09
Excess O2	%	1.80	1.20	1.10	1.10	1.1
Feedwater Flow (X1000)	Lb/Hr	83.0	90.0	100.0	117.0	130.0
Steam Flow (X1000)	Lb/Hr	81.0	91.0	103.0	119.0	131.0
Throttle Stm. Press.	PSIG	618	617	615	615	611
Feedwater to Blr.	*F.	337	344	356	367	374
GENERATOR						
Generator Integrator, Start		4882.0	4894.1	4906.2	4918.5	4935.9
Generator Integrator, Stop		4890.1	4903.0	4916.1	4930.0	4948.3
Generator Integrator, Diff.	MWH	8.1	8.9	9.9	11.5	12.4
Generator Volts	V.	11,400	11,300	11,400	11,300	11,300
Generator Amps	A.	480	505	580	620	690
Generator VARS	MVAR	6.1	6.0	7.2	6.3	7.2
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	9760.1	9768.2	9775.7	9782.9	9791.9
Aux. KWH Mtr. End (X100)	KWH	9765.7	9773.8	9781.7	9788.9	9797.6
Aux. Integrator, Diff.	KWH	5.6	5.6	6.0	6.0	5.7
Aux. Load Indicator	MW	0.62	0.62	0.63	0.65	0.63
Aux. Amps	A.	32.0	36.0	37.0	38.0	36.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0700	0827	0947	1100	1230
F.O. Totalizer-End	Lbs/Hr.	5977.0	6464.0	7114.0	8136.0	8984.0
End Test	Time	0800	0927	1047	1200	1330
Difference	Lbs/Hr.	5977.0	6464.0	7114.0	8136.0	8984.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	Yes	Yes	Yes	Yes	Yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	239	236	238	229	245
F.O. Temp. @ Burner Deck	*F	223	220	220	217	229
Sulfur, Wt. %		1.95				216
API Gravity @ 60 *F.	API	11.3				
Higher Heating Value	BTU/Gal	150,286				

TESTED BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 02-06-02
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.5	9.0	10.0	11.5	12.5
F.O. Temp. *F.	239	236	238	229	245
F.O. Temp. (Corr.)	0.9378	0.93885	0.93815	0.9413	0.9357
F.O. Usage (Lbs.)	5977.0	6464.0	7114.0	8136.0	8984.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	727.8	787.1	866.3	990.7	1,094.0
PT RATIO	1	1	1	1	1
KW (Gen.)	8,100	8,900	9,900	11,500	12,400
KW (Aux.)	560	560	600	600	570
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	150,286	150,286	150,286	150,286	150,286
HEAT RATE (APPROX.)	13,568	13,355	13,213	13,009	13,322
HEAT RATE (APPROX.)N	14,576	14,252	14,066	13,725	13,964
HEAT RATE (ACTUAL)-G	13,504	13,292	13,151	12,947	13,259
HEAT RATE (ACTUAL)-N	14,507	14,184	13,999	13,660	13,898

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 02-12-02
DATE: 02-06-02 — Tested by: E.Wong

DATA:

GENERATED (MW)	8.1	8.9	9.9	11.5	12.4
HEAT RATE(BTU/MW)G	13,504	13,292	13,151	12,947	13,259
HEAT RATE(BTU/MW)N	14,507	14,184	13,999	13,660	13,898

NUMBER OF TESTS 5
PRICE OF FUEL/BBL $19.7084 act.
H.H.V. (BTU/GAL) 150,286 act.

A, B, C CONSTANTS:

GROSS	A=	21,072.79	NET A=	22,944.72
	B=	(1,489.008)	B=	(1,616.237)
	C=	68.8880	C=	71.1552

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	16,219	15,350	14,967	14,619	14,305	14,025	13,780	13,570	13,393	13,252
HEAT RATE(BTU/MW)N	17,618	16,642	16,208	15,809	15,445	15,118	14,825	14,569	14,348	14,162
GROSS (MBTU)	64.876	76.750	82.319	87.712	92.981	98.177	103.351	108.556	113.844	119.265
NET (MBTU)	70.473	83.212	89.143	94.853	100.396	105.824	111.191	116.550	121.955	127.459
COST/KWH	$0.0506	$0.0479	$0.0467	$0.0456	$0.0447	$0.0438	$0.0430	$0.0424	$0.0418	$0.0414
G/KWH	400.73	379.26	369.80	361.19	353.43	346.53	340.47	335.27	330.92	327.41
G/PS-H	291.94	276.30	269.41	263.14	257.49	252.45	248.04	244.25	241.08	238.53

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,144	13,072	13,033	13,029	13,060	13,125	13,224	13,358
HEAT RATE(BTU/MW)N	14,012	13,898	13,819	13,776	13,768	13,796	13,860	13,959
GROSS (MBTU)	124.871	130.715	136.848	143.321	150.186	157.495	165.299	173.651
NET (MBTU)	133.116	138.979	145.100	151.535	158.335	165.555	173.247	181.465
COST/KWH	$0.0410	$0.0408	$0.0407	$0.0407	$0.0408	$0.0410	$0.0413	$0.0417
G/KWH	324.76	322.96	322.01	321.92	322.67	324.27	326.73	330.04
G/PS-H	236.60	235.29	234.60	234.52	235.07	236.24	238.03	240.44

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 12-27-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,000	9,000	10,000	12,000	13,000
BOILER-TURBINE						
Ambient Air Temp	*F.	99	108	107	108	108
Gas Entering A.H.	*F.	602	616	633	678	706
Gas Leaving A.H.	*F.	310	324	329	341	350
Air Entering A.H.	*F.	170	166	161	149	142
Air Leaving A.H.	*F.	440	420	424	435	446
Circ. Water Inlet	*F.	70.0	70.0	70.0	70.0	70.0
Circ. Water Outlet	*F.	83.8	85.3	86.49	89.1	90.9
Condenser Vacuum	Hg.	28.00	27.80	27.80	27.40	27.2
Barometric Pressure	Hg.	29.95	29.96	29.98	29.95	29.91
Excess O2	%	1.80	1.71	1.38	1.32	1.5
Feedwater Flow (X1000)	Lb/Hr	81.0	90.0	101.0	123.0	134.0
Steam Flow (X1000)	Lb/Hr	81.0	91.0	99.0	126.0	136.0
Throttle Stm. Press.	PSIG	620	618	618	612	612
Feedwater to Blr.	*F.	335	340	350	375	377
GENERATOR						
Generator Integrator, Start		2571.1	2583.5	2608.5	2622.8	2638.2
Generator Integrator, Stop		2579.2	2592.8	2618.3	2634.9	2651.2
Generator Integrator, Diff.	MWH	8.1	9.3	9.8	12.1	13.0
Generator Volts	V.	11,600	11,600	11,500	11,700	11,800
Generator Amps	A.	420	495	520	670	730
Generator VARS	MVAR	4.3	5.9	5.2	7.4	8.1
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	4039.4	4047.2	4061.0	4068.5	4075.6
Aux. KWH Mtr. End (X100)	KWH	4044.6	4052.5	4066.4	4074.2	4081.5
Aux. Integrator, Diff.	KWH	5.2	5.3	5.4	5.7	5.9
Aux. Load Indicator	MW	0.57	0.56	0.58	0.60	0.61
Aux. Amps	A.	32.0	32.0	33.0	35.0	35.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0600	0730	1005	1130	1245
F.O. Totalizer-End	Lbs/Hr.	5896.0	6583.0	6996.0	8632.0	9223.0
End Test	Time	0700	0830	1105	1230	1345
Difference	Lbs/Hr.	5896.0	6583.0	6996.0	8632.0	9223.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	260	257	251	241	245
F.O. Temp. @ Burner Deck	*F	240	238	237	235	230
Sulfur, Wt. %						
API Gravity @ 60 *F.	API					
Higher Heating Value	BTU/Gal					

TESTED BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 12-27-01
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.0	9.0	10.0	12.0	13.0
F.O. Temp. *F.	260	257	251	241	245
F.O. Temp. (Corr.)	0.93045	0.9315	0.9336	0.9371	0.9357
F.O. Usage (Lbs.)	5896.0	6583.0	6996.0	8632.0	9223.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	718.0	801.6	851.9	1,051.1	1,123.1
PT RATIO	1	1	1	1	1
KW (Gen.)	8,100	9,300	9,800	12,100	13,000
KW (Aux.)	520	530	540	570	590
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)	13,384	13,016	13,127	13,118	13,045
HEAT RATE (APPROX.)N	14,303	13,802	13,892	13,766	13,666
HEAT RATE (ACTUAL)-G	0	0	0	0	0
HEAT RATE (ACTUAL)-N	0	0	0	0	0

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested:
DATE: 12-27-01 — Tested by:

DATA:					
GENERATED (MW)	8.1	9.3	9.8	12.1	13.0
HEAT RATE(BTU/MW)G	13,384	13,016	13,127	13,118	13,045
HEAT RATE(BTU/MW)N	14,303	13,802	13,892	13,766	13,666
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.5897	act.			
H.H.V. (BTU/GAL)	151,000	est.			

A, B, C CONSTANTS:

GROSS A=	17,028.27	NET A=	19,462.32	
B=	(710.089)	B=	(977.919)	
C=	31.3832	C=	41.2781	

PREDICTED VALUES:										
GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	14,690	14,262	14,072	13,898	13,739	13,595	13,468	13,356	13,260	13,180
HEAT RATE(BTU/MW)N	16,211	15,605	15,332	15,081	14,850	14,640	14,450	14,281	14,132	14,005
GROSS (MBTU)	58.760	71.312	77.397	83.385	89.301	95.168	101.009	106.849	112.710	118.616
NET (MBTU)	64.844	78.023	84.328	90.485	96.524	102.477	108.374	114.246	120.125	126.041
COST/KWH	$0.0593	$0.0575	$0.0568	$0.0561	$0.0554	$0.0549	$0.0543	$0.0539	$0.0535	$0.0532
G/KWH	362.95	352.39	347.69	343.37	339.45	335.91	332.76	330.00	327.62	325.63
G/PS-H	264.42	256.72	253.30	250.16	247.30	244.72	242.42	240.41	238.68	237.23

PREDICTED VALUES (CONT.):								
GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,115	13,066	13,032	13,015	13,013	13,026	13,056	13,101
HEAT RATE(BTU/MW)N	13,897	13,811	13,745	13,700	13,675	13,671	13,688	13,725
GROSS (MBTU)	124.590	130.657	136.840	143.161	149.646	156.317	163.197	170.312
NET (MBTU)	132.026	138.109	144.323	150.698	157.266	164.056	171.100	178.430
COST/KWH	$0.0529	$0.0527	$0.0526	$0.0525	$0.0525	$0.0526	$0.0527	$0.0529
G/KWH	324.03	322.82	322.00	321.56	321.51	321.85	322.58	323.69
G/PS-H	236.07	235.18	234.58	234.26	234.23	234.48	235.00	235.82

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 09-17-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	7,500	8,900	10,000	12,000	13,100
BOILER-TURBINE						
Ambient Air Temp	*F.	104	108	110	110	109
Gas Entering A.H.	*F.	550	562	575	610	630
Gas Leaving A.H.	*F.	285	290	292	308	312
Air Entering A.H.	*F.	150	148	148	140	130
Air Leaving A.H.	*F.	465	470	470	480	480
Circ. Water Inlet	*F.	72.0	72.0	73.0	72.0	72.0
Circ. Water Outlet	*F.	81.7	84.5	86.80	88.4	90.3
Condenser Vacuum	Hg.	28.20	28.00	27.90	27.70	27.5
Barometric Pressure	Hg.	30.11	30.12	30.12	30.12	30.10
Excess O2	%	3.06	2.02	1.2	1.31	0.9
Feedwater Flow (X1000)	Lb/Hr	73.0	90.0	99.0	120.0	134.0
Steam Flow (X1000)	Lb/Hr	70.0	86.0	96.0	120.0	135.0
Throttle Stm. Press.	PSIG	565	562	562	558	553
Feedwater to Blr.	*F.	325	340	350	370	375
GENERATOR						
Generator Integrator, Start		3208.0	3219.2	3232.8	3248.2	3266.5
Generator Integrator, Stop		3215.1	3228.1	3242.7	3260.1	3279.7
Generator Integrator, Diff.	MWH	7.1	8.9	9.9	11.9	13.2
Generator Volts	V.	11,700	11,600	11,500	11,600	11,600
Generator Amps	A.	430	495	535	680	710
Generator VARS	MVAR	5.5	5.9	5.3	7.2	6.8
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	642.0	650.0	658.3	666.5	675.1
Aux. KWH Mtr. End (X100)	KWH	647.3	655.5	663.8	672.2	680.9
Aux. Integrator, Diff.	KWH	5.3	5.5	5.5	5.7	5.8
Aux. Load Indicator	MW	0.57	0.59	0.59	0.60	0.63
Aux. Amps	A.	37.0	36.0	35.0	34.0	35.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0600	0730	0900	1030	1200
F.O. Totalizer-End	Lbs/Hr.	5086.0	6240.0	6948.0	8281.0	9230.0
End Test	Time	0700	0830	1000	1130	1300
Difference	Lbs/Hr.	5086.0	6240.0	6948.0	8281.0	9230.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	260	257	252	252	251
F.O. Temp. @ Burner Deck	*F	238	240	236	240	240
Sulfur, Wt. %		1.84				
API Gravity @ 60 *F.	API	15.9				
Higher Heating Value	BTU/Gal	147,500				

TESTED BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 09-17-01
KPP UNIT NO. 4

	TEST LOADS - MW				
	7.5	8.9	10.0	12.0	13.1
F.O. Temp. *F.	260	257	252	252	251
F.O. Temp. (Corr.)	0.93045	0.9315	0.93325	0.93325	0.9336
F.O. Usage (Lbs.)	5086.0	6240.0	6948.0	8281.0	9230.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	619.3	759.9	846.1	1,008.4	1,124.0
PT RATIO	1	1	1	1	1
KW (Gen.)	7,100	8,900	9,900	11,900	13,200
KW (Aux.)	530	550	550	570	580
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	147,500	147,500	147,500	147,500	147,500
HEAT RATE (APPROX.)	13,172	12,892	12,905	12,796	12,857
HEAT RATE (APPROX.)N	14,234	13,741	13,664	13,439	13,448
HEAT RATE (ACTUAL)-G	12,867	12,593	12,606	12,499	12,559
HEAT RATE (ACTUAL)-N	13,904	13,423	13,347	13,128	13,137

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 09-19-01
DATE: 09-17-01 — Tested by: E.Wong

DATA:

GENERATED (MW)	7.1	8.9	9.9	11.9	13.2
HEAT RATE(BTU/MW)G	12,867	12,593	12,606	12,499	12,559
HEAT RATE(BTU/MW)N	13,904	13,423	13,347	13,128	13,137
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.4008	act.			
H.H.V. (BTU/GAL)	147,500	act.			

A, B, C CONSTANTS:

GROSS A=	14,822.36	NET A=	17,231.71
B=	(398.907)	B=	(656.186)
C=	17.2158	C=	26.2125

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	13,502	13,258	13,149	13,049	12,957	12,874	12,799	12,733	12,676	12,627
HEAT RATE(BTU/MW)N	15,026	14,606	14,416	14,238	14,074	13,923	13,785	13,660	13,548	13,449
GROSS (MBTU)	54.009	66.291	72.320	78.292	84.219	90.115	95.992	101.863	107.742	113.640
NET (MBTU)	60.105	73.030	79.286	85.429	91.481	97.460	103.386	109.279	115.158	121.043
COST/KWH	$0.0554	$0.0544	$0.0539	$0.0535	$0.0531	$0.0528	$0.0525	$0.0522	$0.0520	$0.0518
G/KWH	333.60	327.58	324.88	322.40	320.13	318.07	316.23	314.60	313.18	311.97
G/PS-H	243.04	238.65	236.68	234.88	233.22	231.72	230.38	229.19	228.16	227.28

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,586	12,555	12,532	12,518	12,512	12,515	12,526	12,546
HEAT RATE(BTU/MW)N	13,364	13,291	13,232	13,185	13,152	13,132	13,125	13,131
GROSS (MBTU)	119.572	125.549	131.585	137.693	143.885	150.175	156.575	163.099
NET (MBTU)	126.954	132.911	138.933	145.039	151.250	157.585	164.064	170.706
COST/KWH	$0.0516	$0.0515	$0.0514	$0.0513	$0.0513	$0.0513	$0.0514	$0.0514
G/KWH	310.98	310.20	309.63	309.28	309.13	309.20	309.49	309.98
G/PS-H	226.56	225.99	225.57	225.32	225.21	225.26	225.47	225.83

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 04-11-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	8,500	9,000	10,000	11,000	12,000
BOILER-TURBINE						
Ambient Air Temp	*F.	97	98	99	99	99
Gas Entering A.H.	*F.	625	630	650	675	703
Gas Leaving A.H.	*F.	450	450	463	475	490
Air Entering A.H.	*F.	145	145	140	140	138
Air Leaving A.H.	*F.	315	315	312.0	318	323
Circ. Water Inlet	*F.	73.0	73.0	73.0	73.0	73.0
Circ. Water Outlet	*F.	84.0	84.0	86.00	87.0	89.0
Condenser Vacuum	Hg.	28.50	28.50	28.20	28.00	27.8
Barometric Pressure	Hg.	30.22	30.25	30.27	30.25	30.20
Excess O2	%	2.50	2.30	1.5	1.40	1.2
Feedwater Flow (X1000)	Lb/Hr	92.0	96.0	109.0	119.0	132.0
Steam Flow (X1000)	Lb/Hr	86.0	91.0	106.0	116.0	130.0
Throttle Stm. Press.	PSIG					
Feedwater to Blr.	*F.	340	345	357	364	372
GENERATOR						
Generator Integrator, Start		8747.9	8761.6	8777.1	8792.0	8808.2
Generator Integrator, Stop		8756.5	8770.5	8787.2	8802.9	8820.3
Generator Integrator, Diff.	MWH	8.6	8.9	10.1	10.9	12.1
Generator Volts	V.	11,600	11,600	11,600	11,600	11,700
Generator Amps	A.	460	500	585	620	660
Generator VARS	MVAR	5.1	6.0	7.0	7.0	7.0
AUX. TRANSPORMER						
Aux. KWH Mtr. Start (X100)	KWH	3395.0	3403.8	3413.3	3421.8	3430.4
Aux. KWH Mtr. End (X100)	KWH	3400.6	3409.3	3419.1	3427.7	3436.8
Aux. Load Indicator	MW	0.59	0.60	0.67	0.63	0.63
Aux. Volts	V.					
Aux. Amps	A.	33.5	34.0	34.5	35.0	36.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0625	0801	0943	1110	1237
F.O. Totalizer-End	Lbs/Hr.	6746.0	6877.0	7754.0	8425.0	9310.0
End Test	Time	0725	0901	1043	1210	1337
Difference	Lbs/Hr.	6746.0	6877.0	7754.0	8425.0	9310.0
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	0	0	0	0	0
Supplying Stn Aux Stm	Yes/No	yes	yes	yes	yes	yes
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	245	247	247	245	245
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.72				
API Gravity @ 60 *F.	API	9.8				
Higher Heating Value	BTU/Gal	151,452				

TESTED BY: J.Kealiinohomoku

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 04-11-01
KPP UNIT NO. 4

	TEST LOADS - MW				
	8.5	9.0	10.0	11.0	12.0
F.O. Temp. *F.	245	247	247	245	245
F.O. Temp. (Corr.)	0.9357	0.935	0.935	0.9357	0.9357
F.O. Usage (Lbs.)	6746.0	6877.0	7754.0	8425.0	9310.0
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	821.5	837.4	944.2	1,025.9	1,133.7
PT RATIO	1	1	1	1	1
KW (Gen.)	8,600	8,900	10,100	10,900	12,100
KW (Aux.)	560	550	580	590	640
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	151,452	151,452	151,452	151,452	151,452
HEAT RATE (APPROX.)	14,424	14,208	14,117	14,213	14,148
HEAT RATE (APPROX.)N	15,428	15,144	14,977	15,026	14,938
HEAT RATE (ACTUAL)-G	14,467	14,251	14,159	14,255	14,190
HEAT RATE (ACTUAL)-N	15,475	15,189	15,022	15,071	14,983

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 04-12-01
DATE: 04-11-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	8.6	8.9	10.1	10.9	12.1
HEAT RATE(BTU/MW)G	14,467	14,251	14,159	14,255	14,190
HEAT RATE(BTU/MW)N	15,475	15,189	15,022	15,071	14,983
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$25.4171	act.			
H.H.V. (BTU/GAL)	151,452	act.			

A, B, C CONSTANTS:

GROSS A=	18,599.29	NET A=	21,839.59
B=	(802.781)	B=	(1,209.548)
C=	36.4070	C=	53.3134

PREDICTED VALUES:

GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	15,971	15,496	15,285	15,093	14,919	14,764	14,626	14,507	14,406	14,323
HEAT RATE(BTU/MW)N	17,854	17,125	16,800	16,502	16,230	15,985	15,767	15,575	15,410	15,272
GROSS (MBTU)	63.883	77.478	84.069	90.560	96.976	103.346	109.697	116.057	122.452	128.909
NET (MBTU)	71.418	85.623	92.399	99.010	105.495	111.896	118.251	124.602	130.988	137.448
COST/KWH	$0.0638	$0.0619	$0.0611	$0.0603	$0.0596	$0.0590	$0.0584	$0.0580	$0.0576	$0.0572
G/KWH	394.60	382.86	377.66	372.92	368.62	364.78	361.38	358.43	355.94	353.89
G/PS-H	287.47	278.92	275.14	271.68	268.55	265.75	263.27	261.13	259.31	257.82

PREDICTED VALUES (CONT.):

GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	14,259	14,212	14,184	14,174	14,182	14,209	14,253	14,316
HEAT RATE(BTU/MW)N	15,160	15,075	15,017	14,985	14,980	15,002	15,050	15,125
GROSS (MBTU)	135.457	142.122	148.932	155.913	163.095	170.502	178.164	186.107
NET (MBTU)	144.024	150.755	157.680	164.840	172.276	180.026	188.131	196.631
COST/KWH	$0.0570	$0.0568	$0.0567	$0.0566	$0.0567	$0.0568	$0.0570	$0.0572
G/KWH	352.29	351.15	350.45	350.20	350.40	351.06	352.16	353.71
G/PS-H	256.65	255.82	255.31	255.13	255.28	255.75	256.56	257.69

MAUI ELECTRIC CO., LTD.
KAHULUI POWER PLANT
HEAT RATE TEST DATA

KPP UNIT NO. 4
DATE: 01-15-01

Gross Load (K3-4) --->	KWH	7,000	9,000	10,000	12,000	13,500
Actual Test Load	KWH	9,000	10,000	11,000	12,000	12,500
BOILER-TURBINE						
Ambient Air Temp	*F.	100	102	105	104	104
Gas Entering A.H.	*F.	600	618	638	660	670
Gas Leaving A.H.	*F.	440	450	460	470	475
Air Entering A.H.	*F.	160	165	165	155	150
Air Leaving A.H.	*F.	360	360	368.0	368	365
Circ. Water Inlet	*F.	72.0	73.0	73.0	72.0	72.0
Circ. Water Outlet	*F.	84.0	85.1	86.70	88.3	89.0
Condenser Vacuum	Hg.	28.50	28.40	28.30	28.10	28
Barometric Pressure	Hg.	30.15	30.18	30.20	30.20	30.20
Excess O2	%	2.50	3.20	3.1	2.85	2.7
Feedwater Flow (X1000)	Lb/Hr	94.4	100.8	112.2	122.8	128.4
Steam Flow (X1000)	Lb/Hr	90.9	102.3	114.0	125.5	131.2
Throttle Stm. Press.	PSIG	670	665	665	655	652
Feedwater to Blr.	*F.	340	350	360	370	375
GENERATOR						
Generator Integrator, Start		3830.2	3843.9	3859.1	3875.9	3891.0
Generator Integrator, Stop		3839.2	3853.8	3870.1	3887.9	3903.5
Generator Integrator, Diff.	MWH	9.0	9.9	11.0	12.0	12.5
Generator Volts	V.	11,500	11,200	11,400	11,600	11,700
Generator Amps	A.	450	500	638	675	700
Generator VARS	MVAR	4.0	6.5	7.5	8.0	7.8
AUX. TRANSFORMER						
Aux. KWH Mtr. Start (X100)	KWH	1073.8	1082.0	1090.5	1099.3	1106.9
Aux. KWH Mtr. End (X100)	KWH	1079.3	1087.7	1096.4	1105.4	1113.0
Aux. Load Indicator	MW	0.59	0.60	0.67	0.63	0.63
Aux. Volts	V.					
Aux. Amps	A.	34.0	35.0	38.0	37.0	34.0
FUEL OIL						
F.O. Totalizer-Start	Lbs/Hr.	0.0	0.0	0.0	0.0	0.0
Start Test	Time	0600	0730	0900	1030	1145
F.O. Totalizer-End	Lbs/Hr.	6714.3	7274.9	8057.6	8813.5	9201.1
End Test	Time	0700	0830	1000	1130	1245
Difference	Lbs/Hr.	6714.3	7274.9	8057.6	8813.5	9201.1
EQUIPMENT STATUS						
Boiler Blowdown-Open	%	No	No	No	No	No
Supplying Stn Aux Stm	Yes/No	No	No	No	No	No
Circulating Pumps	Number	3	3	3	3	3
FUEL OIL ANALYSIS						
F.O. Temp. @ Heater	*F	235	240	225	220	220
F.O. Temp. @ Burner Deck	*F					
Sulfur, Wt. %		1.84				
API Gravity @ 60 *F.	API	13.6				
Higher Heating Value	BTU/Gal	149,095				

TESTED BY: G.Graf

MAUI ELECTRIC COMPANY, INC.

Kahului Power Plant

Subject: Heat Rate Testing
DATE: 01-15-01
KPP UNIT NO. 4

	TEST LOADS - MW				
	9.0	10.0	11.0	12.0	12.5
F.O. Temp. *F.	235	240	225	220	220
F.O. Temp. (Corr.)	0.9392	0.93745	0.9427	0.94445	0.94445
F.O. Usage (Lbs.)	6714.3	7274.9	8057.6	8813.5	9201.1
Test Time (Hours)	1	1	1	1	1
Specific Gravity @ F.O.Temp					
F.O. Used (Gals.)	817.6	885.9	981.2	1,073.2	1,120.4
PT RATIO	1	1	1	1	1
KW (Gen.)	9,000	9,900	11,000	12,000	12,500
KW (Aux.)	550	570	590	610	610
BTU/gal (Approx.)	151,000	151,000	151,000	151,000	151,000
BTU/gal (Test Lab)	149,095	149,095	149,095	149,095	149,095
HEAT RATE (APPROX.)	13,718	13,512	13,469	13,505	13,535
HEAT RATE (APPROX.)N	14,611	14,337	14,233	14,228	14,229
HEAT RATE (ACTUAL)-G	13,545	13,342	13,299	13,335	13,364
HEAT RATE (ACTUAL)-N	14,426	14,157	14,053	14,049	14,050

FUEL CORRECTION: 1

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

KPP UNIT NO. 4 — Fuel Oil Tested: 01-17-01
DATE: 01-15-01 — Tested by: K.Yokoyama

DATA:					
GENERATED (MW)	9.0	9.9	11.0	12.0	12.5
HEAT RATE(BTU/MW)G	13,545	13,342	13,299	13,335	13,364
HEAT RATE(BTU/MW)N	14,426	14,157	14,053	14,049	14,050
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$31.6781	act.			
H.H.V. (BTU/GAL)	149,095	act.			

A, B, C CONSTANTS:

GROSS	A=	19,886.55	NET A=	21,884.28
	B=	(1,182.452)	B=	(1,356.869)
	C=	52.9390	C=	58.5196

PREDICTED VALUES:										
GENERATED (MW)	4.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
HEAT RATE(BTU/MW)G	16,004	15,298	14,984	14,698	14,437	14,203	13,996	13,815	13,661	13,533
HEAT RATE(BTU/MW)N	17,393	16,563	16,192	15,850	15,537	15,254	14,999	14,775	14,579	14,413
GROSS (MBTU)	64.015	76.489	82.415	88.186	93.842	99.424	104.970	110.520	116.115	121.793
NET (MBTU)	69.572	82.815	89.054	95.099	100.991	106.776	112.496	118.197	123.921	129.713
COST/KWH	$0.0810	$0.0774	$0.0758	$0.0744	$0.0730	$0.0719	$0.0708	$0.0699	$0.0691	$0.0685
G/KWH	395.41	377.97	370.23	363.14	356.71	350.93	345.81	341.33	337.52	334.35
G/PS-H	288.07	275.36	269.72	264.56	259.87	255.66	251.93	248.67	245.89	243.59

PREDICTED VALUES (CONT.):								
GENERATED (MW)	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,431	13,356	13,307	13,285	13,290	13,320	13,378	13,461
HEAT RATE(BTU/MW)N	14,275	14,168	14,089	14,040	14,020	14,029	14,067	14,135
GROSS (MBTU)	127.594	133.559	139.727	146.137	152.830	159.844	167.220	174.998
NET (MBTU)	135.617	141.676	147.934	154.436	161.224	168.344	175.839	183.752
COST/KWH	$0.0679	$0.0676	$0.0673	$0.0672	$0.0672	$0.0674	$0.0677	$0.0681
G/KWH	331.85	329.99	328.79	328.24	328.35	329.11	330.53	332.60
G/PS-H	241.76	240.41	239.53	239.13	239.21	239.77	240.80	242.30

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note:

MPP UNIT NO. 4
DATE: 03-30-06

Gross Load - (M4-9) -->	MWH	3.1	4.0	4.5	5	5.6
Actual Test Load	MWH	3.08	4.02	4.49	4.990	5.59
Description\Time		0734	0853	1010	1140	1259
Ambient air temp	°F.	67	68	71	78	87
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	6517.4	6517.9	6518.6	6519.4	6520.2
Std KWH meter-stop	KWH	6517.8	6518.4	6519.1	6520.0	6520.9
Generator Digital Counter	KWH	0.367	0.478	0.535	0.594	0.666
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	3165.2	3165.5	3165.7	3166.0	3166.2
Aux. clocked-stop	KWH	3165.4	3165.7	3165.9	3166.2	3166.4
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	52	45	50	50	53
Fuel Oil						
F.O. tank level-start	in.	22.00	24.25	24.75	22.25	30.00
F.O. tank level-end	in.	30.625	30.375	29.625	21.875	26.125
F.O. meter rdg-start	gal.	328880	329241	329633	330106	330727
F.O. meter rdg-end	gal.	329241	329633	330041	330462	331071
F.O. temp.	°F.	82	83	85	85	88
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis		
API gravity @ 60 °F.		35.5
Suffur, Wt. %		[redacted]
Higher heating value	BTU/gal	138,738

TEST BY: S.Miguel

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
03-30-06

TEST #1
MPP UNIT NO. 4

DATA:

Dia. of tank	48	Tank level start (h1)	30	in.
Vol. of tank	579.581	Tank level stop (h2)	26.125	in.
Ht. from floor	7			
		Vol diff=	-59.06	gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.5208333
u2= 0.8015625

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.4135264
f(u2)= 0.4935588

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 52.651815
% tank f(u2)= 62.841856

Volume in tank
Vol of f(u1)= 274.42109
Vol of f(u2)= 215.36154

Vol diff= -59.06 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
03-30-06
Unit No.: 4

	3.1	4.0	4.5	5	5.6
	TEST LOADS - MW				
	3.1	4.0	4.5	5.0	5.6
F.O. Temp. °F.	82	83	85	85	88
F.O. Temp. (Corr.)	0.9890	0.9885	0.9875	0.9875	0.9860
F.O.-start gal.	328880	329241	329633	330106	330727
F.O.-end gal.	*329241*	*329633*	*330041*	*330462*	*331071*
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	129.28	92.78	73.86	(5.35)	(59.06)
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,083	4,015	4,494	4,990	5,594
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,738	138,738	138,738	138,738	138,738
HEAT RATE (APPROX.)G	10,266	10,173	10,139	9,878	9,810
HEAT RATE (APPROX.)N	10,586	10,415	10,354	10,064	9,976
HEAT RATE (ACTUAL)-G	10,314	10,220	10,187	9,922	9,856
HEAT RATE (ACTUAL)-N	10,636	10,463	10,403	10,111	10,023

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note:

0

M-4 Fuel Tested: 04-04-06
03-30-06 Tested by: rh

DATA:

GENERATED (MW)	4.015	4.494	4.990	5.594
HEAT RATE(BTU/MW)G	10,220	10,187	9,922	9,856
HEAT RATE(BTU/MW)N	10,463	10,403	10,111	10,023

NUMBER OF TESTS 4
PRICE OF FUEL/BBL $82.9671 act.
H.H.V. (BTU/BBL) 138,738 act.

A, B, C CONSTANTS:

GROSS A=	11,585.74	NET A=	12,258.29
B=	(388.076)	B=	(536.709)
C=	13.5224	C=	23.9353

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,543	10,513	10,482	10,423	10,364	10,306	10,250	10,194	10,140	10,087	10,035
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,864	10,825	10,786	10,710	10,636	10,564	10,494	10,426	10,360	10,296	10,234
GROSS (MBTU)	31.630	32.589	33.544	35.437	37.310	39.164	40.999	42.816	44.616	46.399	48.166
NET (MBTU)	31.577	32.546	33.509	35.415	37.298	39.159	40.999	42.818	44.618	46.401	48.166
COST/KWH	$0.1501	$0.1497	$0.1493	$0.1484	$0.1476	$0.1467	$0.1459	$0.1452	$0.1444	$0.1436	$0.1429
G/KWH	260.50	259.74	258.99	257.52	256.07	254.64	253.25	251.88	250.53	249.22	247.93
G/PS-H	189.78	189.23	188.68	187.61	186.55	185.51	184.50	183.50	182.52	181.56	180.62

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,983	9,933	9,884	9,837	9,790	9,744	9,722	9,699
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,173	10,115	10,058	10,003	9,951	9,900	9,875	9,851
GROSS (MBTU)	49.917	51.654	53.376	55.085	56.781	58.465	59.302	60.137
NET (MBTU)	49.916	51.652	53.375	55.085	56.785	58.475	59.316	60.156
COST/KWH	$0.1421	$0.1414	$0.1407	$0.1401	$0.1394	$0.1387	$0.1384	$0.1381
G/KWH	246.67	245.43	244.22	243.04	241.88	240.75	240.20	239.65
G/PS-H	179.70	178.80	177.92	177.06	176.22	175.39	174.99	174.59

WORKSHEE (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	0
4.0152	16.121831	64.732376	259.91344	10220.1163	41035.811	164766.99	
4.494	20.196036	90.760986	407.87987	10186.5761	45778.473	205728.46	
4.9896	24.8961082	124.22162	619.8162	9921.90718	49506.348	247016.87	
5.5944	31.2973114	175.08968	979.5217	9855.73069	55136.9	308457.87	
0	0	0	0	0	0	0	0
19.0932	92.5112866	454.80466	2267.1312	40184.3302	191457.53	925970.19	

a=	5.49486	C=	13.5224374
b=	-13623.323	B=	-388.07594
d=	-1417.3274	A=	11585.7409
e=	52.8821503		
f=	510.186683		

WORKSHEE (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
0	0	0	0	0	0	0	0
4.0152	16.121831	64.732376	259.91344	10463.337	42012.389	168688.14	
4.494	20.196036	90.760986	407.87987	10402.622	46749.384	210091.73	
4.9896	24.896108	124.22162	619.8162	10111.04	50450.045	251725.55	
5.5944	31.297311	175.08968	979.5217	10022.947	56072.375	313691.29	
0	0	0	0	0	0	0	0
19.0932	92.511287	454.80466	2267.1312	40999.946	195284.19	944196.72	

a=	5.49486	C=	23.935294
b=	-16170.87	B=	-536.7092
d=	-1683.392	A=	12258.289
e=	52.88215		
f=	510.18668		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note:

MPP UNIT NO. 4
DATE: 04-08-05

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.18	4.01	4.49	4.910	5.46
Description\Time		0911	1030	1145	1335	1500
Ambient air temp	°F.	73	74	77	77	78
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	5093.2	5093.8	5094.3	5095.3	5096.2
Std KWH meter-stop	KWH	5093.6	5094.2	5094.9	5095.9	5096.8
Generator Digital Counter	KWH	0.378	0.477	0.535	0.585	0.65
Generator volts	V.					
Generator amps	A					
Generator vars	MVARS					
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	1774.4	1774.7	1774.9	1775.3	1775.6
Aux. clocked-stop	KWH	1774.6	1774.9	1775.1	1775.5	1775.8
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	40	50	50	55	55
Fuel Oil						
F.O. tank level-start	in.	38	30.5	22.5	29.75	23.75
F.O. tank level-end	in.	23	23.375	23	34.125	26.5
F.O. meter rdg-start	gal.	446535	446767	446995	447717	448137
F.O. meter rdg-end	gal.	446535	446927	447332	448137	448576
F.O. temp.	°F.	89	95	96	96	97
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis

API gravity @ 60 °F.		34.1
Sulfur, Wt. %		
Higher heating value	BTU/gal	138,929

TEST BY: K.Inouye

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
04-08-05

TEST #1
MPP UNIT NO. 4

DATA:

Dia. of tank	48	Tank level start (h1)	23.75	in.
Vol. of tank	579,581	Tank level stop (h2)	13.05	in.
Ht. from floor	7			
		Vol diff=	-137.72	gal.

CALCULATIONS:

% of tank u=h/D

u1= 0.6510417
u2= 0.8739583

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]

f(u1)= 0.541411
f(u2)= 0.728044

% tank fill = (4/pi)*f(u)*100

% tank f(u1)= 68.934593
% tank f(u2)= 92.697437

Volume in tank

Vol of f(u1)= 180.04919
Vol of f(u2)= 42.324267

Vol diff= -137.72 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
04-08-05
Unit No.: 4

	3.1	4.0	5.0	5.6	6.1
			TEST LOADS-MW		
	3.2	4.0	4.5	4.9	5.5
F.O. Temp. °F.	89	95	96	96	97
F.O. Temp. (Corr.)	0.9855	0.9825	0.9820	0.9820	0.9815
F.O.-start gal.	446535	446767	446995	447717	448137
F.O.-end gal.	446535	446927	447332	448137	448576
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(226.74)	(107.54)	7.22	87.12	(137.72)
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,175	4,007	4,494	4,914	5,460
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,929	138,929	138,929	138,929	138,929
HEAT RATE (APPROX.)G	9,718	9,059	9,951	9,736	14,317
HEAT RATE (APPROX.)N	10,013	9,276	10,162	9,927	14,566
HEAT RATE (ACTUAL)-G	9,777	9,114	10,011	9,797	14,403
HEAT RATE (ACTUAL)-N	10,073	9,331	10,224	9,987	14,654

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note:
0

M-4 Fuel Tested: 04-14-05
04-08-05 Tested by: K Okuyama

DATA:

GENERATED (MW)	3 175	4.007	4 494	4.914
HEAT RATE(BTU/MW)G	9,777	9,114	10,011	9,797
HEAT RATE(BTU/MW)N	10,073	9,331	10,224	9,987

NUMBER OF TESTS 4
PRICE OF FUEL/BBL $66.9989 act.
H.H.V. (BTU/BBL) 138,929 act.

A, B, C CONSTANTS:

GROSS A= 17,933.77 NET A= 18,860.53
B= (4,350.866) B= (4,641.083)
C= 555.4125 C= 584.1175

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,880	9,784	9,698	9,561	9,469	9,421	9,417	9,458	9,543	9,672	9,846
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,194	10,087	9,990	9,833	9,723	9,659	9,642	9,672	9,748	9,871	10,041
GROSS (MBTU)	29.640	30.329	31.035	32.509	34.088	35.798	37.668	39.722	41.988	44.493	47.262
NET (MBTU)	29.632	30.327	31.037	32.516	34.095	35.803	37.669	39.719	41.983	44.488	47.262
COST/KWH	$0.1134	$0.1123	$0.1114	$0.1098	$0.1087	$0.1082	$0.1081	$0.1086	$0.1096	$0.1111	$0.1131
G/KWH	244.11	241.73	239.62	236.24	233.95	232.76	232.67	233.67	235.78	238.98	243.28
G/PS-H	177.84	176.10	174.57	172.11	170.44	169.57	169.50	170.24	171.77	174.10	177.23

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	10,065	10,328	10,635	10,987	11,383	11,823	12,060	12,308
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,258	10,521	10,832	11,188	11,592	12,042	12,285	12,539
GROSS (MBTU)	50.324	53.704	57.429	61.525	66.020	70.941	73.568	76.312
NET (MBTU)	50.333	53.730	57.480	61.611	66.152	71.130	73.792	76.574
COST/KWH	$0.1156	$0.1186	$0.1221	$0.1262	$0.1307	$0.1358	$0.1385	$0.1413
G/KWH	248.67	255.17	262.76	271.45	281.24	292.13	297.98	304.11
G/PS-H	181.17	185.90	191.43	197.76	204.89	212.82	217.09	221.55

WORKSHEI (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.1752	10.081895	32.012033	101.64461	9776.99189	31043.905	98570.606
4.0068	16.0544462	64.326955	257.74524	9114.12932	36518.493	146322.3
4.494	20.196036	90.760986	407.87987	10011.3882	44991.179	202190.36
4.914	24.147396	118.6603	583.09673	9797.04156	48142.662	236573.04
0	0	0	0	0	0	0
0	0	0	0	0	0	0
16.59	70.4797733	305.76028	1350.3665	38699.551	160696.24	683656.3

a= 6.69099312 C= 555.412546
b= 7089.63754 B= -4350.8656
d= 759.404671 A= 17933.7651
e= 53.7816735
f= 434.06738

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.1752	10.081895	32.012033	101.64461	10073.085	31984.059	101555.78
4.0068	16.054446	64.326955	257.74524	9331.4947	37389.433	149811.98
4.494	20.196036	90.760986	407.87987	10223.719	45945.392	206478.59
4.914	24.147396	118.6603	583.09673	9986.7229	49074.756	241153.35
0	0	0	0	0	0	0
0	0	0	0	0	0	0
16.59	70.479773	305.76028	1350.3665	39615.021	164393.64	698999.71

a= 6.6909931 C= 584.11746
b= 3941.1213 B= -4641.083
d= 361.35967 A= 18860.531
e= 53.781673
f= 434.06738

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MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note:

MPP UNIT NO. 4
DATE: 12-29-04

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3 108	4 1076	4 536	5 116	5 5608
Description\Time		0820	0941	1100	1224	1343
Ambient air temp	°F.	65	68	71	73	74
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 6400)						
Std KWH meter-start	KWH	4291.7	4292.2	4292.9	4293.6	4294.5
Std KWH meter-stop	KWH	4292.0	4292.7	4293.4	4294.2	4295.1
Generator Digital Counter	KWH	0.370	0.489	0.540	0.609	0.662
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	1363.5	1363.8	1364.1	1364.4	1364.7
Aux. clocked-stop	KWH	1363.7	1364.0	1364.3	1364.6	1365.0
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	51	51	51	51	52
Fuel Oil						
F.O. tank level-start	in.	33 75	39	39	34	29+3/4
F.O. tank level-end	in.	20	20 75	25 25	39	32.0
F.O. meter rdg-start	gal.	950909	951301	951706	952120	952549
F.O. meter rdg-end	gal.	950925	951330	951836	952549	952988
F.O. temp.	°F.	87	90	92	94	94
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis		
API gravity @ 60 °F.		
Sulfur, Wt. %		
Higher heating value	BTU/gal	

TEST BY: W.Julian

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
12-29-04

TEST #1
MPP UNIT NO 4

DATA:
Dia. of tank 48
Vol. of tank 579 581
Ht. from floor 7

Tank level start (h1) 29 75 in.
Tank level stop (h2) 32 in.
Vol diff= 34.58 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0 5260417
u2= 0 4791667

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0 418729
f(u2)= 0.3718718

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 53.314228
% tank f(u2)= 47.348185

Volume in tank
Vol of f(u1)= 270.58186
Vol of f(u2)= 305.15991

Vol diff= 34.58 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
12-29-04
Unit No.: 4

	3.1	4.0	5.0	5.6	6.1
	TEST LOADS-MW				
	3.1	4.1	4.5	5.1	5 6
F.O. Temp. °F.	87	90	92	94	94
F.O. Temp. (Corr.)	0 9865	0 9850	0 9840	0 9830	0.9830
F.O -start gal.	950909	951301	951706	952120	952549
F.O.-end gal.	950925	951330	951836	952549	952988
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(205.17)	(273.32)	(208.22)	74.67	34.58
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,108	4,108	4,536	5,116	5,561
KW (Aux.)	93.33	93.33	93.33	93.33	140.00
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)G	9,694	10,011	10,132	9,402	9,872
HEAT RATE (APPROX.)N	9,995	10,244	10,345	9,577	10,127
HEAT RATE (ACTUAL)-G	0	0	0	0	0
HEAT RATE (ACTUAL)-N	0	0	0	0	0

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note:

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M-4 Fuel Tested:
12-29-04 Tested by:

DATA:

GENERATED (MW)	3.108		5.116	5.561
HEAT RATE(BTU/MW)G	9,694		9,402	9,872
HEAT RATE(BTU/MW)N	9,995		9,577	10,127
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$72.1288	act.		
H.H.V. (BTU/BBL)	138,095	est.		

A, B, C CONSTANTS:

GROSS A=	17,931.98	NET A=	19,999.39
B=	(4,172.405)	B=	(5,048.539)
C=	489.6893	C=	588.6328

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,822	9,703	9,595	9,407	9,258	9,148	9,077	9,046	9,054	9,101	9,187
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,151	10,006	9,872	9,639	9,453	9,315	9,223	9,179	9,182	9,232	9,328
GROSS (MBTU)	29.466	30.081	30.703	31.982	33.328	34.762	36.310	37.993	39.837	41.863	44.097
NET (MBTU)	29.507	30.084	30.668	31.873	33.150	34.527	36.033	37.695	39.543	41.604	43.906
COST/KWH	$0.1221	$0.1207	$0.1193	$0.1170	$0.1151	$0.1138	$0.1129	$0.1125	$0.1126	$0.1132	$0.1142
G/KWH	242.68	239.75	237.06	232.41	228.73	226.02	224.26	223.50	223.70	224.86	226.98
G/PS-H	176.80	174.66	172.70	169.32	166.64	164.66	163.39	162.83	162.97	163.81	165.36

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,312	9,477	9,680	9,923	10,205	10,526	10,702	10,887
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,473	9,664	9,902	10,187	10,519	10,899	11,106	11,325
GROSS (MBTU)	46.561	49.279	52.274	55.570	59.190	63.158	65.280	67.498
NET (MBTU)	46.479	49.349	52.546	55.622	59.540	63.868	66.194	68.632
COST/KWH	$0.1158	$0.1179	$0.1204	$0.1234	$0.1269	$0.1309	$0.1331	$0.1354
G/KWH	230.08	234.14	239.18	245.18	252.14	260.08	264.41	268.98
G/PS-H	167.62	170.58	174.25	178.62	183.69	189.47	192.63	195.96

WORKSHE· (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.108	9.659664	30.022236	93.309109	9694.38475	30130.148	93644.499
0	0	0	0	0	0	0
0	0	0	0	0	0	0
5.1156	26.1693634	133.872	684.83558	9402.48865	48089.371	246057.14
5.5608	30.9224966	171.95382	956.2008	9872.49271	54898.957	305282.12
0	0	0	0	0	0	0
13.7844	66.751524	335.84805	1734.3455	28969.3661	133128.48	644983.76

a=	10.2448886	C=	489.68932
b=	1201.95487	B=	-4172.4046
d=	60.0984071	A=	17931.9841
e=	87.4144433		
f=	747.270501		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.108	9.659664	30.022236	93.309109	9994.5205	31062.97	96543.71
0	0	0	0	0	0	0
0	0	0	0	0	0	0
5.1156	26.169363	133.872	684.83558	9577.2236	48993.245	250629.84
5.5608	30.922497	171.95382	956.2008	10127.464	56316.802	313166.47
0	0	0	0	0	0	0
13.7844	66.751524	335.84805	1734.3455	29699.208	136373.02	660340.03

a=	10.244889	C=	588.63282
b=	-1447.322	B=	-5048.539
d=	-266.7141	A=	19999.386
e=	87.414443		
f=	747.2705		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note:

MPP UNIT NO. 4
DATE. 10-29-04

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.0576	3.9648	4.5192	4.996	5.696
Description\Time		1643	1758	1947	2056	2211
Ambient air temp	°F.	*72*	*70*	*70*	*69*	*69*
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	3885.1	3886.6	3886.5	3887.2	3887.9
Std KWH meter-stop	KWH	3885.5	3886.1	3887.1	3887.8	3888.6
Generator Digital Counter	KWH	0.364	0.472	0.538	0.595	0.669
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	1096.5	1096.6	1097.1	1097.4	1097.7
Aux. clocked-stop	KWH	1096.7	1097.0	1097.4	1097.6	1097.9
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	50	50	50	50	50
Fuel Oil						
F.O. tank level-start	in.	26.6	29.5	20.5	20.7	20.8
F.O. tank level-end	in.	34.8	36.9	24.2	25.2	22.0
F.O. meter rdg-start	gal.	697835	698198	698609	699006	699467
F.O. meter rdg-end	gal.	698198	698592	699007	699441	699898
F.O. temp.	°F.	106	102	100	104	98
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis		
API gravity @ 60 °F.		35.0
Sulfur, Wt. %		0.32
Higher heating value	BTU/gal	138,286

TEST BY: D.Ernestberg

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
10-29-04

TEST #1
MPP UNIT NO 4

DATA:

Dia. of tank	48	Tank level start (h1)	20.8	in.
Vol. of tank	579,581	Tank level stop (h2)	22	in.
Ht. from floor	7			
		Vol diff=	16.91	gal.

CALCULATIONS:

% of tank u=h/D

u1= 0.7125
u2= 0.6875

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]

f(u1)= 0.5986163
f(u2)= 0.5757069

% tank fill = (4/pi)*f(u)*100

% tank f(u1)= 76.2182
% tank f(u2)= 73.301273

Volume in tank

Vol of f(u1)= 137.83479
Vol of f(u2)= 154.74075

Vol diff= 16.91 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
10-29-04
Unit No.: 4

	3.1	4.0	5.0	5.6	6.1
	TEST LOADS-MW				
	3.1	4.0	4.5	5.0	5.7
F.O. Temp. °F.	106	102	100	104	98
F.O. Temp. (Corr.)	*0.9770*	*0.9790*	*0.9800*	*0.9780*	*0.9810*
F.O.-start gal.	697835	698198	698609	699006	699467
F.O -end gal.	698198	698592	699007	699441	699898
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	155.39	112.83	52.99	65.05	16.91
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,058	3,965	4,519	4,998	5,620
KW (Aux.)	93.33	93.33	140.00	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,286	138,286	138,286	138,286	138,286
HEAT RATE (APPROX.)G	9,161	9,588	10,332	9,997	9,982
HEAT RATE (APPROX.)N	9,449	9,819	10,662	10,187	10,151
HEAT RATE (ACTUAL)-G	9,174	9,601	10,346	10,011	9,996
HEAT RATE (ACTUAL)-N	9,462	9,832	10,677	10,201	10,165

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note:

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M-4 Fuel Tested: 11-15-04
10-29-04 Tested by: E.Wong

DATA:

GENERATED (MW)		4.519	4.998	5.620
HEAT RATE(BTU/MW)G		10,346	10,011	9,996
HEAT RATE(BTU/MW)N		10,677	10,201	10,165
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$34.5863 act.			
H.H.V. (BTU/BBL)	138,286 act.			

A, B, C CONSTANTS:

GROSS A=	27,411.06	NET A=	34,362.85
B=	(6,557.175)	B=	(9,082.130)
C=	815 3867	C=	849 9116

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3 4	3.6	3.8	4.0	4.2	4 4	4.6	4 8
HEAT RATE(BTU/MW)G	13,278	12,998	12,730	12,231	11,781	11,380	11,029	10,726	10,473	10,270	10,115
GENERATED (MW)N	2.9	3 0	3.1	3 3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	14,766	14,376	14,003	13,309	12,682	12,123	11,633	11,210	10,856	10,569	10,351
GROSS (MBTU)	39 834	40.293	40 735	41.584	42.410	43.244	44.114	45.051	46.063	47.240	48.553
NET (MBTU)	42.919	43.224	43.504	44.008	44.472	44.936	45 446	46 038	46.753	47.139	48.234
COST/KWH	$0 0791	$0.0774	$0 0758	$0.0728	$0.0702	$0.0678	$0.0657	$0.0639	$0.0624	$0 0612	$0.0602
G/KWH	328.07	321.14	314.52	302.19	291.07	281.17	272.49	265 02	258.77	253.74	249.92
G/PS-H	239 00	233.96	229.13	220.15	212.05	204.84	198.51	193.07	188.52	184.85	182.07

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	10,010	9,954	9,947	9,989	10,081	10,222	10,311	10,412
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,200	10,117	10,103	10,158	10,278	10,467	10,587	10,724
GROSS (MBTU)	50 049	51,760	53 714	55 941	58.470	61.332	62.896	64.555
NET (MBTU)	50.048	51.666	53 612	55.927	58.651	61.825	63.593	65 490
COST/KWH	$0 0596	$0.0593	$0 0592	$0 0595	$0.0600	$0.0609	$0.0614	$0.0620
G/KWH	247.32	245.93	245.77	246.81	249.08	252.56	254.75	257.26
G/PS-H	180.18	179.17	179 05	179 81	181.46	183 99	185 60	187.42

WORKSHEI (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
4.5192	20 4231688	92 296384	417.10582	10346 0248	46755.755	211298.61
4.998	24.980004	124 85006	624.0006	10010.6655	50033.306	250066.47
5.6196	31.5799042	177 46643	997.29035	9996 21673	56174.74	315679 57
0	0	0	0	0	0	0
15.1368	76 9830768	394 61287	2038.3968	30352.9071	152963 8	777044.64

a=	1.82651616	C=	615.386732
b=	-5526 2535	B=	-6557.1747
d=	-554 48017	A=	27411.0618
e=	18 5611825		
f=	188.796178		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
4 5192	20 423169	92.296384	417.10582	10676.78	48250.504	218053 68
4.998	24.980004	124.85006	624 0008	10201.163	50985 415	254825.1
5 6196	31.579904	177.46643	997.29035	10165.043	57123 477	321011.09
0	0	0	0	0	0	0
15.1368	76.983077	394.61287	2038.3968	31042.987	156359 4	793889.87

a=	1.8265162	C=	849.91165
b=	-8115.009	B=	-9082.13
d=	-813 2928	A=	34362 855
e=	18.561182		
f=	188.79618		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note: 5 4MW max. actuator

MPP UNIT NO. 4
DATE: 12-19-03

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.0828	3.9584	4.4856	4.990	5.3508
Description\Time		0710	0850	1010	1125	1255
Ambient air temp	°F.	62	65	70	70	72
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	1445.5	1446.1	1446.8	1447.5	1448.4
Std KWH meter-stop	KWH	1445.9	1446.6	1447.3	1448.0	1449
Generator Digital Counter	KWH	0.387	0.471	0.534	0.594	0.637
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	9660.2	9660.5	9660.8	9661.1	9661.4
Aux. clocked-stop	KWH	9660.4	9660.7	9661.0	9661.3	9661.6
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	45	45	45	45	45
Fuel Oil						
F.O. tank level-start	in.	29.5	26.75	26.25	23.875	22.5
F.O. tank level-end	in.	36.5	33	31.5	29.75	21
F.O. meter rdg-start	gal.	186945	187305	187690	188093	188593
F.O. meter rdg-end	gal.	187279	187690	188093	188517	188953
F.O. temp.	°F.	85	89	89	89	89
F.O. drain tank-start	in.					
F.O. drain tank-end	in					

Fuel Oil Analysis		
API gravity @ 60 °F.		35.3
Sulfur, Wt. %		0.06
Higher heating value	BTU/gal	139,296

TEST BY: K.Inouye

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
12-19-03

TEST #1
MPP UNIT NO. 4

DATA:

Dia. of tank	48	Tank level start (h1)	22.5	in.
Vol. of tank	579.581	Tank level stop (h2)	21	in.
Ht. from floor	7			
		Vol diff=	-21.27	gal.

CALCULATIONS:

% of tank u=h/D	
u1=	0.6770833
u2=	0.7083333

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))

f(u1)=	0.5660074
f(u2)=	0.5948366

% tank fill = (4/pi)*f(u)*100

% tank f(u1)=	72.066299
% tank f(u2)=	75.736951

Volume in tank

Vol of f(u1)=	161.89842
Vol of f(u2)=	140.62402
Vol diff=	-21.27 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
12-19-03
Unit No.: 4

	3.1	4.0	5.0	5.6	6.1
	TEST LOADS-MW				
	3.1	4.0	4.5	5.0	5.4
F.O. Temp. °F.	85	89	89	89	89
F.O. Temp. (Corr.)	0.9875	0.9855	0.9855	0.9855	0.9855
F.O.-start gal.	186945	187305	187690	188093	188593
F.O.-end gal.	187279	187690	188093	188517	188953
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	106.86	95.71	80.23	88.70	(21.27)
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,083	3,956	4,486	4,990	5,351
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,296	139,296	139,296	139,296	139,296
HEAT RATE (APPROX.)G	10,048	9,951	9,793	9,145	9,697
HEAT RATE (APPROX.)N	10,361	10,191	10,001	9,320	9,869
HEAT RATE (ACTUAL)-G	10,135	10,038	9,878	9,225	9,782
HEAT RATE (ACTUAL)-N	10,451	10,280	10,088	9,401	9,955

CA-IR-73
DOCKET NO. 2006-0387
Page 237 of 362

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: 5.4MW max. actuator
0

M-4 Fuel Tested: 12-29-03
12-19-03 Tested by: K.Nakamatsu

DATA.

GENERATED (MW)	3.083	3.956	4.486	4.990	5.351
HEAT RATE(BTU/MW)G	10,135	10,038	9,878	9,225	9,782
HEAT RATE(BTU/MW)N	10,451	10,280	10,088	9,401	9,955

NUMBER OF TESTS 5
PRICE OF FUEL/BBL $40.6153 act.
H.H.V. (BTU/BBL) 139,296 act.

A, B, C CONSTANTS:

GROSS A=	11,413.81	NET A=	12,188.69
B=	(465.670)	B=	(662.376)
C=	21.9622	C=	37.5989

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,214	10,181	10,149	10,084	10,022	9,961	9,903	9,845	9,790	9,736	9,685
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,540	10,497	10,454	10,371	10,291	10,215	10,141	10,070	10,002	9,937	9,876
GROSS (MBTU)	30 643	31.582	32 475	34 287	36 079	37.853	39 610	41.351	43.076	44.788	46.486
NET (MBTU)	30 636	31.560	32 478	34.295	36 089	37.862	39.617	41.354	43 076	44.785	46 481
COST/KWH	$0 0709	$0 0707	$0 0705	$0.0700	$0 0696	$0.0692	$0.0687	$0.0683	$0.0680	$0.0676	$0.0672
G/KWH	252.37	251.55	250.75	249.16	247.82	246.12	244.67	243 26	241.89	240.56	239 26
G/PS-H	183.86	183 26	182.67	181.52	180.40	179.31	178.25	177.22	176.22	175.26	174.32

PREDICTED VALUES (CONT.):

HEAT RATE(BTU/MW)G	5.0	5.2	5 4	5.6	5 8	6 0	6.1	6.2
GENERATED (MW)N	9,635	9,586	9,540	9,495	9,452	9,410	9,390	9,371
HEAT RATE(BTU/MW)N	4.9	5.1	5 3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,817	9,781	9,708	9,658	9,612	9,568	9,547	9,527
GROSS (MBTU)	48,173	49 848	51.514	53 171	54.820	56 463	57.282	58.099
NET (MBTU)	48,168	49 847	51.519	53.186	54.851	56.515	57.347	58.180
COST/KWH	$0 0669	$0 0665	$0 0662	$0 0659	$0 0656	$0.0653	$0.0652	$0.0651
G/KWH	238.04	236.85	235.70	234.59	233.53	232.51	232.01	231.53
G/PS-H	173 42	172.55	171.71	170.91	170.13	169 39	169 03	168.68

WORKSHE (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0828	9.50365584	29.29787	90 319474	10135.0063	31244.197	96319 611
3.9564	15.653101	61.929929	245 01957	10037 568	39712.634	157119.07
4.4856	20.1206074	90 252996	404.83884	9877.97433	44308 642	198750 84
4.9896	24.8961082	124.22162	619.8162	9224.93036	46028.713	229664 86
5.3508	28 6310606	153.19908	819.73763	9781.58403	52339.3	280057.13
0	0	0	0	0	0	0
21.8652	98.804533	458.9015	2179.7317	49057.063	213633 49	961911.51

a=	15.9356938	C=	21.9621838
b=	-37502.65	B=	-465 67034
d=	-4475.0668	A=	11413.815
e=	134.126605		
f=	1136.32286		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0828	9.5036558	29.29787	90.319474	10451.429	32219.664	99326 78
3 9564	15.653101	61.929929	245.01957	10280 08	40672.108	160915.13
4 4856	20.120607	90 252996	404 83884	10087.676	45250.177	202974.19
4.9896	24.896108	124.22162	619 8162	9400.7773	46906.118	234042.77
5.3508	28 631061	153.19908	819.73763	9955 2319	53268 455	285028 85
0	0	0	0	0	0	0
21.8652	98.804533	458.9015	2179.7317	50175.394	218316.52	982287.72

a=	15.935694	C=	37.598897
b=	-48117.75	B=	-662.3759
d=	-5512.408	A=	12188.687
e=	134.1266		
f=	1136.3229		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note: Derated to 4.0MW-high cylinder exhaust temps.

MPP UNIT NO. 4
DATE: 04-17-01

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1	
Actual Test Load	MWH	3 007	3 4776	3.654	3 982		
Description\Time		0830	0955	1123	1300		
Ambient air temp	°F.	69	71	71	74		
Manifold Air-Left	°F.	98	100	104	107		
Manifold Air-Right	°F.	100	103	106	110		
Intercooler Water-In	R/L °F.	101	104	106	111		
Intercooler Water-Out	R/L °F.	107	112	114	122		
Jacket Water-In	°F.	153	154	153	157		
Jacket Water-Out	°F.	158	159	158	162		
Exhaust Gas-Lvg T/C-L	°F.	-	-	-	-		
Exhaust Gas-Lvg T/C-R	°F.	-	-	-	-		
Manifold Pressure-Lft	hg	4.9	5.9	6.4	7.2		
Manifold Pressure-Rt	hg	4.9	5.9	6.4	7.2		
Generator (X 8400)							
Std KWH meter-start	KWH	7682.2	7682.7	7683.3	7684.1		
Std KWH meter-stop	KWH	7682.6	7683.2	7683.8	6868.2		
Generator Digital Counter	KWH	0.358	0.414	0.435	0.474		
Generator volts	V.	4050	4020	4025	4060		
Generator amps	A.	470	515	545	600		
Generator vars	MVARS	1.2	1.1	1.2	1.3		
Auxilliaries (X 1400)							
Aux. clocked-start	KWH	5613.4	5613.6	5613.8	5614.1		
Aux. clocked-stop	KWH	5613.5	5613.8	5614.0	4562.7		
Aux. load indicator	KW	-	-	-	-		
Aux. volts	V.	-	-	-	-		
Aux. amps	A.	38	38	40	49		
Fuel Oil							
F.O. tank level-start	in.	36.375	36.125	34.75	33.875		
F.O. tank level-end	in.	22	19.375	25	27.25		
F.O. meter rdg-start	gal.	851686	852017	852378	852825		
F.O. meter rdg-end	gal	851686	852017	852493	852996		
F.O. temp.	°F.	83	89	90	91		
F.O. drain tank-start	in.	-	-	-	-		
F.O. drain tank-end	in.	-	-	-	-		

Fuel Oil Analysis		
API gravity @ 60 °F.		33.8
Sulfur, Wt. %		0.09
Higher heating value	BTU/gal	139,399

TEST BY: _____

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
04-17-01

TEST #1
MPP UNIT NO. 4

DATA:

Dia. of tank	48	Tank level start (h1)	33.875	in.
Vol. of tank	579.581	Tank level stop (h2)	27.25	in.
Ht. from floor	7			
		Vol diff=	-101.51	gal.

CALCULATIONS:

% of tank u=h/D
u1= 0.4401042
u2= 0.578125

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.3329468
f(u2)= 0.470505

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 42.392104
% tank f(u2)= 59.906559

Volume in tank
Vol of f(u1)= 333.88442
Vol of f(u2)= 232.37397

Vol diff= -101.51 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
04-17-01
Unit No.: 4

	3.1	4.0	5.0	5.6	6.1
	TEST LOADS-MW				
	3.0	3.5	3.7	4.0	0.0
F.O. Temp °F.	83	89	90	91	0
F.O. Temp. (Corr.)	0.9885	0.9855	0.9850	0.9845	1.0300
F.O.-start gal.	851686	852017	852378	852825	0
F.O.-end gal.	851686	852017	852493	852996	0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(216.99)	(249.65)	(146.69)	(101.51)	
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,007	3,478	3,654	3,982	0
KW (Aux.)	*46.67*	*93.33*	*93.33*	*-481320.00*	*0.00*
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,399	139,399	139,399	139,399	139,399
HEAT RATE (APPROX.)G	9,850	9,770	9,816	9,305	#DIV/0!
HEAT RATE (APPROX.)N	10,005	10,039	10,073	76	#DIV/0!
HEAT RATE (ACTUAL)-G	9,943	9,862	9,909	9,393	#DIV/0!
HEAT RATE (ACTUAL)-N	10,100	10,134	10,169	77	#DIV/0!

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: Derated to 4.0MW-high cylinder exhaust temps.

M-4 Fuel Tested: 04-19-01
04-17-01 Tested by: K.Yokoyama

DATA:

GENERATED (MW)	3.007	3.478	3.654
HEAT RATE(BTU/MW)G	9,650	9,770	9,816
HEAT RATE(BTU/MW)N	10,005	10,039	10,073
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$42.7842	act.	
H.H.V. (BTU/BBL)	139,399	act.	

A, B, C CONSTANTS:

GROSS A=	17,357.30	NET A=	11,745.98
B=	(4,508.038)	B=	(1,142.124)
C=	668.9163	C=	187.2983

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,853	9,811	9,781	9,763	9,798	9,886	10,028	10,223	10,472	10,775	11,131
GENERATED (MW)N	3.0	3.1	3.2	3.4	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,005	10,005	10,009	10,028	10,062	10,110	10,174	10,253	10,347	10,455	10,579
GROSS (MBTU)	29.560	30.413	31.300	33.193	35.271	37.566	40.111	42.938	46.077	49.563	53.427
NET (MBTU)	29.549	30.550	31.562	33.627	35.283	37.477	39.748	42.106	44.560	47.120	49.793
COST/KWH	$0.0720	$0.0717	$0.0715	$0.0713	$0.0716	$0.0722	$0.0733	$0.0747	$0.0765	$0.0787	$0.0813
G/KWH	243.45	242.40	241.67	241.21	242.07	244.26	247.76	252.59	258.74	266.21	275.01
G/PS-H	177.36	176.59	176.06	175.73	176.36	177.95	180.50	184.02	188.50	193.94	200.35

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	11,540	12,003	12,519	13,089	13,713	14,390	14,749	15,121
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,718	10,871	11,040	11,224	11,422	11,636	11,748	11,865
GROSS (MBTU)	57.700	62.416	67.605	73.301	79.536	86.340	89.967	93.748
NET (MBTU)	52.589	55.517	58.587	61.806	65.184	68.730	70.569	72.453
COST/KWH	$0.0843	$0.0877	$0.0915	$0.0957	$0.1002	$0.1052	$0.1078	$0.1105
G/KWH	285.12	298.56	309.32	323.41	338.81	355.54	364.40	373.59
G/PS-H	207.72	216.05	225.35	235.61	246.83	259.02	265.48	272.17

WORKSHE (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0072	9.04325184	27.194867	81.780404	9849.90485	29620.634	89075.17
3.4776	12.0937018	42.057057	146.25782	9769.81918	33975.523	118153.28
3.654	13.351716	48.78717	178.26832	9816.10741	35868.056	131061.88
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10.1388	34.4886696	118.03909	406.30635	29435.8314	99464.214	338290.33

a=	0.67074336	C=	668.916265
b=	-331.68108	B=	-4508.0383
d=	-51.367231	A=	17357.2995
e=	4.44355997		
f=	29.450708		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0072	9.0432516	27.194867	81.780404	10005.188	30087.542	90479.255
3.4776	12.093702	42.057057	146.25782	10039.257	34912.521	121411.78
3.654	13.351716	48.78717	178.26832	10073.41	36808.241	134497.31
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
10.1388	34.48867	118.03909	406.30635	30117.836	101808.3	346388.35

a=	0.6707434	C=	187.29826
b=	440.97096	B=	-1142.124
d=	66.199126	A=	11745.977
e=	4.44356		
f=	29.450708		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 5
DATE: 11-18-05

Gross Load - (M4-9) -->	MWH	3.1	4.0	4.5	5.6	6.1
Actual Test Load	MWH	3.10	4.00	4.47	5.04	5.62
Description\Time		1609	1734	1846	2005	2124
Ambient air temp	°F.	70	67	69	68	70
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	9100.8	9101.4	9102.0	9102.7	9103.5
Std KWH meter-stop	KWH	9101.2	9101.9	9102.5	9103.3	9104.2
Generator Digital Counter	KWH	0.369	0.476	0.532	0.660	0.669
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	2679.2	2679.4	2679.6	2679.8	2680.1
Aux. clocked-stop	KWH	2679.3	2679.6	2679.8	2680.1	2680.3
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	50	50	50	50	50
Fuel Oil						
F.O. tank level-start	in.	26.00	24.50	25.00	20.50	26.75
F.O. tank level-end	in.	33.25	29.00	29.25	22.50	25.5
F.O. meter rdg-start	gal.	50203	50545	50906	51234	51862
F.O. meter rdg-end	gal.	50545	50906	51284	51679	52225
F.O. temp.	°F.	92	84	93	96	93
F.O. drain tank-start	in.	-	-	-	-	-
F.O. drain tank-end	in.	-	-	-	-	-

Fuel Oil Analysis		
API gravity @ 60 °F.		33.3
Sulfur, Wt. %		
Higher heating value	BTU/gal	139,429

TEST BY: Donald K. Ernestberg, Jr.

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
11-18-05

TEST #1
MPP UNIT NO. 5

DATA:

Dia. of tank	48	Tank level start (h1)	26.75	in.
Vol. of tank	579.581	Tank level stop (h2)	25.5	in.
Ht from floor	1			
		Vol diff=	-18.81	gal.

CALCULATIONS:
% of tank u=h/D

u1=	0.5865417
u2=	0.6145833

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]

f(u1)=	0.4807758
f(u2)=	0.5062714

% tank fill = (4/pi)*f(u)*100

% tank f(u1)=	61.214275
% tank f(u2)=	64.46048

Volume in tank

Vol of f(u1)=	224.79469
Vol of f(u2)=	205.98031
Vol diff=	-18.81 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
11-18-05
Unit No.: 5

0 0 0 0

TEST LOADS-MW

	3.1	4.0	4.5	5.0	5.6
F.O. Temp. °F.	92	84	93	96	93
F.O. Temp. (Corr.)	0.9840	0.9880	0.9835	0.9820	0.9835
F.O.-start gal.	50203	50545	50906	51234	51862
F.O.-end gal.	50545	50906	51264	51679	52225
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	110.85	67.98	84.39	28.22	(18.81)
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,100	3,998	4,469	5,544	5,620
KW (Aux.)	46.67	93.33	93.33	140.00	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,429	139,429	139,429	139,429	139,429
HEAT RATE (APPROX.)G	10,134	9,999	9,531	10,195	9,228
HEAT RATE (APPROX.)N	10,288	10,238	9,735	10,459	9,384
HEAT RATE (ACTUAL)-G	10,231	10,095	9,623	10,293	9,317
HEAT RATE (ACTUAL)-N	10,388	10,337	9,829	10,560	9,474

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-5 Fuel Tested: 11-29-05
11-18-05 Tested by: K.Okuyama

DATA:

GENERATED (MW)	3.998	4.469	5.544	5.620
HEAT RATE(BTU/MW)G	10,095	9,623	10,293	9,317
HEAT RATE(BTU/MW)N	10,337	9,829	10,560	9,474

NUMBER OF TESTS 4
PRICE OF FUEL/BBL $97.0858 act.
H.H.V. (BTU/BBL) 139,429 act.

A, B, C CONSTANTS:

GROSS A= 20,117.83 NET A= 20,820.32
B= (4,207.733) B= (4,396.486)
C= 421.8689 C= 439.8393

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	11,291	11,128	10,973	10,688	10,437	10,220	10,037	9,887	9,771	9,689	9,641
GENERATED (MW)N	3.0	3.1	3.2	3.4	3.6	3.8	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	11,589	11,418	11,256	10,957	10,693	10,465	10,272	10,114	9,991	9,903	9,851
GROSS (MBTU)	33.874	34.497	35.114	36.340	37.575	38.837	40.147	41.526	42.993	44.569	46.275
NET (MBTU)	34.227	34.863	35.492	36.741	37.996	39.278	40.129	41.535	43.029	44.632	46.366
COST/KWH	$0.1872	$0.1845	$0.1819	$0.1772	$0.1730	$0.1694	$0.1664	$0.1639	$0.1620	$0.1606	$0.1598
G/KWH	278.98	274.95	271.12	264.08	257.88	252.52	247.98	244.29	241.42	239.39	238.19
G/PS-H	203.25	200.30	197.51	192.39	187.87	183.98	180.66	177.97	175.88	174.40	173.53

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,626	9,645	9,698	9,784	9,905	10,059	10,148	10,247
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,834	9,852	9,905	9,993	10,117	10,276	10,368	10,470
GROSS (MBTU)	48.129	50.154	52.368	54.792	57.447	60.352	61.905	63.528
NET (MBTU)	48.252	50.310	52.563	55.030	57.734	60.695	62.279	63.934
COST/KWH	$0.1596	$0.1599	$0.1608	$0.1622	$0.1642	$0.1668	$0.1682	$0.1699
G/KWH	237.83	238.30	239.61	241.75	244.72	248.53	250.74	253.17
G/PS-H	173.27	173.61	174.56	176.12	178.28	181.06	182.67	184.44

WORKSHE· (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.9984	15.98720256	63.923231	255.59065	10095.31204	40365.096	161395.8
4.4688	19.97017344	89.242711	398.60783	9623.3244	43004.712	192179.46
5.544	30.735936	170.40003	944.69776	10293.11711	57065.041	316368.59
5.6196	31.57990416	177.46643	997.29035	9316.827119	52356.842	294224.51
0	0	0	0	0	0	0
19.6308	98.27321616	501.0324	2596.3866	39328.58068	192791.69	964168.35

a= 7.724556 C= 421.8689401
b= -8272.701196 B= -4207.73265
d= -884.7387029 A= 20117.83029
e= 74.94774975
f= 727.9213114

WORKSHE· (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.9984	15.987203	63.923231	255.59065	10336.596	41329.845	165253.25
4.4688	19.970173	89.242711	398.60783	9828.6001	43922.048	196278.85
5.544	30.735936	170.40003	944.69776	10559.778	58543.41	324564.67
5.6196	31.579904	177.46643	997.29035	9474.1794	53241.098	299193.68
0	0	0	0	0	0	0
19.6308	98.273216	501.0324	2596.3866	40199.153	197036.4	985290.44

a= 7.724556 C= 439.83932
b= -9338.327 B= -4396.486
d= -995.9359 A= 20820.317
e= 74.94775
f= 727.92131

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 5
DATE: 12-07-04

Gross Load - (M4-9) -->	MWH	3.1	4.0	4 5	5 6	6.1
Actual Test Load	MWH	3 20	3.90	4 45	5.07	5.60
Description\Time		0750	0905	1020	1131	1240
Ambient air temp	°F.	65	68	70	76	75
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	8500 2	8500.7	8501.3	8502.0	8502.6
Std KWH meter-stop	KWH	8500.6	8501.2	8501.8	8502.6	8503.3
Generator Digital Counter	KWH	0.381	0 465	0.530	0.604	0 667
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	1262.2	1262 4	1262 6	1262.9	1263.1
Aux. clocked-stop	KWH	1262.3	1262 6	1262.8	1263.1	1263.3
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A	30	57	59	50	50
Fuel Oil						
F O. tank level-start	in.	37.00	32 00	37.00	36.50	35.5
F O. tank level-end	in.	21.50	36.75	27.75	33.50	36.75
F O. meter rdg-start	gal.	677020	677256	677712	678094	678497
F O. meter rdg-end	gal.	677020	677617	677891	678412	678922
F O. temp.	°F.	85	85	88	93	93
F.O. drain tank-start	in.	-	-	-	-	-
F O. drain tank-end	in.	-	-	-	-	-

Fuel Oil Analysis

API gravity @ 60 °F.		35.1
Sulfur, Wt. %		0.22
Higher heating value	BTU/gal	139,071

TEST BY: KI/CF

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
12-07-04

TEST #1
MPP UNIT NO. 5

DATA:
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (h1) 35.5 in.
Tank level stop (h2) 36.75 in.

Vol diff= 18.77 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.40625
u2= 0.3802083

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.2995013
f(u2)= 0.2740635

% tank f/l = (4/pi)*f(u)*100
% tank f(u1)= 38.133694
% tank f(u2)= 34.894849

Volume in tank
Vol of f(u1)= 358.56536
Vol of f(u2)= 377.33709

Vol diff= 18.77 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
12-07-04
Unit No.: 5

0 0 0 0

TEST LOADS-MW

	3.2	3.9	4 5	5 1	5.6
F.O. Temp. °F.	85	85	88	93	93
F.O. Temp. (Corr.)	0 9875	0.9875	0.9860	0.9835	0.9835
F.O.-start gal.	677020	677256	677712	678094	678497
F.O.-end gal.	677020	677617	677891	678412	678922
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(233 42)	72.18	(141.09)	(45 45)	18.77
PT RATIO	8 4	8 4	8.4	8.4	8 4
KW (Gen.)	3,200	3,906	4,452	5,074	5,603
KW (Aux.)	46 67	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,071	139,071	139,071	139,071	139,071
HEAT RATE (APPROX.)G	9,946	10,083	9,790	9,729	9,847
HEAT RATE (APPROX.)N	10,093	10,330	9,999	9,912	10,014
HEAT RATE (ACTUAL)-G	10,016	10,155	9,859	9,798	9,917
HEAT RATE (ACTUAL)-N	10,165	10,403	10,070	9,982	10,085

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-5 Fuel Tested: 12-16-04
12-07-04 Tested by: E.Wong

DATA:

GENERATED (MW)		3.906	4.452	5.074	5.603
HEAT RATE(BTU/MW)G		10,155	9,859	9,798	9,917
HEAT RATE(BTU/MW)N		10,403	10,070	9,982	10,085
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$72.1288 act.				
H.H.V. (BTU/BBL)	139,071 act.				

A, B, C CONSTANTS:

GROSS A=	17,929.74	NET A=	18,732.45
B=	(3,285.093)	B=	(3,493.121)
C=	331.1965	C=	348.1164

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	11,055	10,929	10,809	10,589	10,396	10,229	10,089	9,975	9,887	9,826	9,792
GENERATED (MW)N	3.0	3.1	3.2	3.4	3.6	3.8	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	11,386	11,249	11,119	10,880	10,669	10,485	10,330	10,202	10,102	10,030	9,986
GROSS (MBTU)	33.166	33.879	34.588	36.003	37.425	38.870	40.354	41.894	43.504	45.202	47.002
NET (MBTU)	33.627	34.347	35.062	36.484	37.909	39.355	40.356	41.897	43.507	45.203	47.001
COST/KWH	$0.1365	$0.1350	$0.1335	$0.1308	$0.1284	$0.1263	$0.1246	$0.1232	$0.1221	$0.1213	$0.1209
G/KWH	273.15	270.02	267.06	261.63	256.85	252.73	249.26	246.45	244.29	242.79	241.94
G/PS-H	198.99	196.72	194.56	190.60	187.12	184.12	181.59	179.54	177.97	176.88	176.26

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,784	9,803	9,848	9,920	10,018	10,142	10,214	10,293
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,970	9,981	10,021	10,088	10,183	10,306	10,378	10,457
GROSS (MBTU)	48.921	50.975	53.179	55.549	58.102	60.854	62.308	63.819
NET (MBTU)	48.919	50.971	53.177	55.551	58.111	60.874	62.336	63.856
COST/KWH	$0.1208	$0.1211	$0.1216	$0.1225	$0.1237	$0.1252	$0.1261	$0.1271
G/KWH	241.74	242.20	243.32	245.09	247.51	250.59	252.37	254.32
G/PS-H	176.12	176.45	177.26	178.55	180.32	182.56	183.86	185.28

WORKSHE (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.906	15.256836	59.593201	232.77104	10154.76891	39684.527	154929.64
4.452	19.820304	88.239993	392.84445	9858.975369	43892.158	195407.89
5.0736	25.74141696	130.60165	662.62055	9798.074304	49711.51	252216.32
5.6028	31.39136784	175.87956	985.41797	9916.973505	55562.819	311307.36
0	0	0	0	0	0	0
19.0344	92.2099248	454.3144	2273.654	39728.79209	188831.01	913861.21

a=	6.53131584	C=	331.1965487
b=	-7944.082779	B=	-3285.09315
d=	-889.6615402	A=	17929.74006
e=	62.09702197		
f=	591.9458378		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.906	15.256836	59.593201	232.77104	10403.356	40635.507	158722.29
4.452	19.820304	88.239993	392.84445	10070.088	44832.033	199592.21
5.0736	25.741417	130.60165	662.62055	9981.6964	50643.135	256943.01
5.6028	31.391368	175.87956	985.41797	10084.972	56504.083	316581.08
0	0	0	0	0	0	0
19.0344	92.209925	454.3144	2273.654	40540.113	192614.76	931838.59

a=	6.5313158	C=	348.11639
b=	-10846.39	B=	-3493.121
d=	-1197.688	A=	18732.449
e=	62.097022		
f=	591.94584		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 5
DATE: 06-07-04

Gross Load - (M4-9) -->	MWH	3.1	4.0	4.5	5.6	6.1
Actual Test Load	MWH	3.0744	4.116	4.536	5.0988	5.6112
Description\Time		1525	1738	1848	2005	2135
Ambient air temp	°F.	80	80	72	70	70
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	7227.9	7228.3	7229.0	7229.7	7230.6
Std KWH meter-stop	KWH	7228.3	7228.9	7229.5	7230.3	7231.2
Generator Digital Counter	KWH	0.366	0.490	0.540	0.607	0.668
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	401.2	401.5	401.8	402.1	402.4
Aux. clocked-stop	KWH	401.5	401.7	102.0	402.3	402.6
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	50	55	55	55	50
Fuel Oil						
F.O. tank level-start	in.	20.00	23.00	23.00	19.00	36
F.O. tank level-end	in.	27.50	27.00	26.50	21.00	36
F.O. meter rdg-start	gal.	887279	887620	887986	888362	889159
F.O. meter rdg-end	gal.	887620	887986	888362	888756	889582
F.O. temp.	°F.	90	92	88	88	88
F.O. drain tank-start	in.	-	-	-	-	-
F.O. drain tank-end	in.	-	-	-	-	-

Fuel Oil Analysis

API gravity @ 60 °F.		0.2
Suffur, Wt. %		35.50
Higher heating value	BTU/gal	138,881

TEST BY: R Navarro

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
06-07-04

TEST #1
MPP UNIT NO. 5

DATA:

Dia. of tank	48	Tank level start (h1)	36	in.
Vol. of tank	579.581	Tank level stop (h2)	36	in.
Ht. from floor	7			
		Vol diff=	0.00	gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.3958333
u2= 0.3958333

f(u)=(pi/8)-((1/2)-u)*@SORT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.2892909
f(u2)= 0.2892909

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 36.833664
% tank f(u2)= 36.833664

Volume in tank
Vol of f(u1)= 366.10008
Vol of f(u2)= 366.10008

Vol diff= 0.00 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
06-07-04
Unit No.: 5

	0	0	0	0	
	TEST LOADS-MW				
	3.1	4.1	4.5	5.1	5.6
F.O. Temp. °F.	90	92	88	88	88
F.O. Temp. (Corr.)	0.9850	0.9840	0.9860	0.9860	0.9860
F.O.-start gal.	887279	887620	887986	888362	889159
F.O.-end gal.	887620	887986	888362	888756	889582
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	104.81	59.46	51.90	27.32	0.00
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,074	4,116	4,536	5,099	5,611
KW (Aux.)	140.00	93.33	-139906.7	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,881	138,881	138,881	138,881	138,881
HEAT RATE (APPROX.)G	10,450	10,120	9,729	9,792	10,265
HEAT RATE (APPROX.)N	10,949	10,355	308	9,975	10,436
HEAT RATE (ACTUAL)-G	10,509	10,178	9,784	9,848	10,323
HEAT RATE (ACTUAL)-N	11,011	10,414	307	10,031	10,498

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-5 Fuel Tested: 06-11-04
06-07-04 Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.074	4.116		5 099	5 611
HEAT RATE(BTU/MW)G	10,509	10,178		9,848	10,323
HEAT RATE(BTU/MW)N	11,011	10,414		10,031	10,498
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$58.5056	act.			
H.H.V. (BTU/BBL)	138,881	act.			

A, B, C CONSTANTS:

GROSS A=	14,986.94	NET A=	17,210 40
B=	(2,165.134)	B=	(2,965.903)
C=	234 4740	C=	312.3979

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3 4	3.6	3.8	4.0	4 2	4 4	4.6	4.8
HEAT RATE(BTU/MW)G	10,602	10,528	10,460	10,336	10,231	10,145	10,078	10,029	10,000	9,989	9,997
GENERATED (MW)N	2.9	3.0	3.1	3 3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	11,124	11,018	10,918	10,738	10,582	10,451	10,345	10,264	10,208	10,178	10,172
GROSS (MBTU)	31.805	32.638	33.470	35.142	36.832	38.552	40.312	42.124	43 999	45 948	47.984
NET (MBTU)	31.815	32.614	33.411	35.005	36 613	38.251	39.932	42.152	43.965	45.867	47.875
COST/KWH	$0.1063	$0.1056	$0.1049	$0.1037	$0.1026	$0.1018	$0.1011	$0.1006	$0.1003	$0.1002	$0.1003
G/KWH	261.94	260.13	258.43	255 38	252.79	250 66	249 00	247.80	247 07	246.80	246.99
G/PS-H	190 83	189 51	188.27	186.05	184.16	182.61	181.40	180.53	180 00	179.80	179.94

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5 2	5 4	5 6	5.8	6.0	6.1	6 2
HEAT RATE(BTU/MW)G	10,023	10,068	10,132	10,215	10,317	10,437	10,504	10,576
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,191	10,235	10,304	10,398	10,517	10,661	10,743	10,830
GROSS (MBTU)	50.118	52.356	54.715	57.206	59.836	62.623	64.077	65 573
NET (MBTU)	50.003	52.267	54.681	57.259	60.019	62.973	64 528	66 138
COST/KWH	$0.1005	$0.1010	$0.1016	$0.1025	$0.1035	$0.1047	$0.1054	$0.1061
G/KWH	247.65	248.77	250.35	252.39	254.90	257.88	259.54	261.31
G/PS-H	180.42	181 23	182.38	183 88	185.70	187.87	189.08	190.37

WORKSHE (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0744	9.45193536	29 05903	89.339082	10509 45152	32310 258	99334 656
4.116	16.941456	69.731033	287.01293	10177.69827	41891 406	172425 03
0	0	0	0	0	0	0
5 0988	25.99776144	132.55739	675 8836	9847.791534	50211.919	256020.54
5.6112	31.48556544	176.6718	991.34083	10322.95941	57924.19	325024 21
0	0	0	0	0	0	0
17.9004	83.87671824	408 01925	2043.5764	40857.90074	182337.77	852804.43

a=	15.0825528	C=	234 4739674
b=	-15808.89607	B=	-2165.1339
d=	-2021.673707	A=	14986.93916
e=	130.650208		
f=	1139.001915		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0744	9.4519354	29.05903	89 339082	11010.857	33851.778	104073 91
4.116	16.941456	69.731033	287.01293	10413 84	42863 364	176425.61
0	0	0	0	0	0	0
5 0988	25.997761	132.55739	675.8836	10031 416	51148.185	260794.37
5.6112	31.485565	176 6718	991.34083	10497.57	58903.963	330521.92
0	0	0	0	0	0	0
17.9004	83 876718	408 01925	2043 5764	41953 682	186767.29	871815 8

a=	15.082553	C=	312.3979
b=	-31674	B=	-2965.903
d=	-3918.534	A=	17210.404
e=	130.65021		
f=	1139.0019		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 5
DATE: 06-26-02

Gross Load - (M4-9) -->	MWH	3.1	4.0	4.5	5.6	6.1
Actual Test Load	MWH	3.083	4.066	4.502	4.998	5.619
Description\Time		0748	0853	1009	1123	1250
Ambient air temp	°F.	74	79	82	83	83
Manifold Air-Left	°F.	105	113	123	127	137
Manifold Air-Right	°F.	104	111	121	125	132
Intercooler Water-In	R/L °F.	100	103	109	109	112
Intercooler Water-Out	R/L °F.	111	125	137	145	157
Jacket Water-In	°F.	153	155	158	153.5	158.5
Jacket Water-Out	°F.	158	164	164	168	166
Exhaust Gas-Lvg T/C-L	°F.	-	-	-	-	-
Exhaust Gas-Lvg T/C-R	°F.	-	-	-	-	-
Manifold Pressure-Lft	hg	5.7	8.3	9.5	11.0	13.1
Manifold Pressure-Rt	hg	5.7	8.3	9.5	11.0	13.1
Generator (X 8400)						
Std KWH meter-start	KWH	2170.6	2171.1	2171.7	2172.4	2173.3
Std KWH meter-stop	KWH	2171.0	2171.6	2172.2	2172.9	2173.9
Generator Digital Counter	KWH	0.367	0.484	0.536	0.595	0.689
Generator volts	V.	4000	4000	4000	4000	4000
Generator amps	A.	480	600	650	720	810
Generator vars	MVARS	1.3	1.2	1.2	1.1	1.1
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	7200.4	7200.6	7200.9	7201.2	7201.6
Aux. clocked-stop	KWH	7200.6	7200.9	7201.2	7201.5	7201.8
Aux. load indicator	KW	-	-	-	-	-
Aux. volts	V.	-	-	-	-	-
Aux. amps	A.	38	51	61	57	57
Fuel Oil						
F.O. tank level-start	in.	36.25	31.75	31.50	32.00	24.5
F.O. tank level-end	in.	21.00	37.19	37.25	36.00	26.75
F.O. meter rdg-start	gal.	796696	796921	797294	797689	798103
F.O. meter rdg-end	gal.	796696	797294	797689	798103	798541
F.O. temp.	°F.	93	95	95	96	100
F.O. drain tank-start	in.	-	-	-	-	-
F.O. drain tank-end	in.	-	-	-	-	-

Fuel Oil Analysis		
API gravity @ 60 °F.		36.3
Sulfur, Wt. %		0.12
Higher heating value	BTU/gal	138,453

TEST BY: E.Cravalho

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
06-26-02

TEST #1
MPP UNIT NO. 5

DATA:

Dia. of tank	48	Tank level start (h1)	24.5	in.
Vol. of tank	579.581	Tank level stop (h2)	26.75	in.
Ht. from floor	7			
		Vol diff=	33.70	gal.

CALCULATIONS:

% of tank u=h/D
u1= 0.6354167
u2= 0.5885417

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.5264416
f(u2)= 0.4807758

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 67.028621
% tank f(u2)= 61.214275

Volume in tank
Vol of f(u1)= 191.09585
Vol of f(u2)= 224.79469

Vol diff= 33.70 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
06-26-02
Unit No: 5

	0	0	0	0	
	TEST LOADS-MW				
	3.1	4.1	4.5	5.0	5.8
F.O. Temp. °F.	93	95	95	96	100
F.O. Temp. (Corr.)	0.9835	0.9825	0.9825	0.9820	0.9800
F.O.-start gal.	796696	796921	797294	797689	798103
F.O.-end gal.	796696	797294	797689	798103	798541
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(229.23)	82.53	87.30	60.94	33.70
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,083	4,066	4,502	4,998	5,620
KW (Aux.)	93.33	140.00	140.00	140.00	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,453	138,453	138,453	138,453	138,453
HEAT RATE (APPROX.)G	10,099	9,694	9,272	9,579	9,736
HEAT RATE (APPROX.)N	10,414	10,039	9,570	9,856	9,901
HEAT RATE (ACTUAL)-G	10,125	9,719	9,296	9,604	8,762
HEAT RATE (ACTUAL)-N	10,441	10,065	9,595	9,881	9,927

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-5 Fuel Tested: 07-02-02
06-26-02 Tested by: K Nakamatsu

DATA:

GENERATED (MW)	3.083	4.066	4.502	4.998	5.620
HEAT RATE(BTU/MW)G	10,099	9,694	9,272	9,579	9,736
HEAT RATE(BTU/MW)N	10,414	10,039	9,570	9,856	9,901
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$35.2579	act.			
H.H.V. (BTU/BBL)	138,453	act.			

A, B, C CONSTANTS:

GROSS A=	15,377.92	NET A=	14,981.24
B=	(2,559.328)	B=	(2,169.096)
C=	276.9043	C=	225.3089

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,192	10,105	10,024	9,877	9,753	9,651	9,571	9,513	9,478	9,464	9,473
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,502	10,422	10,347	10,211	10,092	9,992	9,910	9,845	9,799	9,771	9,761
GROSS (MBTU)	30.576	31.326	32.075	33.583	35.111	36.674	38.284	39.956	41.702	43.536	45.471
NET (MBTU)	30.525	31.337	32.146	33.764	35.391	37.038	38.252	39.973	41.745	43.578	45.485
COST/KWH	$0.0618	$0.0613	$0.0608	$0.0599	$0.0591	$0.0585	$0.0580	$0.0577	$0.0575	$0.0574	$0.0574
G/KWH	251.82	249.67	247.66	244.04	240.97	238.45	236.48	235.05	234.17	233.84	234.05
G/PS-H	183.46	181.89	180.42	177.79	175.55	173.72	172.28	171.24	170.60	170.36	170.51

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,504	9,557	9,632	9,729	9,849	9,991	10,070	10,154
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	
HEAT RATE(BTU/MW)N	9,768	9,794	9,838	9,900	9,980	10,078	10,133	10,194
GROSS (MBTU)	47.519	49.696	52.013	54.485	57.124	59.943	61.425	62.957
NET (MBTU)	47.475	49.559	51.749	54.054	56.952	59.526	60.869	0.000
COST/KWH	$0.0576	$0.0579	$0.0584	$0.0590	$0.0597	$0.0606	$0.0611	$0.0616
G/KWH	234.82	236.13	237.98	240.39	243.34	246.84	248.80	250.89
G/PS-H	171.07	172.02	173.38	175.13	177.28	179.83	181.25	182.78

WORKSHEI (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0828	9.50365584	29.29787	90.319474	10099.00117	31133.201	95977.431
4.0656	16.52910336	67.200723	273.21126	9693.645881	39410.487	160227.27
4.5024	20.27160576	91.270878	410.938	9272.437911	41748.224	187967.21
4.998	24.980004	124.85006	624.0006	9579.474975	47878.216	239295.32
5.6196	31.57990416	177.46643	997.29035	9736.488777	54715.172	307477.38
0	0	0	0	0	0	0
22.2684	102.8642731	490.08596	2395.7597	48381.04872	214885.3	990944.62

a=	18.43972704	C=	276.9043419
b=	-21958.32131	B=	-2559.32758
d=	-2942.044179	A=	15377.92305
e=	159.8070206		
f=	1397.73971		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0828	9.5036556	29.29787	90.319474	10414.299	32105.202	98973.917
4.0656	16.529103	67.200723	273.21126	10039.354	40815.996	165941.51
4.5024	20.271606	91.270878	410.938	9570.0129	43088.026	193998.53
4.998	24.980004	124.85006	624.0006	9855.5405	49257.992	246191.44
5.6196	31.579904	177.46643	997.29035	9900.9287	55639.259	312670.38
0	0	0	0	0	0	0
22.2684	102.86427	490.08596	2395.7597	49780.135	220906.48	1017776.8

a=	18.439727	C=	225.30891
b=	-31713.51	B=	-2169.096
d=	-3991.587	A=	14981.238
e=	159.80702		
f=	1397.7397		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 5
DATE: 11-14-01

Gross Load - (M4-9) -->	MWH	3.1	4.0	4.5	5.6	5.1
Actual Test Load	MWH	3.02	4.032	4.988	5.619	
Description\Time		0818	0932	1051	1208	
Ambient air temp	°F.	71	73	74	74	
Manifold Air-Left	°F.	107	116	132	138	
Manifold Air-Right	°F.	105	113	124	129	
Intercooler Water-In	R/L °F.	12	12	12	11.5	
Intercooler Water-Out	R/L °F.	10	10.5	11	11.5	
Jacket Water-In	°F.	145	152	155	156	
Jacket Water-Out	°F.	152	160	163	165	
Exhaust Gas-Lvg T/C-L	°F.	-	-	-	-	
Exhaust Gas-Lvg T/C-R	°F.	-	-	-	-	
Manifold Pressure-Lft	hg	5.8	8.6	11.8	14.0	
Manifold Pressure-Rt	hg	5.8	8.6	11.8	14.0	
Generator (X 8400)						
Std KWH meter-start	KWH	680.3	680.8	681.5	682.2	
Std KWH meter-stop	KWH	680.7	681.3	682.1	682.9	
Generator Digital Counter	KWH	0.360	0.480	0.595	0.669	
Generator volts	V.	4000	4100	4100	4100	
Generator amps	A.	480	610	730	820	
Generator vars	MVARS	1.5	1.6	1.6	1.4	
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	6411.1	6411.3	6411.6	6411.9	
Aux. clocked-stop	KWH	6411.2	6411.5	6411.8	6412.1	
Aux. load indicator	KW	-	-	-	-	
Aux. volts	V.	-	-	-	-	
Aux. amps	A.	40	54	50	59	
Fuel Oil						
F.O. tank level-start	in.	24.50	30.25	27.25	27.00	
F.O. tank level-end	in.	35.00	34.25	34.00	33.50	
F.O. meter rdg-start	gal.	888895	889268	889620	890076	
F.O. meter rdg-end	gal.	889268	889620	890076	890576	
F.O. temp.	°F.	97	97	97	97	
F.O. drain tank-start	in.	-	-	-	-	
F.O. drain tank-end	in.	-	-	-	-	

Fuel Oil Analysis

API gravity @ 60 °F.		
Sulfur, Wt. %		
Higher heating value	BTU/gal	

TEST BY: E.Cravalho

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
11-14-01

TEST #1
MPP UNIT NO. 5

DATA.

Dia. of tank	48	Tank level start (h1)	27 in.
Vol. of tank	579.581	Tank level stop (h2)	33.5 in.
Ht. from floor	7		
		Vol diff=	99.57 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.5833333
u2= 0.4479167

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.475645
f(u2)= 0.3407101

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 60.561001
% tank f(u2)= 43.380556

Volume in tank
Vol of f(u1)= 228.58095
Vol of f(u2)= 328.15554

Vol diff= 99.57 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
11-14-01
Unit No.: 5

	0	0	0	0	
	TEST LOADS-MW				
	3.0	4.0	5.0	5.6	0.0
F.O Temp °F.	97	97	97	97	0
F.O Temp. (Corr.)	0.9815	0.9815	0.9815	0.9815	1.0300
F.O.-start gal.	888895	889268	889620	890076	0
F.O -end gal.	889268	889620	890076	890576	0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end. gal.	159.90	61.34	103.42	99.57	
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,024	4,032	4,998	5,620	0.0
KW (Aux.)	46.67	93.33	93.33	93.33	0.00
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)G	9,551	9,771	9,562	9,658	#DIV/0!
HEAT RATE (APPROX.)N	9,701	10,002	9,744	9,821	#DIV/0!
HEAT RATE (ACTUAL)-G	0	0	0	0	#DIV/0!
HEAT RATE (ACTUAL)-N	0	0	0	0	#DIV/0!

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-5 Fuel Tested:
11-14-01 Tested by:

DATA:

GENERATED (MW)	4.032	4.998	5.620
HEAT RATE(BTU/MW)G	9,771	9,562	9,658
HEAT RATE(BTU/MW)N	10,002	9,744	9,821

NUMBER OF TESTS 3
PRICE OF FUEL/BBL $44.1957 act.
H.H.V. (BTU/BBL) 138,095 est.

A, B, C CONSTANTS:

GROSS A=	15,364.37	NET A=	16,069 77
B=	(2,331.651)	B=	(2,502.576)
C=	234 2194	C=	247 4635

PREDICTED VALUES:

GENERATED (MW)G	3 0	3.1	3 2	3.4	3 6	3.8	4 0	4 2	4 4	4.6	4.8
HEAT RATE(BTU/MW)G	10,477	10,387	10,301	10,144	10,006	9,886	9,785	9,703	9,640	9,595	9,569
GENERATED (MW)N	3.0	3.1	3.2	3.4	3.6	3.8	3 9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,789	10,690	10,598	10,422	10,268	10,133	10,018	9,924	9,849	9,794	9,759
GROSS (MBTU)	31.432	32.200	32.965	34.491	36.021	37.568	39 141	40 753	42.414	44.136	45 931
NET (MBTU)	31.864	32.639	33 411	34.947	36 484	38 034	39.141	40.756	42.418	44.140	45.933
COST/KWH	$0.0798	$0.0791	$0.0785	$0.0773	$0.0762	$0.0753	$0.0748	$0.0739	$0 0735	$0 0731	$0.0729
G/KWH	258.87	256.64	254.52	250.64	247 22	244.26	241.77	239.74	238.17	237.06	236 42
G/PS-H	188.59	186.97	185.43	182.60	180.11	177.95	176.13	174 66	173.51	172.71	172 24

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5 6	5 8	6.0	6.1	6 2
HEAT RATE(BTU/MW)G	9,562	9,573	9,603	9,652	9,720	9,806	9,857	9,912
GENERATED (MW)N	4 9	5.1	5.3	5.5	5.7	5.9	6 0	6.1
HEAT RATE(BTU/MW)N	9,743	9,748	9,772	9,816	9,879	9,963	10,012	10,066
GROSS (MBTU)	47.808	49.780	51.858	54.053	56.376	58.838	60.125	61 451
NET (MBTU)	47.808	49.779	51.857	54 053	56.379	58.848	60.140	61 472
COST/KWH	$0 0729	$0.0729	$0.0732	$0.0735	$0.0741	$0.0747	$0 0751	$0 0755
G/KWH	236.24	236.53	237.27	238.48	240.15	242.29	243 53	244.89
G/PS-H	172.11	172.32	172.86	173.74	174 96	176.51	177.42	178.41

WORKSHE· (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
4.032	16.257024	65.548321	264.29083	9770.884803	39398.127	158845.18
4.998	24.980004	124.85006	624.0006	9561.580372	47788.779	238848.32
5.6196	31 57990416	177 46643	997.29035	9658.050271	54274.379	305000.3
0	0	0	0	0	0	0
0	0	0	0	0	0	0
14.6496	72 81693216	367 86481	1885.5818	28990 49545	141459.28	702693.8

a=	3.84001632	C=	234 219359
b=	-2917.535748	B=	-2331.65136
d=	-321.3074211	A=	15364 37335
e=	36.85550116		
f=	354.4397186		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
4.032	16 257024	65 548321	264.29083	10002.402	40329.684	162609.29
4.998	24.980004	124.85006	624.0006	9743.5324	48698.175	243393.48
5.6196	31.579904	177.46643	997.29035	9821.1655	55191.021	310151.46
0	0	0	0	0	0	0
0	0	0	0	0	0	0
14 6496	72 816932	367.86481	1885.5818	29587.1	144218 88	716154 23

a=	3 8400163	C=	247 46351
b=	-4522.807	B=	-2502 576
d=	-489 5422	A=	16069.769
e=	36.855501		
f=	354 43972		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 6
DATE: 02-01-06
Tested By: Colleen Ford

Recommended Test Loads	MWH	3.1	4.0	5.0	5.6	6.1
Tested Gross Load-(M4-9) -->	MWH	3.1	3.98	4.5	5	5.5
Description\Time		0736	0851	1013	1130	1242
Ambient air temp	°F.	56	63	70	77	79
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	8024.0	8024.5	8025.2	8025.8	8026.6
Std KWH meter-stop	KWH	8024.4	8025.0	8025.7	8026.4	8027.2
Generator Digital Counter	KWH	0.37	0.474	0.530	0.596	0.654
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	38.9	39.1	39.2	39.4	39.6
Aux. clocked-stop	KWH	39.0	39.2	39.4	39.5	39.7
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	25	28	31	35	35
Fuel Oil						
F.O. tank level-start	in.	33.25	19.5	36	36	33.75
F.O. tank level-end	in.	18.75	21.25	15.5	23.75	33.5
F.O. meter rdg-start	gal.	434473	434546	435209	435622	436044
F.O. meter rdg-end	gal.	434473	434867	435209	435793	436420
F.O. temp.	°F.	85	89	89	89	89
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis

API gravity @ 60 °F.		35.0
Sulfur, Wt. %		
Higher heating value	BTU/gal	139,000

TEST BY: Colleen Ford

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
02-01-06

TEST #1
MPP UNIT NO. 6

DATA:
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (h1) 33.75 in.
Tank level stop (h2) 33.5 in
Vol diff= -3.82 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.4427083
u2= 0.4479167

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.335533
f(u2)= 0.3407101

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 42.721392
% tank f(u2)= 43.380556

Volume in tank
Vol of f(u1)= 331.97593
Vol of f(u2)= 328.15554

Vol diff= -3.82 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
02-01-06
Unit No.: 6

TEST LOADS-MW	3.1	4.0	4.5	5.0	5.5
F.O. Temp. °F.	85	89	89	89	89
F.O. Temp. (Corr.)	0.9875	0.9855	0.9855	0.9855	0.9855
F.O.-start gal.	434473	434546	435209	435622	436044
F.O.-end gal.	434473	434867	435209	435793	436420
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(214.34)	24.12	(296.81)	(186.05)	(3.82)
Multplier (x1,000)	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,108	3,982	4,452	5,006	5,494
KW (Aux.)	46.67	46.67	93.33	46.67	46.67
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,000	139,000	139,000	139,000	139,000
HEAT RATE (APPROX.)G	9,405	10,147	9,073	9,706	9,409
HEAT RATE (APPROX.)N	9,548	10,268	9,267	9,797	9,490
HEAT RATE (ACTUAL)-G	9,466	10,214	9,133	9,770	9,471
HEAT RATE (ACTUAL)-N	9,610	10,335	9,328	9,861	9,552

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO 6 Fuel Tested: 02-03-06
DATE: 02-01-06 Tested by: rh
Tested By: Colleen Ford
DATA:

GENERATED (MW)	3.1	4.5	5.5
HEAT RATE(BTU/MW)G	9,466	9,133	9,471
HEAT RATE(BTU/MW)N	9,610	9,328	9,552
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$79 7548 act.		
H.H.V. (BTU/BBL)	139,000 act.		

A, B, C CONSTANTS:

GROSS A=	13,560.91	NET A=	12,728.35
B=	(2,063.981)	B=	(1,556.875)
C=	240.1849	C=	178.1521

PREDICTED VALUES:

GENERATED (MW)G	3 0	3.1	3.2	3 4	3 6	3.8	4.0	4.2	4 4	4.6	4 8
HEAT RATE(BTU/MW)G	9,531	9,471	9,416	9,320	9,243	9,186	9,148	9,129	9,129	9,149	9,188
GENERATED (MW)N	3 0	3.1	3 2	3 4	3.6	3.8	4 0	4.2	4 4	4.5	4.7
HEAT RATE(BTU/MW)N	9,661	9,614	9,571	9,494	9,432	9,385	9,351	9,332	9,327	9,336	9,360
GROSS (MBTU)	28.592	29.359	30 130	31 688	33.276	34.907	36.592	38 342	40.169	42.085	44.101
NET (MBTU)	28.532	29.355	30 179	31.838	33.516	35.224	36.968	38 759	40 604	42.076	44.055
COST/KWH	$0.1302	$0.1294	$0.1286	$0.1273	$0.1263	$0.1255	$0.1250	$0.1247	$0.1247	$0.1250	$0.1255
G/KWH	235.48	234.00	232.64	230.27	228.38	226 96	226 02	225.56	225.56	226.05	227.00
G/PS-H	171.55	170 47	169.48	167.76	166.38	165.35	164 66	164.32	164.33	164.68	165 38

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5 2	5 4	5.6	5 8	6.0	6.1	6 2
HEAT RATE(BTU/MW)G	9,246	9,323	9,419	9,535	9,670	9,824	9,908	9,997
GENERATED (MW)N	4 9	5 2	5.4	5 6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)N	9,398	9,450	9,516	9,597	9,692	9,801	9,860	9,924
GROSS (MBTU)	46 228	48 479	50.864	53.395	56.084	58.942	60 438	61.981
NET (MBTU)	46.112	48.698	50.943	53 293	55.758	58.346	59.888	61.065
COST/KWH	$0.1263	$0.1274	$0 1287	$0 1303	$0.1321	$0.1342	$0.1354	$0.1366
G/KWH	228.44	230 34	232.72	235.58	238.91	242.72	244.80	247 00
G/PS-H	166 42	167.81	169.55	171.63	174.05	176.83	178.34	179.94

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.108	9.659664	30 022236	93.309109	9466.1681	29420 844	91439 984
0	0	0	0	0	0	0
4.452	19 820304	88 239993	392.84445	9132.60769	40658.369	181011.06
0	0	0	0	0	0	0
5 4936	30.179641	165.79488	910.81073	9470.92122	52029 453	285829
0	0	0	0	0	0	0
13.0536	59 659609	284 0571	1396 9643	28069.695	122108 67	558280.05

a=	8.58235392	C=	240.184906
b=	213.111638	B=	-2063.9812
d=	-84.5713438	A=	13560.9143
e=	73.3986426		
f=	631 623922		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.108	9.659664	30.022236	93.309109	9610.4674	29869.333	92833.886
0	0	0	0	0	0	0
4 452	19.820304	88 239993	392.84445	9328.1667	41528.998	184887.1
0	0	0	0	0	0	0
5 4936	30.179641	165.79488	910.81073	9552.0634	52475 216	288277.85
0	0	0	0	0	0	0
13 0536	59 659609	284.0571	1396.9643	28490.698	123873.55	565998.83

a=	8.5823539	C=	178.15214
b=	-1747.382	B=	-1556 875
d=	-285.5298	A=	12728.348
e=	73.398643		
f=	631.62392		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 6
DATE: 03-18-05
Tested By: D K. Ernestberg

Recommended Test Loads	MWH	3.1	4.0	5.0	5.6	6.1
Tested Gross Load-(M4-9) →	MWH	3 08	4	4 5	4 99	5 6
Description\Time		0730	0850	1010	1127	1248
Ambient air temp	°F.	64	69	72	72	72
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	5155.3	5155 9	5156 5	5157.2	5158
Std KWH meter-stop	KWH	5155.7	5156 3	5157 0	5157.8	5158.7
Generator Digital Counter	KWH	0 367	0 476	0.534	0.594	0 664
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	8953.0	8953.2	8953 4	8953 6	8953.8
Aux. clocked-stop	KWH	8953.1	8953.3	8953 6	8953 8	8954.0
Aux. load indicator	KW	29	38	52	30	35
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F O. tank level-start	in.	24	28.5	28.75	29 25	25 75
F.O. tank level-end	in.	34 25	35 25	35 25	33 5	29
F O. meter rdg-start	gal.	691156	691537	691939	692351	692767
F.O. meter rdg-end	gal.	691537	691935	692351	692767	693206
F O. temp.	°F.	88	88	88	88	89
F.O. drain tank-start	in.					
F O. drain tank-end	in.					

Fuel Oil Analysis

API gravity @ 60 °F.		32.9
Sulfur, Wt. %		
Higher heating value	BTU/gal	138,881

TEST BY: K.Inouye, K Katsutani

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
03-18-05

TEST #1
MPP UNIT NO. 6

DATA:

Dia. of tank	46	Tank level start (h1)	25.75	in.
Vol. of tank	579,581	Tank level stop (h2)	29	in.
Ht. from floor	7			
		Vol diff=	49.35	gal.

CALCULATIONS:

% of tank u=h/D	
u1=	0 609375
u2=	0.5416667

f(u)=(pi/8)-{((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)}

f(u1)=	0.5011954
f(u2)=	0 4343175

% tank fill = (4/pi)*f(u)*100

% tank f(u1)=	63 814182
% tank f(u2)=	55 299018

Volume in tank

Vol of f(u1)=	209.72812
Vol of f(u2)=	259.0784
Vol diff=	49 35 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
03-18-05
Unit No.: 6

TEST LOADS-MW

	3 1	4 0	4 5	5.0	5.6
F O. Temp. °F.	88	88	88	88	89
F.O. Temp. (Corr.)	0 9860	0 9860	0 9860	0 9860	0.9855
F O.-start gal.	691156	691537	691939	692351	692767
F.O.-end gal.	691537	691935	692351	692767	693206
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	155 88	103.36	99 54	65.25	49.35
Multiplier (x1,000)	8.4	8.4	8 4	8.4	8.4
KW (Gen.)	3,083	3,998	4,486	4,990	5,578
KW (Aux.)	46.67	46.67	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,881	138,881	138,881	138,881	138,881
HEAT RATE (APPROX.)G	9,943	10,034	9,485	9,572	9,507
HEAT RATE (APPROX.)N	10,096	10,152	9,686	9,754	9,669
HEAT RATE (ACTUAL)-G	10,000	10,091	9,539	9,626	9,562
HEAT RATE (ACTUAL)-N	10,153	10,210	9,741	9,810	9,724

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO 6 Fuel Tested: 03-28-05
DATE: 03-18-05 Tested by: K Okuyama
Tested By: D K. Ernestberg
DATA:

GENERATED (MW)		3 998	4.486	4.990	5 578
HEAT RATE(BTU/MW)G		10,091	9,539	9,626	9,562
HEAT RATE(BTU/MW)N		10.210	9,741	9,810	9,724
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$61.0234	act.			
H.H.V. (BTU/BBL)	138,881	est.			

A, B, C CONSTANTS:

GROSS A=	21,039.01	NET A=	19,016 63
B=	(4,517.677)	B=	(3,610.179)
C=	442.1539	C=	349 5361

PREDICTED VALUES:

GENERATED (MW)G	3 0	3.1	3 2	3 4	3.6	3.8	4.0	4.2	4.4	4.6	4 8
HEAT RATE(BTU/MW)G	11,465	11,283	11,110	10,790	10,506	10,257	10,043	9,864	9,721	9,814	9,541
GENERATED (MW)N	3 0	3.1	3.2	3 4	3.6	3 8	4 0	4.2	4.4	4.5	4.7
HEAT RATE(BTU/MW)N	11,332	11,184	11,043	10,783	10,550	10,345	10,168	10,020	9,899	9,806	9,741
GROSS (MBTU)	34.396	34.978	35.552	36.687	37.820	38 975	40.171	41 430	42.774	44 223	45 799
NET (MBTU)	33.467	34.148	34.823	36.157	37 487	38.829	40.199	41.615	43.093	44.193	45.848
COST/KWH	$0.1199	$0.1160	$0.1162	$0.1129	$0.1099	$0.1073	$0.1051	$0.1032	$0.1017	$0.1006	$0 0998
G/KWH	283.28	278.78	274.50	266.60	259.57	253 41	248.13	243.72	240.19	237.53	235.74
G/PS-H	206 38	203.10	199 98	194 22	189.10	184 82	180 77	177.56	174 98	173.05	171.74

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5 4	5.6	5 8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,504	9,503	9,537	9,606	9,711	9,850	9,934	10,026
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,704	9,695	9,714	9,781	9,836	9,939	10,001	10,070
GROSS (MBTU)	47.522	49 415	51.498	53.793	56.321	59.103	60.596	62.160
NET (MBTU)	47.615	49 510	51.550	53.751	56.131	58.706	60 072	61 493
COST/KWH	$0 0994	$0 0994	$0 0998	$0.1005	$0.1018	$0.1031	$0.1039	$0.1049
G/KWH	234.83	234.79	235.83	237.34	239.92	243 38	245.44	247.71
G/PS-H	171.08	171 05	171 66	172.91	174.79	177.31	178.81	180.46

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.9984	15.9872026	63.923231	255.59065	10090.7677	40347 005	161323 47
4 4856	20.1206074	90.252996	404.83884	9538.79436	42787 216	191926.34
4.9896	24.8961082	124.22162	619.8162	9626 12617	48030.519	239653 08
5.5776	31.1096218	173.51703	967.80857	9561.51322	53330.296	297455.06
0	0	0	0	0	0	0
19 0512	92.1135398	451.91487	2248 0543	38817.2214	184495 04	890357.94

a=	5 50593792	C=	442.153855
b=	-14159.91	B=	-4517 8768
d=	-1534.50204	A=	21039 0073
e=	52.7860286		
f=	507.312793		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.9984	15.987203	63.923231	255.59065	10209 951	40823 47	163228 56
4 4856	20.120607	90 252996	404.83884	9741 4887	43696 422	196004.67
4.9896	24.896106	124 22162	619 8162	9809 6208	48948 084	244221.38
5.5776	31.109622	173.51703	967.80857	9724 2347	54237.891	302517.26
0	0	0	0	0	0	0
19.0512	92.11354	451 91487	2248 0543	39485 296	187703 87	905971.67

a=	5.5059379	C=	349.53611
b=	-13242 85	B=	-3610.179
d=	-1426.797	A=	19016 631
e=	52.786029		
f=	507.31279		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 6
DATE: 05-14-04
Tested By: K.Inouye, K Katsutani

Recommended Test Loads	MWH	3.1	4.0	5.0	5.6	6.1
Tested Gross Load-(M4-9) -->	MWH	3.18	3.91	4.5	5.12	5.5
Description\Time		1610	1720	1835	1950	2104
Ambient air temp	°F.	81	79	79	79	80
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	2907.2	2907.6	2908.2	2908.9	2909.6
Std KWH meter-stop	KWH	2907.5	2908.1	2908.7	2909.5	2910.3
Generator Digital Counter	KWH	0.379	0.465	0.535	0.609	0.660
Generator volts	V.					
Generator amps	A					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	7884.9	7885.1	7885.2	7885.4	7885.6
Aux. clocked-stop	KWH	7885.1	7885.2	7885.4	7885.5	7885.7
Aux. load indicator	KW	25	37	25	30	29
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.	25.5	7.825	34.5	34.75	33.5
F.O. tank level-end	in.	35	23.25	21.5	28.25	35
F.O. meter rdg-start	gal.	329936	330313	330713	331129	331552
F.O. meter rdg-end	gal.	330313	330456	330833	331392	331968
F.O. temp.	°F.	101	96	95	95	94
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis		
API gravity @ 60 °F.		33.6
Sulfur, Wt. %		0.23
Higher heating value	BTU/gal	139,405

TEST BY: K Inouye, K Katsutani

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
05-14-04

TEST #1
MPP UNIT NO. 6

DATA:
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (h1) 33.5 in.
Tank level stop (h2) 35 in.
Vol diff= 22.84 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.4479167
u2= 0.4166667

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.3407101
f(u2)= 0.3097532

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 43.380556
% tank f(u2)= 39.438999

Volume in tank
Vol of f(u1)= 328.15554
Vol of f(u2)= 351.00005

Vol diff= 22.84 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
05-14-04
Unit No.: 6

	TEST LOADS-MW				
	3.2	3.9	4.5	5.1	5.5
F.O. Temp. °F.	101	96	95	95	94
F.O. Temp. (Corr.)	0.9795	0.9820	0.9825	0.9825	0.9830
F.O.-start gal.	329936	330313	330713	331129	331552
F.O.-end gal.	330313	330456	330833	331392	331968
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	145.02	(128.57)	(195.76)	(99.60)	22.84
Multplier (x1,000)	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,184	3,906	4,494	5,116	5,544
KW (Aux.)	93.33	46.67	93.33	46.67	46.67
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,405	139,405	139,405	139,405	139,405
HEAT RATE (APPROX.)G	9,856	9,428	9,533	9,617	9,627
HEAT RATE (APPROX.)N	10,154	9,542	9,735	9,706	9,708
HEAT RATE (ACTUAL)-G	9,950	9,518	9,624	9,708	9,718
HEAT RATE (ACTUAL)-N	10,250	9,633	9,828	9,798	9,801

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO 6 Fuel Tested: 05-20-04
DATE: 05-14-04 Tested by: K.Nakamatsu
Tested By: K.Inouye, K.Katsutani
DATA:

GENERATED (MW)	3.184	3.906	4.494	5.116	5.544
HEAT RATE(BTU/MW)G	9,950	9,518	9,624	9,708	9,718
HEAT RATE(BTU/MW)N	10,250	9,633	9,828	9,798	9,801

NUMBER OF TESTS 5
PRICE OF FUEL/BBL $52.7870 act.
H.H.V. (BTU/BBL) 139,405 act.

A, B, C CONSTANTS:

GROSS A=	13,517.42	NET A=	14,548.73
B=	(1,752.821)	B=	(2,078.807)
C=	194.3410	C=	222.4989

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,008	9,951	9,898	9,804	9,726	9,663	9,616	9,584	9,567	9,567	9,581
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	4.0	4.2	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,315	10,243	10,175	10,053	9,949	9,862	9,793	9,743	9,710	9,694	9,697
GROSS (MBTU)	30.024	30.849	31.675	33.335	35.013	36.719	38.462	40.252	42.097	44.007	45.991
NET (MBTU)	29.982	30.797	31.610	33.242	34.887	36.556	38.717	40.464	41.816	43.689	45.640
COST/KWH	$0.0902	$0.0897	$0.0892	$0.0884	$0.0877	$0.0871	$0.0867	$0.0864	$0.0862	$0.0862	$0.0864
G/KWH	247.27	245.87	244.57	242.24	240.30	238.75	237.58	236.79	236.39	236.37	236.73
G/PS-H	180.14	179.12	178.17	176.46	175.07	173.93	173.08	172.51	172.21	172.20	172.47

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,612	9,658	9,719	9,796	9,889	9,997	10,057	10,120
GENERATED (MW)N	4.9	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)N	9,717	9,755	9,811	9,885	9,977	10,086	10,147	10,213
GROSS (MBTU)	48.059	50.220	52.484	54.856	57.354	59.981	61.346	62.746
NET (MBTU)	47.679	50.272	52.523	54.894	57.398	60.044	61.424	62.844
COST/KWH	$0.0866	$0.0870	$0.0876	$0.0883	$0.0891	$0.0901	$0.0906	$0.0912
G/KWH	237.48	238.62	240.14	242.04	244.32	246.99	248.47	250.05
G/PS-H	173.01	173.84	174.95	176.33	178.00	179.94	181.02	182.17

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.1836	10.135309	32.26677	102.72449	9949.79419	31676.165	100844.24
3.906	15.256836	59.593201	232.77104	9517.84549	37176.704	145212.21
4.494	20.196036	90.760986	407.87987	9623.52576	43246.125	194357.07
5.1156	26.1693634	133.872	684.83558	9708.25978	49663.574	254058.98
5.544	30.735936	170.40003	944.69776	9718.00754	53876.634	298692.06
0	0	0	0	0	0	0
22.2432	102.49348	486.89298	2372.9087	48517.4328	215641.2	993164.55

a=	17.7074554	C=	194.341
b=	-8897.76855	B=	-1752.8206
d=	-976.952508	A=	13517.4173
e=	154.881925		
f=	1359.63021		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.1836	10.135309	32.25677	102.72449	10250.301	32632.86	103889.97
3.906	15.256836	59.593201	232.77104	9632.9343	37626.241	146968.1
4.494	20.196036	90.760986	407.87987	9827.6302	44165.37	198479.17
5.1156	26.169363	133.872	684.83558	9797.638	50120.797	256397.95
5.544	30.735936	170.40003	944.69776	9800.5034	54333.991	301227.64
0	0	0	0	0	0	0
22.2432	102.49348	486.89298	2372.9087	49309.007	218879.26	1006962.8

a=	17.707455	C=	222.4989
b=	-19037.58	B=	-2078.807
d=	-2393.817	A=	14548.727
e=	154.68192		
f=	1359.6302		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO 6
DATE: 03-19-02
Tested By: E.Carvalho, S.Ishikawa

Recommended Test Loads	MWH	3.1	4.0	5.0	5.6	6.1
Tested Gross Load-(M4-9) --:	MWH	3.1	3.5	4.0	4.5	5.0
Description\Time		0743	0858	1013	1135	1255
Ambient air temp	°F.	66	72	76	83	82
Manifold Air-Left	°F.	86	99	109	110	113
Manifold Air-Right	°F.	85	100	111	113	117
Intercooler Water-In	R/L °F.	81	96	104	102	105
Intercooler Water-Out	R/L °F.	93	107	119	124	132
Jacket Water-In	°F.	143	162	166	162	163
Jacket Water-Out	°F.	147	166	171	167	168
Exhaust Gas-Lvg T/C-L	°F.	-	-	-		
Exhaust Gas-Lvg T/C-R	°F.	-	-	-		
Manifold Pressure-Lft	hg	4.5	5.4	6.6	8.2	9.5
Manifold Pressure-Rt	hg	4.4	5.2	6.4	7.9	9.2
Generator (X 8400)						
Std KWH meter-start	KWH	8512.2	8512.7	8513.2	8513.8	8514.6
Std KWH meter-stop	KWH	8512.6	8513.1	8513.6	8514.4	8515.2
Generator Digital Counter	KWH	3.091	3.436	3.965	4.486	4.922
Generator volts	V.	4025	4075	4050	4075	4075
Generator amps	A.	460	520	605	665	730
Generator vars	MVARS	1.0	1.4	1.6	1.4	1.4
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	5416.8	5417.0	5417.1	5417.3	5417.5
Aux. clocked-stop	KWH	5416.9	5417.1	5417.3	5417.5	5417.7
Aux. load indicator	KW	-	-	-	-	-
Aux. volts	V.	-	-	-	-	-
Aux. amps	A.	27	36	36	34	37
Fuel Oil						
F.O. tank level-start	in.	21.5	27.25	31.25	16.25	16.75
F.O. tank level-end	in.	31	36	22.5	21.75	20.75
F.O. meter rdg-start	gal.	670418	670791	671170	671339	671779
F.O. meter rdg-end	gal.	670791	671170	671318	671746	672199
F.O. temp.	°F.	93	92	95	98	90
F.O. drain tank-start	in.	-	-	-	-	-
F.O. drain tank-end	in.	-	-	-	-	-

Fuel Oil Analysis

API gravity @ 60 °F.		36.0
Sulfur, Wt. %		0.09
Higher heating value	BTU/gal	138,160

TEST BY: E.Carvalho, S.Ishikawa

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
03-19-02

TEST #1
MPP UNIT NO. 6

DATA:

Dia. of tank	48	Tank level start (h1)	16.75	in.
Vol. of tank	579.581	Tank level stop (h2)	20.75	in.
Ht. from floor	7			
		Vol diff=	52.77	gal.

CALCULATIONS
% of tank u=h/D
u1= 0.796875
u2= 0.7135417

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.8710671
f(u2)= 0.5995587

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 85.442914
% tank f(u2)= 76.33819

Volume in tank
Vol of f(u1)= 84.370107
Vol of f(u2)= 137.13935

Vol diff= 52.77 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
03-19-02
Unit No.: 6

	TEST LOADS-MW				
	3.1	3.5	4.0	4.5	5.0
F.O. Temp. °F.	93	92	95	98	90
F.O. Temp. (Corr.)	0.9835	0.9840	0.9825	0.9810	0.9850
F.O.-start gal.	670418	670791	671170	671339	671779
F.O.-end gal.	670791	671170	671318	671746	672199
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	142.14	133.73	(131.74)	72.94	52.77
Multiplier (x1,000)	1000	1000	1000	1000	1000
KW (Gen.)	3,091	3,436	3,965	4,486	4,922
KW (Aux.)	*46.67*	*46.67*	*93.33*	*93.33*	*93.33*
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,160	138,160	138,160	138,160	138,160
HEAT RATE (APPROX.)G	10,144	9,700	9,572	10,088	10,149
HEAT RATE (APPROX.)N	10,299	9,833	9,803	10,303	10,345
HEAT RATE (ACTUAL)-G	10,149	9,704	9,577	10,093	10,153
HEAT RATE (ACTUAL)-N	10,304	9,838	9,808	10,307	10,350

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO 6 Fuel Tested: 03-21-02
DATE: 03-19-02 Tested by: E.Wong
Tested By: E.Carvalho, S.Ishikawa
DATA:

GENERATED (MW)	3.436	3.965	4.486	4.922
HEAT RATE(BTU/MW)G	9,704	9,577	10,093	10,153
HEAT RATE(BTU/MW)N	9,838	9,808	10,307	10,350

NUMBER OF TESTS 4
PRICE OF FUEL/BBL $27.4425 act.
H.H.V. (BTU/BBL) 138,160 act.

A, B, C CONSTANTS:

GROSS		NET	
A=	12,821.42	A=	10,819.49
B=	(1,825.610)	B=	(792.644)
C=	263.3466	C=	143.9740

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,715	9,693	9,676	9,659	9,662	9,687	9,733	9,799	9,887	9,996	10,126
GENERATED (MW)N	3.0	3.1	3.2	3.4	3.6	3.8	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	9,737	9,746	9,757	9,789	9,832	9,886	9,952	10,030	10,119	10,220	10,332
GROSS (MBTU)	29.144	30.048	30.964	32.839	34.784	36.810	38.930	41.157	43.503	45.982	48.605
NET (MBTU)	28.757	29.757	30.768	32.825	34.936	37.107	38.881	41.191	43.580	46.058	48.629
COST/KWH	$0.0459	$0.0458	$0.0458	$0.0457	$0.0457	$0.0458	$0.0460	$0.0463	$0.0468	$0.0473	$0.0479
G/KWH	240.03	239.48	239.07	238.64	238.73	239.34	240.47	242.12	244.29	246.98	250.19
G/PS-H	174.86	174.47	174.17	173.86	173.92	174.36	175.19	176.39	177.97	179.93	182.27

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	10,277	10,449	10,642	10,857	11,092	11,348	11,484	11,626
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,456	10,591	10,737	10,896	11,065	11,247	11,342	11,439
GROSS (MBTU)	51.385	54.336	57.468	60.797	64.333	68.089	70.054	72.079
NET (MBTU)	51.303	54.084	56.981	59.999	63.147	66.431	68.126	69.857
COST/KWH	$0.0486	$0.0494	$0.0503	$0.0513	$0.0525	$0.0537	$0.0543	$0.0550
G/KWH	253.92	258.17	262.94	268.24	274.05	280.39	283.75	287.24
G/PS-H	184.99	188.08	191.56	195.42	199.65	204.27	206.72	209.26

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.436	11.806096	40.565746	139.3839	9704.40022	33344.319	114571.08
3.965	15.721225	62.334657	247.15692	9576.92888	37972.523	150561.05
4.486	20.124196	90.277143	404.98326	10092.9132	45278.809	203111.76
4.922	24.226084	119.24079	586.90315	10153.4842	49975.449	245979.16
0	0	0	0	0	0	0
16.809	71.877601	312.41833	1378.4272	39527.7266	166569.1	714223.06

a=	4.967923	C=	263.346582
b=	15734.0827	B=	-1825.6101
d=	1854.84541	A=	12821.4213
e=	41.4827315		
f=	347.31939		

WORKSHE' (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.436	11.806096	40.565746	139.3839	9838.0171	33803.427	116148.57
3.965	15.721225	62.334657	247.15692	9807.7976	38887.917	154190.59
4.486	20.124196	90.277143	404.98326	10307.363	46238.829	207427.39
4.922	24.226084	119.24079	586.90315	10349.741	50941.425	250733.69
0	0	0	0	0	0	0
16.809	71.877601	312.41833	1378.4272	40302.918	169871.6	728500.25

a=	4.967923	C=	143.97401
b=	17123.91	B=	-792.6444
d=	2034.6388	A=	10819.493
e=	41.482732		
f=	347.31939		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

Note: Derated to 5.0 MW.
High Cyl. Exh Temp

MPP UNIT NO. 6
DATE: 07-21-01
Tested By: C.Cua

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.058	3.528	4.0	4.444	4.939
Description\Time		0742	0903	1008	1125	1139
Ambient air temp	°F.	70	76	77	77	77.5
Manifold Air-Left	°F.	102	111	113	118	12
Manifold Air-Right	°F.	100	108	111	113	117
Intercooler Water-In	R/L °F.	98	104	104	107	104
Intercooler Water-Out	R/L °F.	108	118	122	129	133
Jacket Water-In	°F.	159	164	161.5	164	163
Jacket Water-Out	°F.	162	168	165.5	169	169
Exhaust Gas-Lvg T/C-L	°F.	-	-	-		
Exhaust Gas-Lvg T/C-R	°F.	-	-	-		
Manifold Pressure-Lft	hg	4.8	6.0	7.2	8.6	10.1
Manifold Pressure-Rt	hg	4.7	5.9	7.1	8.5	10.0
Generator (X 8400)						
Std KWH meter-start	KWH	6895.2	6895.6	6896.1	6896.7	6897.4
Std KWH meter-stop	KWH	6895.6	6896.1	6896.7	6897.3	6898
Generator Digital Counter	KWH	0.384	0.420	0.474	0.529	0.588
Generator volts	V.	4075	4140	4140	4125	4125
Generator amps	A.	505	530	605	660	730
Generator vars	MVARS	1.8	1.4	1.5	1.5	1.5
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	4600.8	4600.9	4601.1	4601.4	4601.7
Aux. clocked-stop	KWH	4600.8	4601.1	4601.3	4601.6	4601.9
Aux. load indicator	KW	-	-	-	-	-
Aux. volts	V	-	-	-	-	-
Aux. amps	A	46	52	54	57	62
Fuel Oil						
F.O. tank level-start	in.	35.125	27.75	20	27.625	29.25
F.O. tank level-end	in.	20.25	36.125	34.5	33.75	33.5
F.O. meter rdg-start	gal.	686839	687035	687417	687676	688097
F.O. meter rdg-end	gal	686839	687417	687440	688097	688510
F.O. temp.	°F.	89.5	95.5	94.5	98	94
F.O. drain tank-start	in.	-	-	-	-	-
F.O. drain tank-end	in.	-	-	-	-	-

Fuel Oil Analysis

API gravity @ 60 °F.		34.8
Sulfur, Wt. %		0.15
Higher heating value	BTU/gal	138,238

TEST BY: C.Cua

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
07-21-01

TEST #1
MPP UNIT NO 6

DATA:

Dia. of tank	48	Tank level start (h1)	34.5	in.
Vol. of tank	579.581	Tank level stop (h2)	20	in.
Ht. from floor	7			
		Vol diff=	-216.61	gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.4270833
u2= 0.7291667

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.3200417
f(u2)= 0.6135683

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 40.748975
% tank f(u2)= 78.121938

Volume in tank
Vol of f(u1)= 343.40768
Vol of f(u2)= 126.80109

Vol diff= -216.61 gal.

MAUI ELECTRIC COMPANY, INC

Maalaea Power Plant

Subject: Heat Rate Testing
07-21-01
Unit No.: 6

	3,058	3,528	3,982	-	
	TEST LOADS-MW				
	3.1	3.5	4.0	4.4	4.9
F.O. Temp. °F.	89.5	95.5	94.5	98	94
F.O. Temp. (Corr.)	0.9853	0.9823	0.9828	0.9810	0.9830
F.O.-start gal.	686839	687035	687417	687676	688097
F.O.-end gal.	686839	687417	687440	688097	688510
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(222.67)	128.00	(216.61)	93.90	65.25
PT RATIO	8400	8400	8400	8400	8400
KW (Gen.)	3,058	3,528	3,982	4,444	4,939
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,238	138,238	138,238	138,238	138,238
HEAT RATE (APPROX.)G	9,908	9,766	8,167	9,972	9,557
HEAT RATE (APPROX.)N	10,220	10,031	8,363	10,186	9,742
HEAT RATE (ACTUAL)-G	9,919	9,776	8,176	9,983	9,567
HEAT RATE (ACTUAL)-N	10,231	10,042	8,372	10,197	9,752

CA-IR-73
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Note: Derated to 5.0 MW,
High Cyl. Exh Temp

MPP UNIT NO 6 Fuel Tested: 07-24-01
DATE: 07-21-01 Tested by: K. Yokoyama
Tested By: C.Cua
DATA:

GENERATED (MW)	3.058	3.528		4.444
HEAT RATE(BTU/MW)G	9,919	9,776		9,983
HEAT RATE(BTU/MW)N	10,231	10,042		10,197
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$44.2768	act.		
H.H.V. (BTU/BBL)	138,238	act.		

A, B, C CONSTANTS:

GROSS A=	14,967.92	NET A=	15,917.81
B=	(2,819.3572)	B=	(3,122.649)
C=	381.9964	C=	412.9903

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,948	9,899	9,858	9,798	9,769	9,770	9,802	9,865	9,958	10,082	10,236
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,267	10,206	10,154	10,075	10,029	10,015	10,035	10,088	10,174	10,293	10,444
GROSS (MBTU)	29.843	30.687	31.544	33.313	35.168	37.128	39.210	41.433	43.816	46.377	49.134
NET (MBTU)	29.842	30.688	31.547	33.315	35.167	37.124	39.204	41.428	43.815	46.385	49.159
COST/KWH	$0.0759	$0.0755	$0.0752	$0.0747	$0.0745	$0.0745	$0.0748	$0.0752	$0.0759	$0.0789	$0.0781
G/KWH	245.79	244.58	243.56	242.08	241.37	241.40	242.19	243.74	246.04	249.10	252.91
G/PS-H	179.06	178.18	177.44	176.36	175.84	175.87	176.44	177.57	179.25	181.47	184.25

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	10,421	10,636	10,882	11,159	11,466	11,804	11,984	12,172
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,629	10,847	11,098	11,382	11,699	12,050	12,237	12,433
GROSS (MBTU)	52.105	55.310	58.765	62.490	66.503	70.822	73.102	75.465
NET (MBTU)	52.155	55.394	58.895	62.679	66.765	71.173	73.504	75.923
COST/KWH	$0.0795	$0.0811	$0.0830	$0.0851	$0.0874	$0.0900	$0.0914	$0.0928
G/KWH	257.48	262.80	268.88	275.71	283.30	291.64	296.09	300.74
G/PS-H	187.58	191.48	195.88	200.86	206.39	212.47	215.71	219.09

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0576	9.34891776	28.585251	87.402263	9918.71072	30327.45	92729.211
3.528	12.446784	43.912254	154.92243	9775.85877	34489.23	121678
0	0	0	0	0	0	0
4.4436	19.745581	87.741464	389.88797	9982.56932	44358.545	197111.63
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11.0292	41.5412827	160.23897	632.21266	29677.1388	109175.22	411518.84

a=	2.98059552	C=	381.996381
b=	1730.11845	B=	-2819.3572
d=	210.574641	A=	14967.9246
e=	22.54979		
f=	170.959818		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0576	9.3489178	28.585251	87.402263	10231.013	31282.344	95648.896
3.528	12.446784	43.912254	154.92243	10041.507	35426.437	124984.47
0	0	0	0	0	0	0
4.4436	19.745581	87.741464	389.88797	10196.742	45310.241	201340.59
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11.0292	41.541283	160.23897	632.21266	30469.261	112019.02	421973.95

a=	2.9805955	C=	412.99026
b=	189.6568	B=	-3122.649
d=	5.4895032	A=	15917.813
e=	22.54979		
f=	170.95982		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 7
DATE: 11-22-05

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.11	3.74	4.40	4.87	5.52
Description\Time		0800	0920	1040	1155	1320
Ambient air temp	°F.	80	84	85	85	88
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	7203.1	7203.7	7204.3	7204.9	7205.8
Std KWH meter-stop	KWH	7203.5	7204.1	7204.8	7205.5	7206.4
Demand meter		0.37	0.445	0.524	0.58	0.657
Generator volts	V.					
Generator amps	A					
Generator vars	MVARS					
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	9821.2	9821.5	9821.8	9822.0	9822.3
Aux. clocked-stop	KWH	9821.4	9821.7	9822.0	9822.2	9822.5
Aux. load indicator	KW	50	52	53	53	53
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	226202	226587	226967	227379	227809
F.O. meter rdg-end	gal.	226578	226967	227379	227809	228261
F.O. temp.	°F.	96	95	97	97	99
F.O. drain tank-start	in.	24.75	27.75	28	28.25	22.5
F.O. drain tank-end	in.	33.75	35	33.75	33	25.75
Fuel Oil Analysis						
API gravity @ 60 °F.		33.5				
Sulfur, Wt. %						
Higher heating value	BTU/gal	140,167				

TEST BY: Keith Inouye

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
11-22-05

TEST #1
MPP UNIT NO. 7

DATA:
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (n1) 22.5 in.
Tank level stop (h2) 25.75 in.

Vol diff= 47.83 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.677083
u2= 0.609375

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.56600739
f(u2)= 0.5011954

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 72.0662991
% tank f(u2)= 63.8141824

Volume in tank
Vol of f(u1)= 161.898423
Vol of f(u2)= 209.726123

Vol diff= 47.83 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
11-22-05
Unit No.: 7

	TEST LOADS-MW				
	3.1	3.7	4.4	4.9	5.5
F.O. Temp. °F.	96	95	97	97	99
F.O. Temp. (Corr.)	0.9820	0.9825	0.9815	0.9815	0.9805
F.O.-start gal.	226202	226587	226967	227379	227809
F.O.-end gal.	226578	226967	227379	227809	228261
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	137.17	111.02	88.19	72.90	47.83
PT RATIO	8400	8400	8400	8400	8400
KW (Gen.)	3,108.0	3,738.0	4,401.6	4,672.0	5,519
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	140,167	140,167	140,167	140,167	140,167
HEAT RATE (APPROX.)-G	10,421	9,763	9,971	9,935	9,916
HEAT RATE (APPROX.)N	10,743	10,013	10,187	10,129	10,087
HEAT RATE (ACTUAL)-G	10,577	9,910	10,121	10,084	10,065
HEAT RATE (ACTUAL)-N	10,905	10,163	10,340	10,281	10,238

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-7 Fuel Tested: 11-30-05
11-22-05 Tested by: K.Okuyama

DATA:

GENERATED (MW)	3.108	4.402	4.872	5.519
HEAT RATE(BTU/MW)G	10,577	10,121	10,084	10,065
HEAT RATE(BTU/MW)N	10,905	10,340	10,281	10,238
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$97.0858 act.			
H.H.V. (BTU/BBL)	140,167 act.			

A, B, C CONSTANTS:

GROSS A=	13,269.14	NET A=	14,084.88
B=	(1,236.409)	B=	(1,446.145)
C=	118.9767	C=	135.8966

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,631	10,580	10,531	10,441	10,360	10,289	10,227	10,175	10,132	10,099	10,076
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,970	10,908	10,849	10,739	10,640	10,552	10,475	10,408	10,353	10,308	10,274
GROSS (MBTU)	31.892	32.797	33.699	35.498	37.296	39.097	40.909	42.735	44.582	46.456	48.363
NET (MBTU)	31.885	32.796	33.704	35.510	37.311	39.113	40.921	42.744	44.586	46.456	48.359
COST/KWH	$0.1753	$0.1745	$0.1737	$0.1722	$0.1709	$0.1697	$0.1687	$0.1678	$0.1671	$0.1666	$0.1662
G/KWH	262.66	261.40	260.19	257.96	255.97	254.21	252.69	251.40	250.34	249.53	248.94
G/PS-H	191.35	190.43	189.56	187.93	186.48	185.20	184.09	183.15	182.38	181.79	181.36

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	10,062	10,057	10,062	10,076	10,100	10,134	10,154	10,177
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	10,252	10,240	10,238	10,248	10,269	10,300	10,320	10,343
GROSS (MBTU)	50.308	52.296	54.334	56.428	58.582	60.803	61.940	63.097
NET (MBTU)	50.301	52.290	54.332	56.434	58.601	60.841	61.990	63.159
COST/KWH	$0.1659	$0.1659	$0.1659	$0.1662	$0.1666	$0.1671	$0.1675	$0.1678
G/KWH	248.59	248.48	248.60	248.96	249.55	250.38	250.88	251.44
G/PS-H	181.11	181.02	181.11	181.37	181.81	182.41	182.77	183.18

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.108	9.659664	30.0222357	93.3091086	10577.0389	32873.4369	102170.642
0	0	0	0	0	0	0
4.4016	19.3740826	85.2769618	375.355075	10120.7974	44547.702	196081.165
4.872	23.736384	115.643663	563.415925	10083.6467	49127.5268	239349.31
5.5188	30.4571534	168.086938	927.638196	10064.9533	55546.464	306549.826
0	0	0	0	0	0	0
17.9004	83.227284	399.029799	1959.7183	40846.4363	182095.13	844150.942

a=	12.4848158	C=	118.976708
b=	-22934.1827	B=	-1236.40896
d=	-2787.02968	A=	13269.1358
e=	106.317521		
f=	912.092417		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.108	9.659664	30.0222357	93.3091086	10904.5014	33891.1904	105333.82
0	0	0	0	0	0	0
4.4016	19.3740826	85.2769618	375.355075	10340.0522	45512.7736	200329.024
4.872	23.736384	115.643663	563.415925	10280.5929	50087.0486	244024.101
5.5188	30.4571534	168.086938	927.638196	10238.0988	56502.0199	311823.347
0	0	0	0	0	0	0
17.9004	83.227284	399.029799	1959.7183	41763.2453	185993.032	861510.292

a=	12.4848158	C=	135.896626
b=	-29800.3096	B=	-1446.14539
d=	-3606.66648	A=	14084.8798
e=	106.317521		
f=	912.092417		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 7
DATE: 05-27-04

Gross Load - (M4-9) -->	MWH	3 1	4.0	5 0	5 6	6.1
Actual Test Load	MWH	3.09	4.03	4.44	5.02	5 51
Description\Time		1555	1720	1845	2010	2125
Ambient air temp	°F.	88	84	82	80	80
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	5027.9	5028 5	5029.1	5029.9	5030.7
Std KWH meter-stop	KWH	5028.2	5028.9	5029.7	5030.5	50313
Demand meter		0.368	0.48	0 528	0.598	0.656
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	7940.1	7940 4	7940.6	7940.8	7941.1
Aux. clocked-stop	KWH	7940 3	7940.5	7940 6	7941.0	7941.2
Aux. load indicator	KW	40	40	38	38	38
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F O tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	869347	869586	870081	870581	871014
F.O. meter rdg-end	gal.	869347	869747	870163	870890	871463
F.O. temp.	°F.	98	98	97	95	94
F.O. drain tank-start	in.	36	28	32.75	34.25	32 25
F.O. drain tank-end	in	21.25	20	16	30.5	36

Fuel Oil Analysis		
API gravity @ 60 °F.		33.7
Suffur, Wt. %		0.25
Higher heating value	BTU/gal	140,143

TEST BY: Myles Matsuda/Donald Ernestberg

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
05-27-04

TEST #1
MPP UNIT NO. 7

DATA:

Dia of tank	48	Tank level start (h1:	32 25	in.
Vol. of tank	579.581	Tank level stop (h2)	36	in.
Ht. from floor	7			
		Vol diff=	57.10	gal.

CALCULATIONS:

% of tank u=h/D
u1= 0.473958
u2= 0 39583333

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.36666919
f(u2)= 0.2892909

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 46.6857717
% tank f(u2)= 36 8336638

Volume in tank
Vol of f(u1)= 308 999137
Vol of f(u2)= 366.100083

Vol diff= 57.10 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
05-27-04
Unit No.: 7

	TEST LOADS-MW				
	3.1	4.0	4 4	5.0	5.5
F.O. Temp. °F.	98	98	97	95	94
F.O. Temp. (Corr.)	0.9810	0.9810	0.9815	0.9825	0.9830
F.O.-start gal.	869347	869586	870081	870581	871014
F.O.-end gal.	869347	869747	870163	870890	871463
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(221.97)	(116.99)	(216.48)	(57 50)	57.1
PT RATIO	8400	8400	8400	8400	8400
KW (Gen.)	3,091 2	4,032.0	4,435.2	5,023.2	5,510
KW (Aux.)	93.33	46.67	93.33	93.33	46 67
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	140,143	140,143	140,143	140,143	140,143
HEAT RATE (APPROX.)-G	9,728	9,340	9,122	9,899	9,654
HEAT RATE (APPROX.)N	10,031	9,450	9,318	10,087	9,737
HEAT RATE (ACTUAL)-G	9,872	9,479	9,257	10,046	9,798
HEAT RATE (ACTUAL)-N	10,179	9,590	9,456	10,236	9,881

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-7 Fuel Tested: 06-04-04
05-27-04 Tested by: K Nakamatsu

DATA:

GENERATED (MW)	3.091	4.032	4.435		5.510
HEAT RATE(BTU/MW)G	9,872	9,479	9,257		9,798
HEAT RATE(BTU/MW)N	10,179	9,590	9,456		9,881
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$52.7670	act.			
H.H.V. (BTU/BBL)	140,143	act.			

A, B, C CONSTANTS:

GROSS A=	15,712.66	NET A=	16,794.01
B=	(2,916.060)	B=	(3,265.675)
C=	333.9325	C=	364.8247

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,970	9,882	9,801	9,656	9,543	9,454	9,391	9,356	9,347	9,365	9,409
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.2	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,280	10,176	10,080	9,908	9,766	9,653	9,569	9,514	9,488	9,492	9,524
GROSS (MBTU)	29.910	30.634	31.362	32.838	34.353	35.924	37.565	39.294	41.126	43.078	45.165
NET (MBTU)	29.882	30.597	31.314	32.763	34.245	35.779	37.361	39.513	40.862	42.776	44.828
COST/KWH	$0.0894	$0.0886	$0.0879	$0.0866	$0.0855	$0.0848	$0.0842	$0.0839	$0.0838	$0.0840	$0.0844
G/KWH	246.33	244.16	242.15	238.63	235.77	233.57	232.04	231.16	230.94	231.38	232.48
G/PS-H	179.46	177.88	176.41	173.85	171.77	170.17	169.04	168.40	168.24	168.57	169.37

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,481	9,579	9,703	9,855	10,033	10,238	10,350	10,469
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)N	9,586	9,677	9,798	9,947	10,126	10,334	10,449	10,571
GROSS (MBTU)	47.403	49.809	52.398	55.187	58.191	61.427	63.137	64.911
NET (MBTU)	47.037	49.419	51.993	55.239	58.257	61.519	63.248	65.045
COST/KWH	$0.0850	$0.0859	$0.0870	$0.0883	$0.0899	$0.0918	$0.0928	$0.0939
G/KWH	234.24	236.66	239.75	243.49	247.89	252.95	255.73	258.67
G/PS-H	170.65	172.42	174.66	177.39	180.59	184.28	186.31	188.45

WORKSHEET (GROSS)

MEGAWATTS = X			HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2
3.0912	9.55551744	29.5380155	91.3079135	9872.04558	30516.4673	94332.5037
4.032	16.257024	65.5483208	264.290829	9478.69665	38218.1049	154095.399
4.4352	19.670999	87.2448149	386.948203	9256.85154	41055.988	182091.518
0	0	0	0	0	0	0
5.5104	30.3645082	167.320586	922.003356	9797.53048	53988.312	297497.194
0	0	0	0	0	0	0
17.0688	75.8480486	349.651737	1664.5503	38405.1243	163778.872	728016.615

a=	12.0482611	C=	333.93252
b=	-887.273943	B=	-2916.06009
d=	-413.896434	A=	15712.6602
e=	103.971775		
f=	905.274725		

WORKSHEET (NET)

MEGAWATTS = X			HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2
3.0912	9.55551744	29.5380155	91.3079135	10179.3945	31466.5441	97269.3812
4.032	16.257024	65.5483208	264.290829	9589.68842	38665.6237	155899.795
4.4352	19.670999	87.2448149	386.948203	9455.83603	41938.5328	186005.781
0	0	0	0	0	0	0
5.5104	30.3645082	167.320586	922.003356	9881.21284	54449.4352	300038.168
0	0	0	0	0	0	0
17.0688	75.8480486	349.651737	1664.5503	39106.1337	166520.136	739213.125

a=	12.0482611	C=	364.824704
b=	-9271.43527	B=	-3265.67492
d=	-1414.232	A=	16794.011
e=	103.971775		
f=	905.274725		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 7
DATE: 12-03-02

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.040	4.006	4.418	5.065	5.661
Description\Time		1341	1227	1109	0955	0812
Ambient air temp	°F.	86	87	87	84	84
Manifold Air-Left	°F.	111	121	128	132	141
Manifold Air-Right	°F.	112	121	127	131	138
Intercooler Water-In	R/L °F	151.9	150.8	150.4	150.3	152.7
Intercooler Water-Out	R/L °F.	167.1	167.7	168.7	169.2	172
Jacket Water-In	°F.	161.5	162	162.8	162.7	164.8
Jacket Water-Out	°F.	160.9	162	163.4	163.6	166.1
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg	7.0	9.7	11.6	13.4	16.0
Manifold Pressure-Rt	hg	7.0	9.7	11.6	13.4	16.0
Generator (X 8400)						
Std KWH meter-start	KWH	1004.6	1004.1	1003.4	1002.7	1001.6
Std KWH meter-stop	KWH	1004.9	1004.5	1003.9	1003.3	1002.3
Demand meter		0.362	0.477	0.526	0.603	0.674
Generator volts	V.	4100	4100	4100	4075	4050
Generator amps	A.	530	630	690	740	830
Generator vars	MVARS	2.2	2.2	2.1	2.0	1.8
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	6282.8	6282.6	6282.4	6282.3	6282.0
Aux. clocked-stop	KWH	6282.9	6282.7	6282.6	6282.4	6282.2
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	27	25	29	30	40
Fuel Oil						
F.O. tank level-start	in.	28.75	29.75	28.5	31	22.25
F.O. tank level-end	in.	27.75	32	35.5	33.5	27
F.O. meter rdg-start	gal.	384805	384482	384055	383663	382858
F.O. meter rdg-end	gal.	385020	384805	384482	384055	383335
F.O. temp.	°F.	95	87	93	92	92
F.O. drain tank-start	in.					
F.O. drain tank-end	in.					

Fuel Oil Analysis

API gravity @ 60 °F.		34.1
Sulfur, Wt. %		0.14
Higher heating value	BTU/gal	139,244

TEST BY: _____

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
12-03-02

TEST #1
MPP UNIT NO. 7

DATA:
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (h1) 22.25 in.
Tank level stop (h2) 27 in.
Vol diff= 70.27 gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.682292
u2= 0.58333333

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.57086774
f(u2)= 0.4756450

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 72.6851383
% tank f(u2)= 60.5610009

Volume in tank
Vol of f(u1)= 158.311748
Vol of f(u2)= 228.580945

Vol diff= 70.27 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
12-03-02
Unit No.: 7

TEST LOADS - MW

	3.0	4.0	4.4	5.1	5.7
F.O. Temp. °F.	95	87	93	92	92
F.O. Temp. (Corr.)	0.9825	0.9865	0.9835	0.9840	0.9840
F.O.-start gal.	384805	384482	384055	383663	382858
F.O.-end gal.	385020	384805	384482	384055	383335
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(15.27)	34.58	107.14	38.37	70.27
PT RATIO	8400	8400	8400	8400	8400
KW (Gen.)	3,040.8	4,006.8	4,418.4	5,065.2	5,662
KW (Aux.)	46.67	46.67	93.33	46.67	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,244	139,244	139,244	139,244	139,244
HEAT RATE (APPROX.)-G	10,274	9,806	9,832	9,487	9,762
HEAT RATE (APPROX.)N	10,435	9,922	10,044	9,575	9,926
HEAT RATE (ACTUAL)-G	10,360	9,888	9,914	9,566	9,843
HEAT RATE (ACTUAL)-N	10,521	10,004	10,128	9,655	10,008

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-7 Fuel Tested: 03-17-03
12-03-02 Tested by: K.Nakamatsu

DATA:

GENERATED (MW)	3.041	4 007	4 418	5.065	5.662
HEAT RATE(BTU/MW)G	10,274	9,806	9,832	9,487	9,762
HEAT RATE(BTU/MW)N	10,435	9,922	10,044	9,575	9,926
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$41.6843 act.				
H.H.V. (BTU/BBL)	139,244 act.				

A, B, C CONSTANTS:

GROSS A=	13,689.76	NET A=	13,949.13
B=	(1,598.653)	B=	(1,645.864)
C=	157.9157	C=	162.7005

PREDICTED VALUES:

GENERATED (MW)	3.0	3.1	3.2	3 4	3.6	3.8	4.0	4.2	4 4	4.6	4.8
HEAT RATE(BTU/MW)G	10,315	10,252	10,191	10,080	9,981	9,895	9,822	9,761	9,713	9,677	9,655
HEAT RATE(BTU/MW)N	10,476	10,411	10,348	10,234	10,133	10,044	9,969	9,907	9,857	9,821	9,798
GROSS (MBTU)	30.945	31.780	32 612	34 271	35.932	37.602	39.287	40.996	42.737	44.516	46.342
NET (MBTU)	31.428	32.273	33.115	34.796	36 477	38.168	39.876	41.607	43.372	45.176	47.028
COST/KWH	$0 0735	$0.0731	$0 0726	$0.0718	$0.0711	$0.0705	$0 0700	$0.0696	$0 0692	$0.0690	$0.0688
G/KWH	254.86	253.29	251.80	249.05	246.61	244.48	242.67	241.17	239.98	239.11	238.54
G/PS-H	185.67	184 53	183 44	181.44	179.66	178.11	176.79	175.70	174.83	174.19	173.78

PREDICTED VALUES (CONT.):

GENERATED (MW)	5.0	5 2	5 4	5.6	5.8	6.0	6.1	6 2
HEAT RATE(BTU/MW)G	9,644	9,647	9,662	9,690	9,730	9,783	9,814	9,848
HEAT RATE(BTU/MW)N	9,787	9,790	9,806	9,835	9,876	9,931	9,963	9,999
GROSS (MBTU)	48 222	50.163	52.174	54.261	56 433	58.697	59 866	61.060
NET (MBTU)	48.937	50.908	52.951	55.074	57.283	59 587	60.777	61.994
COST/KWH	$0 0687	$0.0688	$0.0689	$0.0691	$0.0694	$0.0697	$0.0700	$0 0702
G/KWH	238.29	238.35	238.72	239 40	240 40	241.71	242.48	243.33
G/PS-H	173 60	173.64	173 91	174 41	175.14	176 09	176.65	177 27

WORKSHEE' (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0408	9 24646464	28.1166497	85 4971083	10274.4839	31242 6508	95002 6525
4.0068	16.0544462	64.3269552	257.745244	9806 24527	39291.6635	157433 837
4 4184	19 5222586	86.2571472	381.118579	9832.12115	43442.2441	191945.211
5.0652	25.656251	129.954043	658 243217	9486 92693	48053 1823	243398.979
5 6616	32.0537146	181.47531	1027.44062	9762.02863	55268.7013	312909 279
0	0	0	0	0	0	0
22.1928	102.533135	490.130105	2410.04477	49161.8059	217298.442	1000689.96

a=	20.1453034	C=	157.91565
b=	-37264 2886	B=	-1598.65266
d=	-4545.91656	A=	13689.7596
e=	175.153167		
f=	1537.18005		

WORKSHEE' (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0408	9.24646464	28.1166497	85 4971083	10434 6224	31729 5998	96483.3671
4.0068	16.0544462	64.3269552	257.745244	9921.80319	39754 681	159289.056
4 4184	19.5222586	86 2571472	381.118579	10044.2947	44379.7116	196087.318
5.0652	25.656251	129.954043	658.243217	9575.14459	48500 0224	245662.313
5.6616	32.0537146	181.47531	1027.44062	9925.65633	56195.0959	318154.155
0	0	0	0	0	0	0
22.1928	102.533135	490.130105	2410 04477	49901.5212	220559.111	1015676.21

a=	20.1453034	C=	162.700498
b=	-38178.3668	B=	-1645.8642
d=	-4658 92612	A=	13949.1328
e=	175.153167		
f=	1537.18005		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 7
DATE: 04-16-02

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1	
Actual Test Load	MWH	3.133	4.040	4.972	5.518		
Description\Time		0706	0819	0937	1056		
Ambient air temp	°F.	80	84.5	84.5	84.5		
Manifold Air-Left	°F.	na	na	na	na		
Manifold Air-Right	°F.	103	114	131	138		
Intercooler Water-In	R/L °F.	101	110	117	122		
Intercooler Water-Out	R/L °F.	117	137	162	170		
Jacket Water-In	°F.	159.4	159.9	161.1	163.9		
Jacket Water-Out	°F.	163.7	165	167.1	170.4		
Exhaust Gas-Lvg T/C-L	°F.						
Exhaust Gas-Lvg T/C-R	°F.						
Manifold Pressure-Lft	hg	6.6	9.3	12.9	15.3		
Manifold Pressure-Rt	hg	6.7	9.3	12.9	15.3		
Generator (X 8400)							
Std KWH meter-start	KWH	9251.4	9251.9	9252.5	9253.3		
Std KWH meter-stop	KWH	9251.8	9252.4	9253.1	9254		
Demand meter		0.373	0.481	0.592	0.657		
Generator volts	V.	4100	4200	4210	4190		
Generator amps	A.	510	570	72	825		
Generator vars	MVARS	1.8	1.0	1.3	2.2		
Auxiliaries (X 1400)							
Aux. clocked-start	KWH	5499.8	5500.0	5500.3	5500.6		
Aux. clocked-stop	KWH	5500.0	5500.2	5500.5	5500.8		
Aux. load indicator	KW						
Aux. volts	V.						
Aux. amps	A	42	52	53	52		
Fuel Oil							
F.O. tank level-start	in.	34.5	28.25	29.875	28.375		
F.O. tank level-end	in.	19.75	35.75	35	32.5		
F.O. meter rdg-start	gal.	302266	302468	302879	303336		
F.O. meter rdg-end	gal.	302266	302879	303336	303807		
F.O. temp.	°F.	87	87	93	94		
F.O. drain tank-start	in.						
F.O. drain tank-end	in.						

Fuel Oil Analysis		
API gravity @ 60 °F.		36.9
Sulfur, Wt. %		0.12
Higher heating value	BTU/gal	137,115

TEST BY: H.Kimura

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
04-16-02

TEST #1
MPP UNIT NO. 7

DATA:

Dia. of tank	48	Tank level start (h1)	34.5	in
Vol. of tank	579.581	Tank level stop (h2)	19.75	in.
Ht. from floor	7			
		Vol diff=	-220.01	gal.

CALCULATIONS:

% of tank u=h/D
u1= 0.427083
u2= 0.734375

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.3200417
f(u2)= 0.6181832

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 40.7469753
% tank f(u2)= 78.7095303

Volume in tank
Vol of f(u1)= 343.407682
Vol of f(u2)= 123.395517

Vol diff= -220.01 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
04-16-02
Unit No : 7

	TEST LOADS-MW				
	3.1	4.0	5.0	5.5	0.0
F.O. Temp. °F.	87	87	93	94	0
F.O. Temp. (Corr.)	0.9865	0.9865	0.9835	0.9830	1.0300
F.O.-start gal.	302266	302468	302879	303336	0
F.O.-end gal.	302266	302879	303336	303807	0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(220.01)	114.73	78.50	63.32	0.96
PT RATIO	8400	8400	8400	8400	8400
KW (Gen.)	3,133.2	4,040.4	4,972.8	5,518.8	0
KW (Aux.)	93.33	93.33	93.33	93.33	0.00
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	137,115	137,115	137,115	137,115	137,115
HEAT RATE (APPROX.)-G	9,566	9,989	10,338	10,028	#DIV/0!
HEAT RATE (APPROX.)N	9,860	10,226	10,535	10,200	#DIV/0!
HEAT RATE (ACTUAL)-G	9,498	9,918	10,264	9,957	#DIV/0!
HEAT RATE (ACTUAL)-N	9,790	10,153	10,461	10,128	#DIV/0!

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-7 Fuel Tested: 04/24/02
04-16-02 Tested by: E.Wong/S.Oshiro

DATA:

GENERATED (MW)	3.133	4.040	4.973	5.519
HEAT RATE(BTU/MW)G	9,566	9,989	10,338	10,028
HEAT RATE(BTU/MW)N	9,860	10,226	10,535	10,200
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$28.8825 act.			
H.H.V. (BTU/BBL)	137,115 act.			

A, B, C CONSTANTS:

GROSS A=	4,482.94	NET A=	5,049 22
B=	2,397.539	B=	2,289.049
C=	(250.3949)	C=	(243 6139)

PREDICTED VALUES:

GENERATED (MW)	3 0	3.1	3.2	3.4	3.6	3 8	4.0	4.2	4 4	4 6	4.8
HEAT RATE(BTU/MW)G	9,422	9,509	9,591	9,740	9,869	9,978	10,067	10,136	10,184	10,213	10,222
HEAT RATE(BTU/MW)N	9,724	9,804	9,880	10,016	10,133	10,230	10,308	10,366	10,405	10,424	10,424
GROSS (MBTU)	28 266	29 478	30.691	33.116	35.528	37.916	40.267	42.570	44.812	46.981	49.066
NET (MBTU)	29.172	30.393	31.615	34.054	36.477	38.873	41.230	43.537	45.781	47.950	50.034
COST/KWH	$0.0473	$0 0477	$0.0481	$0.0488	$0.0495	$0 0500	$0 0505	$0.0508	$0.0511	$0.0512	$0.0513
G/KWH	232.79	234.94	236.97	240.65	243 84	246 53	248 72	250.43	251.63	252.34	252.56
G/PS-H	169.60	171.16	172 64	175.32	177.64	179 60	181 20	182.44	183 32	183.84	184.00

PREDICTED VALUES (CONT.):

GENERATED (MW)	5 0	5 2	5 4	5 6	5 8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	10,211	10,179	10,128	10,057	9,965	9,854	9,791	9,722
HEAT RATE(BTU/MW)N	10,404	10,365	10,306	10,228	10,131	10,013	9,948	9,877
GROSS (MBTU)	51.054	52.933	54 892	56 318	57.799	59.124	59.723	60 279
NET (MBTU)	52.021	53.898	55 654	57 278	58.757	60 081	60.680	61.236
COST/KWH	$0 0512	$0.0511	$0.0508	$0 0504	$0.0500	$0.0494	$0.0491	$0 0488
G/KWH	252.28	251.51	250.24	248 48	246.22	243 47	241.90	240.22
G/PS-H	183.79	183 23	182.31	181.02	179.38	177.37	176.23	175.00

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.1332	9 81694224	30.7584434	96.3723549	9565.97733	29972.1202	93908.6469
4 0404	16.3248322	65.9588519	266.500145	9989 37597	40361.0747	163074.886
4 9728	24.7287398	122.971077	611.510574	10337.5402	51406.5197	255634.341
5 5188	30.4571534	168.086938	927.638196	10027.8129	55341 4939	305418.637
0	0	0	0	0	0	0
0	0	0	0	0	0	0
17.6652	81.3276677	387.775311	1902.02127	39920.7064	177081.208	818036.511

a=	13 2513797	C=	-250.394903
b=	25486.1019	B=	2397.53854
d=	3117 57161	A=	4482.93551
e=	114.43173		
f=	993 895549		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.1332	9 81694224	30.7584434	96.3723549	9859 68249	30892.3572	96791.9335
4.0404	16.3248322	65.9588519	266.500145	10225.5873	41315.4628	166930.998
4.9728	24.7287398	122.971077	611.510574	10535.2743	52389.812	260524.057
5.5188	30 4571534	168.086938	927.638196	10200.3196	56293.5237	310672.699
0	0	0	0	0	0	0
0	0	0	0	0	0	0
17.6652	81.3276677	387.775311	1902 02127	40820.8636	180891.156	834919 685

a=	13.2513797	C=	-243.613887
b=	19813.1086	B=	2289.04927
d=	2455.90249	A=	5049 22494
e=	114.43173		
f=	993.895549		

MAUI ELECTRIC CO , LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

M7 derated to 5 0 MW due to high cylinder exhaust temps.

MPP UNIT NO. 7
DATE: 05-11-01

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	2.990	3 595	3 956	4 460	4.964
Description\Time		0708	0828	0948	1109	1223
Ambient air temp	°F.	66.5	72	76	77	79
Manifold Air-Left	°F.	99	110	115	123	133
Manifold Air-Right	°F.	97	110	113	123	132
Intercooler Water-In	R/L °F.	97	104	106	110	115
Intercooler Water-Out	R/L °F.	108	123	129	142	153
Jacket Water-In	°F.	157.3	160 2	159 1	161.1	162.7
Jacket Water-Out	°F.	159	163.4	162.6	165.1	167.2
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg	6.2	8.1	9.1	11.0	12.7
Manifold Pressure-Rt	hg	6 2	8 1	9 1	11 0	12.7
Generator (X 8400)						
Std KWH meter-start	KWH	7598.5	7599	7599 6	7600.2	7600.9
Std KWH meter-stop	KWH	7598.9	7599 5	7600.1	7600 8	7601.5
Demand meter		0.356	0 428	0.471	0.531	0 591
Generator volts	V.	4060	4065	4100	4100	4100
Generator amps	A.	455	530	600	660	730
Generator vars	MVARS	1.1	1 1	1.6	1 6	1.55
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	4321.4	4321.6	4321.9	4322.1	4322.4
Aux. clocked-stop	KWH	4321.6	4321.8	4322.1	4322.3	4322.6
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	40	46	49	49	52
Fuel Oil						
F.O. tank level-start	in.	34.375	35.5	31 625	32 5	33.375
F.O. tank level-end	in.	19.375	18	31.375	32.5	33.4375
F.O. meter rdg-start	gal.	254958	255294	255594	256019	256445
F.O. meter rdg-end	gal.	254958	255294	255890	256356	256814
F.O. temp.	°F.	84.5	89.5	91	90 5	93
F.O. drain tank-start	in.					
F O. drain tank-end	in.					

Fuel Oil Analysis		
API gravity @ 60 °F.		35 2
Sulfur, Wt. %		0.11
Higher heating value	BTU/gal	138,244

TEST BY: _____

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
05-11-01

TEST #1
MPP UNIT NO. 7

DATA:

Dia. of tank	48	Tank level start (h1)	33.375	in.
Vol. of tank	579.581	Tank level stop (h2)	33.4375	in.
Ht. from floor	7			
		Vol diff=	0.96	gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.45052083
u2= 0 44921875

f(u)=(pi/8)-[(1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.34330079
f(u2)= 0.34200527

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 43.7104142
% tank f(u2)= 43 5454632

Volume in tank
Vol of f(u1)= 326.243744
Vol of f(u2)= 327.199769

Vol diff= 0 96 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
05-11-01
Unit No.: 7

	TEST LOADS-MW				
	3.0	3.6	4.0	4.5	5.0
F O. Temp. °F.	84.5	89.5	91	90.5	93
F.O. Temp. (Corr.)	0.9878	0.9853	0.9845	0.9848	0.9835
F O.-start gal.	254958	255294	255594	256019	256445
F.O.-end gal.	254958	255294	255890	256356	256814
F O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(223.18)	(258 38)	(3.84)	0 00	0.96
PT RATIO	8400	8400	8400	8400	8400
KW (Gen)	2,990.4	3,595 2	3,956 4	4,460.4	4,964
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,244	138,244	138,244	138,244	138,244
HEAT RATE (APPROX.)-G	10,180	9,778	10,303	10,274	10,069
HEAT RATE (APPROX.)N	10,508	10,039	10,552	10,494	10,262
HEAT RATE (ACTUAL)-G	10,191	9,789	10,315	10,286	10,080
HEAT RATE (ACTUAL)-N	10,519	10,050	10,564	10,505	10,273

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M7 derated to 5.0 MW due to high cylinder exhaust temps.

M-7 — Fuel Tested: 05-16-01
05-11-01 — Tested by: K.Yokoyama

DATA:

GENERATED (MW)	2.990	3.595	4.460
HEAT RATE(BTU/MW)G	10,191	9,789	10,286
HEAT RATE(BTU/MW)N	10,519	10,050	10,505
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$41.5099	act.	
H.H.V. (BTU/BBL)	138,244	act.	

A, B, C CONSTANTS:

GROSS A=	21,244.18	NET A=	22,374.06
B=	(6,217.364)	B=	(6,615.628)
C=	843.0849	C=	886.6316

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,180	10,072	9,982	9,851	9,788	9,792	9,864	10,003	10,210	10,484	10,826
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	10,507	10,386	10,283	10,130	10,049	10,038	10,098	10,229	10,430	10,703	11,047
GROSS (MBTU)	30.540	31.224	31.942	33.494	35.237	37.211	39.456	42.014	44.924	48.226	51.962
NET (MBTU)	30.540	31.228	31.947	33.498	35.237	37.206	39.448	42.006	44.921	48.237	51.995
COST/KWH	$0.0728	$0.0720	$0.0714	$0.0704	$0.0700	$0.0700	$0.0705	$0.0715	$0.0730	$0.0750	$0.0774
G/KWH	251.52	248.86	246.63	243.40	241.84	241.94	243.72	247.16	252.26	259.03	267.47
G/PS-H	183.24	181.30	179.67	177.32	176.18	176.26	177.55	180.06	183.78	188.71	194.86

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	11,234	11,711	12,255	12,866	13,545	14,291	14,689	15,105
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	11,462	11,947	12,504	13,131	13,830	14,599	15,010	15,439
GROSS (MBTU)	*56.172*	*60.697*	*66.176*	*72.050*	*78.560*	*85.746*	*89.606*	*93.649*
NET (MBTU)	56.239	61.011	66.354	72.310	78.922	86.232	90.162	94.283
COST/KWH	$0.0803	$0.0837	$0.0876	$0.0920	$0.0968	$0.1022	$0.1050	$0.1080
G/KWH	277.58	289.35	302.78	317.89	334.66	353.10	362.94	373.20
G/PS-H	202.22	210.80	220.59	231.59	243.81	257.24	264.41	271.88

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.9904	8.94249216	26.7416286	79.968166	10191.0591	30475.343	91133.4658
3.5952	12.925463	46.4696247	167.067595	9788.78013	35192.6223	126524.516
0	0	0	0	0	0	0
4.4604	19.8951682	88.7404081	395.817716	10285.5702	45877.7575	204633.15
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11.046	41.7631234	161.951661	642.853477	30265.4094	111545.723	422291.131

a=	3.27525408	C=	843.084915
b=	2895.36558	B=	-6217.36377
d=	325.455932	A=	21244.1834
e=	24.5395234		
f=	184.401958		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
2.9904	8.94249216	26.7416286	79.968166	10519.3793	31457.1518	94069.4667
3.5952	12.925463	46.4696247	167.067595	10049.6751	36130.592	129896.704
0	0	0	0	0	0	0
4.4604	19.8951682	88.7404081	395.817716	10505.3944	46858.261	209006.587
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11.046	41.7631234	161.951661	642.853477	31074.4488	114446.005	432972.758

a=	3.27525408	C=	886.63163
b=	1152.23851	B=	-6615.6285
d=	89.6533891	A=	22374.0583
e=	24.5395234		
f=	184.401958		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO 8
DATE: 11-25-05

Gross Load - (M-9) -->	MWH	3.1	4.0	5.0	5.8	6.1
Actual Test Load	MWH	3.16	4.19	4.61	5.01	5.4
Description\Time		1403	1243	1125	1002	0847
Ambient air temp	°F.	80	80	78	77	73
Manifold Air-Left	°F.					
Manifold Air-Right	°F					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-LR	hg					
Manifold Pressure-Rt	hg					
Generator (K 8400)						
Std KWH meter-start	KWH	7507.2	7506.5	7505.8	7505.0	7504.2
Std KWH meter-stop	KWH	7507.5	7507.0	7506.4	7505.8	7504.9
Generator Digital Counter	KWH	0.378	0.499	0.549	0.587	0.843
Generator volts	V.					
Generator amps	A					
Generator vars	MVARS					
Auxiliaries (K 1400)						
Aux. clocked-start	KWH	2706.9	2706.8	2706.6	2706.5	2706.3
Aux. clocked-stop	KWH	2707.1	2706.9	2706.8	2706.6	2706.5
Aux. load indicator	KW	33	32	30	31	30
Aux volts	V.					
Aux amps	A					
Fuel Oil						
F O tank level-start	in	17.5	15	12	15	18.75
F O tank level-end	in.	15.25	11	19	19.25	19.25
F O meter rdg-start	gal	7867260	7866880	7866420	7865980	7865580
F O meter rdg-end	gal	7867450	7867080	7866820	7866390	7865950
F O temp	°F.	93	93	92	90	85
F O drain tank-start	in					
F O drain tank-end	in					
Fuel Oil Analyses						
API gravity @ 60 °F.		33.0				
Sulfur, Wt. %						
Higher heating value	BTU/gal	139,881				

TEST BY: K Inouye/K Katsutani

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
11-25-05

TEST #1
MPP UNIT NO. 8

DATA
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (h1) 15.00 in
Tank level stop (h2) 11.00 in
Vol diff= (40.42) gal

CALCULATIONS
% of tank u=h/D
u1= 0.833333
u2= 0.916667

f(u)=(pi/8)-[(1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.699357
f(u2)= 0.754137

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 89.0449
% tank f(u2)= 96.01975

Volume in tank
Vol of f(u1)= 63.49369
Vol of f(u2)= 23.06877

Vol diff= -40.42 gal

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
11-25-05
Unit No.: 8

	0	0	0	0	
TEST LOADS - MW	3.2	4.2	4.6	5.0	5.4
F O Temp °F.	93	93	92	90	85
F O Temp (Corr.)	0.9835	0.9835	0.9840	0.9850	0.9875
F O -start gal.	7867260	7866880	7866420	7865980	7865580
F O -end gal	7867450	7867080	7866820	7866390	7865950
F O Drain Tnk-start	0	0	0	0	0
F O Drain Tnk-end, gal.	(27.40)	(40.42)	81.28	53.16	8.66
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,159	4,192	4,612	5,015	5,401
KW (Aux.)	93.33	46.67	93.33	46.67	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,881	139,881	139,881	139,881	139,881
HEAT RATE (APPROX.)	9,349	7,790	9,391	9,679	9,174
HEAT RATE (APPROX.)	9,633	7,878	9,585	9,770	9,335
HEAT RATE (ACTUAL)-(	9,469	7,891	9,513	9,804	9,292
HEAT RATE (ACTUAL)-(	9,758	7,980	9,709	9,896	9,456

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by Rodney Jung

M-8 — Fuel Tested 12-01-05
11-25-05 — Tested by K Okuyama

DATA

GENERATED (MW)	3 158		4 612	5 015
HEAT RATE(BTU/MW)G	9,469		9,513	9 804
HEAT RATE(BTU/MW)N	9,758		9,709	9,896
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$97 0658	act		
H H V. (BTU/BBL)	139 881	act.		

A, B, C CONSTANTS

GROSS A=	14,811 08	NET A=	13,763 13
B=	(2,869 995)	B=	(2,113 846)
C=	373 2126	C=	267 7621

PREDICTED VALUES

GENERATED (MW)G	3 0	3.1	3 2	3 4	3 6	3 8	4.0	4 2	4 4	4 6	4 8
HEAT RATE(BTU/MW)G	9,560	9,501	9,449	9 367	9,316	9,294	9,302	9,341	9,408	9,506	9,634
GENERATED (MW)N	2 9	3 0	3 1	3 3	3 5	3 7	3 9	4 2	4 4	4 5	4 7
HEAT RATE(BTU/MW)N	9,831	9,783	9,741	9,671	9,623	9,597	9,592	9,608	9,646	9,705	9,786
GROSS (MBTU)	28 680	29 452	30 236	31 849	33 537	35 316	37 210	39 230	41 397	43 729	46 243
NET (MBTU)	28 577	29 416	30 261	31 980	33 747	35 573	37 473	39 506	41 992	43 739	46 058
COST/KWH	$0 1580	$0 1570	$0 1561	$0 1548	$0 1539	$0 1536	$0 1537	$0 1544	$0 1555	$0 1571	$0 1592
G/KWH	236 20	234 74	233 48	231 45	230 17	229 64	229 84	230 78	232 46	234 88	238 03
G/PS-H	172 08	171 01	170 08	168 61	167 69	167 30	167 44	168 13	169 35	171 11	173 41

PREDICTED VALUES (CONT)

GENERATED (MW)G	5.0	5 2	5 4	5.6	5 8	6 0	6 1	6 2
HEAT RATE(BTU/MW)G	9,791	9,979	10,186	10,443	10,720	11,027	11,191	11,363
GENERATED (MW)N	4 9	5 1	5 3	5 5	5 7	5 9	6 0	6 1
HEAT RATE(BTU/MW)N	9,888	10,011	10,156	10,323	10,510	10,719	10,832	10,950
GROSS (MBTU)	48 957	51 890	55 058	58 481	62.176	66 161	68 267	70 453
NET (MBTU)	48 517	51,125	53 896	56 844	59 979	63 317	65 065	66 869
COST/KWH	$0 1618	$0,1649	$0,1685	$0,1726	$0,1772	$0 1822	$0 1849	$0 1878
G/KWH	241,92	246 55	251 92	256 02	264 86	272 44	276 51	280 76
G/PS-H	176 25	179 62	183 53	187 97	192 96	198 48	201 44	204 54

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3 1584	9 97549056	31 50659	99 51041	9469 463046	29908 35	94462 54
0	0	0	0	0	0	0
4 6116	21 26685456	98 07423	452 2791	9512 865693	43869 53	202308 7
5 0148	25 14821904	126 1133	632 4329	9804 257849	49186 39	246559 6
0	0	0	0	0	0	0
0	0	0	0	0	0	0
12 7848	56 39056416	255 6941	1184 222	28786 58659	122944 3	543330 9

a=	5 72058144	C=	373 212591
b=	6700 824903	B=	-2869 99488
d=	802 0751175	A=	14811 07621
e=	46 14022947		
f=	372 7715807		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3 1584	9 975491	31 50659	99 51041	9757 615	30819 08	97338 99
0	0	0	0	0	0	0
4 6116	21 26685	98 07423	452 2791	9709 372	44775 74	206487 8
5 0148	25 14822	126 1133	632 4329	9896 351	49628 22	248875 8
0	0	0	0	0	0	0
0	0	0	0	0	0	0
12 7848	56 39056	255 6941	1184 222	29363 54	125223	552702 4

a=	5 720581	C=	267 7621
b=	2280 73	B=	-2113 85
d=	262 1727	A=	13763 13
e=	46 14023		
f=	372 7716		

MAUI ELECTRIC CO , LTD
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO 8
DATE 07-29-05

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.09	3.58	4.03	4.52	5
Description\Time		1604	1724	1846	2011	2132
Ambient air temp	°F.	78	73	72	73	71
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	6689 8	6690.3	6690 9	6691 6	6692 3
Std KWH meter-stop	KWH	6690 1	6690 7	6691 4	6692 1	6696 9
Generator Digital Counter	KWH	0 368	0 424	0 480	0 535	0 595
Generator volts	V					
Generator amps	A					
Generator vars	MVARS					
Auxiliaries (X 1400)						
Aux clocked-start	KWH	2183 7	2183 9	2184 1	2184.3	2184 5
Aux clocked-stop	KWH	2183 9	2184 0	2184 2	2184.4	2184 7
Aux load indicator	KW	25	25	25	25	25
Aux. volts	V.					
Aux amps	A					
Fuel Oil						
F O tank level-start	in	33.625	24	27.75	26.625	20 25
F O tank level-end	in	31.625	22	21	20 5	20 5
F O meter rdg-start	gal.	7382910	7383100	7383500	7383890	7384300
F O meter rdg-end	gal	7383100	7383300	7383700	7384200	7384710
F O temp	°F.	94	93	93	91	90
F O drain tank-start	in					
F O drain tank-end	in					

Fuel Oil Analysis

API gravity @ 60 °F.		35 6
Sulfur, Wt. %		
Higher heating value	BTU/gal	137,500

TEST BY: S Miguel/A Villa

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
07-29-05

TEST #1
MPP UNIT NO 8

DATA

Dia of tank 48
Vol of tank 579 561
Ht from floor 7

Tank level start (h1) 24 25 in
Tank level stop (h2) 28 50 in

Vol diff= 64 02 gal

CALCULATIONS
% of tank u=h/D
u1= 0 840625
u2= 0 552083

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0 531447
f(u2)= 0 444888

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 67 666
% tank f(u2)= 56 81944

Volume in tank
Vol of f(u1)= 187 4017
Vol of f(u2)= 251 4255

Vol diff= 64 02 gal

MAUI ELECTRIC COMPANY, INC

Maalaea Power Plant

Subject: Heat Rate Testing
07-29-05
Unit No : 6

	0	0	0	0	
	TEST LOADS-MW				
	3.1	3.6	4.0	4.5	5.0
F O Temp °F	94	93	93	91	90
F O Temp (Corr)	0 9830	0 9835	0.9835	0.9845	0 9850
F O -start gal	7382910	7383100	7383500	7383890	7384300
F O -end gal	7383100	7383300	7383700	7384200	7384710
F O Drain Tnk-start	0	0	0	0	0
F O Drain Tnk-end, gal	(30 67)	(28 98)	(99 35)	(5 66)	64 02
PT RATIO	8 4	8 4	8 4	8 4	8 4
KW (Gen)	3,091	3,562	4,032	4,519	4,998
KW (Aux)	93 33	46 67	46 67	46 67	93 33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	137,500	137,500	137,500	137,500	137,500
HEAT RATE (APPROX)	9,691	8,732	10,083	9,496	9,416
HEAT RATE (APPROX)	9,992	8,848	10,202	9,595	9,595
HEAT RATE (ACTUAL)-(	9,649	8,694	10,040	9,455	9,375
HEAT RATE (ACTUAL)-(	9,949	8,810	10,156	9,554	9,554

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-8 — Fuel Tested: 08-08-05
07-29-05 — Tested by: K.Okuyama

DATA

GENERATED (MW)	3.091	3.562	4.032	4.519	4.998
HEAT RATE(BTU/MW)G	9,649	8,694	10,040	9,455	9,375
HEAT RATE(BTU/MW)N	9,949	8,810	10,156	9,554	9,554
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$77.2052	act.			
H H V (BTU/BBL)	137,500	act.			

A, B, C CONSTANTS

GROSS A=	8,256.23	NET A=	11,187.50
B=	557.330	B=	(793.765)
C=	(63.4856)	C=	96.6100

PREDICTED VALUES.

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,357	9,374	9,390	9,417	9,440	9,457	9,476	9,477	9,479	9,477	9,469
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)N	9,677	9,657	9,639	9,608	9,585	9,569	9,561	9,561	9,569	9,585	9,608
GROSS (MBTU)	28,071	29,059	30,047	32,019	33,983	35,938	37,879	39,804	41,709	43,592	45,450
NET (MBTU)	28,130	29,036	29,945	31,770	34,057	35,916	37,799	39,711	41,657	43,642	45,669
COST/KWH	$0.1251	$0.1253	$0.1255	$0.1259	$0.1262	$0.1264	$0.1266	$0.1267	$0.1267	$0.1267	$0.1266
G/KWH	231.18	231.60	231.99	232.68	233.23	233.67	233.97	234.18	234.21	234.14	233.95
G/PS-H	168.42	168.73	169.01	169.51	169.92	170.23	170.46	170.59	170.63	170.56	170.44

PREDICTED VALUES (CONT.)

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,456	9,438	9,415	9,386	9,353	9,315	9,294	9,271
GENERATED (MW)N	4.9	5.1	5.3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,638	9,678	9,724	9,778	9,840	9,910	9,948	9,988
GROSS (MBTU)	47,279	49,076	50,839	52,564	54,248	55,888	56,691	57,462
NET (MBTU)	47,295	49,421	51,603	53,847	56,156	58,536	59,754	60,991
COST/KWH	$0.1264	$0.1262	$0.1259	$0.1255	$0.1250	$0.1245	$0.1242	$0.1239
G/KWH	233.83	233.18	232.61	231.91	231.09	230.14	229.62	229.07
G/PS-H	170.20	169.88	169.46	168.95	168.36	167.67	167.29	166.88

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0912	9.55551744	29.53802	91.30791	9648.780045	29826.31	92199.09
3.5616	12.68499456	45.17888	160.9091	8694.196885	30965.25	110285.6
4.032	16.257024	65.54832	264.2908	10040.04829	40481.47	163221.3
4.5192	20.42316864	92.29638	417.1058	9455.323868	42730.5	193107.7
4.998	24.980004	124.8501	624.0006	9375.483443	46858.67	234199.6
0	0	0	0	0	0	0
20.202	83.90070864	357.4117	1557.614	47213.83253	190862.2	793013.5

a=	11.3627392	C=	-63.4855541
b=	3793.593105	B=	557.3295405
d=	497.1606038	A=	8256.228826
e=	92.09616712		
f=	748.7423247		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3.0912	9.555517	29.53802	91.30791	9949.178	30754.9	95089.54
3.5616	12.68499	45.17888	160.9091	8809.627	31376.37	111750.1
4.032	16.25702	65.54832	264.2908	10157.61	40955.5	165132.6
4.5192	20.42317	92.29638	417.1058	9553.981	43176.35	195122.6
4.998	24.98	124.8501	624.0006	9553.894	47750.36	238656.3
0	0	0	0	0	0	0
20.202	83.90071	357.4117	1557.614	48024.29	194013.5	805731.1

a=	11.38274	C=	96.61002
b=	-616.98	B=	-793.765
d=	-119.389	A=	11187.5
e=	92.09617		
f=	748.7423		

MAUI ELECTRIC CO., LTD
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 8
DATE: 08-13-04

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.09	3.96	4.47	5.02	5.59
Description\Time		1250	1125	1012	0850	0733
Ambient air temp	°F.	83	91	86	88	89
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	5179.0	5176.3	5177.7	5176.9	5176.1
Std KWH meter-stop	KWH	5179.3	5178.8	5178.2	5177.5	5176.7
Generator Digital Counter	KWH	0.368	0.472	0.532	0.598	0.668
Generator volts	V.					
Generator amps	A					
Generator vars	MVARS					
Auxiliaries (X 1400)						
Aux clocked-start	KWH	720.5	720.1	719.7	719.2	718.9
Aux clocked-stop	KWH	720.9	720.4	720.0	719.5	719.1
Aux load indicator	KW	65	65	65	65	55
Aux volts	V.					
Aux amps	A					
Fuel Oil						
F O tank level-start	in	21.375	19.75	32.5	21.75	29.125
F O tank level-end	in	20	28.375	24	26.375	30.25
F O meter rdg-start	gal.	6490250	6489860	6489660	6489060	6488650
F O meter rdg-end	gal	6490520	6490250	6489860	6489460	6489060
F O temp	°F.	95	97	94	91	86
F O drain tank-start	in					
F O drain tank-end	in					

Fuel Oil Analysis

API gravity @ 60 °F.		34.2
Sulfur, Wt %		0.26
Higher heating value	BTU/gal	138,881

TEST BY: S Miguel

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By Rodney Jung
08-13-04

TEST #1
MPP UNIT NO 8

DATA

Dia of tank	48	Tank level start (h1)	32.50 in.
Vol of tank	579.581	Tank level stop (h2)	24.00 in
Ht from floor	2	Vol diff=	(129.12) gal

CALCULATIONS
% of tank u=h/D
u1= 0.46875
u2= 0.645833

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)-(1/4)*@ASIN(1-2*u))
f(u1)= 0.361469
f(u2)= 0.536438

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 46.02372
% tank f(u2)= 68.30135

Volume in tank
Vol of f(u1)= 312.8363
Vol of f(u2)= 183.7184

Vol diff= -129.12 gal.

MAUI ELECTRIC COMPANY, INC

Maalaea Power Plant

Subject: Heat Rate Testing
08-13-04
Unit No : 8

	0	0	0	0	
	TEST LOADS - MW				
	3.1	4.0	4.5	5.0	5.6
F O Temp °F.	95	97	94	91	86
F O Temp (Corr)	0.9825	0.9815	0.9830	0.9845	0.9870
F O -start gal	6490250	6489860	6489660	6489060	6488650
F O -end gal	6490520	6490250	6489860	6489460	6489060
F O Drain Tnk-start	0	0	0	0	0
F O Drain Tnk-end, gal	52.63	128.12	(129.12)	67.94	17.27
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen)	3,091	3,965	4,468	5,023	5,594
KW (Aux)	186.67	140.00	140.00	140.00	93.33
BTU/gal (Approx)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,881	138,881	138,881	138,881	138,881
HEAT RATE (APPROX)	9,541	9,021	9,996	8,957	9,568
HEAT RATE (APPROX)	10,154	9,351	10,321	9,245	9,731
HEAT RATE (ACTUAL)-H	9,595	9,072	10,054	9,036	9,823
HEAT RATE (ACTUAL)-H	10,217	9,404	10,380	9,298	9,786

CA-IR-73
DOCKET NO. 2006-0387
Page 275 of 362

CALCULATIONS FOR HEAT RATE CURVE
by Rodney Jung

M-8 — Fuel Tested 08-19-04
08-13-04 — Tested by E Wong

DATA:

GENERATED (MW)	3 091	3 965		5 023	5 594
HEAT RATE(BTU/MW)G	9,565	9,072		9,038	9,623
HEAT RATE(BTU/MW)N	10,212	9 404		9,298	9 786
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$55 6178	act			
H H V. (BTU/BBL)	138,881	act			

A, B, C CONSTANTS

GROSS A=	16,946 58	NET A=	19,155 93
B=	(3,671 788)	B=	(4,386 199)
C=	420 9538	C=	484 0286

PREDICTED VALUES

GENERATED (MW)G	3 0	3 1	3 2	3 4	3 6	3 8	4 0	4 2	4 4	4 6	4 8
HEAT RATE(BTU/MW)G	9,720	9,609	9,507	9,329	9,184	9,072	8,995	8,951	8,940	8,964	9,021
GENERATED (MW)N	2 8	2 9	3 0	3 2	3 4	3 6	3 8	4 1	4 3	4 5	4 7
HEAT RATE(BTU/MW)N	10,354	10,210	10,077	9,836	9 639	9 478	9,356	9 272	9,227	9,221	9,254
GROSS (MBTU)	29 159	29 789	30 424	31,718	33 081	34 475	35 979	37,593	39 338	41,233	43 300
NET (MBTU)	29 128	29 745	30 364	31 613	32 899	34 246	36 113	37 645	39 309	41,126	43 125
COST/KWH	$0 0927	$0 0918	$0 0907	$0 0889	$0 0876	$0 0865	$0 0858	$0 0853	$0 0852	$0 0855	$0 0860
G/KWH	240 15	237 42	234 90	230 49	226 91	224 15	222 24	221.15	220 89	221 47	222 88
G/PS-H	174 96	172 97	171,13	167 92	165 31	163 30	161 90	161,11	160 93	161 35	162 37

PREDICTED VALUES (CONT)

GENERATED (MW)G	5.0	5 2	5 4	5.6	5 8	6 0	6.1	6 2
HEAT RATE(BTU/MW)G	9,111	9,236	9,394	9,586	9,811	10,070	10,212	10,363
GENERATED (MW)N	4 9	5 1	5 3	5.5	5 7	5 9	6.0	6 1
HEAT RATE(BTU/MW)N	9,328	9,436	9,585	9,772	9,999	10,264	10,411	10,568
GROSS (MBTU)	45 557	48 026	50 727	53 680	56 904	60 421	62 295	64 250
NET (MBTU)	45 323	47,745	50 416	53 613	57 080	60 625	62 535	64 533
COST/KWH	$0 0868	$0 0881	$0 0896	$0 0914	$0 0935	$0 0960	$0 0974	$0 0988
G/KWH	225 12	228 19	232.10	236 84	242 41	248 81	252 32	256 04
G/PS-H	164 01	166 25	169 09	172 54	176 80	181 26	183 62	186 53

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3 0912	9 55551744	29 53802	91 30791	9585 051125	29660 25	91685 77
3 9648	15 71963904	62 32522	247.1071	9072 316248	35969 92	142613 5
0	0	0	0	0	0	0
5 0232	25 23253824	126 7481	636 681	9038 461241	45402	228063 3
5 5944	31 29731136	175 0897	979 5217	9822 776547	53633 86	301167
0	0	0	0	0	0	0
17 6736	81 80500608	393 701	1954 618	37328 61516	164865 8	763529 7

a=	14 86388736	C=	420 9537801
b=	451 0627389	B=	-3671 78941
d=	-267 684785	A=	16948 55648
e=	129 0150651		
f=	1126 411578		

WORKSHI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3 0912	9 555517	29 53802	91 30791	10211.71	31566 44	97578 16
3 9648	15 71964	62 32522	247.1071	9404 392	37286 53	147833.7
0	0	0	0	0	0	0
5 0232	25 23254	126 7481	636 681	9297 591	46703 68	234601 8
5 5944	31 29731	175 0897	979 5217	9786.04	54747 02	306276 6
0	0	0	0	0	0	0
17 6736	81 80501	393.701	1954 618	38699 73	170303.7	786290 4

a=	14 86389	C=	484 0286
b=	-20670 4	B=	-4386 2
d=	-2748 99	A=	19155 93
e=	129 0151		
f=	1126 412		

MAUI ELECTRIC CO , LTD
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO 8
DATE 03-12-03

Gross Load - (M4-9) -->	MWH	3 1	4 0	5 0	5 6	6 1	
Actual Test Load	MWH	3 15	4 14	4 58	5 06		
Description\Time		0815	0934	1055	1215		
Ambient air temp	°F.	78	77	77	79		
Manifold Air-Left	°F.	83	93	101	110		
Manifold Air-Right	°F.	86	75	81	89		
Intercooler Water-In	Rt. °F.	91	96	101	104		
Intercooler Water-Out	Rt. °F.	93/94	103/103	107/108	114/114		
Jacket Water-In	°F.	149	156	157	163		
Jacket Water-Out	°F.	156	162	169	171		
Exhaust Gas-Lvg T/C-L	°F.	750	770	830	840		
Exhaust Gas-Lvg T/C-R	°F	750	770	830	840		
Manifold Pressure-Lft	hg	8 6	10 0	12 3	14 6		
Manifold Pressure-Rt	hg	9 8	12 6	14 8	17 4		
Generator (X 8400)							
Std KWH meter-start	KWH	3905 5	3906 0	3906 7	3907 4		
Std KWH meter-stop	KWH	3905 9	3906 5	3907 2	3908 0		
Generator Digital Counter	KWH	0 375	0 493	0 546	0 6		
Generator volts	V.	4100	4125	4100	4125		
Generator amps	A	490	620	680	750		
Generator vars	MVARS	1 5	1 6	1 9	1 8		
Auxiliaries (X 1400)							
Aux clocked-start	KWH	6519 0	6519 1	6519 3	6519 5		
Aux clocked-stop	KWH	6519 1	6519 3	6519 5	6519 7		
Aux load indicator	KW	-	-	-	-		
Aux volts	V.	-	-	-	-		
Aux amps	A	28	35	37	40		
Fuel Oil							
F O tank level-start	in	28	19 25	19 25	32 375		
F O tank level-end	in	25 75	27 5	25 5	20 25		
F O meter rdg-start	gal.	5723870	5724060	5724460	5725070		
F O meter rdg-end	gal	5724060	5724460	5724860	5725270		
F O temp	°F.	84	86	88	90		
F O drain tank-start	in.	-	-	-			
F O drain tank-end	in	-	-	-			
Fuel Oil Analysis							
API gravity @ 60 °F.		35.1					
Sulfur, Wt. %		0.12					
Higher heating value	BTU/gal	138,051					

TEST BY: E Craveiro

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By Rodney Jung
03-12-03

TEST #1
MPP UNIT NO 8

DATA
Dia. of tank 49
Vol. of tank 579,681
HL from floor 7

Tank level start (h1) 32 38 in.
Tank level stop (h2) 20 25 in.
Vol diff= (180 69) gal

CALCULATIONS:
% of tank u=h/D
u1= 0 471354
u2= 0 723958

f(u)=(pi/8)-((1/2)+u)*@SQRT(u*(1-u)+(1/4))*@ASIN(1-2*u)
f(u1)= 0 364088
f(u2)= 0 608925

% tank fill = (4/pi)*f(u)*100
% tank f(u1): 46 3547
% tank f(u2): 77 53078

Volume in tank
Vol of f(u1)= 310 918
Vol of f(u2)= 130 2273

Vol diff= -180 69 gal

MAUI ELECTRIC COMPANY, INC

Maalaea Power Plant

Subject Heat Rate Testing
03-12-03
Unit No.: 8

	0	0	0	0	
	TEST LOADS - MW				
	3.2	4.1	4.6	5.1	0.0
F O Temp °F.	84	86	88	90	0
F O Temp (Corr)	0 9880	0 9870	0 9860	0 9850	1 0300
F O -start gal.	5723870	5724060	5724460	5725070	0
F O -end gal	5724060	5724460	5724860	5725270	0
F O Drain Tnk-start	0	0	0	0	0
F O Drain Tnk-end gal	(34 06)	119 52	89 33	(180 69)	
PT RATIO	8 4	8 4	8 4	8 4	8 4
KW (Gen)	3,150	4,141	4,586	5,057	0 0
KW (Aux)	46 67	93 33	93 33	93 33	0 00
BTU/gal (Approx)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,051	138,051	138,051	138,051	138,051
HEAT RATE (APPROX)	9,705	9,231	9,223	10,240	#DIV/0!
HEAT RATE (APPROX)	9,851	9,444	9,415	10,433	#DIV/0!
HEAT RATE (ACTUAL)-(	9,702	9,229	9,220	10,237	#DIV/0!
HEAT RATE (ACTUAL)-(	9,848	9,441	9,412	10,429	#DIV/0!

CALCULATIONS FOR HEAT RATE CURVE
by Rodney Jung

0
0

M-8 Fuel Tested 03-17-03
03-12-03 Tested by K Nakamatsu

DATA

GENERATED (MW)	3 150	4 141	4,586
HEAT RATE(BTU/MW)G	9 705	9,231	9,223
HEAT RATE(BTU/MW)N	9,851	9,444	9,415
NUMBER OF TESTS	3		
PRICE OF FUCL/BBL	$42 5851	act	
H H V. (B1U/BBL)	138,051	act	

A, B, C CONSTANTS

GROSS A=	15,378 01	NET A=	14,264 47
B=	(2,807 668)	B=	(2,155 047)
C=	319 5752	C=	239 3264

PREDICTED VALUES.

GENERATED (MW)G	3 0	3 1	3 2	3 4	3 6	3 8	4 0	4 2	4 4	4 6	4 8	
HEAT RATE(BTU/MW)G	9 631	9 745	9 666	9,526	9,412	9,324	9,261	9,223	9,211	9,225	9,264	
GENERATED (MW)N	3 0	3 1	3 2	3 4	3 6	3 8	4 0	4 1	4 3	4 5	4 7	
HEAT RATE(BTU/MW)N	9,953	9,884	9,819	9,704	9,608	9,531	9,474	9 435	9,416	9,415	9,434	
GROSS (MBTU)	29 494	30 211	30 931	32 369	33,884	35 429	37 042	38 737	40 530	42 435	44 468	
NET (MBTU)	29 395	30 178	30 962	32 540	34 140	35 773	37 452	38,747	40 550	42 432	44 405	
COST/KWH	$0.0722	$0 0716	$0 0710	$0 0700	$0 0691	$0 0685	$0 0680	$0 0677	$0 0677	$0 0678	$0 0680	
G/KWH	242 90	240 78	238 82	235 37	232 55	230.36	228 80	227 88	227 59	227 93	228 90	
G/PS-H	176 96	175 42	173 99	171 47	169 42	167 82	166 69	166.02	165 80	166 05	166 76	

PREDICTED VALUES (CONT.)

GENERATED (MW)G	5 0	5 2	5 4	5 6	5 8	6 0	6 1	6 2
HEAT RATE(BTU/MW)G	9,329	9 419	9 535	9 677	9 844	10,037	10,143	10,255
GENERATED (MW)N	4 9	5 1	5 3	5 5	5 7	5 9	6.0	6 1
HEAT RATE(BTU/MW)N	9,472	9,530	9,606	9 701	9,816	9 950	10,024	10,103
GROSS (MBTU)	46 845	48 981	51 491	54 191	57 096	60 220	61 870	63 581
NET (MBTU)	46 478	48 665	50 976	53 423	56 016	58 771	60 211	61 695
COST/KWH	$0 0685	$0 0692	$0 0700	$0 0711	$0 0723	$0 0737	$0 0745	$0 0753
G/KWH	230.50	232 73	235 60	239 09	243 22	247 98	250 60	253 37
G/PS-H	167 92	168 55	171 84	174 19	177.19	180 86	182 57	184 58

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3 15	9 9225	31 25588	98 45601	9704 846639	30570 27	96296 34
4 1412	17,14953744	71 01966	294 1066	9231 468677	38229 36	158315 4
4 5864	21 03506496	96 47522	442 474	9223 213418	42301 35	194010 9
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11 8776	48 1071024	198 7508	835 0366	28159 52873	111101	448622 7

a=	3 24392544	C=	319 5752292
b=	-8805 37674	B=	-2807 66756
d=	-1164 70544	A=	15378 01431
e=	24 85536467		
f=	190 8164943		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
3 15	9 9225	31 25588	98 45601	9650 784	31029 97	97744 41
4 1412	17,14954	71 01966	294 1066	9444 322	39110 83	161965 8
4 5864	21 03508	96 47522	442 474	9414 805	43180 06	198041
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
11 8776	48 1071	198 7508	835 0366	28709 91	113320 9	457751 2

a=	3 243925	C=	239 3264
b=	-7897 05	B=	-2155 05
d=	-1042 27	A=	14264 47
e=	24 85536		
f=	190 8165		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 9
DATE: 03-30-05

High cyl. Temp at 5.0MW

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.14	3.47	3.83	4.2	4.53
Description\Time		1559	1716	1842	2002	2124
Ambient air temp	°F.	80	77	74	75	76
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 8400)						
Std KWH meter-start	KWH	5970.2	5970.7	5971.3	5971.9	5972.6
Std KWH meter-stop	KWH	5970.5	5971.1	5971.8	5972.4	5973.2
Generator Digital Counter	KWH	0.374	0.417	0.456	0.501	0.540
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxilliaries (X 1400)						
Aux. clocked-start	KWH	8991.7	8991.9	8992.1	8992.3	8992.5
Aux. clocked-stop	KWH	8991.8	8992.0	8992.2	8992.4	8992.6
Aux. load indicator	KW	40	38	37	37	37
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	413570	413960	414330	414690	415080
F.O. meter rdg-end	gal.	413760	414150	414520	414880	415280
F.O. temp.	°F.	91	90	90	90	88
F.O. drain tank-start	in.	13.25	20	21	20.875	20.25
F.O. drain tank-end	in.	11	16	15.125	13.75	12

Fuel Oil Analysis

API gravity @ 60 °F.		33.7
Sulfur, Wt. %		
Higher heating value	BTU/gal	139,143

TEST BY: K.Inouye & M.Tomcer

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
03-30-05

TEST #1
MPP UNIT NO. 9

DATA:
Dia. of tank 48
Vol. of tank 579.581
Ht. from floor 7

Tank level start (h1) 20.25 in.
Tank level stop (h2) 12.00 in
Vol diff= (98.20) gal.

CALCULATIONS:
% of tank u=h/D
u1= 0.7239583
u2= 0.8958333

f(u)=(pi/8)-((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u))
f(u1)= 0.6089253
f(u2)= 0.742

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 77.530783
% tank f(u2)= 94.474369

Volume in tank
Vol of f(u1)= 130.22731
Vol of f(u2)= 32.025508

Vol diff= -98.20 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
03-30-05
Unit No.: 9

	0	0	0	0	
	TEST LOADS-MW				
	3.1	3.5	3.8	4.2	4.5
F.O. Temp. °F.	91	90	90	90	88
F.O. Temp. (Corr.)	0.9845	0.9850	0.9850	0.9850	0.9860
F.O.-start gal.	413570	413960	414330	414690	415080
F.O.-end gal.	413760	414150	414520	414880	415280
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(21.31)	(51.57)	(75.69)	(89.24)	(98.20)
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,142	3,503	3,830	4,208	4,536
KW (Aux.)	46.67	46.67	46.67	46.67	46.67
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,143	139,143	139,143	139,143	139,143
HEAT RATE (APPROX.)G	9,145	9,381	9,435	9,026	8,951
HEAT RATE (APPROX.)N	9,282	9,508	9,551	9,127	9,044
HEAT RATE (ACTUAL)-G	9,214	9,452	9,507	9,094	9,019
HEAT RATE (ACTUAL)-N	9,353	9,580	9,624	9,196	9,113

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-9 Fuel Tested: 04-06-05
03-30-05 Tested by: K.Okuyama

DATA:

GENERATED (MW)	3.503		4.208	4.536
HEAT RATE(BTU/MW)G	9,452		9,094	9,019
HEAT RATE(BTU/MW)N	9,580		9,196	9,113
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$61.0234	act.		
H.H.V. (BTU/BBL)	139,143	act.		

A, B, C CONSTANTS:

GROSS A=	15,211.01	NET A=	15,626.75
B=	(2,590.299)	B=	(2,710.75)
C=	270.1239	C=	281.03

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	9,871	9,777	9,688	9,527	9,387	9,268	9,172	9,097	9,043	9,011	9,001
GENERATED (MW)N	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)N	10,024	9,924	9,830	9,659	9,510	9,384	9,280	9,199	9,140	9,104	9,090
GROSS (MBTU)	29.614	30.309	31.002	32.391	33.792	35.220	36.687	38.206	39.790	41.453	43.206
NET (MBTU)	29.603	30.301	30.997	32.389	33.793	35.221	36.687	38.206	39.790	41.453	43.208
COST/KWH	$0.1031	$0.1021	$0.1012	$0.0995	$0.0980	$0.0968	$0.0958	$0.0950	$0.0944	$0.0941	$0.0940
G/KWH	243.89	241.56	239.37	235.38	231.92	229.00	226.61	224.76	223.44	222.65	222.40
G/PS-H	177.68	175.99	174.39	171.48	168.96	166.83	165.09	163.74	162.78	162.21	162.02

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)G	9,013	9,046	9,100	9,176	9,274	9,394	9,461	9,535
GENERATED (MW)N	5.0	5.2	5.4	5.6	5.8	6.0	6.1	6.2
HEAT RATE(BTU/MW)N	9,099	9,130	9,184	9,260	9,358	9,479	9,548	9,623
GROSS (MBTU)	45.063	47.037	49.141	51.388	53.791	56.362	57.715	59.115
NET (MBTU)	45.069	47.049	49.162	51.422	53.841	56.433	57.799	59.212
COST/KWH	$0.0941	$0.0945	$0.0950	$0.0958	$0.0968	$0.0981	$0.0988	$0.0996
G/KWH	222.68	223.49	224.84	226.73	229.14	232.09	233.77	235.58
G/PS-H	162.23	162.82	163.80	165.18	166.94	169.09	170.31	171.62

WORKSHE (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.5028	12.2696078	42.977982	150.54328	9452.02378	33108.549	115972.63
0	0	0	0	0	0	0
4.2084	17.7106306	74.533418	313.66643	9094.05894	38271.438	161061.52
4.536	20.575296	93.329543	423.34281	9019.29153	40911.506	185574.59
0	0	0	0	0	0	0
12.2472	50.5555344	210.84094	887.55252	27565.3743	112291.49	462608.74

a=	1.67269536	C=	270.123923
b=	-5756.01752	B=	-2590.2994
d=	-724.17275	A=	15211.0098
e=	13.359087		
f=	106.795492		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
3.5028	12.269608	42.977982	150.54328	9579.6504	33555.599	117538.55
0	0	0	0	0	0	0
4.2084	17.710631	74.533418	313.66643	9196.0331	38700.586	162887.55
4.536	20.575296	93.329543	423.34281	9113.0472	41336.782	187503.64
0	0	0	0	0	0	0
12.2472	50.555534	210.84094	887.55252	27888.731	113592.97	467909.74

a=	1.6726954	C=	281.03004
b=	-6200.458	B=	-2710.754
d=	-779.9609	A=	15626.751
e=	13.359087		
f=	106.79549		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 9
DATE: 04-30-04

Gross Load - (M4-9) -->	MWH	3.1	4.0	5.0	5.6	6.1
Actual Test Load	MWH	3.2	4.05	4.46	4.96	5.58
Description\Time		1406	1252	1141	1029	0849
Ambient air temp	*F.	84	85	85	83	80
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	hg					
Manifold Pressure-Rt	hg					
Generator (X 6400)						
Std KWH meter-start	KWH	5298.0	5297.4	5296.8	5296.1	5295.1
Std KWH meter-stop	KWH	5298.4	5297.9	5297.4	5296.7	5295.7
Generator Digital Counter	KWH	0.381	0.482	0.531	0.6	0.864
Generator volts	V.					
Generator amps	A.					
Generator vars	MVARS					
Auxiliaries (X 1400)						
Aux. clocked-start	KWH	7837.6	7837.4	7837.1	7836.9	7836.6
Aux. clocked-stop	KWH	7837.8	7837.6	7837.3	7837.1	7836.8
Aux. load indicator	KW	44	44	51	44	50
Aux. volts	V.					
Aux. amps	A					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	19860	19460	19260	18860	18250
F.O. meter rdg-end	gal.	20050	19860	19460	19060	18450
F.O. temp.	*F.	95	95	93	93	90
F.O. drain tank-start	in.	25.5	23	32.75	33	33
F.O. drain tank-end	in.	24.25	29.75	24.75	23	23

Fuel Oil Analysis

API gravity @ 60 *F.		34.0
Sulfur, Wt. %		0.19
Higher heating value	BTU/gal	138,881

TEST BY: K.Inouye & S.Miguel

CALCULATIONS FOR VOLUMES IN HORIZONTAL CYLINDRICAL TANKS
By: Rodney Jung
04-30-04

TEST #1
MPP UNIT NO. 9

DATA:

Dia. of tank	48	Tank level start (h1)	33.00	in.
Vol. of tank	579.561	Tank level stop (h2)	23.00	in.
Ht. from floor	7			
		Vol diff=	(151.39)	gal.

CALCULATIONS:

% of tank u=h/D
u1= 0.4583333
u2= 0.6666667

f(u)=(pi/8)-[((1/2)-u)*@SQRT(u*(1-u)+(1/4)*@ASIN(1-2*u)]
f(u1)= 0.3510807
f(u2)= 0.5562257

% tank fill = (4/pi)*f(u)*100
% tank f(u1)= 44.700982
% tank f(u2)= 70.820859

Volume in tank
Vol of f(u1)= 320.5026
Vol of f(u2)= 169.11675

Vol diff= -151.39 gal.

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
04-30-04
Unit No.: 9

0 0 0 0

TEST LOADS-MW

	3.2	4.1	4.5	5.0	5.6
F.O. Temp. *F.	95	95	93	93	90
F.O. Temp. (Corr.)	0.9825	0.9825	0.9835	0.9835	0.9850
F.O.-start gal.	19860	19460	19260	18860	18250
F.O.-end gal.	20050	19860	19460	19060	18450
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end, gal.	(18.58)	101.47	(121.87)	(151.39)	(151.39)
PT RATIO	8.4	8.4	8.4	8.4	8.4
KW (Gen.)	3,200	4,049	4,460	4,964	5,578
KW (Aux.)	93.33	93.33	93.33	93.33	93.33
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,881	138,881	138,881	138,881	138,881
HEAT RATE (APPROX.)G	8,843	10,004	9,801	9,613	8,570
HEAT RATE (APPROX.)N	9,106	10,240	10,010	9,798	8,715
HEAT RATE (ACTUAL)-G	8,893	10,061	9,857	9,668	8,618
HEAT RATE (ACTUAL)-N	9,160	10,298	10,067	9,853	8,765

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

M-9 Fuel Tested: 05-20-04
04-30-04 Tested by: K Nakamatsu

DATA:

GENERATED (MW)	4 049	4 460	4.964
HEAT RATE(BTU/MW)G	10,061	9,857	9,668
HEAT RATE(BTU/MW)N	10,298	10,067	9,853

NUMBER OF TESTS 3
PRICE OF FUEL/BBL $51.7174 act.
H.H.V. (BTU/BBL) 138,681 act.

A, B, C CONSTANTS:

GROSS A=	14,490.01	NET A=	15,277.70
B=	(1,838.190)	B=	(1,836.50)
C=	133.9308	C=	149.84

PREDICTED VALUES:

GENERATED (MW)G	3.0	3.1	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8
HEAT RATE(BTU/MW)G	10,787	10,705	10,626	10,475	10,335	10,206	10,088	9,981	9,884	9,798	9,722
GENERATED (MW)N	2.9	3.0	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7
HEAT RATE(BTU/MW)N	11,117	11,024	10,935	10,766	10,608	10,463	10,329	10,207	10,098	10,000	9,915
GROSS (MBTU)	32.360	33.185	34 002	35 616	37.208	38.785	40.353	41.918	43 488	45.069	46.666
NET (MBTU)	32.313	33.147	33.972	35.599	37.200	38.782	40.353	41.919	43 489	45.068	46.666
COST/KWH	$0.0956	$0 0949	$0 0942	$0.0929	$0.0916	$0.0905	$0.0894	$0 0885	$0 0876	$0.0869	$0.0862
G/KWH	266.51	264 49	262.53	258.82	255.36	252.18	249 25	246.59	244.20	242.07	240 21
G/PS-H	194.16	192 69	191.26	188.55	186.04	183.72	181.59	179 65	177.91	176.36	175.00

PREDICTED VALUES (CONT.):

GENERATED (MW)G	5.0	5 2	5 4	5.6	5.8	6.0	6.1	6 2
HEAT RATE(BTU/MW)G	9,657	9,603	9,580	9,527	9,506	9,494	9,493	9,494
GENERATED (MW)N	4 9	5.1	5 3	5.5	5.7	5.9	6.0	6.1
HEAT RATE(BTU/MW)N	9,841	9,779	9,730	9,692	9,666	9,653	9,650	9,651
GROSS (MBTU)	48 287	49 937	51.624	53 354	55.132	56.966	57.906	58.862
NET (MBTU)	48.287	49 941	51.633	53 372	55.164	57.016	57.967	58.936
COST/KWH	$0 0856	$0 0851	$0 0848	$0 0845	$0.0843	$0.0842	$0.0842	$0 0842
G/KWH	238.61	237.27	236.20	235.40	234.86	234 58	234.54	234.57
G/PS-H	173 83	172.86	172 08	171.49	171.10	170.90	170.87	170.89

WORKSHE (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
4 0488	16 3927814	66 371093	268.72328	10060.9016	40734.578	164926 16
4 4604	19 8951682	88.740408	395 81772	9856 52308	43964.036	196097.18
4.9644	24 6452674	122 34897	607.3892	9668.06767	47996 155	238272.11
0	0	0	0	0	0	0
0	0	0	0	0	0	0
13.4736	60 933217	277 46047	1271.9302	29585 4924	132694.77	599295 46

a=	1.26175392	C=	133.930758
b=	-4852.85111	B=	-1836.1901
d=	-538 782486	A=	14490.0103
e=	11.3916085		
f=	102.933679		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
4.0488	16 392781	66.371093	268.72328	10298 299	41695 753	168817 76
4 4604	19.895168	88.740408	395 81772	10067.178	44903 639	200288.19
4.9644	24 645267	122.34897	607.3892	9853.3152	48915.798	242837.59
0	0	0	0	0	0	0
0	0	0	0	0	0	0
13 4736	60.933217	277 46047	1271.9302	30218.792	135515.19	611943 54

a=	1.2617539	C=	149.83554
b=	-5497.567	B=	-1836.5
d=	-610 3434	A=	15277.7
e=	11.391608		
f=	102.93368		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 10
Test Date: 01-24-06
Tested by: Keith Inouye

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 01-24-06
MPP UNIT NO. 10

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1	
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5	
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.	F.O. Temp. *F.
Actual Test Load	KWH	6.6	8.3	9.6	11.1	12.5	F.O. Temp. (Corr.)
Description\Time		0805	0930	1100	1220	1335	F.O.-start gal.
Ambient air temp	*F.	69	72	79	81	77	F.O.-end gal.
Manifold Air-Left	*F.						F.O. Drain Tnk-start
Manifold Air-Right	*F.						F.O. Drain Tnk-end
Intercooler Water-In	R/L *F.						PT RATIO
Intercooler Water-Out	R/L *F.						KW (Gen.)
Jacket Water-In	*F.						KW (Aux.)
Jacket Water-Out	*F.						BTU/gal (Approx.)
Exhaust Gas-Lvg T/C-L	*F.						BTU/gal (Test Lab)
Exhaust Gas-Lvg T/C-R	*F.						
Manifold Pressure-Lft	psi						HEAT RATE (APPROX.)-G
Manifold Pressure-Rt	psi						HEAT RATE (APPROX.)-N
							HEAT RATE (ACTUAL)-G
Generator							HEAT RATE (ACTUAL)-N
Std KWH meter-start	X18 KWH	7264.8	7265.3	7266.0	7266.7	7267.5	
Std KWH meter-stop	X18 KWH	7265.1	7265.8	7266.5	7267.3	7268.2	
Demand meter	X18 KWH	0.367	0.460	0.531	0.614	0.694	NOTE: F.O. Tank
Generator volts	V.						F.O. Drain Tank
Generator amps	A.						
Generator vars	VARS						
Auxilliaries							
Aux. KWH clock-start	KWH	3809.9	3810.1	3810.4	3810.8	3811.2	
Aux. KWH clock-end	KWH	3810.1	3810.3	3810.7	3811.1	3811.6	
Aux. load indicator	KW	5	5	110	113	115	
Aux. volts	*V.*						
Aux. amps	A.	38	39	102	78	102	
Fuel Oil							
F.O. tank level-start	in.						
F.O. tank level-end	in.						
F.O. meter rdg-start	gal.	487060	487760	488530	489410	490390	
F.O. meter rdg-end	gal.	487510	488280	489170	490150	491230	
F.O. temp.	*F.	116	115	115	113	110	
F.O. drain tank-start	in.	4.563	5.313	6.188	7.125	8.188	
F.O. drain tank-end	in.	5.063	5.875	6.875	7.938	9.063	
Fuel Oil Analysis							
API gravity @ 60 *F.		34.1					
Sulfur, Wt.	%						
Viscosity @ 210 *F.	SSF						
Higher heating value	BTU/gal	139,238					

9.75 gal/in
2.76 gal/in

TEST LOADS - MW

6.5	9.0	10.0	11.0	12.5
116	115	115	113	110
0.9720	0.9725	0.9725	0.9735	0.9750
487060.0	487760.0	488530.0	489410.0	490390.0
487510.0	488280.0	489170.0	490150.0	491230.0
4.563	5.313	6.188	7.125	8.188
5.063	5.875	6.875	7.938	9.063
18,000	18,000	18,000	18,000	18,000
6,606	8,280	9,558	11,052	12,492
160	160	240	240	320
138,095	138,095	138,095	138,095	138,095
139,238	139,238	139,238	139,238	139,238
9,133	8,425	8,983	8,991	9,044
9,360	8,591	9,214	9,191	9,282
9,209	8,495	9,057	9,066	9,119
9,438	8,662	9,290	9,267	9,359

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 10 Fuel Oil Tested: 01-27-06
Test Date: 01-24-06 Tested By: rh
Tested by: Keith Inouye
DATA:

GENERATED (MW)	6.606	8.280	9.558	11.052	12.492
HEAT RATE(BTU/MW)G	9,133	8,425	8,983	8,991	9,044
HEAT RATE(BTU/MW)N	9,360	8,591	9,214	9,191	9,282
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$86.1318	act.			
H.H.V. (BTU/GAL)	139,238	act.			

A, B, C CONSTANTS:

GROSS A=	*11,752.64*	*NET* A=	*12,241.59*
B=	(647.471)	B=	(711.968)
C=	35.0487	C=	38.6020

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	10,126	9,724	9,392	9,130	**8,938**	8,816	**8,764**	8,783	**8,871**	9,030	**9,136**	9,259
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	10,453	10,011	9,647	9,359	**9,149**	9,016	**8,961**	8,982	**9,081**	9,257	**9,374**	9,510
GROSS (MBTU)	30.377	38.894	46.958	54.777	62.564	70.528	78.879	87.828	97.585	108.360	114.195	120.364
NET (MBTU)	29.687	38.444	46.691	54.659	62.581	70.688	79.212	87.665	97.709	108.858	114.920	121.344
COST/KWH	$0.1491	$0.1432	$0.1383	$0.1345	$0.1316	$0.1298	$0.1291	$0.1294	$0.1307	$0.1330	$0.1346	$0.1364
G/KWH	250.18	240.24	232.04	225.57	220.83	217.82	216.54	217.00	219.19	223.11	225.72	228.76
G/PS-H	182.26	175.02	169.05	164.33	160.88	158.69	157.76	158.09	159.68	162.54	164.44	166.66

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.606	43.639236	288.28079	1904.3829	9133.4603	60335.639	398577.23
8.28	68.5584	567.66355	4700.2542	8425.012	69759.099	577605.34
9.558	91.355364	873.17457	8345.8025	8982.8414	85857.999	820630.75
11.052	122.1467	1349.9654	14919.817	8991.4068	99373.028	1098270.7
12.492	156.05006	1949.3774	24351.622	9044.3478	112981.99	1411371.1
0	0	0	0	0	0	0
47.988	481.74977	5028.4617	54221.879	44577.068	428307.76	4306455.1

a=	105.9007	C=	35.048662
b=	57283.069	B=	-647.4706
d=	2374.4309	A=	11752.64
e=	2024.1006		
f=	39026.558		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.606	43.639236	288.28079	1904.3829	9360.1674	61833.266	408470.55
8.28	68.5584	567.66355	4700.2542	8591.0221	71133.663	588986.73
9.558	91.355364	873.17457	8345.8025	9214.2089	88069.409	841767.41
11.052	122.1467	1349.9654	14919.817	9190.9941	101578.87	1122649.6
12.492	156.05006	1949.3774	24351.622	9282.1223	115952.27	1448475.8
0	0	0	0	0	0	0
47.988	481.74977	5028.4617	54221.879	45638.515	438567.48	4410350.1

a=	105.9007	C=	38.601967
b=	65406.631	B=	-711.9682
d=	2736.3329	A=	12241.591
e=	2024.1006		
f=	39026.558		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 10
Test Date: 01-28-05
Tested by: M.Matsuda

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 01-28-05
MPP UNIT NO. 10

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1	
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5	
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.	F.O. Temp. *F.
Actual Test Load	KWH	6.48	8.06	9.72	11.25	12.33	F.O. Temp. (Corr.)
Description\Time		0740	0850	1002	1122	1233	F.O.-start gal.
Ambient air temp	*F.	69	73	77	77	77	F.O.-end gal.
Manifold Air-Left	*F.						F.O. Drain Tnk-start
Manifold Air-Right	*F.						F.O. Drain Tnk-end
Intercooler Water-In	R/L *F.						PT RATIO
Intercooler Water-Out	R/L *F.						KW (Gen.)
Jacket Water-In	*F.						KW (Aux.)
Jacket Water-Out	*F.						BTU/gal (Approx.)
Exhaust Gas-Lvg T/C-L	*F.						BTU/gal (Test Lab)
Exhaust Gas-Lvg T/C-R	*F.						
Manifold Pressure-Lft	psi						HEAT RATE (APPROX.)-G
Manifold Pressure-Rt	psi						HEAT RATE (APPROX.)-N
							HEAT RATE (ACTUAL)-G
Generator							HEAT RATE (ACTUAL)-N
Std KWH meter-start	X18 KWH	3059.7	3060.2	3060.7	3061.5	3062.2	
Std KWH meter-stop	X18 KWH	3060.1	3060.6	3061.3	3062.1	3062.9	
Demand meter	X18 KWH	0.36	0.448	0.54	0.625	0.685	NOTE: F.O. Tank
Generator volts	V.						F.O. Drain Tank
Generator amps	A.						
Generator vars	VARS						
Auxilliaries							
Aux. KWH clock-start	KWH	1583.4	1583.6	1583.8	1584.2	1584.5	
Aux. KWH clock-end	KWH	1583.6	1583.8	1584.1	1584.4	1584.8	
Aux. load indicator	KW						
Aux. volts	V.						
Aux. amps	A.	38	39	102	78	102	
Fuel Oil							
F.O. tank level-start	in.						
F.O. tank level-end	in.						
F.O. meter rdg-start	gal.	465280	465800	466450	467330	468210	
F.O. meter rdg-end	gal.	465710	466330	467090	468060	469020	
F.O. temp.	*F.	108	108	107	110	110	
F.O. drain tank-start	in.	3.500	4.063	4.750	4.250	5.000	
F.O. drain tank-end	in.	3.938	4.625	5.438	4.875	5.875	
Fuel Oil Analysis							
API gravity @ 60 *F.		34.5					
Sulfur, Wt.	%	0.24					
Viscosity @ 210 *F.	SSF						
Higher heating value	BTU/gal	137,286					

9.75 gal/in
2.76 gal/in

TEST LOADS-MW

6.5	9.0	10.0	11.0	12.5
108	108	107	110	110
0.9760	0.9760	0.9765	0.9750	0.9750
465280.0	465800.0	466450.0	467330.0	468210.0
465710.0	466330.0	467090.0	468060.0	469020.0
3.500	4.063	4.750	4.250	5.000
3.938	4.625	5.438	4.875	5.875
18,000	18,000	18,000	18,000	18,000
6,480	8,064	9,720	11,250	12,330
160	160	240	160	240
138,095	138,095	138,095	138,095	138,095
137,286	137,286	137,286	137,286	137,286
8,935	8,849	8,869	8,729	8,836
9,161	9,028	9,094	8,855	9,011
8,882	8,797	8,817	8,678	8,784
9,107	8,975	9,041	8,803	8,958

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 10 Fuel Oil Tested: 02-01-05
Test Date: 01-28-05 Tested By: D.Rinehart
Tested by: M.Matsuda
DATA:

GENERATED (MW)	6.480	8.064	9.720	11.250	12.330
HEAT RATE(BTU/MW)G	8,882	8,797	8,817	8,678	8,784
HEAT RATE(BTU/MW)N	9,107	8,975	9,041	8,803	8,958
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$69.2519	act.			
H.H.V. (BTU/GAL)	137,286	act.			

A, B, C CONSTANTS:

GROSS A=	9,471.44	NET A=	9,809.54
B=	(126.684)	B=	(148.784)
C=	5.5464	C=	6.1558

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	9,141	9,053	8,977	8,911	**8,856**	8,813	**8,781**	8,759	**8,749**	8,750	**8,755**	8,762
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,419	9,313	9,220	9,138	**9,070**	9,013	**8,969**	8,937	**8,918**	8,911	**8,912**	8,916
GROSS (MBTU)	27.424	36.214	44.883	53.466	61.995	70.503	79.025	87.592	96.239	104.999	109.431	113.904
NET (MBTU)	26.749	35.762	44.622	53.369	62.037	70.664	79.287	87.228	95.955	104.788	109.256	113.764
COST/KWH	$0.1098	$0.1087	$0.1078	$0.1070	$0.1064	$0.1058	$0.1055	$0.1052	$0.1051	$0.1051	$0.1051	$0.1052
G/KWH	225.86	223.69	221.79	220.17	218.82	217.75	216.94	216.42	216.17	216.19	216.30	216.48
G/PS-H	164.54	162.96	161.58	160.40	159.42	158.63	158.05	157.67	157.48	157.50	157.58	157.71

WORKSHEET (GROSS)

MEGAWATTS = X HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.48	41.9904	272.09779	1763.1937	8882.3222	57557.448	372972.26
8.064	65.028096	524.38657	4228.6533	8797.0963	70939.784	572058.42
9.72	94.4784	918.33005	8926.1681	8817.4809	85705.914	833061.48
11.25	126.5625	1423.8281	16018.066	8678.1732	97629.449	1098331.3
12.33	152.0289	1874.5163	23112.786	8783.8014	108304.27	1335391.7
0	0	0	0	0	0	0
47.844	480.0883	5013.1589	54048.868	43958.874	420136.87	4211815.1

a=	111.39314	C=	5.5463788
b=	-45065.24	B=	-126.6841
d=	-2484.034	A=	9471.4392
e=	2096.4499		
f=	39759.567		

WORKSHEI (NET)

MEGAWATTS = X HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.48	41.9904	272.09779	1763.1937	9107.1911	59014.598	382414.6
8.064	65.028096	524.38657	4228.6533	8975.1752	72375.812	583638.55
9.72	94.4784	918.33005	8926.1681	9040.7082	87875.684	854151.65
11.25	126.5625	1423.8281	16018.066	8803.3768	99037.989	1114177.4
12.33	152.0289	1874.5163	23112.786	8958.1696	110454.23	1361900.7
0	0	0	0	0	0	0
47.844	480.0883	5013.1589	54048.868	44884.621	428758.32	4296282.8

a=	111.39314	C=	6.1557728
b=	-67166.92	B=	-148.7838
d=	-3668.226	A=	9809.5437
e=	2096.4499		
f=	39759.567		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 10
Test Date: 05-24-04
Tested by: K.Inouye, K.Katsutani

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 05-24-04
MPP UNIT NO. 10

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1	
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5	
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.	F.O. Temp. *F.
Actual Test Load	KWH	6.52	7.96	9.72	11.05	12.46	F.O. Temp. (Corr.)
Description\Time		0750	0910	1027	1142	1313	F.O.-start gal.
Ambient air temp	*F.	78	77	80	84	85	F.O.-end gal.
Manifold Air-Left	*F.						F.O. Drain Tnk-start
Manifold Air-Right	*F.						F.O. Drain Tnk-end
Intercooler Water-In	R/L *F.						PT RATIO
Intercooler Water-Out	R/L *F.						KW (Gen.)
Jacket Water-In	*F.						KW (Aux.)
Jacket Water-Out	*F.						BTU/gal (Approx.)
Exhaust Gas-Lvg T/C-L	*F.						BTU/gal (Test Lab)
Exhaust Gas-Lvg T/C-R	*F.						
Manifold Pressure-Lft	psi						HEAT RATE (APPROX.)-G
Manifold Pressure-Rt	psi						HEAT RATE (APPROX.)-N
							HEAT RATE (ACTUAL)-G
Generator							HEAT RATE (ACTUAL)-N
Std KWH meter-start	X18 KWH	1317.0	1317.5	1318.2	1318.9	1319.8	
Std KWH meter-stop	X18 KWH	1317.4	1318.0	1318.7	1319.5	1320.5	
Demand meter	X18 KWH	0.362	0.442	0.54	0.614	0.692	NOTE: F.O. Tank
Generator volts	V.						F.O. Drain Tank
Generator amps	A.						
Generator vars	VARS						
Auxilliaries							
Aux. KWH clock-start	KWH	687.8	688.0	688.3	688.5	688.9	
Aux. KWH clock-end	KWH	688.0	688.2	688.5	688.8	689.1	
Aux. load indicator	KW						
Aux. volts	V.						
Aux. amps	A.	90	100	87	111	105	
Fuel Oil							
F.O. tank level-start	in.						
F.O. tank level-end	in.						
F.O. meter rdg-start	gal.	390861	391473	392209	393031	394131	
F.O. meter rdg-end	gal.	391312	392005	392854	393764	394954	
F.O. temp.	*F.	123	118	116	113	115	
F.O. drain tank-start	in.	4.000	4.500	5.375	5.875	6.875	
F.O. drain tank-end	in.	4.375	5.000	5.750	6.500	7.500	
Fuel Oil Analysis							
API gravity @ 60 *F.		33.7					
Sulfur, Wt.	%	0.23					
Viscosity @ 210 *F.	SSF						
Higher heating value	BTU/gal	139,095					

TEST LOADS - MW

6.5	9.0	10.0	11.0	12.5
123	118	116	113	115
0.9685	0.9710	0.9720	0.9735	0.9725
390861.0	391473.0	392209.0	393031.0	394131.0
391312.0	392005.0	392854.0	393764.0	394954.0
4.000	4.500	5.375	5.875	6.875
4.375	5.000	5.750	6.500	7.500
18,000	18,000	18,000	18,000	18,000
6,516	7,956	9,720	11,052	12,456
160	160	160	240	160
138,095	138,095	138,095	138,095	138,095
139,095	139,095	139,095	139,095	139,095
9,249	8,958	8,902	8,909	8,867
9,482	9,142	9,051	9,106	8,982
9,316	9,023	8,966	8,973	8,931
9,551	9,208	9,116	9,172	9,047

9.75 gal/in
2.76 gal/in

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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 10 Fuel Oil Tested: 05-28-04
Test Date: 05-24-04 Tested By: K.Nakamatsu/E.Wong
Tested by: K.Inouye, K.Katsutani
DATA:

GENERATED (MW)	6.516	7.956	9.720	11.052	12.456
HEAT RATE(BTU/MW)G	9,316	9,023	8,966	8,973	8,931
HEAT RATE(BTU/MW)N	9,551	9,208	9,116	9,172	9,047
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$52.7670	act.			
H.H.V. (BTU/GAL)	139,095	act.			

A, B, C CONSTANTS:

GROSS A=	11,081.28	NET A=	11,437.45
B=	(391.740)	B=	(414.841)
C=	17.7769	C=	18.2088

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	10,066	9,799	9,567	9,371	**9,210**	9,085	**8,996**	8,942	**8,923**	8,940	**8,962**	8,993
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	10,357	10,069	9,818	9,604	**9,426**	9,284	**9,179**	9,110	**9,077**	9,081	**9,097**	9,122
GROSS (MBTU)	30.198	39.195	47.835	56.225	64.471	72.681	80.960	89.416	98.155	107.283	112.027	116.909
NET (MBTU)	29.413	38.667	47.521	56.087	64.472	72.787	81.141	88.913	97.673	106.798	111.530	116.394
COST/KWH	$0.0909	$0.0885	$0.0864	$0.0846	$0.0832	$0.0821	$0.0813	$0.0808	$0.0806	$0.0808	$0.0809	$0.0812
G/KWH	248.71	242.10	236.38	231.53	227.56	224.47	222.26	220.92	220.47	220.89	221.43	222.19
G/PS-H	181.19	176.38	172.21	168.67	165.78	163.53	161.92	160.95	160.62	160.93	161.32	161.87

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.516	42.458256	276.658	1802.7035	9316.3564	60705.378	395556.24	
7.956	63.297936	503.59838	4006.6287	9022.7721	71785.175	571122.85	
9.72	94.4784	918.33005	8926.1681	8966.4268	87153.668	847133.66	
11.052	122.1467	1349.9654	14919.817	8973.0658	99170.323	1096030.4	
12.456	155.15194	1932.5725	24072.123	8930.8578	111242.76	1385639.9	
0	0	0	0	0	0	0	
47.7	477.53323	4981.1243	53727.441	45209.479	430057.31	4295483	

a=	112.37616	C=	17.776928
b=	-111613.4	B=	-391.7398
d=	-6205.596	A=	11081.278
e=	2127.2864		
f=	40599.216		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	9550.8776	62233.519	405513.61
7.956	63.297936	503.59838	4006.6287	9207.9495	73258.447	582844.2
9.72	94.4784	918.33005	8926.1681	9116.4925	88612.307	861311.63
11.052	122.1467	1349.9654	14919.817	9172.246	101371.66	1120359.6
12.456	155.15194	1932.5725	24072.123	9047.0693	112690.3	1403670.3
0	0	0	0	0	0	0
47.7	477.53323	4981.1243	53727.441	46094.635	438166.23	4373699.4

a=	112.37616	C=	18.208795
b=	-143223.2	B=	-414.8412
d=	-7882.937	A=	11437.451
e=	2127.2864		
f=	40599.216		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 10
Test Date: 10-06-03
Tested by: SK

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 10-06-03
MPP UNIT NO. 10

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1	
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5	
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.	F.O. Temp. *F.
Actual Test Load	KWH	6.49	9	10.01	11.05	12.53	F.O. Temp. (Corr.)
Description\Time		0515	0345	0210	0053	2335	F.O.-start gal.
Ambient air temp	*F.	77	78	78	79	79	F.O.-end gal.
Manifold Air-Left	*F.						F.O. Drain Tnk-start
Manifold Air-Right	*F.						F.O. Drain Tnk-end
Intercooler Water-In	R/L *F.						PT RATIO
Intercooler Water-Out	R/L *F.						KW (Gen.)
Jacket Water-In	*F.						KW (Aux.)
Jacket Water-Out	*F.						BTU/gal (Approx.)
Exhaust Gas-Lvg T/C-L	*F.						BTU/gal (Test Lab)
Exhaust Gas-Lvg T/C-R	*F.						
Manifold Pressure-Lft	psi						HEAT RATE (APPROX.)-G
Manifold Pressure-Rt	psi						HEAT RATE (APPROX.)-N
							HEAT RATE (ACTUAL)-G
Generator							HEAT RATE (ACTUAL)-N
Std KWH meter-start	X18 KWH	8914.0	8913.3	8912.5	8911.7	8910.9	
Std KWH meter-stop	X18 KWH	8914.4	8913.8	8913.1	8912.3	8911.5	
Demand meter	X18 KWH	0.361	0.500	0.556	0.614	0.696	NOTE: F.O. Tank
Generator volts	V.						F.O. Drain Tank
Generator amps	A.						
Generator vars	VARS						
Auxilliaries							
Aux. KWH clock-start	KWH	9834.6	9834.3	9834.0	9833.8	9833.5	
Aux. KWH clock-end	KWH	9834.8	9834.5	9834.2	9834.0	9833.7	
Aux. load indicator	KW	600	690	690	680	665	
Aux. volts	V.						
Aux. amps	A.						
Fuel Oil							
F.O. tank level-start	in.						
F.O. tank level-end	in.						
F.O. meter rdg-start	gal.	555020	554200	553210	552310	551290	
F.O. meter rdg-end	gal.	555460	554800	553860	553020	552090	
F.O. temp.	*F.	122	115	113	112	112	
F.O. drain tank-start	in.	5.750	5.000	4.188	3.500	2.688	
F.O. drain tank-end	in.	6.188	5.438	4.688	4.000	3.375	
Fuel Oil Analysis							
API gravity @ 60 *F.		34.1					
Sulfur, Wt.	%	0.2					
Viscosity @ 210 *F.	SSF						
Higher heating value	BTU/gal	138,095					

TEST LOADS-MW

6.5	9.0	10.0	11.0	12.5
122	115	113	112	112
0.9690	0.9725	0.9735	0.9740	0.9740
555020.0	554200.0	553210.0	552310.0	551290.0
555460.0	554800.0	553860.0	553020.0	552090.0
5.750	5.000	4.188	3.500	2.688
6.188	5.438	4.688	4.000	3.375
18,000	18,000	18,000	18,000	18,000
6,498	9,000	10,008	11,052	12,528
160	160	160	160	160
138,095	138,095	138,095	138,095	138,095
138,095	138,095	138,095	138,095	138,095
9,052	8,947	8,725	8,635	8,582
9,280	9,109	8,866	8,762	8,693
9,052	8,947	8,725	8,635	8,582
9,280	9,109	8,866	8,762	8,693

9.75 gal/in
2.76 gal/in

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 10 Fuel Oil Tested: 11-04-03
Test Date: 10-06-03 Tested By: K.Nakamatsu
Tested by: SK
DATA:

GENERATED (MW)	6.498	9.000	10.008	11.052	12.528
HEAT RATE(BTU/MW)G	9,052	8,947	8,725	8,635	8,582
HEAT RATE(BTU/MW)N	9,280	9,109	8,866	8,762	8,693
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$45.0396 act.				
H.H.V. (BTU/GAL)	138,095 act.				

A, B, C CONSTANTS:

GROSS A=	9,579.00	NET A=	10,099.22
B=	(74.437)	B=	(132.532)
C=	(0.6001)	C=	1.4311

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,350	9,272	9,192	9,111	9,029	8,945	8,860	8,775	8,688	8,599	8,555	8,510
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,715	9,592	9,472	9,356	9,242	9,131	9,022	8,917	8,815	8,715	8,666	8,618
GROSS (MBTU)	28.051	37.087	45.959	54.665	63.200	71.561	79.744	87.746	95.563	103.192	106.935	110.629
NET (MBTU)	27.589	36.833	45.846	54.636	63.213	71.584	79.758	87.030	94.844	102.487	106.247	109.968
COST/KWH	$0.0726	$0.0720	$0.0714	$0.0707	$0.0701	$0.0695	$0.0688	$0.0681	$0.0675	$0.0668	$0.0664	$0.0661
G/KWH	231.02	229.08	227.11	225.10	223.07	221.01	218.92	216.80	214.65	212.47	211.37	210.26
G/PS-H	168.31	166.89	165.45	163.99	162.51	161.01	159.49	157.94	156.38	154.79	153.99	153.18

WORKSHEET (GROSS)

MEGAWATTS = X / HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.498	42.224004	274.37158	1782.8665	9051.9763	58819.742	382210.68
9	81	729	6561	8946.6462	80519.816	724678.35
10.008	100.16006	1002.4019	10032.038	8724.6199	87315.996	873858.49
11.052	122.1467	1349.9654	14919.817	8634.7384	95431.129	1054704.8
12.528	156.95078	1966.2794	24633.549	8581.684	107511.34	1346902
0	0	0	0	0	0	0
49.086	502.48156	5322.0183	57929.271	43939.665	429598.02	4382354.4

a=	102.97238	C=	-0.600059
b=	-167099.2	B=	-74.43747
d=	-8832.288	A=	9579.0042
e=	1945.2818		
f=	37158.64		

WORKSHEET (NET)

MEGAWATTS = X / HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.498	42.224004	274.37158	1782.8665	9280.4894	60304.62	391859.42
9	81	729	6561	9108.5765	81977.188	737794.7
10.008	100.16006	1002.4019	10032.038	8866.3684	88734.615	888056.03
11.052	122.1467	1349.9654	14919.817	8761.5799	96832.981	1070198.1
12.528	156.95078	1966.2794	24633.549	8692.7019	108902.17	1364326.4
0	0	0	0	0	0	0
49.086	502.48156	5322.0183	57929.271	44709.716	436751.58	4452234.6

a=	102.97238	C=	1.4311055
b=	-204634.6	B=	-132.5322
d=	-10863.25	A=	10099.218
e=	1945.2818		
f=	37158.64		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 10
Test Date: 03-11-02
Tested by: K. Inouye

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 03-11-02
MPP UNIT NO. 10

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	KWH	6.498	9.036	10.062	11.07	12.384
Description\Time		0730	0856	1027	1140	1303
Ambient air temp	*F.	82	85	86	85	89
Manifold Air-Left	*F.	97	113	123	126	136
Manifold Air-Right	*F.	98	113	123	126	136
Intercooler Water-In	R/L *F.	93	98	102	100	106
Intercooler Water-Out	R/L *F.	96/95	104/104	111/110	109/109	11/118
Jacket Water-In	*F.	153	156	162	161	165
Jacket Water-Out	*F.	160	163	170	169	171
Exhaust Gas-Lvg T/C-L	*F.	643	657	665	667	685
Exhaust Gas-Lvg T/C-R	*F.	645	660	668	669	685
Manifold Pressure-Lft	psi	11	18.5	21.5	24.5	28
Manifold Pressure-Rt	psi	11	18	21	24	27
Generator						
Std KWH meter-start	X18 KWH	3728.9	3729.4	3730.2	3730.9	3731.8
Std KWH meter-stop	X18 KWH	3729.2	3730.0	3730.8	3731.5	3732.5
Demand meter	X18 KWH	0.361	0.502	0.559	0.615	0.688
Generator volts	V.	6750	6750	6750	6850	6850
Generator amps	A.	625	820	910	1045	1160
Generator vars	VARS	3.5	3.5	3.8	6.0	6.4
Auxilliaries						
Aux. KWH clock-start	KWH	7547.6	7547.8	7548.1	7548.3	7548.6
Aux. KWH clock-end	KWH	7547.8	7548.0	7548.3	7548.5	7548.8
Aux. load indicator	KW	600	680	670	700	700
Aux. volts	V.	488	488	488	496	496
Aux. amps	A.	82	83	83	99	99
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	413646	414329	415257	416068	417105
F.O. meter rdg-end	gal.	414084	414924	415914	416793	417914
F.O. temp.	*F.	107	105	103	105	105
F.O. drain tank-start	in.	0.000	0.000	0.000	0.000	0.000
F.O. drain tank-end	in.	0.750	0.750	0.875	0.875	1.000
Fuel Oil Analysis						
API gravity @ 60 *F.		36.3				
Sulfur, Wt.	%	0.08				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,311				

F.O. Temp. *F.	
F.O. Temp. (Corr.)	
F.O.-start gal.	
F.O.-end gal.	
F.O. Drain Tnk-start	
F.O. Drain Tnk-end	
PT RATIO	
KW (Gen.)	
KW (Aux.)	
BTU/gal (Approx.)	
BTU/gal (Test Lab)	
HEAT RATE (APPROX.)-G	
HEAT RATE (APPROX.)-N	
HEAT RATE (ACTUAL)-G	
HEAT RATE (ACTUAL)-N	

TEST LOADS - MW

6.5	9.0	10.0	11.0	12.5
107	105	103	105	105
0.9765	0.9775	0.9785	0.9775	0.9775
413646.0	414329.0	415257.0	416068.0	417105.0
414084.0	414924.0	415914.0	416793.0	417914.0
0	0	0	0	0
0.7500	0.7500	0.8750	0.8750	1.0000
18,000	18,000	18,000	18,000	18,000
6,498	9,036	10,062	11,070	12,384
160	160	160	160	160
138,095	138,095	138,095	138,095	138,095
138,311	138,311	138,311	138,311	138,311
9,074	8,877	8,811	8,830	8,807
9,303	9,037	8,954	8,959	8,923
9,088	8,891	8,825	8,844	8,821
9,318	9,052	8,968	8,974	8,937

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 10 Fuel Oil Tested: 03-16-02
Test Date: 03-11-02 Tested By: E.Wong
Tested by: K. Inouye
DATA:

GENERATED (MW)	6.498	9.036	10.062	11.070
HEAT RATE(BTU/MW)G	9,088	8,891	8,825	8,844
HEAT RATE(BTU/MW)N	9,318	9,052	8,968	8,974
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$27.4425	act.		
H.H.V. (BTU/GAL)	138,311	act.		

A, B, C CONSTANTS:

GROSS A=	10,434.04	NET A=	10,994.89
B=	(295.781)	B=	(363.947)
C=	13.6840	C=	16.3243

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,670	9,470	9,297	9,152	9,034	8,944	8,880	8,845	8,836	8,855	8,875	8,901
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	10,050	9,800	9,583	9,399	9,247	9,128	9,042	8,988	8,967	8,978	8,996	9,022
GROSS (MBTU)	29.010	37.879	46.486	54.912	63.239	71.549	79.924	88.446	97.198	106.262	110.936	115.719
NET (MBTU)	28.542	37.633	46.383	54.890	63.251	71.564	79.928	87.722	96.482	105.584	110.294	115.126
COST/KWH	$0.0457	$0.0447	$0.0439	$0.0432	$0.0427	$0.0423	$0.0420	$0.0418	$0.0417	$0.0418	$0.0419	$0.0421
G/KWH	238.92	233.98	229.71	226.12	223.21	220.97	219.41	218.53	218.32	218.79	219.28	219.93
G/PS-H	174.06	170.46	167.35	164.74	162.61	160.98	159.85	159.20	159.05	159.39	159.75	160.23

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.498	42.224004	274.37158	1782.8665	9088.2252	59055.287	383741.26	
9.036	81.649296	737.78304	6666.6075	8891.3244	80342.007	725970.38	
10.062	101.24384	1018.7156	10250.316	8825.1038	88798.195	893487.44	
11.07	122.5449	1356.572	15017.253	8843.8101	97900.978	1083763.8	
0	0	0	0	0	0	0	
0	0	0	0	0	0	0	
36.666	347.66204	3387.4422	33717.043	35648.464	326096.47	3086962.9	

a=	46.25262	C=	13.68403
b=	-45766.12	B=	-295.7812
d=	-2700.695	A=	10434.04
e=	802.39237		
f=	13999.273		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.498	42.224004	274.37158	1782.8665	9317.6534	60546.112	393428.64
9.036	81.649296	737.78304	6666.6075	9051.6006	81790.263	739056.82
10.062	101.24384	1018.7156	10250.316	8967.703	90233.027	907924.72
11.07	122.5449	1356.572	15017.253	8973.5085	99336.739	1099657.7
0	0	0	0	0	0	0
0	0	0	0	0	0	0
36.666	347.66204	3387.4422	33717.043	36310.466	331906.14	3140067.9

a=	46.25262	C=	16.324333
b=	-63499.15	B=	-363.9466
d=	-3734.962	A=	10994.895
e=	802.39237		
f=	13999.273		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 10
Test Date: 04-20-01
Tested by:

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 04-20-01
MPP UNIT NO. 10

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1	
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5	
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.	F.O. Temp. *F.
Actual Test Load	KWH	6.426	9.072	10.098	11.034	12.096	F.O. Temp. (Corr.)
Description\Time		0711	0835	0957	1125	1251	F.O.-start gal.
Ambient air temp	*F.	75	76	80	78	83	F.O.-end gal.
Manifold Air-Left	*F.	99	109	115	123	132	F.O. Drain Tnk-start
Manifold Air-Right	*F.	101	110	114	123	132	F.O. Drain Tnk-end
Intercooler Water-In	R/L *F.	NA/9490	NA/94	NA/95	NA/99	NA/106	PT RATIO
Intercooler Water-Out	R/L *F.	96/96	98/99	102/103	107/108	115/115	KW (Gen.)
Jacket Water-In	*F.	152	154	158	157	163	KW (Aux.)
Jacket Water-Out	*F.	157	162	166	165	173	BTU/gal (Approx.)
Exhaust Gas-Lvg T/C-L	*F.	640	635	637	645	671	BTU/gal (Test Lab)
Exhaust Gas-Lvg T/C-R	*F.	630	628	634	642	667	
Manifold Pressure-Lft	psi	11	18	22	24	26	HEAT RATE (APPROX.)-G
Manifold Pressure-Rt	psi	11	18	21	24	26	HEAT RATE (APPROX.)-N
							HEAT RATE (ACTUAL)-G
Generator							HEAT RATE (ACTUAL)-N
Std KWH meter-start	X18 KWH	357.2	357.7	358.4	359.2	360.1	
Std KWH meter-stop	X18 KWH	357.5	358.2	359	359.9	360.8	
Demand meter	X18 KWH	0.357	0.504	0.561	0.613	0.672	NOTE: F.O. Tank
Generator volts	V.	6800	6800	6850	6825	6825	F.O. Drain Tank
Generator amps	A.	600	790	880	970	1055	
Generator vars	VARS	3.0	2.5	3.0	3.6	3.7	
Auxilliaries							
Aux. KWH clock-start	KWH	6005.5	6005.8	6006.1	6006.5	6006.8	
Aux. KWH clock-end	KWH	6005.7	6006.1	6006.4	6006.7	6007.1	
Aux. load indicator	KW	700	925	825	830	960	
Aux. volts	V.	490	490	490	490	490	
Aux. amps	A.	40	90	79	80	91	
Fuel Oil							
F.O. tank level-start	in.						
F.O. tank level-end	in.						
F.O. meter rdg-start	gal.	445400	446045	446850	447825	448855	
F.O. meter rdg-end	gal.	445825	446620	447495	448530	449625	
F.O. temp.	*F.	111	105	106	107	107	
F.O. drain tank-start	in.	0.000	0.000	0.000	0.000	0.000	
F.O. drain tank-end	in.	0.750	0.875	0.875	0.875	0.938	
Fuel Oil Analysis							
API gravity @ 60 *F.		34.3					
Sulfur, Wt.	%	0.09					
Viscosity @ 210 *F.	SSF						
Higher heating value	BTU/gal	138,892					

TEST LOADS - MW

6.5	9.0	10.0	11.0	12.5
111	105	106	107	107
0.9745	0.9775	0.9770	0.9765	0.9765
445400.0	446045.0	446850.0	447825.0	448855.0
445825.0	446620.0	447495.0	448530.0	449625.0
0	0	0	0	0
0.7500	0.8750	0.8750	0.8750	0.9375
18,000	18,000	18,000	18,000	18,000
6,426	9,072	10,098	11,034	12,096
160	240	240	160	240
138,095	138,095	138,095	138,095	138,095
138,892	138,892	138,892	138,892	138,892
8,885	8,543	8,606	8,605	8,574
9,112	8,775	8,816	8,732	8,747
8,936	8,592	8,656	8,655	8,623
9,164	8,826	8,867	8,782	8,798

9.75 gal/in
2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 10 Fuel Oil Tested: 04-24-01
Test Date: 04-20-01 Tested By: K.Yokoyama
Tested by:
DATA:

GENERATED (MW)	6.426	9.072	10.098	11.034	12.096
HEAT RATE(BTU/MW)G	8,936	8,592	8,656	8,655	8,623
HEAT RATE(BTU/MW)N	9,164	8,826	8,867	8,782	8,798
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$42.7842	act.			
H.H.V. (BTU/GAL)	138,892	act.			

A, B, C CONSTANTS:

GROSS A=	10,641.95	NET A=	10,779.45
B=	(383.658)	B=	(353.036)
C=	18.1237	C=	15.6820

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,654	9,397	9,177	8,992	8,844	8,733	8,657	8,618	8,615	8,648	8,678	8,717
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,861	9,618	9,406	9,226	9,077	8,959	8,872	8,817	8,794	8,801	8,817	8,840
GROSS (MBTU)	28.962	37.589	45.884	53.955	61.911	69.861	77.913	86.177	94.762	103.774	108.476	113.325
NET (MBTU)	28.007	36.934	45.527	53.879	62.084	70.237	78.432	86.057	94.619	103.502	108.094	112.801
COST/KWH	$0.0708	$0.0689	$0.0673	$0.0660	$0.0649	$0.0640	$0.0635	$0.0632	$0.0632	$0.0634	$0.0636	$0.0639
G/KWH	238.53	232.18	226.73	222.18	218.52	215.76	213.89	212.92	212.85	213.67	214.41	215.38
G/PS-H	173.77	169.15	165.18	161.86	159.20	157.19	155.83	155.12	155.06	155.66	156.21	156.91

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.426	41.293476	265.35188	1705.1512	8935.9392	57422.345	368995.99
9.072	82.301184	746.63634	6773.4849	8592.0622	77947.189	707136.9
10.098	101.9696	1029.6891	10397.8	8655.7875	87406.142	882627.22
11.034	121.74916	1343.3802	14822.857	8654.9839	95499.092	1053737
12.096	146.31322	1769.8047	21407.557	8623.2174	104306.44	1261690.7
0	0	0	0	0	0	0
48.726	493.62664	5154.8621	55106.85	43461.99	422581.21	4274187.8

a=	93.910104	C=	18.123697
b=	-83057.21	B=	-383.658
d=	-4822.905	A=	10641.954
e=	1721.8592		
f=	31866.996		

WORKSHEI (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.426	41.293476	265.35188	1705.1512	9164.1151	58888.604	378418.17
9.072	82.301184	746.63634	6773.4849	8825.5422	80065.319	726352.57
10.098	101.9696	1029.6891	10397.8	8866.5188	89534.106	904115.41
11.034	121.74916	1343.3802	14822.857	8782.3333	96904.266	1069241.7
12.096	146.31322	1769.8047	21407.557	8797.7765	106417.9	1287231
0	0	0	0	0	0	0
48.726	493.62664	5154.8621	55106.85	44436.286	431810.2	4365358.8

a=	93.910104	C=	15.681966
b=	-108140.4	B=	-353.0356
d=	-6151.47	A=	10779.452
e=	1721.8592		
f=	31866.996		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 11
Test Date: 01-30-06
Test By: Colleen Ford

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 01-30-06
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	KWH	6.48	7.95	8.96	11.01	12.13
Description\Time		0740	0859	1029	1208	1327
Ambient air temp	*F.	59	67	76	76	78
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	9696.7	9697.2	9697.8	9698.7	9699.5
Std KWH meter-stop	X18 KWH	9697.0	9697.6	9698.3	9699.3	9700.2
Digital meter	X18 KWH	0.360	0.442	0.498	0.612	0.674
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	KWH	3846.9	3847.2	3847.5	3848.0	3848.4
Aux. KWH clock-end	KWH	3847.1	3847.4	3847.8	3848.3	3848.7
Aux. load indicator	KW	69	69	100	100	111
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	95007620	95008200	95009000	95010023	95010977
F.O. meter rdg-end	gal.	95008043	95008720	95009578	95010737	95011761
F.O. temp.	*F.	110	113	114	113	112
F.O. drain tank-start	in.	1.9375	2.125	2.25	2.5	2.6875
F.O. drain tank-end	in.	2.063	2.188	2.375	2.625	2.8125
Fuel Oil Analysis						
API gravity @ 60 *F.		35.1				
Sulfur, Wt.	%					
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,190				

TEST LOADS-MW

	6.5	9.0	10.0	11.0	12.5
F.O. Temp. *F.	110	113	114	113	112
F.O. Temp. (Corr.)	0.9750	0.9735	0.9730	0.9735	0.9740
F.O.-start gal.	95007620.0	95008200.0	95009000.0	95010023.0	95010977.0
F.O.-end gal.	95008043.0	95008720.0	95009578.0	95010737.0	95011761.0
F.O. Drain Tnk-start	1.9375	2.125	2.25	2.5	2.6875
F.O. Drain Tnk-end	2.063	2.188	2.375	2.625	2.813
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,480	7,956	8,964	11,016	12,132
KW (Aux.)	160	160	240	240	240
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,190	138,190	138,190	138,190	138,190
HEAT RATE (APPROX.)-G	8,787	8,786	8,662	8,712	8,691
HEAT RATE (APPROX.)-N	9,009	8,966	8,900	8,906	8,866
HEAT RATE (ACTUAL)-G	8,793	8,792	8,668	8,718	8,697
HEAT RATE (ACTUAL)-N	9,015	8,972	8,907	8,912	8,872

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

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DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 02-01-06
Test Date: 01-30-06 Tested By: rh

DATA:

GENERATED (MW)	6.480	7.956	8.964		12.132
HEAT RATE(BTU/MW)G	8,793	8,792	8,668		8,697
HEAT RATE(BTU/MW)N	9,015	8,972	8,907		8,872
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$79.7548	act.			
H.H.V. (BTU/GAL)	138,190	act.			

A, B, C CONSTANTS:

GROSS A=	9,426.64	NET A=	9,535.45
B=	(135.471)	B=	(107.748)
C=	6.1774	C=	4.3648

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	9,076	8,984	8,904	8,836	**8,781**	8,738	**8,708**	8,690	**8,684**	8,691	**8,698**	8,710
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,251	9,174	9,106	9,046	**8,995**	8,953	**8,919**	8,894	**8,878**	8,871	**8,871**	8,872
GROSS (MBTU)	27.227	35.934	44.519	53.017	61.467	69.906	78.370	86.897	95.523	104.286	108.731	113.224
NET (MBTU)	26.274	35.229	44.072	52.829	61.526	70.190	78.133	86.810	95.531	104.323	108.754	113.212
COST/KWH	$0.1247	$0.1234	$0.1223	$0.1214	$0.1207	$0.1201	$0.1197	$0.1194	$0.1193	$0.1194	$0.1195	$0.1197
G/KWH	224.24	221.96	219.99	218.32	216.96	215.90	215.15	214.70	214.56	214.72	214.92	215.19
G/PS-H	163.36	161.70	160.27	159.05	158.06	157.29	156.74	156.41	156.31	156.43	156.57	156.77

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.48	41.9904	272.09779	1763.1937	8792.6489	56976.365	369206.85
7.956	63.297936	503.59838	4006.6287	8791.6509	69946.375	556493.36
8.964	80.353296	720.28695	6456.6522	8668.082	77700.687	696508.96
0	0	0	0	0	0	0
12.132	147.185424	1785.6536	21663.549	8696.6398	105507.63	1280018.6
0	0	0	0	0	0	0
35.532	332.827056	3281.6367	33890.024	34949.022	310131.06	2902227.8

a=	68.7852	C=	6.1774476
b=	-23068.88	B=	-135.4708
d=	-1284.39401	A=	9426.6371
e=	1300.53577		
f=	24786.2452		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.48	41.9904	272.09779	1763.1937	9015.2477	58418.805	378553.86
7.956	63.297936	503.59838	4006.6287	8972.085	71381.908	567914.46
8.964	80.353296	720.28695	6456.6522	8906.5437	79838.258	715670.14
0	0	0	0	0	0	0
12.132	147.18542	1785.6536	21663.549	8872.1522	107636.95	1305851.5
0	0	0	0	0	0	0
35.532	332.82706	3281.6367	33890.024	35766.029	317275.92	2967989.9

a=	68.7852	C=	4.3648239
b=	-31942.22	B=	-107.7478
d=	-1734.842	A=	9535.4476
e=	1300.5358		
f=	24786.245		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 11
Test Date: 01-21-05
Test By: K.Inouye, K.Katsutani

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 01-21-05
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	KWH	6.84	8.28	9.72	11.03	12.35
Description\Time		0741	0905	1026	1147	1309
Ambient air temp	*F.	68	73	75	78	77
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	5412.9	5413.4	5414.1	5414.8	5415.7
Std KWH meter-stop	X18 KWH	5413.3	5413.9	5414.6	5415.4	5416.4
Digital meter	X18 KWH	0.380	0.460	0.540	0.613	0.686
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	KWH	1544.7	1544.9	1545.0	1545.2	1545.5
Aux. KWH clock-end	KWH	1544.8	1545.0	1545.2	1545.4	1545.7
Aux. load indicator	KW	48	48	50	55	79
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	89988485	89989153	89989897	89990771	89991766
F.O. meter rdg-end	gal.	89988945	89989695	89990527	89991481	89992560
F.O. temp.	*F.	117	113	111	111	109
F.O. drain tank-start	in.	3.75	3.8125	3.9375	4.0625	4.25
F.O. drain tank-end	in.	3.750	3.875	4.063	4.250	4.5

Fuel Oil Analysis		
API gravity @ 60 *F.		34.1
Sulfur, Wt.	%	0.2
Viscosity @ 210 *F.	SSF	
Higher heating value	BTU/gal	138,524

TEST LOADS - MW

F.O. Temp. *F.	6.5	9.0	10.0	11.0	12.5
F.O. Temp. (Corr.)	117	113	111	111	109
F.O.-start gal.	0.9715	0.9735	0.9745	0.9745	0.9755
F.O.-end gal.	89988485.0	89989153.0	89989897.0	89990771.0	89991766.0
F.O. Drain Tnk-start	89988945.0	89989695.0	89990527.0	89991481.0	89992560.0
F.O. Drain Tnk-end	3.75	3.8125	3.9375	4.0625	4.25
PT RATIO	3.750	3.875	4.063	4.250	4.500
KW (Gen.)	*18,000*	*18,000*	*18,000*	*18,000*	*18,000*
KW (Aux.)	6,840	8,280	9,720	11,034	12,348
BTU/gal (Approx.)	80	80	160	160	160
BTU/gal (Test Lab)	138,095	138,095	138,095	138,095	138,095
	138,524	138,524	138,524	138,524	138,524
HEAT RATE (APPROX.)-G					
HEAT RATE (APPROX.)-N	9,022	8,799	8,721	8,657	8,659
HEAT RATE (ACTUAL)-G	9,129	8,885	8,867	8,784	8,773
HEAT RATE (ACTUAL)-N	9,050	8,826	8,748	8,684	8,686
	9,158	8,912	8,894	8,812	8,800

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 01-27-05
Test Date: 01-21-05 Tested By: D.Rinehart

DATA:

GENERATED (MW)	6.840	8.280	9.720	11.034	12.348
HEAT RATE(BTU/MW)G	9,050	8,826	8,748	8,684	8,686
HEAT RATE(BTU/MW)N	9,158	8,912	8,894	8,812	8,800
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$69.2519	act.			
H.H.V. (BTU/GAL)	138,524	act.			

A, B, C CONSTANTS:

GROSS A=	10,898.72	NET A=	10,775.68
B=	(386.792)	B=	(339.295)
C=	16.8436	C=	14.5839

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	9,890	9,621	9,386	9,184	**9,017**	8,882	**8,782**	8,715	**8,682**	8,683	**8,696**	8,717
GENERATED (MW)N	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,889	9,652	9,444	9,265	**9,115**	8,995	**8,903**	8,841	**8,808**	8,804	**8,813**	8,830
GROSS (MBTU)	29.670	38.484	46.929	55.106	63.116	71.059	79.037	87.152	95.503	104.192	108.695	113.321
NET (MBTU)	28.876	37.835	46.464	54.848	63.077	71.238	79.418	86.997	95.480	104.242	108.755	113.371
COST/KWH	$0.1177	$0.1145	$0.1117	$0.1093	$0.1073	$0.1057	$0.1045	$0.1037	$0.1033	$0.1034	$0.1035	$0.1038
G/KWH	244.36	237.71	231.90	226.92	222.78	219.46	216.98	215.33	214.51	214.53	214.85	215.37
G/PS-H	178.02	173.18	168.95	165.32	162.30	159.88	158.07	156.87	156.28	156.29	156.52	156.91

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.84	46.7856	320.0135	2188.8924	9050.4247	61904.905	423429.55
8.28	68.5584	567.66355	4700.2542	8826.3115	73081.859	605117.79
9.72	94.4784	918.33005	8926.1681	8747.71	85027.741	826469.64
11.034	121.749156	1343.3802	14822.857	8683.9424	95818.62	1057262.7
12.348	152.473104	1882.7379	23248.047	8686.3799	107259.42	1324439.3
0	0	0	0	0	0	0
48.222	484.04466	5032.1252	53886.219	43994.768	423092.54	4236718.9

a=	94.862016	C=	16.843589
b=	-111838.015	B=	-386.7923
d=	-6053.00347	A=	10898.724
e=	1819.0243		
f=	35131.8625		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.84	46.7856	320.0135	2188.8924	9157.5304	62637.508	428440.55
8.28	68.5584	567.66355	4700.2542	8912.4218	73794.853	611021.38
9.72	94.4784	918.33005	8926.1681	8894.1152	86450.799	840301.77
11.034	121.74916	1343.3802	14822.857	8811.7179	97228.495	1072819.2
12.348	152.4731	1882.7379	23248.047	8800.4118	108667.48	1341826.1
0	0	0	0	0	0	0
48.222	484.04466	5032.1252	53886.219	44576.197	428779.14	4294409

a=	94.862016	C=	14.583934
b=	-104825	B=	-339.295
d=	-5657.675	A=	10775.681
e=	1819.0243		
f=	35131.862		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 11
Test Date: 07-16-04
Test By: D.Isagawa

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 07-16-04
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) –>	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	KWH	6.48	8.06	9.52	11.08	12.38
Description\Time		1515	1703	1842	2010	2156
Ambient air temp	*F.	87	91	87	84	83
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	3541.2	3542.0	3542.7	3543.6	3544.7
Std KWH meter-stop	X18 KWH	3541.6	3542.4	3543.3	3544.2	3545.4
Digital meter	X18 KWH	0.360	0.443	0.529	0.616	0.688
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	KWH	931.1	931.5	931.8	932.2	932.6
Aux. KWH clock-end	KWH	931.3	931.7	932.1	932.4	932.8
Aux. load indicator	KW	109	111	109	112	110
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	87829420	87830280	87831160	87832120	87833420
F.O. meter rdg-end	gal.	87829850	87830810	87831790	87832830	87834210
F.O. temp.	*F.	129	118	112	110	112
F.O. drain tank-start	in.	2.25	2.5	2.75	2.875	3.375
F.O. drain tank-end	in.	2.375	2.625	2.875	3.125	3.3125
Fuel Oil Analysis						
API gravity @ 60 *F.		35.9				
Sulfur, Wt.	%	0.28				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,310				

	TEST LOADS - MW				
	6.5	9.0	10.0	11.0	12.5
F.O. Temp. *F.	129	118	112	110	112
F.O. Temp. (Corr.)	0.9655	0.9710	0.9740	0.9750	0.9740
F.O.-start gal.	87829420.0	87830280.0	87831160.0	87832120.0	87833420.0
F.O.-end gal.	87829850.0	87830810.0	87831790.0	87832830.0	87834210.0
F.O. Drain Tnk-start	2.25	2.5	2.75	2.875	3.375
F.O. Drain Tnk-end	2.375	2.625	2.875	3.125	3.313
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,480	7,974	9,522	11,088	12,384
KW (Aux.)	160	160	240	160	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,310	138,310	138,310	138,310	138,310
HEAT RATE (APPROX.)-G	8,845	8,910	8,897	8,619	8,581
HEAT RATE (APPROX.)-N	9,069	9,093	9,127	8,745	8,693
HEAT RATE (ACTUAL)-G	8,859	8,924	8,911	8,632	8,594
HEAT RATE (ACTUAL)-N	9,083	9,107	9,142	8,758	8,707

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 07-20-04
Test Date: 07-16-04 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)	7.974	11.088	12.384	
HEAT RATE(BTU/MW)G	8,924	8,632	8,594	
HEAT RATE(BTU/MW)N	9,107	8,758	8,707	
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$64.3612	act.		
H.H.V. (BTU/GAL)	138,310	act.		

A, B, C CONSTANTS:

GROSS A=	10,971.89	NET A=	11,446.81
B=	(373.987)	B=	(423.967)
C=	14.6963	C=	16.3690

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	9,982	9,711	9,469	9,257	**9,074**	8,921	**8,796**	8,702	**8,636**	8,600	**8,593**	8,594
GENERATED (MW)N	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8	20.8
HEAT RATE(BTU/MW)N	10,322	10,013	9,736	9,492	**9,281**	9,103	**8,957**	8,844	**8,764**	8,716	**8,705**	8,702
GROSS (MBTU)	29.947	38.844	47.347	55.542	63.519	71.365	79.168	87.017	94.999	103.204	107.417	111.719
NET (MBTU)	215.115	208.668	202.902	197.819	193.419	189.700	186.664	184.310	182.638	181.649	181.410	181.341
COST/KWH	$0.1106	$0.1076	$0.1049	$0.1026	$0.1005	$0.0988	$0.0975	$0.0964	$0.0957	$0.0953	$0.0952	$0.0952
G/KWH	246.63	239.94	233.96	228.72	224.20	220.40	217.34	215.00	213.38	212.49	212.32	212.33
G/PS-H	179.68	174.80	170.45	166.63	163.33	160.57	158.34	156.63	155.45	154.81	154.68	154.69

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
7.974	63.584676	507.02421	4043.011	8924.184	71161.443	567441.35
0	0	0	0	0	0	0
11.088	122.943744	1363.2002	15115.164	8631.9494	95711.055	1061244.2
12.384	153.363456	1899.253	23520.35	8594.3206	106432.07	1318054.7
0	0	0	0	0	0	0
31.446	339.891876	3769.4775	42678.525	26150.454	273304.56	2946740.2

a=	30.824712	C=	14.696326
b=	-48106.164	B=	-373.9868
d=	-2413.48303	A=	10971.893
e=	620.192504		
f=	12509.0872		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
7.974	63.584676	507.02421	4043.011	9106.9162	72618.55	579060.31
0	0	0	0	0	0	0
11.088	122.94374	1363.2002	15115.164	8758.3323	97112.388	1076782.2
12.384	153.36346	1899.253	23520.35	8706.8117	107825.16	1335306.7
0	0	0	0	0	0	0
31.446	339.89188	3769.4775	42678.525	26572.06	277556.09	2991149.2

a=	30.824712	C=	16.369011
b=	-58179.75	B=	-423.967
d=	-2916.722	A=	11446.811
e=	620.1925		
f=	12509.087		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 11
Test Date: 09-25-03
Test By: D.Isagawa

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 09-25-03
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	KWH	6.49	9.03	10.11	10.98	12.47
Description\Time		*0507*	*0329*	*0213*	*0048*	*2320*
Ambient air temp	*F.	65	63	65	65	68
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	778.7	778.0	777.3	776.4	775.5
Std KWH meter-stop	X18 KWH	779.1	778.5	777.8	777.0	776.1
Digital meter	X18 KWH	0.361	0.502	0.562	0.610	0.693
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	KWH	9786.1	9785.8	9785.7	9785.5	9785.3
Aux. KWH clock-end	KWH	9786.2	9785.9	9785.8	9785.6	9785.4
Aux. load indicator	KW	500	495	495	540	550
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	84651760	84650910	84650110	84649150	84648030
F.O. meter rdg-end	gal.	84652020	84651480	84650730	84649840	84648820
F.O. temp.	*F.	120	119	119	120	120
F.O. drain tank-start	in.	11.25	11.5	11.6875	11.9375	12.125
F.O. drain tank-end	in.	11.125	11.375	11.563	11.750	12
Fuel Oil Analysis						
API gravity @ 60 *F.		34.2				
Sulfur, Wt.	%	0.26				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,643				

TEST LOADS - MW

	6.5	9.0	10.0	11.0	12.5
F.O. Temp. *F.	120	119	119	120	120
F.O. Temp. (Corr.)	0.9700	0.9705	0.9705	0.9700	0.9700
F.O.-start gal.	*84651760.0*	*84650910.0*	*84650110.0*	*84649150.0*	*84648030.0*
F.O.-end gal.	84652020.0	84651480.0	84650730.0	84649840.0	84648820.0
F.O. Drain Tnk-start	11.25	11.5	11.6875	11.9375	12.125
F.O. Drain Tnk-end	11.125	11.375	11.563	11.750	12.000
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,498	9,036	10,116	10,980	12,474
KW (Aux.)	80	80	80	80	80
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,643	138,643	138,643	138,643	138,643
HEAT RATE (APPROX.)-G	5,362	8,456	8,216	8,420	8,485
HEAT RATE (APPROX.)-N	5,429	8,532	8,281	8,482	8,540
HEAT RATE (ACTUAL)-G	5,384	8,490	8,248	8,453	8,518
HEAT RATE (ACTUAL)-N	5,451	8,565	8,314	8,515	8,573

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 11-04-03
Test Date: 09-25-03 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)		9.036	10.116	10.980	12.474
HEAT RATE(BTU/MW)G		8,490	8,248	8,453	8,518
HEAT RATE(BTU/MW)N		8,565	8,314	8,515	8,573
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$41.2988 act.				
H.H.V. (BTU/GAL)	138,643 act.				

A, B, C CONSTANTS:

GROSS A=	13,824.55	NET A=	14,062.23
B=	(1,041.504)	B=	(1,068.148)
C=	49.5190	C=	50.4819

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	11,146	10,451	9,855	9,358	8,960	8,662	8,462	8,361	8,360	8,457	8,543	8,654
GENERATED (MW)N	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.4	12.9
HEAT RATE(BTU/MW)N	11,312	10,597	9,984	9,471	9,059	8,748	8,538	8,429	8,421	8,514	8,598	8,708
GROSS (MBTU)	33.437	41.803	49.275	56.149	62.723	69.294	76.158	83.614	91.958	101.487	106.789	112.498
NET (MBTU)	33.031	41.542	49.119	56.067	62.687	69.283	76.158	83.615	91.956	101.485	106.789	112.504
COST/KWH	$0.0790	$0.0741	$0.0699	$0.0664	$0.0636	$0.0614	$0.0600	$0.0593	$0.0593	$0.0600	$0.0606	$0.0614
G/KWH	275.38	258.21	243.49	231.22	221.39	214.01	209.08	206.59	206.55	208.96	211.08	213.81
G/PS-H	200.62	188.12	177.39	168.45	161.29	155.91	152.32	150.51	150.48	152.23	153.78	155.77

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
9.036	81.649296	737.78304	6666.6075	8489.5936	76711.968	693169.34
10.116	102.333456	1035.2052	10472.136	8248.2812	83439.613	844075.12
10.98	120.5604	1323.7532	14534.81	8453.4499	92818.88	1019151.3
12.474	155.600676	1940.9628	24211.57	8518.4249	106258.83	1325472.7
0	0	0	0	0	0	0
42.606	460.143828	5037.7043	55885.124	33709.75	359229.29	3881868.4

a=	25.304076	C=	49.519
b=	16140.5146	B=	-1041.504
d=	679.578124	A=	13824.551
e=	545.92928		
f=	11808.1542		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
9.036	81.649296	737.78304	6666.6075	8565.4274	77397.202	699361.12
10.116	102.33346	1035.2052	10472.136	8314.0308	84104.735	850803.5
10.98	120.5604	1323.7532	14534.81	8515.4936	93500.119	1026631.3
12.474	155.60068	1940.9628	24211.57	8573.4091	106944.7	1334028.2
0	0	0	0	0	0	0
42.606	460.14383	5037.7043	55885.124	33968.361	361946.76	3910824.2

a=	25.304076	C=	50.481943
b=	12965.129	B=	-1068.148
d=	531.06468	A=	14062.233
e=	545.92928		
f=	11808.154		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 11
Test Date: 09-17-03
Test By: R.Navarro

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 09-17-03
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	8.0	9.5	11	12.0

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	
Actual Test Load	KWH	6.51	8.06	9.47	11.14	12.13
Description\Time		0525	0415	0305	0125	2346
Ambient air temp	*F.	84	84	86	86	86
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	674.7	674.1	673.4	672.5	671.2
Std KWH meter-stop	X18 KWH	675.0	674.6	674.0	673.1	672.2
Digital meter	X18 KWH	0.300	0.500	0.600	0.600	1.000
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	KWH	9752.8	9752.6	9752.4	9752.1	9751.7
Aux. KWH clock-end	KWH	9753.0	9752.8	9752.5	9752.3	9752
Aux. load indicator	KW	600	620	600	700	700
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	84532560	84531890	84531170	84530060	84528830
F.O. meter rdg-end	gal.	84532990	84532460	84531760	84530730	84529700
F.O. temp.	*F.	110	110	106	108	108
F.O. drain tank-start	in.	0	0	0	0	0
F.O. drain tank-end	in.	0.125	0.125	0.125	0.125	0.125

Fuel Oil Analysis		
API gravity @ 60 *F.		33.3
Sulfur, Wt.	%	0.23
Viscosity @ 210 *F.	SSF	
Higher heating value	BTU/gal	139,900

TEST LOADS - MW

	6.5	9.0	10.0	11.0	12.5
F.O. Temp. *F.	110	110	106	108	108
F.O. Temp. (Corr.)	0.9750	0.9750	0.9770	0.9760	0.9760
F.O.-start gal.	84532560.0	84531890.0	84531170.0	84530060.0	84528830.0
F.O.-end gal.	84532990.0	84532460.0	84531760.0	84530730.0	84529700.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	0.1250	0.1250	0.1250	0.1250	0.1250
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	5,400	9,000	10,800	10,800	18,000
KW (Aux.)	160	160	80	160	240
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,900	139,900	139,900	139,900	139,900
HEAT RATE (APPROX.)-G	10,718	8,525	7,369	8,360	6,513
HEAT RATE (APPROX.)-N	11,046	8,680	7,424	8,486	6,601
HEAT RATE (ACTUAL)-G	10,859	8,637	7,465	8,469	6,599
HEAT RATE (ACTUAL)-N	11,190	8,793	7,521	8,596	6,688

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 09-19-03
Test Date: 09-17-03 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)	5.400	9.000	10.800
HEAT RATE(BTU/MW)G	10,859	8,637	8,469
HEAT RATE(BTU/MW)N	11,190	8,793	8,596
NUMBER OF TESTS	3		
PRICE OF FUEL/BBL	$41.2988 act.		
H.H.V. (BTU/GAL)	139,900 act.		

A, B, C CONSTANTS:

GROSS A=	18,905.77	NET A=	19,793.41
B=	(2,014.104)	B=	(2,149.664)
C=	97.0135	C=	103.0472

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	13,737	12,402	11,261	10,314	9,561	9,002	8,637	8,466	8,489	8,706	8,888	9,118
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	14,272	12,844	11,621	10,605	9,795	9,191	8,793	8,601	8,616	8,836	9,024	9,263
GROSS (MBTU)	41.210	49.606	56.303	61.882	66.925	72.014	77.732	84.661	93.382	104.478	111.098	118.530
NET (MBTU)	40.532	49.319	56.247	61.934	66.998	72.058	77.732	84.639	93.395	104.621	111.353	118.934
COST/KWH	$0.0965	$0.0872	$0.0791	$0.0725	$0.0672	$0.0633	$0.0607	$0.0595	$0.0597	$0.0612	$0.0625	$0.0641
G/KWH	339.40	306.41	278.22	254.82	236.22	222.41	213.40	209.18	209.75	215.11	219.60	225.28
G/PS-H	247.26	223.23	202.69	185.65	172.09	162.03	155.46	152.39	152.81	156.72	159.98	164.12

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
5.4	29.16	157.464	850.3056	10858.523	58636.025	316634.53
9	81	729	6561	8636.9305	77732.375	699591.37
0	0	0	0	0	0	0
10.8	116.64	1259.712	13604.89	8469.1056	91466.34	987836.47
0	0	0	0	0	0	0
0	0	0	0	0	0	0
25.2	226.8	2146.176	21016.195	27964.559	227834.74	2004062.4

a=	45.36	C=	97.013512
b=	-330174.884	B=	-2014.1036
d=	-21202.6727	A=	18905.769
e=	723.168		
f=	11610.3456		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
5.4	29.16	157.464	850.3056	11190.081	60426.438	326302.76
9	81	729	6561	8793.2551	79139.295	712253.66
0	0	0	0	0	0	0
10.8	116.64	1259.712	13604.89	8596.4605	92841.774	1002691.2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
25.2	226.8	2146.176	21016.195	28579.797	232407.51	2041247.6

a=	45.36	C=	103.04717
b=	-358155.1	B=	-2149.664
d=	-22988.35	A=	19793.412
e=	723.168		
f=	11610.346		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 11
Test Date: 03-05-02
Test By:

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 03-05-02
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	
Gross Load - (M10-13) -->	KWH	6.0	8.0	10.0	11.0	
6480		0.338	0.447	0.549	0.613	
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	
Actual Test Load	KWH	6.084	8.046	9.882	11.034	
Description\Time		0729	0851	1012	1132	
Ambient air temp	°F.	74	77	79	80.5	
Manifold Air-Left	°F.	102	112	124	128	
Manifold Air-Right	°F.	101	112	124	128	
Intercooler Water-In	R/L °F.	na/90	na/97	na/102	na/100	
Intercooler Water-Out	R/L °F.	87/89	97/97	104/104	105/103	
Jacket Water-In	°F.	148	155	162	162	
Jacket Water-Out	°F.	154	158	167	168	
Exhaust Gas-Lvg T/C-L	°F.	767	760	750	759	
Exhaust Gas-Lvg T/C-R	°F.	720	714	714	728	
Manifold Pressure-Lft	psi	10	13.5	19	21.5	
Manifold Pressure-Rt	psi	3.3	9	14	17	
Generator						
Std KWH meter-start	X18 KWH	5443.7	5444.2	5444.8	5445.6	
Std KWH meter-stop	X18 KWH	5444.1	5444.7	5444.5	5446.3	
Digital meter	X18 KWH	0.338	0.447	0.549	0.613	
Generator volts	V.	6880	6880	6900	6900	
Generator amps	A.	560	725	860	965	
Generator vars	VARS	3.2	3.2	3.0	3.2	
Auxilliaries						
Aux. KWH clock-start	KWH	7526.2	7526.4	7526.7	7526.9	
Aux. KWH clock-end	KWH	7526.4	7526.6	7526.9	7527.1	
Aux. load indicator	KW	530	620	590	670	
Aux. volts	V.	488	488	488	488	
Aux. amps	A.	72	82	82	94	
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	78474700	78475280	78476020	78476880	
F.O. meter rdg-end	gal.	78475108	78475816	78476658	78477616	
F.O. temp.	°F.	119	116	113	110	
F.O. drain tank-start	in.	0	0	0	0	
F.O. drain tank-end	in.	0.125	0.125	0.250	0.125	

Fuel Oil Analysis		
API gravity @ 60 °F.		40.3
Sulfur, Wt.	%	0.08
Viscosity @ 210 °F.	SSF	
Higher heating value	BTU/gal	134,736

TEST LOADS - MW

	6.5	9.0	10.0	11.0	12.5
F.O. Temp. °F.	119	116	113	110	0
F.O. Temp. (Corr.)	0.9705	0.9720	0.9735	0.9750	1.0300
F.O.-start gal.	78474700.0	78475280.0	78476020.0	78476880.0	0.0
F.O.-end gal.	78475108.0	78475816.0	78476658.0	78477616.0	0.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	0.1250	0.1250	0.2500	0.1250	0.0000
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,084	8,046	9,882	11,034	0
KW (Aux.)	160	160	160	160	0
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	134,736	134,736	134,736	134,736	134,736
HEAT RATE (APPROX.)-G	8,985	8,940	8,676	8,980	#DIV/0!
HEAT RATE (APPROX.)-N	9,228	9,121	8,819	9,112	#DIV/0!
HEAT RATE (ACTUAL)-G	8,766	8,722	8,465	8,761	#DIV/0!
HEAT RATE (ACTUAL)-N	9,003	8,899	8,604	8,890	#DIV/0!

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 03-08-02
Test Date: 03-05-02 Tested By: E.Wong

DATA:

GENERATED (MW)	6.084	8.046	9.882	11.034
HEAT RATE(BTU/MW)G	8,766	8,722	8,465	8,761
HEAT RATE(BTU/MW)N	9,003	8,899	8,604	8,890
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$27.4425	act.		
H.H.V. (BTU/GAL)	134,736	act.		

A, B, C CONSTANTS:

GROSS A=	10,560.13	NET A=	11,134.40
B=	(437.562)	B=	(511.464)
C=	24.3153	C=	27.3508

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,466	9,199	8,980	8,810	8,689	8,616	8,592	8,616	8,689	8,811	8,890	8,981
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,846	9,526	9,261	9,050	8,894	8,793	8,747	8,755	8,818	8,935	9,015	9,108
GROSS (MBTU)	28.399	36.796	44.901	52.861	60.821	68.927	77.325	86.160	95.580	105.729	111.123	116.754
NET (MBTU)	27.963	36.580	44.822	52.853	60.837	68.938	77.320	86.148	95.584	105.794	111.241	116.942
COST/KWH	$0.0459	$0.0446	$0.0435	$0.0427	$0.0421	$0.0418	$0.0417	$0.0418	$0.0421	$0.0427	$0.0431	$0.0436
G/KWH	233.89	227.28	221.88	217.68	214.67	212.87	212.28	212.88	214.69	217.69	219.65	221.90
G/PS-H	170.39	165.58	161.64	158.58	156.40	155.08	154.65	155.09	156.40	158.59	160.02	161.66

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.084	37.015056	225.1996	1370.1144	8766.315	53334.26	324485.64
8.046	64.738116	520.88288	4191.0237	8722.3475	70180.008	564668.34
9.882	97.653924	965.01608	9536.2889	8464.9661	83650.795	826637.16
11.034	121.749156	1343.3802	14822.857	8761.1141	96670.133	1066658.2
0	0	0	0	0	0	0
0	0	0	0	0	0	0
35.046	321.156252	3054.4787	29920.284	34714.743	303835.2	2782449.4

a=	56.402892	C=	24.315267
b=	-19059.1	B=	-437.5616
d=	-1272.08689	A=	10560.131
e=	962.672978		
f=	16539.7974		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.084	37.015056	225.1996	1370.1144	9003.0824	54774.754	333249.6
8.046	64.738116	520.88288	4191.0237	8899.3162	71603.898	576124.97
9.882	97.653924	965.01608	9536.2889	8604.2784	85027.48	840241.55
11.034	121.74916	1343.3802	14822.857	8890.0251	98092.537	1082353
0	0	0	0	0	0	0
0	0	0	0	0	0	0
35.046	321.15625	3054.4787	29920.284	35396.702	309498.67	2831969.2

a=	56.402892	C=	27.35082
b=	-39995.53	B=	-511.464
d=	-2518.152	A=	11134.395
e=	962.67298		
f=	16539.797		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 11
Test Date: 01-03-01
Test By: E.Carvalho

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 01-03-01
MPP UNIT NO. 11

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.0
6480		0.362	0.516	0.553	0.614	0.664
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	
Actual Test Load	KWH	6.52	9.28	9.95	11.05	11.95
Description\Time		0800	0925	1116	1256	1422
Ambient air temp	*F.	82	82	84	82	85
Manifold Air-Left	*F.	101	114	121	129	133
Manifold Air-Right	*F.	100	114	121	129	132
Intercooler Water-In	R/L *F.	89	94	97	102	97
Intercooler Water-Out	R/L *F.	87/89	93/96	97/99	103/104	101/102
Jacket Water-In	*F.	147	148	156	163	158
Jacket Water-Out	*F.	159	160	169	178	176
Exhaust Gas-Lvg T/C-L	*F.	712	699	705	707	715
Exhaust Gas-Lvg T/C-R	*F.	716	709	718	724	733
Manifold Pressure-Lft	psi	10	16	18	21	23.5
Manifold Pressure-Rt	psi	4	12	13.5	17	19
Generator						
Std KWH meter-start	X18 KWH	762.9	763.5	764.5	765.4	766.4
Std KWH meter-stop	X18 KWH	763.3	764.0	765.0	766.0	767.0
Digital meter	X18 KWH	0.362	0.516	0.553	0.614	0.664
Generator volts	V.	6990	7000	7000	7000	7000
Generator amps	A.	625	800	920	995	1065
Generator vars	VARS	3.8	3.2	5.0	5.0	4.8
Auxilliaries						
Aux. KWH clock-start	KWH	5596.7	5597.0	5597.4	5597.8	5598.1
Aux. KWH clock-end	KWH	5596.9	5597.2	5597.6	5598.0	5598.4
Aux. load indicator	KW	720	805	810	795	910
Aux. volts	V.	490	495	495	495	495
Aux. amps	A.	73	79	79	78	88
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	73219495	73220155	73221270	73222375	73223470
F.O. meter rdg-end	gal.	73219920	73220745	73221910	73223080	73224240
F.O. temp.	*F.	122	119	118	114	114
F.O. drain tank-start	in.	0	0	0	0	0
F.O. drain tank-end	in.	0.125	0.125	0.250	0.250	0.25

Fuel Oil Analysis		
API gravity @ 60 *F.		35.7
Sulfur, Wt.	%	0.15
Viscosity @ 210 *F.	SSF	
Higher heating value	BTU/gal	137,799

TEST LOADS - MW

	6.5	9.0	10.0	11.0	12.5
F.O. Temp. *F.	122	119	118	114	114
F.O. Temp. (Corr.)	0.9690	0.9705	0.9710	0.9730	0.9730
F.O.-start gal.	73219495.0	73220155.0	73221270.0	73222375.0	73223470.0
F.O.-end gal.	73219920.0	73220745.0	73221910.0	73223080.0	73224240.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	0.1250	0.1250	0.2500	0.2500	0.2500
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,516	9,288	9,954	11,052	10,800
KW (Aux.)	160	160	160	160	240
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	137,799	137,799	137,799	137,799	137,799
HEAT RATE (APPROX.)-G	8,725	8,512	8,618	8,568	9,577
HEAT RATE (APPROX.)-N	8,945	8,661	8,759	8,694	9,794
HEAT RATE (ACTUAL)-G	8,707	8,493	8,600	8,550	9,556
HEAT RATE (ACTUAL)-N	8,926	8,642	8,740	8,675	9,773

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 11 Fuel Oil Tested: 01-09-01
Test Date: 01-03-01 Tested By: K.Yokoyama

DATA:

GENERATED (MW)	6.516	9.288		11.052	10.800
HEAT RATE(BTU/MW)G	8,707	8,493		8,550	9,556
HEAT RATE(BTU/MW)N	8,926	8,642		8,675	9,773
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$53.4721	act.			
H.H.V. (BTU/GAL)	138,095	act.			

A, B, C CONSTANTS:

GROSS A=	12,236.39	NET A=	12,920.48
B=	(910.669)	B=	(1,018.025)
C=	56.1955	C=	61.6839

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	10,010	9,493	9,088	8,795	8,615	8,548	8,592	8,749	9,019	9,401	9,634	9,895
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	10,422	9,835	9,372	9,033	8,817	8,724	8,755	8,909	9,186	9,587	9,833	10,111
GROSS (MBTU)	30.030	37.971	45.440	52.772	60.307	68.380	77.330	87.492	99.206	112.806	120.420	128.631
NET (MBTU)	29.597	37.768	45.363	52.752	60.307	68.397	77.391	87.661	98.841	112.739	120.556	129.013
COST/KWH	$0.0923	$0.0875	$0.0838	$0.0811	$0.0794	$0.0788	$0.0792	$0.0807	$0.0831	$0.0867	$0.0888	$0.0912
G/KWH	247.33	234.54	224.54	217.31	212.86	211.19	212.29	216.17	222.83	232.26	238.02	244.47
G/PS-H	180.18	170.87	163.58	158.32	155.08	153.86	154.66	157.49	162.34	169.21	173.40	178.11

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	8706.6271	56732.382	369668.2
9.288	86.266944	801.24738	7441.9856	8493.3572	78886.302	732695.97
0	0	0	0	0	0	0
11.052	122.146704	1349.9654	14919.817	8549.7441	94491.771	1044323.1
10.8	116.64	1259.712	13604.89	9556.1916	103206.87	1114634.2
0	0	0	0	0	0	0
37.656	367.511904	3687.5827	37769.396	35305.92	333317.32	3261321.4

a=	52.07328	C=	56.195459
b=	69939.8002	B=	-910.6686
d=	3789.57578	A=	12236.389
e=	911.302721		
f=	16012.5845		

WORKSHE (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	8925.7996	58160.51	378973.88
9.288	86.266944	801.24738	7441.9856	8642.2329	80269.059	745539.02
0	0	0	0	0	0	0
11.052	122.1467	1349.9654	14919.817	8675.3371	95879.825	1059663.8
10.8	116.64	1259.712	13604.89	9773.3778	105552.48	1139966.8
0	0	0	0	0	0	0
37.656	367.5119	3687.5827	37769.396	36016.747	339861.87	3324143.5

a=	52.07328	C=	61.683942
b=	59990.683	B=	-1018.025
d=	3200.8605	A=	12920.475
e=	911.30272		
f=	16012.585		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 12
Test Date: 01-31-06
Tested by: William Julian

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 01-31-06
MPP UNIT NO. 12

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.0
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.620	8.050	9.540	10.940	12.470
Description\Time		0730	0845	1000	1120	1302
Ambient air temp	°F.	62	66	72	77	75
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	743.9	744.4	744.9	745.6	746.8
Std KWH meter-stop	X18 KWH	744.3	744.8	745.5	746.3	747.5
Demand meter	X18 KWH	0.368	0.447	0.53	0.609	0.693
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	KWH	3133.3	3133.4	3133.5	3133.7	3133.9
Aux. KWH clock-end	KWH	3133.4	3133.5	3133.7	3133.8	3134.1
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	35	40	42	50	50
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	81683450	81684040	81684740	81685610	81686910
F.O. meter rdg-end	gal.	81683910	81684580	81685380	81686340	81687750
F.O. temp.	°F.	107	109	111	111	109
F.O. drain tank-start	in.	11.875	13.75	15.625	17.4375	19.875
F.O. drain tank-end	in.	13.3750	15.2500	17.0000	18.8125	21.2500
Fuel Oil Analysis						
API gravity @ 60 °F.		35.4				
Sulfur, Wt.	%					
Viscosity @ 210 °F.	SSF					
Higher heating value	BTU/gal	138,571				

TEST LOADS - MW

F.O. Temp. °F.	6.62	8.05	9.54	10.94	12.47
F.O. Temp. (Corr.)	107	109	111	111	109
F.O.-start gal.	0.9765	0.9755	0.9745	0.9745	0.9755
F.O.-end gal.	81683450.0	81684040.0	81684740.0	81685610.0	81686910.0
F.O. Drain Tnk-start	81683910.0	81684580.0	81685380.0	81686340.0	81687750.0
F.O. Drain Tnk-end	11.875	13.75	15.625	17.4375	19.875
PT RATIO	13.3750	15.2500	17.0000	18.8125	21.2500
KW (Gen.)	18,000	18,000	18,000	18,000	18,000
KW (Aux.)	6,624	8,046	9,540	10,962	12,474
BTU/gal (Approx.)	80	80	160	80	160
BTU/gal (Test Lab)	138,095	138,095	138,095	138,095	138,095
	138,571	138,571	138,571	138,571	138,571
HEAT RATE (APPROX.)-G	9,334	9,016	9,009	8,945	9,057
HEAT RATE (APPROX.)-N	9,448	9,106	9,162	9,011	9,174
HEAT RATE (ACTUAL)-G	9,366	9,047	9,040	8,976	9,088
HEAT RATE (ACTUAL)-N	9,481	9,138	9,194	9,042	9,206

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 12 Fuel Oil Tested: 02-02-06
Test Date: 01-31-06 Tested By: rh

DATA:

GENERATED (MW)	6.624	8.046	9.540	10.962	12.474
HEAT RATE(BTU/MW)G	9,366	9,047	9,040	8,976	9,088
HEAT RATE(BTU/MW)N	9,481	9,138	9,194	9,042	9,206
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$86.1318	act.			
H.H.V. (BTU/GAL)	138,571	act.			

A, B, C CONSTANTS:

GROSS A=	11,848.74	NET A=	11,972.85
B=	(556.940)	B=	(559.120)
C=	26.9437	C=	27.0004

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	6.0	6.5	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	10,052	9,738	9,477	9,367	9,270	9,118	9,019	8,974	8,983	9,045	9,097	9,162
GENERATED (MW)N	3.92	4.92	5.92	6.42	6.92	7.92	8.92	9.84	10.84	11.84	12.34	12.84
HEAT RATE(BTU/MW)N	10,168	9,852	9,590	9,479	9,382	9,228	9,128	9,082	9,090	9,151	9,203	9,267
GROSS (MBTU)	40.208	48.688	56.862	60.885	64.893	72.941	81.168	89.737	98.808	108.544	113.712	119.106
NET (MBTU)	39.860	48.473	56.774	60.857	64.924	73.085	81.420	89.364	98.531	108.353	113.561	118.993
COST/KWH	$0.1488	$0.1441	$0.1403	$0.1386	$0.1372	$0.1349	$0.1335	$0.1328	$0.1329	$0.1339	$0.1346	$0.1356
G/KWH	248.36	240.59	234.15	231.43	229.05	225.27	222.83	221.72	221.94	223.49	224.76	226.37
G/PS-H	180.94	175.28	170.59	168.61	166.87	164.12	162.34	161.53	161.69	162.82	163.74	164.92

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.624	43.877376	290.6437	1925.224	9366.23302	62041.93	410965.7	
8.046	64.738116	520.8829	4191.024	9047.04285	72792.51	585688.5	
9.54	91.0116	868.2507	8283.111	9039.68045	86238.55	822715.8	
10.962	120.16544	1317.254	14439.73	8975.73058	98391.96	1078573	
12.474	155.60068	1940.963	24211.57	9087.8894	113362.3	1414082	
0	0	0	0	0	0	0	
47.646	475.39321	4937.994	53050.66	45516.5763	432827.3	4312024	

a=	106.82474	C=	26.9437091
b=	-78149.389	B=	-556.93996
d=	-4546.4104	A=	11848.7362
e=	2039.3836		
f=	39254.611		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.624	43.87738	290.6437	1925.224	9480.735	62800.39	415989.8	
8.046	64.73812	520.8829	4191.024	9137.899	73523.54	591570.4	
9.54	91.0116	868.2507	8283.111	9193.875	87709.57	836749.3	
10.962	120.1654	1317.254	14439.73	9041.716	99115.3	1086502	
12.474	155.6007	1940.963	24211.57	9205.971	114835.3	1432455	
0	0	0	0	0	0	0	
47.646	475.3932	4937.994	53050.66	46060.2	437984.1	4363267	

a=	106.8247	C=	27.00036
b=	-80371.6	B=	-559.12
d=	-4663.76	A=	11972.85
e=	2039.384		
f=	39254.61		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 12
Test Date: 05-09-05
Tested by: William Julian/Colleen Ford/Alex Villa

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 05-09-05
MPP UNIT NO. 12

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.0
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.768	7.956	9.558	10.944	12.420
Description\Time		0725	0838	0952	1131	1253
Ambient air temp	*F.	76	77	77	80	78
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	7888.3	7888.8	7889.4	7890.3	7891.2
Std KWH meter-stop	X18 KWH	7888.7	7889.3	7890.0	7891.0	7891.9
Demand meter	X18 KWH	0.376	0.442	0.531	0.608	0.690
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxillianes						
Aux. KWH clock-start	KWH	2056.5	2056.8	2057.0	2057.4	2057.7
Aux. KWH clock-end	KWH	2056.7	2057.0	2057.2	2057.6	2057.9
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	78	79	79	79	77
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	78208360	78208860	78209570	78210683	78211714
F.O. meter rdg-end	gal.	78208876	78209427	78210220	78211416	78212557
F.O. temp.	*F.	123	123	122	118	116
F.O. drain tank-start	in.	4.25	5.125	6.3125	7.875	9.75
F.O. drain tank-end	in.	5.0000	6.0625	7.3125	9.0625	10.8750
Fuel Oil Analysis						
API gravity @ 60 *F.		34.3				
Sulfur, Wt.	%					
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,881				

TEST LOADS - MW

	6.768	7.956	9.558	10.944	12.42
F.O. Temp. *F.	123	123	122	118	116
F.O. Temp. (Corr.)	0.9685	0.9685	0.9690	0.9710	0.9720
F.O.-start gal.	78208360.0	78208860.0	78209570.0	78210683.0	78211714.0
F.O.-end gal.	78208876.0	78209427.0	78210220.0	78211416.0	78212557.0
F.O. Drain Tnk-start	4.25	5.125	6.3125	7.875	9.75
F.O. Drain Tnk-end	5.0000	6.0625	7.3125	9.0625	10.8750
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,768	7,956	9,558	10,944	12,420
KW (Aux.)	160	160	160	160	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,881	138,881	138,881	138,881	138,881
HEAT RATE (APPROX.)-G	10,182	9,516	9,086	8,966	9,099
HEAT RATE (APPROX.)-N	10,429	9,711	9,241	9,099	9,217
HEAT RATE (ACTUAL)-G	10,240	9,570	9,138	9,017	9,150
HEAT RATE (ACTUAL)-N	10,488	9,766	9,293	9,151	9,270

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 12 Fuel Oil Tested: 05-13-05
Test Date: 05-09-05 Tested By: K.Okuyama

DATA:

GENERATED (MW)	6.768	7.956	9.558	10.944	12.420
HEAT RATE(BTU/MW)G	10,240	9,570	9,138	9,017	9,150
HEAT RATE(BTU/MW)N	10,488	9,766	9,293	9,151	9,270
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$74.8584	act.			
H.H.V. (BTU/GAL)	138,881	act.			

A, B, C CONSTANTS:

GROSS		NET	
A=	17,505.29	A=	18,206.46
B=	(1,562.153)	B=	(1,654.041)
C=	71.6975	C=	75.3338

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	6.0	6.5	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	12,404	11,487	10,713	10,381	10,083	9,597	9,253	9,054	8,997	9,084	9,181	9,314
GENERATED (MW)N	3.84	4.84	5.84	6.34	6.84	7.84	8.84	9.84	10.84	11.84	12.34	12.84
HEAT RATE(BTU/MW)N	12,796	11,820	10,994	10,638	10,320	9,795	9,422	9,199	9,127	9,206	9,302	9,435
GROSS (MBTU)	49.615	57.435	64.281	67.473	70.584	76.774	83.281	90.535	98.967	109.007	114.764	121.084
NET (MBTU)	49.135	57.207	64.206	67.445	70.586	76.797	83.292	90.522	98.941	109.000	114.785	121.150
COST/KWH	$0.1592	$0.1474	$0.1375	$0.1332	$0.1294	$0.1232	$0.1188	$0.1162	$0.1155	$0.1166	$0.1178	$0.1195
G/KWH	306.47	283.81	264.70	256.48	249.14	237.11	228.63	223.69	222.29	224.44	226.84	230.13
G/PS-H	223.27	206.77	192.84	186.85	181.50	172.74	166.56	162.96	161.95	163.51	165.26	167.66

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.768	45.805824	310.0138	2098.174	10240.0001	69304.32	469051.6
7.956	63.297936	503.5984	4006.629	9569.99965	76138.92	605761.2
9.558	91.355364	873.1746	8345.803	9137.85229	87339.59	834791.8
10.944	119.77114	1310.775	14345.13	9017.4897	98687.41	1080035
12.42	154.2564	1915.864	23795.04	9150.29231	113646.6	1411491
0	0	0	0	0	0	0
47.646	474.48666	4913.427	52590.77	47115.6341	445116.9	4401131

a=	102.29198	C=	71.6974894
b=	-350085.71	B=	-1562.1527
d=	-19287.161	A=	17505.292
e=	1959.7414		
f=	37816.243		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.768	45.80582	310.0138	2098.174	10487.94	70982.39	480408.8
7.956	63.29794	503.5984	4006.629	9766.408	77701.54	618193.5
9.558	91.35536	873.1746	8345.803	9293.423	88826.54	849004.1
10.944	119.7711	1310.775	14345.13	9151.28	100151.6	1096059
12.42	154.2564	1915.864	23795.04	9269.709	115129.8	1429912
0	0	0	0	0	0	0
47.646	474.4867	4913.427	52590.77	47968.76	452791.9	4473578

a=	102.292	C=	75.33381
b=	-392650	B=	-1654.04
d=	-21560.3	A=	18206.46
e=	1959.741		
f=	37816.24		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 12
Test Date: 02-23-04
Tested by: K.Inouye & M.Matsuda

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 02-23-04
MPP UNIT NO. 12

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) —>	KWH	6.5	9.0	10.0	11.0	12.0
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.410	9.140	10.170	11.140	12.350
Description\Time		0800	0917	1031	1152	1320
Ambient air temp	°F.	72	73	75	80	81
Manifold Air-Left	°F.					
Manifold Air-Right	°F.					
Intercooler Water-In	R/L °F.					
Intercooler Water-Out	R/L °F.					
Jacket Water-In	°F.					
Jacket Water-Out	°F.					
Exhaust Gas-Lvg T/C-L	°F.					
Exhaust Gas-Lvg T/C-R	°F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	X18 KWH	3240.2	3240.7	3241.3	3242.1	3243
Std KWH meter-stop	X18 KWH	3240.5	3241.2	3241.9	3242.7	3243.7
Demand meter	X18 KWH	0.356	0.508	0.565	0.619	0.686
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxiliaries						
Aux. KWH clock-start	KWH	160.2	160.5	160.7	161.0	161.4
Aux. KWH clock-end	KWH	160.4	160.7	161.0	161.3	161.6
Aux. load indicator	KW					
Aux. volts	V.					
Aux. amps	A.	60	80	83	83	83
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	72515055	72515660	72516432	72517375	72518506
F.O. meter rdg-end	gal.	72515426	72516278	72517116	72518129	72519345
F.O. temp.	°F.	123	118	117	117	118
F.O. drain tank-start	in.	2.5	9.375	10.25	11.25	9
F.O. drain tank-end	in.	9.2500	10.0625	10.9375	12.7500	10.2500
Fuel Oil Analysis						
API gravity @ 60 °F.		34.7				
Sulfur, Wt.	%	0.16				
Viscosity @ 210 °F.	SSF					
Higher heating value	BTU/gal	139,429				

TEST LOADS - MW

	6.41	9.14	10.17	11.14	12.35
F.O. Temp. °F.	123	118	117	117	118
F.O. Temp. (Corr.)	0.9685	0.9710	0.9715	0.9715	0.9710
F.O.-start gal.	72515055.0	72515660.0	72516432.0	72517375.0	72518506.0
F.O.-end gal.	72515426.0	72516278.0	72517116.0	72518129.0	72519345.0
F.O. Drain Tnk-start	2.5	9.375	10.25	11.25	9
F.O. Drain Tnk-end	9.2500	10.0625	10.9375	12.7500	10.2500
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,408	9,144	10,170	11,142	12,348
KW (Aux.)	160	160	240	240	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,429	139,429	139,429	139,429	139,429
HEAT RATE (APPROX.)-G	7,602	9,052	9,014	9,061	9,097
HEAT RATE (APPROX.)-N	7,797	9,214	9,232	9,260	9,217
HEAT RATE (ACTUAL)-G	7,676	9,140	9,101	9,148	9,185
HEAT RATE (ACTUAL)-N	7,872	9,303	9,321	9,350	9,306

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 12 Fuel Oil Tested: 03-01-04
Test Date: 02-23-04 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)		9.144	10.170	11.142
HEAT RATE(BTU/MW)G		9,052	9,014	9,061
HEAT RATE(BTU/MW)N		9,214	9,232	9,260
NUMBER OF TESTS	3			
PRICE OF FUEL/BBL	$45.7140 act.			
H.H.V. (BTU/GAL)	139,429 act.			

A, B, C CONSTANTS:

GROSS A=	13,374.41	NET A=	9,580.38
B=	(863.963)	B=	(92.136)
C=	42.7939	C=	5.6903

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	**7.0**	8.0	**9.0**	10.0	**11.0**	12.0	**12.5**	13.0
HEAT RATE(BTU/MW)G	11,168	10,603	10,124	9,731	**9,424**	9,202	**9,065**	9,014	**9,049**	9,169	**9,261**	9,375
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,355	9,303	9,262	9,232	**9,214**	9,207	**9,212**	9,228	**9,255**	9,294	**9,318**	9,344
GROSS (MBTU)	33.503	42.413	50.622	58.387	65.965	73.612	81.585	90.142	99.538	110.030	115.768	121.876
NET (MBTU)	26.569	35.723	44.828	53.917	63.025	72.187	81.435	90.066	99.588	109.299	114.981	119.980
COST/KWH	$0.0872	$0.0828	$0.0790	$0.0760	$0.0736	$0.0718	$0.0708	$0.0704	$0.0706	$0.0716	$0.0723	$0.0732
G/KWH	275.92	261.98	250.15	240.43	232.83	227.35	223.97	222.72	223.57	226.55	228.83	231.63
G/PS-H	201.02	190.86	182.24	175.16	169.62	165.63	163.17	162.26	162.88	165.05	166.71	168.75

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
9.144	83.612736	764.5549	6991.09	9052.44798	82775.58	756899.9
10.17	103.4289	1051.872	10697.54	9014.03358	91672.72	932311.6
11.142	124.14416	1383.214	15411.77	9060.7492	100954.9	1124839
0	0	0	0	0	0	0
0	0	0	0	0	0	0
30.456	311.1858	3199.641	33100.4	27127.2308	275403.2	2814051

a=	5.989464	C=	42.7939287
b=	542.96051	B=	-863.96287
d=	22.580239	A=	13374.407
e=	121.44841		
f=	2464.5992		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
0	0	0	0	0	0	0
9.144	83.61274	764.5549	6991.09	9213.667	84249.77	770379.9
10.17	103.4289	1051.872	10697.54	9231.895	93888.38	954844.8
11.142	124.1442	1383.214	15411.77	9260.215	103177.3	1149602
0	0	0	0	0	0	0
0	0	0	0	0	0	0
30.456	311.1858	3199.641	33100.4	27705.78	281315.5	2874826

a=	5.989464	C=	5.690302
b=	2834.542	B=	-92.136
d=	139.2329	A=	9580.377
e=	121.4484		
f=	2464.599		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 12
Test Date: 09-11-03
Tested by: E.Caravtho

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 09-11-03
MPP UNIT NO. 12

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.0

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.490	9.144	10.008	11.052	12.042
Description\Time		0647	0449	0331	0216	0048
Ambient air temp	°F.	73	82	81	81	82
Manifold Air-Left	°F.	102	112	121	126	134
Manifold Air-Right	°F.	96	104	112	116	123
Intercooler Water-In	R/L °F.	97	99	103	105	109
Intercooler Water-Out	R/L °F.	95/98	103/105	105/109	109/113	114/119
Jacket Water-In	°F.	158	162	164	162	160
Jacket Water-Out	°F.	162	166	169	168	169
Exhaust Gas-Lvg T/C-L	°F.	649	643	637	638	642
Exhaust Gas-Lvg T/C-R	°F.	659	654	648	650	655
Manifold Pressure-Lft	psi	9.0	16.0	20.0	23.0	27.0
Manifold Pressure-Rt	psi	9.0	16.0	20.0	23.0	26.0
Generator						
Std KWH meter-start	X18 KWH	1307.7	1307.1	1306.4	1305.6	1304.7
Std KWH meter-stop	X18 KWH	1308.1	1307.6	1306.9	1306.2	1305.4
Demand meter	X18 KWH	0.361	0.508	0.556	0.614	0.669
Generator volts	V.	6825	6850	6850	6875	6875
Generator amps	A.	620	810	890	950	1160
Generator vars	VARS	3.4	3.1	3.1	2.9	3.4
Auxilliaries						
Aux. KWH clock-start	KWH	9425.9	9425.7	9425.5	9425.3	9425.1
Aux. KWH clock-end	KWH	9426.0	9425.8	9425.7	9425.5	9425.3
Aux. load indicator	KW	325	490	480	480	480
Aux. volts	V.	480	480	480	495	485
Aux. amps	A.	37	51	48	50	49
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	70170713	70169958	70169091	70168177	70167000
F.O. meter rdg-end	gal.	70171160	70170568	70169770	70168918	70167823
F.O. temp.	°F.	122	109	105	110	111
F.O. drain tank-start	in.	0	0	0	0	0
F.O. drain tank-end	in.	0.1250	0.1250	0.1250	0.1250	0.1250

Fuel Oil Analysis		
API gravity @ 60 °F.		37
Sulfur, Wt.	%	0.18
Viscosity @ 210 °F.	SSF	
Higher heating value	BTU/gal	137,587

TEST LOADS - MW

	6.49	9.144	10.008	11.052	12.042
F.O. Temp. °F.	122	109	105	110	111
F.O. Temp. (Corr.)	0.9690	0.9755	0.9775	0.9750	0.9745
F.O.-start gal.	70170713.0	70169958.0	70169091.0	70168177.0	70167000.0
F.O.-end gal.	70171160.0	70170568.0	70169770.0	70168918.0	70167823.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	0.1250	0.1250	0.1250	0.1250	0.1250
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,498	9,144	10,008	11,052	12,042
KW (Aux.)	80	80	160	160	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	137,587	137,587	137,587	137,587	137,587
HEAT RATE (APPROX.)-G	9,203	8,985	9,157	9,026	9,196
HEAT RATE (APPROX.)-N	9,317	9,064	9,305	9,158	9,320
HEAT RATE (ACTUAL)-G	9,169	8,952	9,123	8,993	9,162
HEAT RATE (ACTUAL)-N	9,283	9,031	9,271	9,125	9,285

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 12 Fuel Oil Tested: 09-17-03
Test Date: 09-11-03 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)	6.498	9.144	10.008	11.052	12.042
HEAT RATE(BTU/MW)G	9,169	8,952	9,123	8,993	9,162
HEAT RATE(BTU/MW)N	9,283	9,031	9,271	9,125	9,285
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$41.2988	act.			
H.H.V. (BTU/GAL)	137,587	act.			

A, B, C CONSTANTS:

GROSS A=	10,672.61	NET A=	10,838.73
B=	(355.213)	B=	(370.949)
C=	18.9589	C=	20.0404

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,778	9,555	9,371	9,224	9,115	9,044	9,011	9,016	9,059	9,140	9,195	9,259
GENERATED (MW)N	2.9	3.9	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	9,906	9,676	9,485	9,334	9,224	9,154	9,123	9,133	9,183	9,273	9,333	9,403
GROSS (MBTU)	29.333	38.220	46.853	55.343	63.806	72.354	81.102	90.164	99.652	109.682	114.935	120.366
NET (MBTU)	28.926	37.928	46.666	55.260	63.831	72.498	81.381	89.872	99.546	109.794	115.172	120.738
COST/KWH	$0.0699	$0.0683	$0.0670	$0.0659	$0.0651	$0.0646	$0.0644	$0.0644	$0.0647	$0.0653	$0.0657	$0.0662
G/KWH	241.58	236.08	231.52	227.90	225.21	223.46	222.65	222.77	223.83	225.83	227.18	228.76
G/PS-H	176.00	171.99	168.67	166.03	164.07	162.80	162.20	162.29	163.07	164.52	165.51	166.66

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.498	42.224004	274.3716	1782.867	9168.69509	59578.18	387139	
9.144	83.612736	764.5549	6991.09	8951.7777	81855.06	748482.6	
10.008	100.16006	1002.402	10032.04	9122.97924	91302.78	913758.2	
11.052	122.1467	1349.965	14919.82	8992.61667	99386.4	1098418	
12.042	145.00976	1746.208	21027.83	9162.08866	110329.9	1328592	
0	0	0	0	0	0	0	
48.744	493.15327	5137.501	54753.64	45398.1574	442452.3	4476391	

a=	89.788824	C=	18.9588551
b=	-6296.7007	B=	-355.21273
d=	-626.36597	A=	10672.6051
e=	1649.2434		
f=	30568.068		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.498	42.224	274.3716	1782.867	9282.982	60320.82	391964.7	
9.144	83.61274	764.5549	6991.09	9030.787	82577.52	755088.8	
10.008	100.1601	1002.402	10032.04	9271.2	92786.17	928604	
11.052	122.1467	1349.965	14919.82	9124.715	100846.4	1114554	
12.042	145.0098	1746.208	21027.83	9285.463	111815.5	1346483	
0	0	0	0	0	0	0	
48.744	493.1533	5137.501	54753.64	45995.15	448346.4	4536694	

a=	89.78882	C=	20.04045
b=	813.3105	B=	-370.949
d=	-255.457	A=	10838.73
e=	1649.243		
f=	30568.07		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 12
Test Date: 03-26-02
Tested by: S.Ishikawa

* Manifold Air Right Temp. High

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 03-26-02
MPP UNIT NO. 12

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5
		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.552	9.180	10.008	10.980	11.934
Description\Time		0730	0850	1010	1129	1305
Ambient air temp	*F.	71	78	86	87	86
Manifold Air-Left	*F.	99	115	122	124	132
Manifold Air-Right	*F.	104	123	131	135	145
Intercooler Water-In	R/L *F.	94	100	107	104	109
Intercooler Water-Out	R/L *F.	96/97	105/106	112/114	110/112	117/119
Jacket Water-In	*F.	154	161	163	163	163
Jacket Water-Out	*F.	159	166	166	167	170
Exhaust Gas-Lvg T/C-L	*F.	707	692	699	695	697
Exhaust Gas-Lvg T/C-R	*F.	706	692	698	692	693
Manifold Pressure-Lft	psi	9.0	15.5	18.0	21.0	24.0
Manifold Pressure-Rt	psi	9.0	15.5	18.0	21.0	24.0
Generator						
Std KWH meter-start	X18 KWH	9619.1	9619.6	9620.3	9621.0	9622
Std KWH meter-stop	X18 KWH	9619.4	9620.1	9620.8	9621.6	9622.7
Demand meter	X18 KWH	0.364	0.51	0.556	0.61	0.663
Generator volts	V.	6875	6875	6875	6900	6900
Generator amps	A.	580	790	860	965	1040
Generator vars	VARS	1.8	1.6	1.6	3.4	3.4
Auxilliaries						
Aux. KWH clock-start	KWH	7055.8	7056.0	7056.3	7056.6	7057
Aux. KWH clock-end	KWH	7056.0	7056.2	7056.5	7056.8	7057.2
Aux. load indicator	KW	510	600	810	760	740
Aux. volts	V.	492	492	490	492	491
Aux. amps	A.	60	69	88	84	81
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	63576858	63577538	63578415	63579362	63580631
F.O. meter rdg-end	gal.	63577344	63578185	63579118	63580129	63581467
F.O. temp.	*F.	118	114	113	114	113
F.O. drain tank-start	in.	0	0	0	0	0
F.O. drain tank-end	in.	11.7500	11.2500	10.8750	10.7500	11.2500
Fuel Oil Analysis						
API gravity @ 60 *F.		36.1				
Sulfur, Wt.	%	0.14				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,193				

TEST LOADS-MW

	6.552	9.18	10.008	10.98	11.934
F.O. Temp. *F.	118	114	113	114	113
F.O. Temp. (Corr.)	0.9710	0.9730	0.9735	0.9730	0.9735
F.O.-start gal.	63576858.0	63577538.0	63578415.0	63579362.0	63580631.0
F.O.-end gal.	63577344.0	63578185.0	63579118.0	63580129.0	63581467.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	11.7500	11.2500	10.8750	10.7500	11.2500
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,552	9,180	10,008	10,980	11,934
KW (Aux.)	160	160	160	160	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	138,193	138,193	138,193	138,193	138,193
HEAT RATE (APPROX.)-G	9,706	9,305	9,297	9,255	9,291
HEAT RATE (APPROX.)-N	9,949	9,470	9,448	9,391	9,417
HEAT RATE (ACTUAL)-G	9,713	9,312	9,304	9,261	9,297
HEAT RATE (ACTUAL)-N	9,956	9,477	9,455	9,398	9,424

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 12 Fuel Oil Tested: 03-28-02
Test Date: 03-26-02 Tested By: E.Wong/S.Oshiro

* Manifold Air Right Temp. High

DATA:					
GENERATED (MW)	6.552	9.180	10.008	10.980	11.934
HEAT RATE(BTU/MW)G	9,713	9,312	9,304	9,261	9,297
HEAT RATE(BTU/MW)N	9,956	9,477	9,455	9,398	9,424
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$27.4425	act.			
H.H.V. (BTU/GAL)	138,193	act.			

A, B, C CONSTANTS:			
GROSS A=	12,154.77	NET A=	12,752.59
B=	(535.771)	B=	(607.855)
C=	24.8406	C=	27.5752

PREDICTED VALUES:												
GENERATED (MW)	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	10,771	10,409	10,097	9,834	9,622	9,458	9,345	9,281	9,267	9,303	9,339	9,388
HEAT RATE(BTU/MW)N	11,177	10,762	10,403	10,098	9,849	9,655	9,515	9,432	9,403	9,429	9,463	9,511
GROSS (MBTU)	32.313	41.637	50.485	59.006	67.351	75.667	84.104	92.811	101.937	111.631	116.737	122.042
NET (MBTU)	33.532	43.049	52.013	60.589	68.941	77.236	85.639	94.316	103.431	113.150	118.288	123.639
COST/KWH	$0.0509	$0.0492	$0.0477	$0.0465	$0.0455	$0.0447	$0.0442	$0.0439	$0.0438	$0.0440	$0.0442	$0.0444
G/KWH	266.12	257.18	249.47	242.98	237.72	233.69	230.89	229.31	228.96	229.84	230.74	231.95
G/PS-H	193.88	187.36	181.74	177.02	173.19	170.25	168.21	167.06	166.81	167.45	168.10	168.98

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.552	42.928704	281.2689	1842.874	9712.67207	63637.43	416952.4	
9.18	84.2724	773.6206	7101.837	9311.99154	85484.08	784743.9	
10.008	100.16006	1002.402	10032.04	9303.77589	93112.19	931866.8	
10.98	120.5604	1323.753	14534.81	9261.08633	101686.7	1116520	
11.934	142.42036	1699.645	20283.56	9297.33097	110954.3	1324129	
0	0	0	0	0	0	0	
48.654	490.34192	5080.689	53795.12	46886.8568	454874.8	4574213	

a=	84.497904	C=	24.840617
b=	-119528.83	B=	-535.77115
d=	-6859.2579	A=	12154.7741
e=	1546.3497		
f=	28540.384		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y			
X	X^2	X^3	X^4	Y	YX	YX^2	
6.552	42.9287	281.2689	1842.874	9955.793	65230.35	427389.3	
9.18	84.2724	773.6206	7101.837	9477.171	87000.43	798663.9	
10.008	100.1601	1002.402	10032.04	9454.934	94624.98	947006.8	
10.98	120.5604	1323.753	14534.81	9398.034	103190.4	1133031	
11.934	142.4204	1699.645	20283.56	9423.675	112462.1	1342123	
0	0	0	0	0	0	0	
48.654	490.3419	5080.689	53795.12	47709.61	462508.3	4648214	

a=	84.4979	C=	27.57518
b=	-152951	B=	-607.855
d=	-8721.64	A=	12752.59
e=	1546.35		
f=	28540.38		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 12
Test Date: 11-07-01
Tested by: Howard Kimura

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 11-07-01
MPP UNIT NO. 12

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6	8.0	10.0	11.0	12.0

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	5.958	8.118	10.044	11.016	11.988
Description\Time		0713	0845	1002	1117	1237
Ambient air temp	°F.	82.5	83	85	85	86.5
Manifold Air-Left	°F.	104	107	107	125	132
Manifold Air-Right	°F.	107	103	123	133	141
Intercooler Water-In	R/L °F.	n.a./101	n.a./99	n.a./103	n.a./106	n.a./109
Intercooler Water-Out	R/L °F.	103/104	103/104	109/111	114/115	117/119
Jacket Water-In	°F.	157	163	166	163	163
Jacket Water-Out	°F.	162	165	167	167	167
Exhaust Gas-Lvg T/C-L	°F.	713	693	685	688	690
Exhaust Gas-Lvg T/C-R	°F.	712	695	685	687	689
Manifold Pressure-Lft	psi	8.1	13.0	18.2	22.0	25.0
Manifold Pressure-Rt	psi	8.0	13.0	18.3	21.5	25.0
Generator						
Std KWH meter-start	X18 KWH	8133.2	8133.8	8134.4	8135.1	8135.9
Std KWH meter-stop	X18 KWH	8133.6	8134.2	8134.9	8135.7	8136.6
Demand meter	X18 KWH	0.331	0.451	0.558	0.612	0.666
Generator volts	V.	6850	6850	6840	6875	6875
Generator amps	A.	600	770	920	1045	1115
Generator vars	VARS	3.8	4.0	4.0	5.5	5.5
Auxilliaries						
Aux. KWH clock-start	KWH	6452.3	6452.5	6452.6	6452.8	6453
Aux. KWH clock-end	KWH	6452.4	6452.6	6452.8	6453.0	6453.1
Aux. load indicator	KW	340	430	450	475	430
Aux. volts	V.	493	492	491	493	493
Aux. amps	A.	40	49	50	52	49
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	61670980	61671700	61672460	61673370	61674410
F.O. meter rdg-end	gal.	61671430	61672290	61673170	61674150	61675260
F.O. temp.	°F.	123	121	117	116	114
F.O. drain tank-start	in.	0	0	0	0	0
F.O. drain tank-end	in.	12.8125	10.2000	9.6250	9.5000	10.3125
Fuel Oil Analysis						
API gravity @ 60 °F.						
Sulfur, Wt.	%					
Viscosity @ 210 °F.	SSF					
Higher heating value	BTU/gal					

TEST LOADS - MW

	5.958	8.118	10.044	11.016	11.988
F.O. Temp. °F.	123	121	117	116	114
F.O. Temp. (Corr.)	0.9685	0.9695	0.9715	0.9720	0.9730
F.O.-start gal.	61670980.0	61671700.0	61672460.0	61673370.0	61674410.0
F.O.-end gal.	61671430.0	61672290.0	61673170.0	61674150.0	61675260.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	12.8125	10.2000	9.6250	9.5000	10.3125
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	5,958	8,118	10,044	11,016	11,988
KW (Aux.)	80	80	160	160	80
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	0	0	0	0	0
HEAT RATE (APPROX.)-G	9,814	9,562	9,355	9,388	9,412
HEAT RATE (APPROX.)-N	9,948	9,657	9,506	9,527	9,475
HEAT RATE (ACTUAL)-G	0	0	0	0	0
HEAT RATE (ACTUAL)-N	0	0	0	0	0

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CA-IR-73
DOCKET NO. 2006-0387
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CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 12 Fuel Oil Tested:
Test Date: 11-07-01 Tested By:

DATA:

GENERATED (MW)	5.958	8.118	10.044	11.016	11.988
HEAT RATE(BTU/MW)G	9,814	9,562	9,355	9,388	9,412
HEAT RATE(BTU/MW)N	9,948	9,657	9,506	9,527	9,475
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$44.1957	act.			
H.H.V. (BTU/GAL)	138,095	est.			

A, B, C CONSTANTS:

GROSS A=	11,505.17	NET A=	11,422.19
B=	(387.257)	B=	(333.736)
C=	17.6622	C=	14.3982

PREDICTED VALUES:

GENERATED (MW)	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	10,502	10,239	10,010	9,817	9,660	9,537	9,450	9,399	9,382	9,401	9,424	9,456
HEAT RATE(BTU/MW)N	10,551	10,318	10,113	9,938	9,792	9,674	9,585	9,525	9,493	9,491	9,500	9,517
GROSS (MBTU)	31.507	40.955	50.052	58.905	67.619	76.300	85.054	93.988	103.207	112.817	117.802	122.925
NET (MBTU)	31.652	41.270	50.567	59.629	68.541	77.390	86.263	95.246	104.426	113.888	118.753	123.720
COST/KWH	$0.0800	$0.0780	$0.0763	$0.0748	$0.0736	$0.0727	$0.0720	$0.0716	$0.0715	$0.0716	$0.0718	$0.0721
G/KWH	259.49	252.97	247.33	242.56	238.67	235.65	233.50	232.22	231.82	232.29	232.85	233.63
G/PS-H	189.04	184.30	180.19	176.71	173.88	171.67	170.11	169.18	168.88	169.23	169.64	170.20

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
5.958	35.497764	211.4957	1260.091	9813.97205	58471.65	348374.1
8.118	65.901924	534.9918	4343.064	9562.13634	77625.42	630163.2
10.044	100.88194	1013.258	10177.17	9355.01936	93961.81	943752.5
11.016	121.35226	1336.816	14726.37	9388.42919	103422.9	1139307
11.988	143.71214	1722.821	20653.18	9411.56289	112825.8	1352556
0	0	0	0	0	0	0
47.124	467.34602	4819.383	51159.87	47531.1198	446307.6	4414153

a=	116.05874	C=	17.6622388
b=	-142716.6	B=	-387.25687
d=	-8318.3178	A=	11505.1671
e=	2073.7024		
f=	37387.045		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
5.958	35.49776	211.4957	1260.091	9947.541	59267.45	353115.5
8.118	65.90192	534.9918	4343.064	9657.306	78398.01	636435
10.044	100.8819	1013.258	10177.17	9506.456	95482.85	959029.7
11.016	121.3523	1336.816	14726.37	9526.8	104947.2	1156099
11.988	143.7121	1722.821	20653.18	9474.791	113583.8	1361643
0	0	0	0	0	0	0
47.124	467.346	4819.383	51159.87	48112.89	451679.3	4466321

a=	116.0587	C=	14.39823
b=	-153763	B=	-333.736
d=	-8875.38	A=	11422.19
e=	2073.702		
f=	37387.04		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 13
Test Date: 09-28-05
Tested by: C.Ford, W.Julian, D.Isagawa

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 09-28-05
MPP UNIT NO. 13

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	*6.48*	*7.992*	*9.414*	*11.23*	*1242*
Description\Time		0740	0850	0958	1114	1230
Ambient air temp	*F.	76	80	80	81	83
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	**X18 KWH**	9833.4	9833.9	9834.4	9835.1	9835.9
Std KWH meter-stop	**X18 KWH**	9833.8	9834.3	9834.9	9835.7	9836.6
Demand meter	**X18 KWH**	0.36	0.444	0.523	0.624	0.69
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	**KWH**	2643.7	2643.9	2644.2	2644.4	2644.7
Aux. KWH clock-end	**KWH**	2643.9	2644.1	2644.4	2644.6	2644.9
Aux. load indicator	**KW**	75	82	80	78	78
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	**gal.**	77283490	77284040	77284680	77285540	77286490
F.O. meter rdg-end	**gal.**	77283950	77284600	77285320	77286280	77287330
F.O. temp.	***F.**	117	120	120	119	118
F.O. drain tank-start	**in.**	1.0000	2.1250	3.2500	4.5000	5.7500
F.O. drain tank-end	**in.**	1.3125	3.1250	4.2500	5.5000	6.6250
Fuel Oil Analysis						
API gravity @ 60 *F.		34.1				
Sulfur, Wt.	%					
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	139,190				

TEST LOADS - MW

F.O. Temp. *F.	6.48	7.992	9.414	11.23	1242
F.O. Temp. (Corr.)	117	120	120	119	118
F.O.-start gal.	*0.9715*	*0.9700*	*0.9700*	*0.9705*	*0.9710*
F.O.-end gal.	77283490.0	77284040.0	77284680.0	77285540.0	77286490.0
F.O. Drain Tnk-start	77283950.0	77284600.0	77285320.0	77286280.0	77287330.0
F.O. Drain Tnk-end	1	2.125	3.25	4.5	5.75
PT RATIO	1.3125	3.1250	4.2500	5.5000	6.6250
KW (Gen.)	18,000	18,000	18,000	18,000	18,000
KW (Aux.)	6,480	7,992	9,414	11,232	12,420
BTU/gal (Approx.)	160	160	160	160	160
BTU/gal (Test Lab)	138,095	138,095	138,095	138,095	138,095
	139,190	139,190	139,190	139,190	139,190
HEAT RATE (APPROX.)-G					
HEAT RATE (APPROX.)-N	9,517	9,369	9,092	8,818	9,059
HEAT RATE (ACTUAL)-G	9,758	9,561	9,250	8,945	9,178
HEAT RATE (ACTUAL)-N	9,593	9,444	9,164	8,888	9,131
	9,836	9,637	9,323	9,016	9,250

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 13 Fuel Oil Tested: 10-05-05
Test Date: 09-28-05 Tested By: K.Okuyama

DATA:

GENERATED (MW)	6.480	7.992	9.414	11.232	12.420
HEAT RATE(BTU/MW)G	9,517	9,369	9,092	8,818	9,059
HEAT RATE(BTU/MW)N	9,758	9,561	9,250	8,945	9,178
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$81.5065	act.			
H.H.V. (BTU/GAL)	139,190	act.			

A, B, C CONSTANTS:

GROSS A=	12,069.06	NET A=	12,657.97
B=	(533.878)	B=	(604.843)
C=	22.9317	C=	25.5938

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	6.0	6.5	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	10,300	9,973	9,691	9,568	9,456	9,266	9,122	9,023	8,971	8,965	8,979	9,004
GENERATED (MW)N	3.84	4.84	5.84	6.34	6.84	7.84	8.84	9.84	10.84	11.84	12.34	12.84
HEAT RATE(BTU/MW)N	10,648	10,274	9,950	9,808	9,678	9,457	9,287	9,169	9,102	9,085	9,096	9,120
GROSS (MBTU)	41.202	49.865	58.148	62.190	66.189	74.125	82.095	90.235	98.683	107.576	112.233	117.053
NET (MBTU)	40.889	49.724	58.110	62.182	66.199	74.145	82.101	90.222	98.661	107.571	112.250	117.105
COST/KWH	$0.1436	$0.1390	$0.1351	$0.1334	$0.1318	$0.1292	$0.1272	$0.1258	$0.1251	$0.1250	$0.1252	$0.1255
G/KWH	254.50	246.41	239.45	236.39	233.62	228.93	225.37	222.95	221.65	221.49	221.84	222.47
G/PS-H	185.41	179.51	174.44	172.22	170.20	166.78	164.19	162.42	161.48	161.36	161.62	162.07

WORKSHEET (GROSS)

MEGAWATTS = X HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.48	41.9904	272.09779	1763.1937	9517.18361	61671.35	399630.35
7.992	63.872064	510.46554	4079.6406	9369.27576	74879.252	598434.98
9.414	88.623396	834.30065	7854.1063	9092.35435	85595.424	805795.32
11.232	126.157824	1417.0047	15915.797	8817.81205	99041.665	1112436
12.42	154.2564	1915.8645	23795.037	9059.45868	112518.48	1397479.5
0	0	0	0	0	0	0
47.538	474.900084	4949.7331	53407.774	45856.0844	433706.17	4313776.1

a=	114.638976	C=	22.9317183
b=	-208177.8	B=	-533.87817
d=	-11375.706	A=	12069.062
e=	2172.86553		
f=	41508.7806		

WORKSHEET (NET)

MEGAWATTS = X HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.48	41.9904	272.09779	1763.1937	9758.125	63232.65	409747.57
7.992	63.872064	510.46554	4079.6406	9560.6808	76408.961	610660.41
9.414	88.623396	834.30065	7854.1063	9249.5595	87075.353	819727.38
11.232	126.15782	1417.0047	15915.797	8945.2371	100472.9	1128511.6
12.42	154.2564	1915.8645	23795.037	9177.6898	113986.91	1415717.4
0	0	0	0	0	0	0
47.538	474.90008	4949.7331	53407.774	46691.292	441176.77	4384364.4

a=	114.63898	C=	25.593781
b=	-251876.6	B=	-604.8433
d=	-13726.78	A=	12657.969
e=	2172.8655		
f=	41508.781		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 13
Test Date: 03-01-04
Tested by: K.Inouye, S.Miguel

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 03-01-04
MPP UNIT NO. 13

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.41	9.18	10.26	11.213	12.17
Description\Time		0825	0945	1120	1240	1405
Ambient air temp	*F.	75	72	75	72	75
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	**X18 KWH**	4777.9	4778.4	4779.2	4780.0	4780.9
Std KWH meter-stop	**X18 KWH**	4778.2	4778.9	4779.8	4780.6	4781.6
Demand meter	**X18 KWH**	0.356	0.51	0.57	0.624	0.676
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	**KWH**	195.3	195.5	195.8	196.1	196.4
Aux. KWH clock-end	**KWH**	195.4	195.7	196.0	196.3	196.6
Aux. load indicator	**KW**	70	70	70	83	83
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	**gal.**	71095992	71096627	71097644	71098573	71099659
F.O. meter rdg-end	**gal.**	71096435	71097247	71098328	71099324	71100474
F.O. temp.	***F.**	122	115	113	110	109
F.O. drain tank-start	**in.**	9.7500	9.8750	10.0625	10.2500	10.5000
F.O. drain tank-end	**in.**	9.8750	10.0000	10.1875	10.4375	10.7500
Fuel Oil Analysis						
API gravity @ 60 *F.		33.9				
Sulfur, Wt.	%	0.17				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	139,500				

TEST LOADS - MW

	6.41	9.18	10.26	11.213	12.17
F.O. Temp. *F.	122	115	113	110	109
F.O. Temp. (Corr.)	0.9690	0.9725	0.9735	0.9750	0.9755
F.O.-start gal.	71095992.0	71096627.0	71097644.0	71098573.0	71099659.0
F.O.-end gal.	71096435.0	71097247.0	71098328.0	71099324.0	71100474.0
F.O. Drain Tnk-start	9.75	9.875	10.0625	10.25	10.5
F.O. Drain Tnk-end	9.8750	10.0000	10.1875	10.4375	10.7500
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,408	9,180	10,260	11,232	12,168
KW (Aux.)	80	160	160	160	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,500	139,500	139,500	139,500	139,500
HEAT RATE (APPROX.)-G	9,248	9,068	8,961	9,000	9,020
HEAT RATE (APPROX.)-N	9,365	9,229	9,103	9,130	9,140
HEAT RATE (ACTUAL)-G	9,342	9,161	9,052	9,092	9,112
HEAT RATE (ACTUAL)-N	9,460	9,323	9,195	9,223	9,233

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 13 Fuel Oil Tested: 03-05-04
Test Date: 03-01-04 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)	6.408	9.180	10.260	11.232	12.168
HEAT RATE(BTU/MW)G	9,342	9,161	9,052	9,092	9,112
HEAT RATE(BTU/MW)N	9,460	9,323	9,195	9,223	9,233
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$46.6251	act.			
H.H.V. (BTU/GAL)	139,500	act.			

A, B, C CONSTANTS:

GROSS A=	10,592.95	NET A=	10,377.99
B=	(274.625)	B=	(194.679)
C=	12.5164	C=	8.1871

PREDICTED VALUES:

GENERATED (MW)G	4.0	5.0	6.0	6.5	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,695	9,533	9,396	9,337	9,284	9,197	9,135	9,098	9,087	9,100	9,116	9,138
GENERATED (MW)N	3.92	4.92	5.92	6.42	6.92	7.92	8.84	9.84	10.84	11.84	12.34	12.84
HEAT RATE(BTU/MW)N	9,730	9,609	9,505	9,458	9,416	9,345	9,289	9,250	9,227	9,221	9,224	9,231
GROSS (MBTU)	38.779	47.664	56.375	60.689	64.987	73.576	82.216	90.984	99.952	109.198	113.948	118.795
NET (MBTU)	38.143	47.278	56.268	60.723	65.162	74.009	82.115	91.019	100.022	109.174	113.821	118.523
COST/KWH	$0.0771	$0.0759	$0.0748	$0.0743	$0.0739	$0.0732	$0.0727	$0.0724	$0.0723	$0.0724	$0.0725	$0.0727
G/KWH	239.53	235.53	232.15	230.69	229.38	227.23	225.71	224.80	224.51	224.83	225.23	225.78
G/PS-H	174.50	171.59	169.12	168.06	167.11	165.55	164.43	163.77	163.56	163.80	164.09	164.49

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.408	41.062464	263.12827	1686.1259	9342.36104	59865.85	383620.36
9.18	84.2724	773.62063	7101.8374	9160.62822	84094.567	771988.13
10.26	105.2676	1080.0456	11081.268	9051.89548	92872.448	952871.31
11.232	126.157824	1417.0047	15915.797	9091.87012	102119.89	1147010.6
12.168	148.060224	1801.5968	21921.83	9111.85184	110873.01	1349102.8
0	0	0	0	0	0	0
49.248	504.820512	5335.396	57706.857	45758.6067	449825.76	4604593.2

a=	98.737056	C=	12.5164442
b=	-76917.379	B=	-274.62482
d=	-4391.0498	A=	10592.9544
e=	1815.57924		
f=	33690.5379		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.408	41.062464	263.12827	1686.1259	9460.4693	60622.687	388470.18
9.18	84.2724	773.62063	7101.8374	9323.1227	85586.267	785681.93
10.26	105.2676	1080.0456	11081.268	9195.2918	94343.694	967966.3
11.232	126.15782	1417.0047	15915.797	9223.2555	103595.61	1163585.8
12.168	148.06022	1801.5968	21921.83	9233.2623	112350.34	1367078.9
0	0	0	0	0	0	0
49.248	504.82051	5335.396	57706.857	46435.402	456498.59	4672783.1

a=	98.737056	C=	8.1870782
b=	-77627.55	B=	-194.6787
d=	-4357.713	A=	10377.987
e=	1815.5792		
f=	33690.538		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 13
Test Date: 11-26-03
Tested by: K.Inouye, S.Ishikawa

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 11-26-03
MPP UNIT NO. 13

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.5	9	10	11	12.4
Description\Time		0507	0331	0213	0052	2329
Ambient air temp	***F.**	72	73	76	74	74
Manifold Air-Left	*F.					
Manifold Air-Right	*F.					
Intercooler Water-In	R/L *F.					
Intercooler Water-Out	R/L *F.					
Jacket Water-In	*F.					
Jacket Water-Out	*F.					
Exhaust Gas-Lvg T/C-L	*F.					
Exhaust Gas-Lvg T/C-R	*F.					
Manifold Pressure-Lft	psi					
Manifold Pressure-Rt	psi					
Generator						
Std KWH meter-start	**X18 KWH**	3604.3	3603.5	3602.8	3602.0	3601.1
Std KWH meter-stop	**X18 KWH**	3604.6	3604.0	3603.4	3602.6	3601.8
Demand meter	**X18 KWH**	0.362	0.502	0.556	0.615	0.687
Generator volts	V.					
Generator amps	A.					
Generator vars	VARS					
Auxilliaries						
Aux. KWH clock-start	**KWH**	9731.9	9731.5	9731.2	9731.0	9730.7
Aux. KWH clock-end	**KWH**	9732.1	9731.8	9731.5	9731.2	9730.9
Aux. load indicator	**KW**	690	800	775	675	650
Aux. volts	V.					
Aux. amps	A.					
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	**gal.**	69670360	69669410	69668520	69667560	69666430
F.O. meter rdg-end	**gal.**	69670811	69670021	69669210	69668290	69667261
F.O. temp.	**°F.**	120	116	113	110	108
F.O. drain tank-start	**in.**	1.2000	1.0000	1.8750	1.3750	1.0000
F.O. drain tank-end	**in.**	7.0000	6.2500	7.0000	6.2500	6.0000
Fuel Oil Analysis						
API gravity @ 60 *F.		33.7				
Sulfur, Wt.	%	0.1				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	139,507				

TEST LOADS - MW

	6.5	9	10	11	12.4
F.O. Temp. *F.	120	116	113	110	108
F.O. Temp. (Corr.)	0.9700	0.9720	0.9735	0.9750	0.9760
F.O.-start gal.	69670360.0	69669410.0	69668520.0	69667560.0	69666430.0
F.O.-end gal.	69670810.8	69670020.7	69669210.1	69668290.2	69667260.7
F.O. Drain Tnk-start	1.2	1	1.875	1.375	1
F.O. Drain Tnk-end	7.0000	6.2500	7.0000	6.2500	6.0000
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,516	9,036	10,008	11,070	12,366
KW (Aux.)	160	240	240	160	160
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	139,507	139,507	139,507	139,507	139,507
HEAT RATE (APPROX.)-G	9,148	8,994	9,201	8,822	9,000
HEAT RATE (APPROX.)-N	9,378	9,239	9,427	8,951	9,118
HEAT RATE (ACTUAL)-G	9,242	9,086	9,295	8,912	9,092
HEAT RATE (ACTUAL)-N	9,474	9,334	9,524	9,043	9,211

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 13 Fuel Oil Tested: 11-28-03
Test Date: 11-26-03 Tested By: K.Nakamatsu

DATA:

GENERATED (MW)	6.516	9.036		11.070	12.366
HEAT RATE(BTU/MW)G	9,242	9,086		8,912	9,092
HEAT RATE(BTU/MW)N	9,474	9,334		9,043	9,211
NUMBER OF TESTS	4				
PRICE OF FUEL/BBL	$41.2444	act.			
H.H.V. (BTU/GAL)	139,507	act.			

A, B, C CONSTANTS:

GROSS A=	10,849.04	NET A=	10,815.66
B=	(354.626)	B=	(278.690)
C=	16.9212	C=	11.6739

PREDICTED VALUES:

GENERATED (MW)G	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,937	9,701	9,499	9,330	9,196	9,095	9,028	8,995	8,996	9,030	9,060	9,099
GENERATED (MW)N	2.8	3.8	4.8	5.8	6.8	7.8	8.8	9.8	10.8	11.8	12.3	12.8
HEAT RATE(BTU/MW)N	10,085	9,888	9,714	9,564	9,437	9,333	9,253	9,196	9,163	9,152	9,156	9,166
GROSS (MBTU)	29.812	38.805	47.495	55.983	64.371	72.760	81.252	89.949	98.952	108.362	113.252	118.282
NET (MBTU)	28.640	37.969	47.016	55.852	64.548	73.173	81.057	89.754	99.323	108.365	112.986	117.686
COST/KWH	$0.0700	$0.0683	$0.0669	$0.0657	$0.0647	$0.0640	$0.0635	$0.0633	$0.0633	$0.0636	$0.0638	$0.0640
G/KWH	245.53	239.69	234.69	230.53	227.20	224.71	223.06	222.24	222.26	223.11	223.85	224.80
G/PS-H	178.87	174.62	170.98	167.95	165.52	163.71	162.50	161.91	161.92	162.54	163.08	163.77

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	9241.5894	60218.197	392381.77
9.036	81.649296	737.78304	6666.6075	9085.82412	82099.507	741851.14
0	0	0	0	0	0	0
11.07	122.5449	1356.572	15017.253	8912.21472	98658.217	1092146.5
12.366	152.917956	1890.9834	23383.901	9091.56943	112426.35	1390264.2
0	0	0	0	0	0	0
38.988	399.570408	4261.9965	46870.465	36331.1977	353402.27	3616643.6

a=	78.217488	C=	16.9212064
b=	-50297.128	B=	-354.62618
d=	-2871.6636	A=	10849.0375
e=	1469.53502		
f=	27825.3483		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	9474.2285	61734.073	402259.22
9.036	81.649296	737.78304	6666.6075	9333.732	84339.602	762092.65
0	0	0	0	0	0	0
11.07	122.5449	1356.572	15017.253	9042.9163	100105.08	1108163.3
12.366	152.91796	1890.9834	23383.901	9210.7445	113900.07	1408488.2
0	0	0	0	0	0	0
38.988	399.57041	4261.9965	46870.465	37061.621	360078.83	3681003.4

a=	78.217488	C=	11.673904
b=	-84713.7	B=	-278.6896
d=	-4643.191	A=	10815.656
e=	1469.535		
f=	27825.348		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 13
Test Date: 03-12-02
Tested by: K.Inouye, S.Ishikawa

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 03-12-02
MPP UNIT NO. 13

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.624	9.018	10.08	11.016	12.456
Description\Time		0740	0858	1014	1129	1245
Ambient air temp	*F.	66	75	77	78	82
Manifold Air-Left	*F.	95	110	112	119	129
Manifold Air-Right	*F.	94	109	111	119	132
Intercooler Water-In	R/L *F.	94/90	100/96	102/98	105/103	110/108
Intercooler Water-Out	R/L *F.	96/96	107/104	110/108	116/114	124/124
Jacket Water-In	*F.	155	166	172	169	169
Jacket Water-Out	*F.	158	169	175	174	175
Exhaust Gas-Lvg T/C-L	*F.	648	639	639	644	661
Exhaust Gas-Lvg T/C-R	*F.	651	641	639	643	659
Manifold Pressure-Lft	psi	14.0	19.0	21.0	24.3	29.5
Manifold Pressure-Rt	psi	11.0	19.0	22.5	25.5	30.0
Generator						
Std KWH meter-start	X18 KWH	7150.3	7150.9	7151.5	7152.2	7153
Std KWH meter-stop	X18 KWH	7150.7	7151.4	7152.1	7152.8	7153.7
Demand meter	X18 KWH	0.368	0.501	0.56	0.612	0.692
Generator volts	V.	6950	6950	6950	6950	6900
Generator amps	A.	635	805	900	970	1100
Generator vars	VARS	3.9	3.6	4.0	3.9	4.0
Auxilliaries						
Aux. KWH clock-start	KWH	6992.2	6992.4	6992.6	6992.8	6993
Aux. KWH clock-end	KWH	6992.4	6992.6	6992.8	6992.9	6993.1
Aux. load indicator	KW	400	510	510	500	500
Aux. volts	V.	493	492	491	491	490
Aux. amps	A.	44	55	55	54	55
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	61619620	61620270	61621074	61621939	61622914
F.O. meter rdg-end	gal.	61620090	61620892	61621761	61622691	61623772
F.O. temp.	*F.	113	112	110	111	111
F.O. drain tank-start	in.	0	0	0	0	
F.O. drain tank-end	in.	4.7500	4.5000	4.5000	4.5000	4.3750
Fuel Oil Analysis						
API gravity @ 60 *F.		36.3				
Sulfur, Wt.	%	0.09				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,738				

TEST LOADS - MW

6.624	9.018	10.08	11.016	12.456	
113	112	110	111	111	F.O. Temp. *F.
0.9735	0.9740	0.9750	0.9745	0.9745	F.O. Temp. (Corr.)
61619620.0	61620270.0	61621074.0	61621939.0	61622914.0	F.O.-start gal.
61620090.0	61620892.0	61621761.0	61622691.0	61623772.0	F.O.-end gal.
0	0	0	0	0	F.O. Drain Tnk-start
4.7500	4.5000	4.5000	4.5000	4.3750	F.O. Drain Tnk-end
18,000	18,000	18,000	18,000	18,000	PT RATIO
6,624	9,018	10,080	11,016	12,456	KW (Gen.)
160	160	160	80	80	KW (Aux.)
138,095	138,095	138,095	138,095	138,095	BTU/gal (Approx.)
138,738	138,738	138,738	138,738	138,738	BTU/gal (Test Lab)
9,442	9,210	9,116	9,132	9,222	HEAT RATE (APPROX.)-G
9,676	9,376	9,263	9,198	9,282	HEAT RATE (APPROX.)-N
9,486	9,253	9,159	9,174	9,265	HEAT RATE (ACTUAL)-G
9,721	9,420	9,307	9,241	9,325	HEAT RATE (ACTUAL)-N

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 13 Fuel Oil Tested: 03-16-02
Test Date: 03-12-02 Tested By: E.Wong

DATA:

GENERATED (MW)	6.624	9.018	10.080	11.016	12.456
HEAT RATE(BTU/MW)G	9,486	9,253	9,159	9,174	9,265
HEAT RATE(BTU/MW)N	9,721	9,420	9,307	9,241	9,325
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$27.4425	act.			
H.H.V. (BTU/GAL)	138,738	act.			

A, B, C CONSTANTS:

GROSS A=	11,484.63	NET A=	11,914.83
B=	(439.331)	B=	(466.733)
C=	20.9154	C=	20.6645

PREDICTED VALUES:

GENERATED (MW)	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	10,355	10,062	9,811	9,602	9,434	9,309	9,225	9,183	9,183	9,224	9,261	9,308
HEAT RATE(BTU/MW)N	10,701	10,379	10,098	9,858	9,660	9,503	9,388	9,314	9,281	9,290	9,309	9,340
GROSS (MBTU)	31.065	40.248	49.054	57.610	66.039	74.469	83.023	91.829	101.010	110.694	115.763	121.005
NET (MBTU)	32.102	41.514	50.489	59.150	67.622	76.028	84.493	93.140	102.093	111.477	116.369	121.415
COST/KWH	$0.0488	$0.0474	$0.0462	$0.0452	$0.0444	$0.0438	$0.0434	$0.0432	$0.0432	$0.0434	$0.0436	$0.0438
G/KWH	255.84	248.61	242.40	237.23	233.09	229.99	227.92	226.89	226.88	227.91	228.82	229.98
G/PS-H	186.39	181.12	176.60	172.83	169.82	167.55	166.05	165.29	165.29	166.04	166.70	167.54

WORKSHEET *(GROSS)*

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.624	43.877376	290.64374	1925.2241	9486.31286	62837.336	416234.52
9.018	81.324324	733.38275	6613.6457	9252.96922	83443.276	752491.47
10.08	101.6064	1024.1925	10323.861	9158.87578	92321.468	930600.4
11.016	121.352256	1336.8165	14726.37	9174.12267	101062.14	1113300.5
12.456	155.151936	1932.5725	24072.123	9265.43469	115410.25	1437550.1
0	0	0	0	0	0	0
49.194	503.312292	5317.608	57661.224	46337.7152	455074.47	4650177

a=	96.511824	C=	20.9154411
b=	-71456.693	B=	-439.33086
d=	-4165.2099	A=	11484.6318
e=	1828.09496		
f=	34982.8547		

WORKSHEET *(NET)*

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.624	43.877376	290.64374	1925.2241	9721.1226	64392.716	426537.35
9.018	81.324324	733.38275	6613.6457	9420.1035	84950.493	766083.55
10.08	101.6064	1024.1925	10323.861	9306.5996	93810.524	945610.08
11.016	121.35226	1336.8165	14726.37	9241.234	101801.43	1121444.6
12.456	155.15194	1932.5725	24072.123	9325.3276	116156.28	1446842.6
0	0	0	0	0	0	0
49.194	503.31229	5317.608	57661.224	47014.387	461111.45	4706518.2

a=	96.511824	C=	20.664548
b=	-130328	B=	-466.7333
d=	-7268.529	A=	11914.829
e=	1828.095		
f=	34982.855		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MPP UNIT NO. 13
Test Date: 09-07-01
Tested by: E.Cravalho, K.Inouye

MAUI ELECTRIC COMPANY, INC.

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 09-07-01
MPP UNIT NO. 13

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	9.0	10.0	11.0	12.5

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.71	9.14	10.17	11.23	
Description\Time		0735	0901	1023	1159	
Ambient air temp	*F.	79	80	82	84	
Manifold Air-Left	*F.	103	112	119	128	
Manifold Air-Right	*F.	103	112	119	129	
Intercooler Water-In	R/L *F.	17/18	17/18	17.5/18	17.5/18	
Intercooler Water-Out	R/L *F.	10/11	10/11	10/11	10/11	
Jacket Water-In	*F.	165	163	167	179	
Jacket Water-Out	*F.	168	168	172	185	
Exhaust Gas-Lvg T/C-L	*F.	712	688	688	693	
Exhaust Gas-Lvg T/C-R	*F.	714	687	684	385	
Manifold Pressure-Lft	psi	12.0	16.0	19.5	23.0	
Manifold Pressure-Rt	psi	10.0	18.0	20.5	24.0	
Generator						
Std KWH meter-start	X18 KWH	5928.7	5929.3	5930.0	5930.9	
Std KWH meter-stop	X18 KWH	5929.1	5929.8	5930.6	5931.6	
Demand meter	X18 KWH	0.373	0.508	0.565	0.624	
Generator volts	V.	6825	6900	6900	6975	
Generator amps	A.	670	800	880	950	
Generator vars	VARS	4.4	3.0	3.1	2.8	
Auxilliaries						
Aux. KWH clock-start	KWH	6263.7	6263.9	6264.1	6264.4	
Aux. KWH clock-end	KWH	6263.8	6264.0	6264.2	6264.6	
Aux. load indicator	KW	400	500	425	750	
Aux. volts	V.	485	492	490	490	
Aux. amps	A.	45	55	47	83	
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	60099900	60100585	60101475	60102630	
F.O. meter rdg-end	gal.	60100375	60101225	60102180	60103410	
F.O. temp.	*F.	117	115	114	115	
F.O. drain tank-start	in.	0	0	0	0	
F.O. drain tank-end	in.	5.0000	4.8750	5.0000	4.8750	
Fuel Oil Analysis						
API gravity @ 60 *F.		37.2				
Sulfur, Wt.	%	0.15				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	137,620				

TEST LOADS - MW

	6.71	9.14	10.17	11.23	0
F.O. Temp. *F.	117	115	114	115	0
F.O. Temp. (Corr.)	0.9715	0.9725	0.9730	0.9725	1.0300
F.O.-start gal.	60099900.0	60100585.0	60101475.0	60102630.0	0.0
F.O.-end gal.	60100375.0	60101225.0	60102180.0	60103410.0	0.0
F.O. Drain Tnk-start	0	0	0	0	0
F.O. Drain Tnk-end	5.0000	4.8750	5.0000	4.8750	0.0000
PT RATIO	18,000	18,000	18,000	18,000	18,000
KW (Gen.)	6,714	9,144	10,170	11,232	0
KW (Aux.)	80	80	80	160	0
BTU/gal (Approx.)	138,095	138,095	138,095	138,095	138,095
BTU/gal (Test Lab)	137,620	137,620	137,620	137,620	137,620
HEAT RATE (APPROX.)-G	9,392	9,328	9,248	9,268	#DIV/0!
HEAT RATE (APPROX.)-N	9,505	9,410	9,322	9,402	#DIV/0!
HEAT RATE (ACTUAL)-G	9,359	9,296	9,217	9,236	#DIV/0!
HEAT RATE (ACTUAL)-N	9,472	9,378	9,290	9,370	#DIV/0!

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

MPP UNIT NO. 13 Fuel Oil Tested: 09-11-01
Test Date: 09-07-01 Tested By: E.Wong

DATA:

GENERATED (MW)	6.714	9.144	10.170	11.232
HEAT RATE(BTU/MW)G	9,359	9,296	9,217	9,236
HEAT RATE(BTU/MW)N	9,472	9,378	9,290	9,370
NUMBER OF TESTS	4			
PRICE OF FUEL/BBL	$38.3585	act.		
H.H.V. (BTU/GAL)	137,620	act.		

A, B, C CONSTANTS:

GROSS A=	9,776.78	NET A=	10,620.96
B=	(80.451)	B=	(255.908)
C=	2.7865	C=	12.7292

PREDICTED VALUES:

GENERATED (MW)	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,561	9,500	9,444	9,394	9,350	9,312	9,278	9,251	9,229	9,213	9,207	9,202
HEAT RATE(BTU/MW)N	9,968	9,801	9,660	9,544	9,453	9,388	9,349	9,335	9,346	9,383	9,411	9,445
GROSS (MBTU)	28.682	37.998	47.221	56.366	65.451	74.492	83.506	92.509	101.519	110.552	115.082	119.624
NET (MBTU)	29.903	39.204	48.298	57.263	66.173	75.107	84.140	93.348	102.808	112.597	117.638	122.790
COST/KWH	$0.0634	$0.0630	$0.0627	$0.0623	$0.0621	$0.0618	$0.0616	$0.0614	$0.0612	$0.0611	$0.0611	$0.0611
G/KWH	236.22	234.71	233.34	232.11	231.02	230.06	229.25	228.57	228.02	227.62	227.47	227.35
G/PS-H	172.09	170.99	170.00	169.10	168.30	167.61	167.01	166.52	166.12	165.83	165.72	165.63

WORKSHEET (GROSS)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.714	45.077796	302.65232	2032.0077	9359.24637	62837.98	421894.2
9.144	83.612736	764.55486	6991.0896	9295.95803	85002.24	777260.48
10.17	103.4289	1051.8719	10697.537	9216.61573	93732.982	953264.43
11.232	126.157824	1417.0047	15915.797	9236.04017	103739.2	1165198.7
0	0	0	0	0	0	0
0	0	0	0	0	0	0
37.26	358.277256	3536.0838	35636.431	37107.8603	345312.41	3317617.8

a=	44.801424	C=	2.78653288
b=	-24431.003	B=	-80.451371
d=	-1389.2527	A=	9776.78176
e=	794.924531		
f=	14183.1327		

WORKSHEET (NET)

MEGAWATTS = X				HEAT RATE = Y		
X	X^2	X^3	X^4	Y	YX	YX^2
6.714	45.077796	302.65232	2032.0077	9472.1104	63595.749	426981.86
9.144	83.612736	764.55486	6991.0896	9378.0053	85752.481	784120.68
10.17	103.4289	1051.8719	10697.537	9289.691	94476.157	960822.52
11.232	126.15782	1417.0047	15915.797	9369.509	105238.32	1182036.9
0	0	0	0	0	0	0
0	0	0	0	0	0	0
37.26	358.27726	3536.0838	35636.431	37509.316	349062.71	3353961.9

a=	44.801424	C=	12.729228
b=	-22886.98	B=	-255.9077
d=	-1346.254	A=	10620.961
e=	794.92453		
f=	14183.133		

MAUI ELECTRIC CO., LTD.
MAALAEA POWER PLANT
HEAT RATE TEST DATA

MAUI ELECTRIC COMPANY, INC.

MPP UNIT NO. 13
Test Date: 04-18-01
Tested by: HK

Maalaea Power Plant

Subject: Heat Rate Testing
Test Date: 04-18-01
MPP UNIT NO. 13

Gross Load - (M4-9)	KWH	3.1	4.0	5.0	5.6	6.1
Gross Load - (M10-13) -->	KWH	6.5	8.0	9.0	10.0	11.0

		1 Hr.	1 Hr.	1 Hr.	1 Hr.	1 Hr.
Actual Test Load	MWH	6.516	9.072	10.062	10.962	12.564
Description\Time		0708	0822	0944	1108	1224
Ambient air temp	*F.	71	74	77	80	81
Manifold Air-Left	*F.	107	116	126	133	144
Manifold Air-Right	*F.	100	107	115	122	132
Intercooler Water-In	R/L *F.	100/98	102/99	105/105	109/109	113/113
Intercooler Water-Out	R/L *F.	102/101	107/106	113/113	120/120	126/127
Jacket Water-In	*F.	164	166	161	164	168
Jacket Water-Out	*F.	168	168	167	168	174
Exhaust Gas-Lvg T/C-L	*F.	691	672	672	672	678
Exhaust Gas-Lvg T/C-R	*F.	693	672	669	667	672
Manifold Pressure-Lft	psi	11.5	16.0	19.0	22.0	28.0
Manifold Pressure-Rt	psi	9.5	17.5	20.2	23.5	29.0
Generator						
Std KWH meter-start	X18 KWH	4139.8	4140.3	4141.0	4141.8	4142.5
Std KWH meter-stop	X18 KWH	4140.2	4140.8	4141.5	4142.4	4143.2
Demand meter	X18 KWH	0.362	0.504	0.559	0.609	0.698
Generator volts	V.	6875	6950	6950	6940	6940
Generator amps	A.	610	785	865	945	1075
Generator vars	VARS	3.1	2.5	2.9	3.0	2.9
Auxilliaries						
Aux. KWH clock-start	KWH	5789.9	5790.0	5790.2	5790.3	5790.5
Aux. KWH clock-end	KWH	5790.0	5790.1	5790.3	5790.4	5790.6
Aux. load indicator	KW	275	370	350	350	350
Aux. volts	V.	489	494	493	493	492
Aux. amps	A.	32	41	41	42	39
Fuel Oil						
F.O. tank level-start	in.					
F.O. tank level-end	in.					
F.O. meter rdg-start	gal.	57903800	57904380	57905250	57906210	57907160
F.O. meter rdg-end	gal.	57904250	57905000	57905930	57906940	57907990
F.O. temp.	*F.	117	113	112	113	111
F.O. drain tank-start	in.	0	0	0	0	0
F.O. drain tank-end	in.	4.6875	3.6875	4.3125	3.8750	3.6875
Fuel Oil Analysis						
API gravity @ 60 *F.		34.4				
Sulfur, Wt.	%	0.09				
Viscosity @ 210 *F.	SSF					
Higher heating value	BTU/gal	138,549				

TEST LOADS - MW

6.516	9.072	10.062	10.962	12.564	
117	113	112	113	111	F.O. Temp. *F.
0.9715	0.9735	0.9740	0.9735	0.9745	F.O. Temp. (Corr.)
57903800.0	57904380.0	57905250.0	57906210.0	57907160.0	F.O.-start gal.
57904250.0	57905000.0	57905930.0	57906940.0	57907990.0	F.O.-end gal.
0	0	0	0	0	F.O. Drain Tnk-start
4.6875	3.6875	4.3125	3.8750	3.6875	F.O. Drain Tnk-end
18,000	18,000	18,000	18,000	18,000	PT RATIO
6,516	9,072	10,062	10,962	12,564	KW (Gen.)
80	80	80	80	80	KW (Aux.)
138,095	138,095	138,095	138,095	138,095	BTU/gal (Approx.)
138,549	138,549	138,549	138,549	138,549	BTU/gal (Test Lab)
9,169	9,133	9,032	8,905	8,851	HEAT RATE (APPROX.)-G
9,283	9,214	9,105	8,970	8,907	HEAT RATE (APPROX.)-N
9,199	9,163	9,062	8,934	8,880	HEAT RATE (ACTUAL)-G
9,313	9,245	9,135	9,000	8,937	HEAT RATE (ACTUAL)-N

NOTE: F.O. Tank 9.75 gal/in
F.O. Drain Tank 2.76 gal/in

CALCULATIONS FOR HEAT RATE CURVE
by: Rodney Jung

Need to redo test.

MPP UNIT NO. 13 Fuel Oil Tested: 04-24-01
Test Date: 04-18-01 Tested By: K.Yokoyama

DATA:

GENERATED (MW)	6.516	9.072	10.062	10.962	12.564
HEAT RATE(BTU/MW)G	9,199	9,163	9,062	8,934	8,880
HEAT RATE(BTU/MW)N	9,313	9,245	9,135	9,000	8,937
NUMBER OF TESTS	5				
PRICE OF FUEL/BBL	$42.7842	act.			
H.H.V. (BTU/GAL)	138,549	act.			

A, B, C CONSTANTS:

GROSS A=	9,070.71	NET A=	9,322.70
B=	62.887	B=	35.710
C=	(6.3653)	C=	(5.4376)

PREDICTED VALUES:

GENERATED (MW)	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	12.5	13.0
HEAT RATE(BTU/MW)G	9,202	9,220	9,226	9,219	9,199	9,166	9,121	9,063	8,992	8,909	8,862	8,813
HEAT RATE(BTU/MW)N	9,381	9,379	9,365	9,341	9,306	9,260	9,204	9,136	9,058	8,968	8,919	8,868
GROSS (MBTU)	27.606	36.882	46.130	55.313	64.393	73.331	82.090	90.631	98.915	106.905	110.778	114.563
NET (MBTU)	28.143	37.514	46.827	56.047	65.144	74.083	82.833	91.360	99.633	107.619	111.493	115.284
COST/KWH	$0.0677	$0.0678	$0.0678	$0.0678	$0.0676	$0.0674	$0.0671	$0.0666	$0.0661	$0.0655	$0.0652	$0.0648
G/KWH	227.36	227.81	227.95	227.78	227.28	226.48	225.36	223.93	222.18	220.11	218.96	217.73
G/PS-H	165.64	165.97	166.07	165.94	165.58	165.00	164.18	163.13	161.86	160.36	159.52	158.63

WORKSHEET *(GROSS)*

MEGAWATTS = X HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	9198.77531	59939.22	390563.96
9.072	82.301184	746.63634	6773.4849	9162.99155	83126.659	754125.05
10.062	101.243844	1018.7156	10250.316	9061.99721	91181.816	917471.43
10.962	120.165444	1317.2536	14439.734	8934.30847	97937.889	1073595.1
12.564	157.854096	1983.2789	24917.916	8879.7683	111565.41	1401707.8
0	0	0	0	0	0	0
49.176	504.022824	5342.5424	58184.154	45237.8408	443750.99	4537463.4

a=	101.835144	C=	-6.3652889
b=	-113587.37	B=	62.8868237
d=	-5861.0933	A=	9070.71385
e=	1926.88538		
f=	36881.7624		

WORKSHEET *(NET)*

MEGAWATTS = X HEAT RATE = Y

X	X^2	X^3	X^4	Y	YX	YX^2
6.516	42.458256	276.658	1802.7035	9313.1168	60684.269	395418.7
9.072	82.301184	746.63634	6773.4849	9244.5128	83866.22	760834.35
10.062	101.24384	1018.7156	10250.316	9134.6239	91912.586	924824.44
10.962	120.16544	1317.2536	14439.734	8999.9898	98657.889	1081487.8
12.564	157.8541	1983.2789	24917.916	8936.6717	112280.34	1410690.2
0	0	0	0	0	0	0
49.176	504.02282	5342.5424	58184.154	45628.915	447401.31	4573255.5

a=	101.83514	C=	-5.437565
b=	-131737.2	B=	35.710373
d=	-6840.994	A=	9322.6957
e=	1926.8854		
f=	36881.762		

HEAT RATE SUMMARY
Data from 2005 Source Testing

Unit	SC/CC	Load	Avg. MW (CT Only)	Calc. MW	Fuel Value (BTU/gal.)	Volume Flow (K#/hr)	Heatrate (BTU/KWHR)	Test Date
	14 SC	100%	**20.85**	20.89	139,564	11.81	**11,065.74**	04/26-27/05
	14 SC	75%	**18.79**	18.95	139,885	10.87	**11,255.69**	04/28/05
	14 SC	50%	**12.42**	12.48	139,797	7.99	**12,556.52**	04/23/05
	14 SC	25%	**6.94**	6.94	139,375	5.49	**15,471.17**	04/23/05
	14 CC	100%	20.45	**27.37**	139,802	11.73	**8,406.17**	04/25-26/05
	14 CC	75%	18.44	**24.98**	139,811	10.84	**8,511.77**	04/22/05
	14 CC	50%	12.64	**17.44**	139,441	7.80	**8,750.22**	04/22/05
	14 CC	25%	6.27	**10.96**	139,788	5.06	**9,051.23**	04/29/05
	16 SC	100%	**21.68**	21.22	139,172	11.89	**10,937.99**	05/04/05
	16 SC	75%	**18.49**	18.50	138,926	10.42	**10,978.37**	05/03/05
	16 SC	50%	**12.34**	12.42	139,383	7.64	**12,029.75**	04/30/05
	16 SC	25%	**6.29**	6.35	140,056	4.95	**15,326.14**	04/30/05
	16 CC	100%	21.9	**27.15**	138,844	12.02	**8,621.43**	05/10/05
	16 CC	75%	18.21	**23.02**	139,000	10.35	**8,765.13**	05/10/05
	16 CC	50%	12.43	**17.80**	139,064	8.25	**9,038.95**	05/05/05
	16 CC	25%	6.43	**10.84**	139,206	5.25	**9,459.95**	05/05/05
	17 SC	100%	**22.01**		138,402	N.A.	**10,536.51**	03/17/05
	17 SC	75%	**18.54**		138,021	N.A.	**11,179.15**	03/21/05
	17 SC	50%	**12.38**		138,029	N.A.	**11,801.08**	03/18/05
	17 SC	25%	**6.24**		138,330	N.A.	**15,580.83**	03/15/05
	19 SC	100%	**21.45**		138,174	N.A.	**10,539.38**	03/14/05
	19 SC	75%	**18.48**		138,174	N.A.	**10,849.46**	03/14/05
	19 SC	50%	**12.41**		137,990	N.A.	**12,016.02**	03/11/05
	19 SC	25%	**6.2**		138,133	N.A.	**16,501.95**	03/16/05

EMD (X1, X2, M1-M3) AVERAGE HEAT RATE (2002-2005)

Assume heat rate calculation consistent for all EMD units.

Gross **X2**

GROSS INPUT VALUES*

			Heat rate									
			(MW)	(BTU/KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y		
A	0.0000		0.00	10,413	-	0.00	0.00	0.00	0.00	0.00		
B	10.4128		0.50	10,413	5.21	0.25	0.13	0.06	2.60	1.30		
C	0.0000		1.00	10,413	10.41	1.00	1.00	1.00	10.41	10.41		
			1.50	10,413	15.62	2.25	3.38	5.06	23.43	35.14		
			2.00	10,413	20.83	4.00	8.00	16.00	41.65	83.30	n=	
			2.50	10,413	26.03	6.25	15.63	39.06	65.08	162.70		7
		3/14/2006	2.69	10,413	28.05	7.25	19.54	52.62	75.54	203.44		
			10.19		106.14	21	48	114	219	496	det =	
											148.75	

	Heat Rate Constant
A	0.0000
B	10.4128
C	0.0000

Heat Rate Cuve	
MW	btu/kwh
0.4	10,412.8
0.5	10,412.8
1.0	10,412.8
1.5	10,412.8
2.0	10,412.8
2.5	10,412.8
3.0	10,412.8

EMD (X1, X2, M1-M3) AVERAGE HEAT RATE (2002-2005) Assume heat rate calculation consistent for all EMD units.

Gross X1

A	0.0000
B	10.2217
C	0.0000

GROSS INPUT VALUES*

	(MW)	Heat rate (BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y
	0.00	10,222	-	0.00	0.00	0.00	0.00	0.00
	0.50	10,222	5.11	0.25	0.13	0.06	2.56	1.28
	1.00	10,222	10.22	1.00	1.00	1.00	10.22	10.22
	1.50	10,222	15.33	2.25	3.38	5.06	23.00	34.50
	2.00	10,222	20.44	4.00	8.00	16.00	40.89	81.77
	2.50	10,222	25.55	6.25	15.63	39.06	63.89	159.71
3/2/2005	2.66	10,222	27.19	7.08	18.82	50.06	72.32	192.38
	10.16		103.85	21	47	111	213	480

n= 7

det = 140.90

Heat Rate Constant	
A	0.0000
B	10.2217
C	0.0000

Heat Rate Curve

MW	btu/kwh
0.4	10,221.7
0.5	10,221.7
1.0	10,221.7
1.5	10,221.7
2.0	10,221.7
2.5	10,221.7
3.0	10,221.7

EMD (X1, X2, M1-M3) AVERAGE HEAT RATE (2002-2005)

Assume heat rate calculation consistent for all EMD units.

Gross **X2**

			GROSS INPUT VALUES*											
				Heat rate										
A	0.0000		(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y				
B	10.0931		0.00	10,093	-	0.00	0.00	0.00	0.00	0.00				
C	0.0000		0.50	10,093	5.05	0.25	0.13	0.06	2.52	1.26				
			1.00	10,093	10.09	1.00	1.00	1.00	10.09	10.09				
			1.50	10,093	15.14	2.25	3.38	5.06	22.71	34.06				
			2.00	10,093	20.19	4.00	8.00	16.00	40.37	80.74	n=			
			2.50	10,093	25.23	6.25	15.63	39.06	63.08	157.71	7			
		3/5/2005	2.71	10,093	27.35	7.34	19.90	53.94	74.12	200.88				
			10.21		103.05	21	48	115	213	485	det =			
											152.93			

Heat Rate Constant	
A	0.0000
B	10.0931
C	0.0000

Heat Rate Curve	
MW	btu/kwh
0.4	10,093.1
0.5	10,093.1
1.0	10,093.1
1.5	10,093.1
2.0	10,093.1
2.5	10,093.1
3.0	10,093.1

EMD (X1, X2, M1-M3) AVERAGE HEAT RATE (2002-2005)

Assume heat rate calculation consistent for all EMD units.

Gross **X1**

GROSS INPUT VALUES*

			Heat rate								
			(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y	
A	0.0000		0.00	10,352	-	0.00	0.00	0.00	0.00	0.00	
B	10.3525		0.50	10,352	5.18	0.25	0.13	0.06	2.59	1.29	
C	0.0000		1.00	10,352	10.35	1.00	1.00	1.00	10.35	10.35	
			1.50	10,352	15.53	2.25	3.38	5.06	23.29	34.94	
			2.00	10,352	20.70	4.00	8.00	16.00	41.41	82.82	n=
			2.50	10,352	25.88	6.25	15.63	39.06	64.70	161.76	7
		3/19/2004	2.65	10,352	27.40	7.00	18.54	49.07	72.52	191.93	
			10.15		105.04	21	47	110	215	483	det =
											137.94

Heat Rate Constant	
A	0.0000
B	10.3525
C	0.0000

Heat Rate Curve	
MW	btu/kwh
0.4	10,352.5
0.5	10,352.5
1.0	10,352.5
1.5	10,352.5
2.0	10,352.5
2.5	10,352.5
3.0	10,352.5

EMD (X1, X2, M1-M3) AVERAGE HEAT RATE (2002-2005)

Assume heat rate calculation consistent for all EMD units.

Gross **X2**

A	0.0000
B	10.1711
C	0.0000

GROSS INPUT VALUES*

	(MW)	Heat rate (BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y
	0.00	10,171	-	0.00	0.00	0.00	0.00	0.00
	0.50	10,171	5.09	0.25	0.13	0.06	2.54	1.27
	1.00	10,171	10.17	1.00	1.00	1.00	10.17	10.17
	1.50	10,171	15.26	2.25	3.38	5.06	22.88	34.33
	2.00	10,171	20.34	4.00	8.00	16.00	40.68	81.37
	2.50	10,171	25.43	6.25	15.63	39.06	63.57	158.92
3/19/2004	2.74	10,171	27.83	7.49	20.50	56.09	76.17	208.47
	10.24		104.12	21	49	117	216	495

n= 7

det = 159.98

Heat Rate Constant	
A	0.0000
B	10.1711
C	0.0000

Heat Rate Curve calculated

MW	btu/kwh
0.4	10,171.1
0.5	10,171.1
1.0	10,171.1
1.5	10,171.1
2.0	10,171.1
2.5	10,171.1
3.0	10,171.1

EMD (X1, X2, M1-M3) AVERAGE HEAT RATE (2002-2005)

Assume heat rate calculation consistent for all EMD units.

Gross **X1**

A	0.0000
B	10.4756
C	0.0000

GROSS INPUT VALUES*

	(MW)	Heat rate (BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y
	0.00	10,476	-	0.00	0.00	0.00	0.00	0.00
	0.50	10,476	5.24	0.25	0.13	0.06	2.62	1.31
	1.00	10,476	10.48	1.00	1.00	1.00	10.48	10.48
	1.50	10,476	15.71	2.25	3.38	5.06	23.57	35.36
	2.00	10,476	20.95	4.00	8.00	16.00	41.90	83.80
	2.50	10,476	26.19	6.25	15.63	39.06	65.47	163.68
3/13/2002	2.66	10,476	27.83	7.06	18.75	49.81	73.94	196.42
	10.16		106.40	21	47	111	218	491

n= 7

det = 140.15

Heat Rate Constant	
A	0.0000
B	10.4756
C	0.0000

Heat Rate Curve

MW	btu/kwh
0.4	10,475.6
0.5	10,475.6
1.0	10,475.6
1.5	10,475.6
2.0	10,475.6
2.5	10,475.6
3.0	10,475.6

MX1-M3 AVERAGE HEAT RATE (2002-2006)
NET EMDs (MX1, MX2, M1, M2, M3)

	A	B	C	Date of test
Single Source test ABC Derivation summary	0.0000	10.41283	0.0000	3/14/2006
EMDs	0.0000	10.09312	0.0000	3/5/2005
	0.0000	10.22166	0.0000	3/2/2005
	0.0000	10.17109	0.0000	3/19/2004
	0.0000	10.35248	0.0000	3/19/2004
	0.0000	10.47561	0.0000	3/13/2002
Average of all 6 tests (gross)	0.0000	10.2878	0.0000	

Note:
1. A and C values are "0.0000" here since the EMD units are either always at NTL, or at 0.

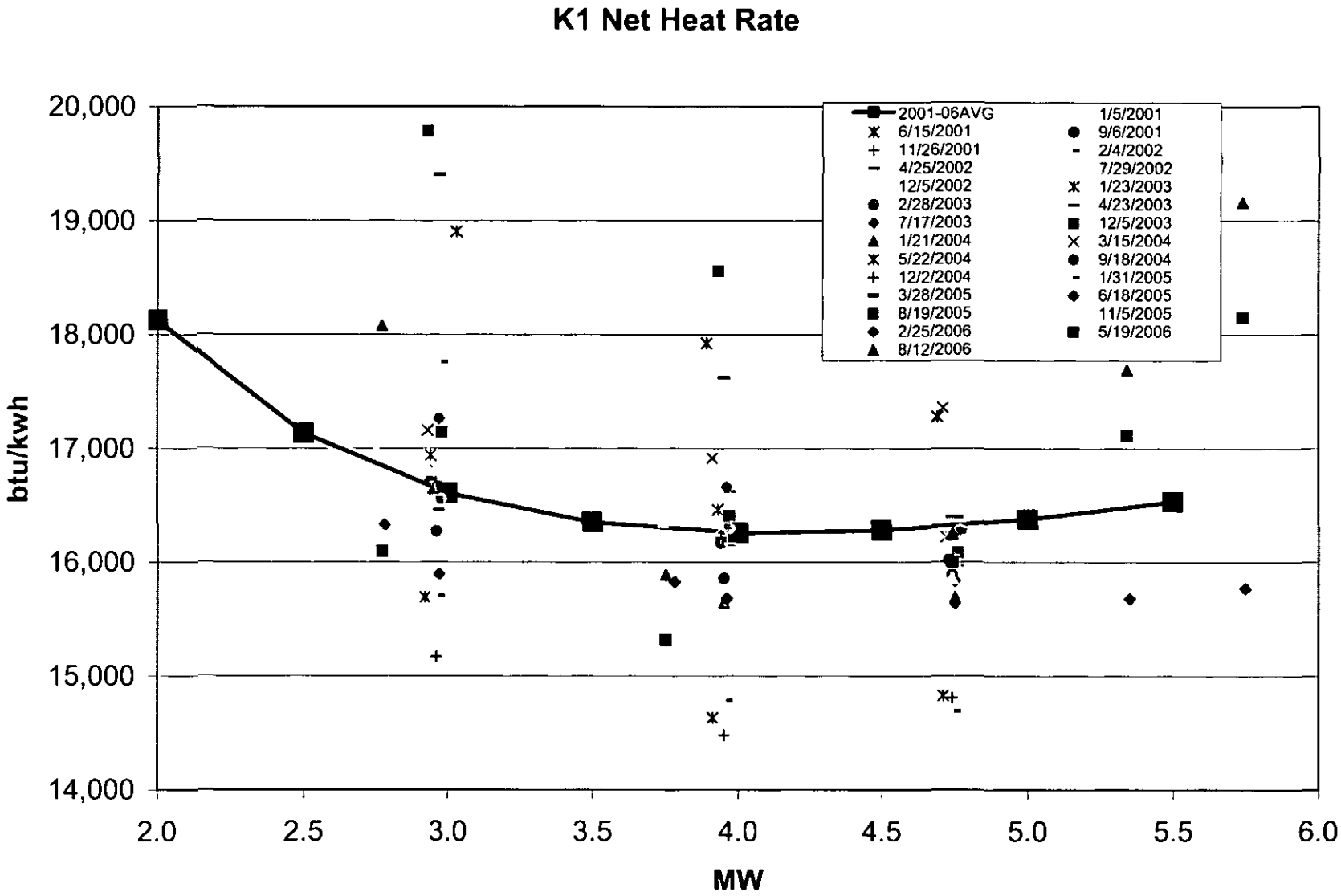
NETK1
2007TY Rate Case
A 14.0467
B 9.4630
C 0.8208

	NET INPUT VALUES*							
		Heat rate						
	(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y
1/5/2001	1.75	18107.45	31.69	3	5	9	55	97
	2.95	16822.26	49.63	9	26	76	146	432
	3.94	16298.15	64.21	16	61	241	253	997
	4.74	16236.81	76.96	22	106	505	365	1729
6/15/2001	1.83	20347.04	37.24	3	6	11	68	125
	3.03	18904.33	57.28	9	28	84	174	526
	3.89	17921.78	69.72	15	59	229	271	1055
	4.69	17279.53	81.04	22	103	484	380	1783
9/6/2001	1.74	17867.99	31.09	3	5	9	54	94
	2.94	16704.01	49.11	9	25	75	144	424
	3.94	16166.70	63.70	16	61	241	251	989
	4.73	16020.05	75.77	22	106	501	358	1695
11/26/2001	1.76	17627.13	31.02	3	5	10	55	96
	2.96	16703.32	49.44	9	26	77	146	433
	3.94	16214.88	63.89	16	61	241	252	992
	4.72	16008.32	75.56	22	105	496	357	1683
2/4/2002	1.78	21367.46	38.03	3	6	10	68	121
	2.98	17760.98	52.93	9	26	79	158	470
	3.97	16403.68	65.12	16	63	248	259	1026
	4.76	16396.58	78.05	23	108	513	372	1768
4/25/2002	1.77	18597.56	32.92	3	6	10	58	103
	2.97	17291.53	51.36	9	26	78	153	453
	3.97	16621.66	65.99	16	63	248	262	1040
	4.77	16359.69	78.04	23	109	518	372	1776
7/29/2002	1.76	18286.73	32.18	3	5	10	57	100
	2.95	17181.71	50.69	9	26	76	150	441
	3.95	16530.05	65.29	16	62	243	258	1019
	4.75	16184.93	76.88	23	107	509	365	1735
12/5/2002	1.78	17465.72	31.09	3	6	10	55	99
	2.98	16843.59	50.19	9	26	79	150	446
	3.97	16434.91	65.25	16	63	248	259	1028
	4.76	16179.81	77.02	23	108	513	367	1745
1/23/2003	1.74	17784.44	30.94	3	5	9	54	94
	2.94	16939.35	49.80	9	25	75	146	430
	3.93	16459.44	64.69	15	61	239	254	999
	4.72	16222.34	76.57	22	105	496	361	1706
2/28/2003	1.78	17213.41	30.64	3	6	10	55	97
	2.98	16554.58	49.33	9	26	79	147	438
	3.97	16296.94	64.70	16	63	248	257	1020
	4.77	16281.53	77.66	23	109	518	370	1767
4/23/2003	1.77	16927.75	29.96	3	6	10	53	94
	2.97	16459.25	48.88	9	26	78	145	431
	3.97	16155.73	64.14	16	63	248	255	1011
	4.76	15969.79	76.02	23	108	513	362	1722
7/17/2003	1.77	18168.43	32.16	3	6	10	57	101
	2.97	17261.48	51.27	9	26	78	152	452
	3.96	16660.26	65.97	16	62	246	261	1035
	4.76	16280.46	77.49	23	108	513	369	1756
12/5/2003	1.78	18495.50	32.92	3	6	10	59	104
	2.98	17139.56	51.08	9	26	79	152	454
	3.97	16407.03	65.14	16	63	248	259	1027
	4.76	16081.13	76.55	23	108	513	364	1734
1/21/2004	1.77	19411.96	34.36	3	6	10	61	108
	2.95	16647.23	49.11	9	26	76	145	427
	3.95	15643.82	61.79	16	62	243	244	964
	4.75	15692.34	74.54	23	107	509	354	1682
3/15/2004	1.73	18625.12	32.22	3	5	9	56	96
	2.93	17159.16	50.28	9	25	74	147	432
	3.91	16913.96	66.13	15	60	234	259	1011
	4.71	17356.92	81.75	22	104	492	385	1814
5/22/2004	1.72	18869.87	32.46	3	5	9	56	96
	2.92	15691.40	45.82	9	25	73	134	391
	3.91	14632.03	57.21	15	60	234	224	875
	4.71	14824.84	69.83	22	104	492	329	1549
9/18/2004	1.76	17444.20	30.70	3	5	10	54	95
	2.96	16272.03	48.17	9	26	77	143	422
	3.95	15856.10	62.63	16	62	243	247	977
	4.74	15890.48	75.32	22	106	505	357	1692
12/2/2004	1.76	17613.13	31.00	3	5	10	55	96
	2.96	15170.75	44.91	9	26	77	133	393
	3.95	14480.49	57.20	16	62	243	226	892
	4.74	14808.67	70.19	22	106	505	333	1577
1/31/2005	1.77	17978.78	31.82	3	6	10	56	100
	2.97	15704.11	46.64	9	26	78	139	411
	3.96	14786.26	58.55	16	62	246	232	918
	4.75	14691.93	69.79	23	107	509	331	1575
3/28/2005	1.77	21915.02	38.79	3	6	10	69	122
	2.97	19403.43	57.63	9	26	78	171	508
	3.95	17621.82	69.61	16	62	243	275	1086
	4.74	16400.35	77.74	22	106	505	368	1747
6/18/2005	1.77	16745.45	29.64	3	6	10	52	93
	2.97	15893.79	47.20	9	26	78	140	416
	3.96	15680.00	62.09	16	62	246	246	974
	4.75	15833.58	75.21	23	107	509	357	1697
8/19/2005	1.73	22194.85	38.40	3	5	9	66	115
	2.93	19784.85	57.97	9	25	74	170	498
	3.93	18556.06	72.93	15	61	239	287	1126
	4.73	18083.26	85.53	22	106	501	405	1914
11/5/2005	1.75	17754.16	31.07	3	5	9	54	95
	2.75	16981.04	46.70	8	21	57	128	353
	3.74	16349.52	61.15	14	52	196	229	855

	Heat Rate Constant
n= 112 A	14.0467
B	9.4630
C	0.8208

Heat Rate Curve	
MW	btu/kwh
2.0	16,128
2.5	17,134
3.0	16,607
3.5	16,349
4.0	16,258
4.5	16,278
5.0	16,376
5.5	16,531

	4.74	15859.61	75.17	22	106	505	356	1689	
	5.34	15633.63	83.48	29	152	813	446	2381	
	5.74	15511.30	89.03	33	189	1086	511	2933	
2/25/2006	1.78	17151.58	30.53	3	6	10	54	97	
	2.78	16328.63	45.39	8	21	60	126	351	
	3.78	15823.72	59.81	14	54	204	226	855	
	4.75	15636.85	74.28	23	107	509	353	1676	
	5.35	15677.39	83.87	29	153	819	449	2401	
	5.75	15768.03	90.67	33	190	1093	521	2998	
5/19/2006	1.77	18337.92	32.48	3	6	10	57	102	
	2.77	18093.20	44.58	8	21	59	123	342	
	3.75	15313.91	57.43	14	53	198	215	808	
	4.74	16000.03	75.84	22	106	505	359	1704	
	5.34	17115.10	91.39	29	152	813	488	2606	
	5.74	18151.57	104.19	33	189	1086	598	3433	
8/12/2006	1.77	22825.39	40.40	3	6	10	72	127	
	2.77	18079.20	50.08	8	21	59	139	384	
	3.75	15886.49	59.57	14	53	198	223	838	
	4.74	16247.25	77.01	22	106	505	365	1730	
	5.34	17689.39	94.46	29	152	813	504	2694	
	5.74	19161.50	109.99	33	189	1086	631	3624	
									det =
									3764342.559
NTL	391.57		6537.98	1534.36	6503.36	29068.69	25357.53	106952.18	


K1 Net Heat Rate
20,000
19,000
18,000
17,000
16,000
15,000
14,000
btu/kwh
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
MW
2001-06AVG
6/15/2001
11/26/2001
4/25/2002
12/5/2002
2/28/2003
7/17/2003
1/21/2004
5/22/2004
12/2/2004
3/28/2005
8/19/2005
2/25/2006
8/12/2006
1/5/2001
9/6/2001
2/4/2002
7/29/2002
1/23/2003
4/23/2003
12/5/2003
3/15/2004
9/18/2004
1/31/2005
6/18/2005
11/5/2005
5/19/2006

K2 AVERAGE HEAT RATE (2001-2006)

NET K2 — NET INPUT VALUES'

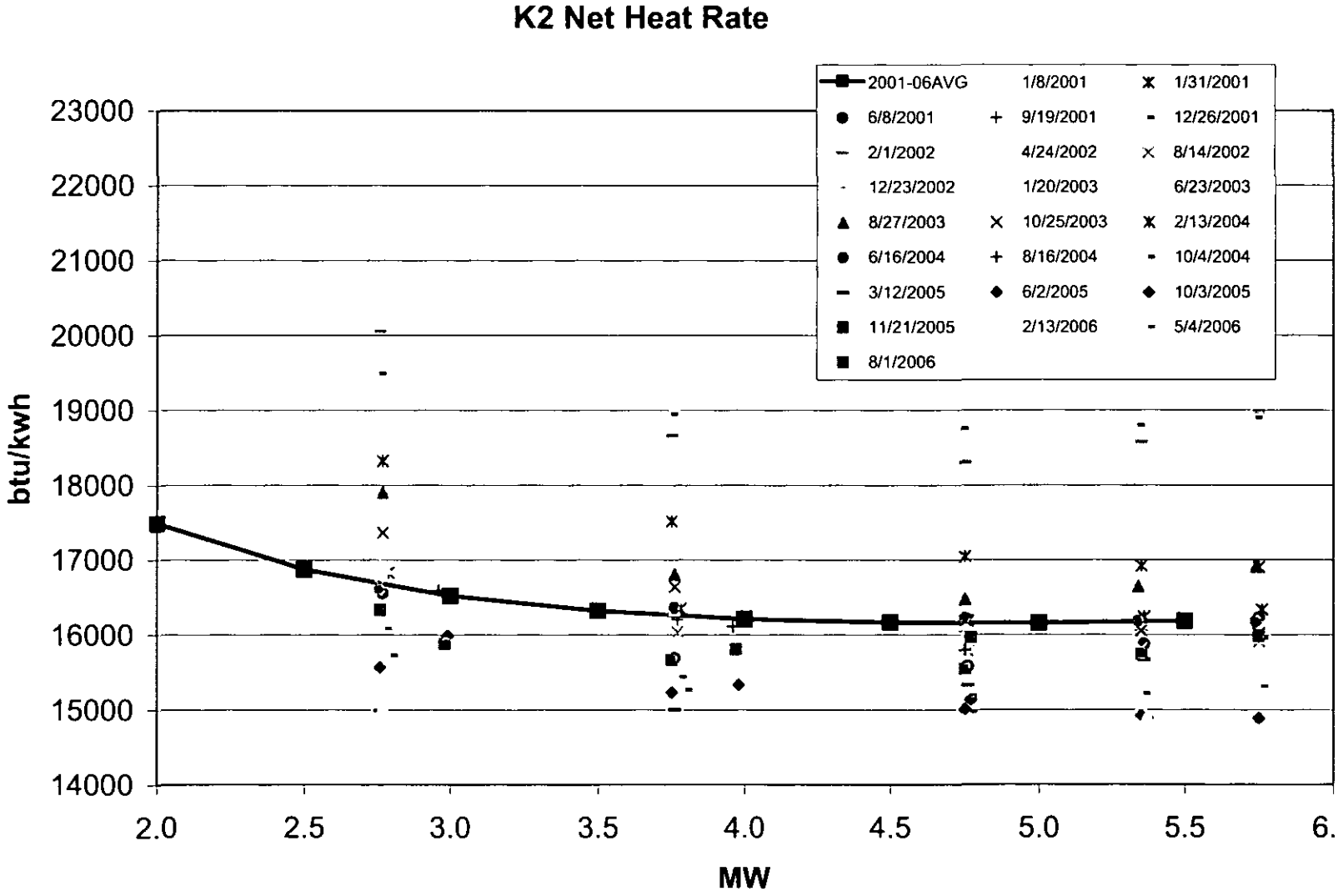
2007TY Rate Case

A	7.7579		Heat rate	(MBTU/H						
B	12.9351	(MW)	(BTU/ KWH)	)	x^2	x^3	x^4	xy	x^2y	
C	0.3343									
	1/8/2001	1.77	17,736	31.39	3	6	10	56	98	n=
		2.77	16,910	46.84	8	21	59	130	359	
		3.75	16,373	61.40	14	53	198	230	863	
		4.75	16,126	76.60	23	107	509	364	1,728	
		5.34	16,116	86.06	29	152	813	460	2,454	
		5.74	16,167	92.80	33	189	1086	533	3,058	
	1/31/2001	1.79	17,631	31.56	3	6	10	56	101	
		2.79	16,832	46.96	8	22	61	131	366	
		3.78	16,350	61.80	14	54	204	234	883	
		4.76	16,185	77.04	23	108	513	367	1,746	
		5.36	16,237	87.03	29	154	825	466	2,500	
		5.76	16,335	94.09	33	191	1101	542	3,122	
	6/8/2001	1.77	18,184	32.19	3	6	10	57	101	
		2.77	16,558	45.87	8	21	59	127	352	
		3.76	15,689	58.99	14	53	200	222	834	
		4.76	15,578	74.15	23	108	513	353	1,680	
		5.36	15,875	85.09	29	154	825	456	2,445	
		5.75	16,225	93.29	33	190	1093	536	3,084	
	9/19/2001	1.77	17,189	30.42	3	6	10	54	95	
		2.77	16,586	45.94	8	21	59	127	353	
		3.77	16,205	61.09	14	54	202	230	868	
		4.75	16,045	76.21	23	107	509	362	1,720	
		5.35	16,055	85.89	29	153	819	460	2,458	
		5.75	16,105	92.61	33	190	1093	532	3,062	
	12/26/2001	1.76	20,379	35.87	3	5	10	63	111	
		2.76	19,493	53.80	8	21	58	148	410	
		3.75	18,951	71.07	14	53	198	266	999	
		4.74	18,753	88.89	22	106	505	421	1,997	
		5.34	18,799	100.39	29	152	813	536	2,863	
		5.74	18,898	108.48	33	189	1086	623	3,574	
	2/1/2002	1.76	22,461	39.53	3	5	10	70	122	
		2.76	20,047	55.33	8	21	58	153	421	
		3.75	18,660	69.98	14	53	198	262	984	
		4.75	18,302	86.93	23	107	509	413	1,961	
		5.35	18,580	99.40	29	153	819	532	2,845	
		5.75	18,971	109.08	33	190	1093	627	3,607	
	4/24/2002	1.78	17,734	31.57	3	6	10	56	100	
		2.78	16,887	46.95	8	21	60	131	363	
		3.76	16,334	61.42	14	53	200	231	868	
		4.76	16,074	76.51	23	108	513	364	1,734	
		5.35	16,059	85.91	29	153	819	460	2,459	
		5.76	16,107	92.78	33	191	1101	534	3,078	
	8/14/2002	1.76	17,674	31.11	3	5	10	55	96	
		2.76	16,664	45.99	8	21	58	127	350	
		3.77	16,034	60.45	14	54	202	228	859	
		4.76	15,783	75.12	23	108	513	358	1,702	
		5.35	15,813	84.60	29	153	819	453	2,422	
		5.75	15,910	91.48	33	190	1093	526	3,025	
	12/23/2002	1.76	17,653	31.07	3	5	10	55	96	
		2.76	16,951	46.79	8	21	58	129	356	
		3.76	16,437	61.80	14	53	200	232	874	
		4.75	16,109	76.52	23	107	509	363	1,726	
		5.34	16,003	85.46	29	152	813	456	2,437	
		5.74	15,970	91.67	33	189	1086	526	3,020	
	1/20/2003	1.77	17,547	31.06	3	6	10	55	97	
		2.77	16,825	46.61	8	21	59	129	358	
		3.76	16,419	61.73	14	53	200	232	873	
		4.76	16,328	77.72	23	108	513	370	1,761	
		5.35	16,425	87.87	29	153	819	470	2,515	
		5.74	16,552	95.01	33	189	1086	545	3,130	
	6/23/2003	1.76	18,487	32.54	3	5	10	57	101	
		2.76	17,499	48.30	8	21	58	133	368	
		3.75	16,815	63.06	14	53	198	236	887	
		4.75	16,436	78.07	23	107	509	371	1,762	
		5.30	16,355	86.68	28	149	789	459	2,435	
		5.70	16,363	93.27	32	185	1056	532	3,030	

	Heat Rate Constant
138 A	7.7579
B	12.9351
C	0.3343

Heat Rate Curve	
MW	btu/kwh
2.0	17482.57103
2.5	16873.9145
3.0	16523.85345
3.5	16321.56126
4.0	16211.62459
4.5	16163.25828
5.0	16157.99122
5.5	16184.06907

8/27/2003	1.77	19,749	34.96	3	6	10	62	110	
	2.77	17,900	49.58	8	21	59	137	380	
	3.76	16,810	63.21	14	53	200	238	894	
	4.75	16,479	78.28	23	107	509	372	1,766	
	5.34	16,645	88.89	29	152	813	475	2,535	
	5.74	16,908	97.05	33	189	1086	557	3,198	
10/25/2003	1.77	18,366	32.51	3	6	10	58	102	
	2.77	17,366	48.10	8	21	59	133	369	
	3.76	16,642	62.57	14	53	200	235	885	
	4.75	16,192	76.91	23	107	509	365	1,735	
	5.35	16,055	85.89	29	153	819	460	2,458	
	5.75	16,018	92.10	33	190	1093	530	3,045	
2/13/2004	1.77	19,460	34.45	3	6	10	61	108	
	2.77	18,322	50.75	8	21	59	141	389	
	3.75	17,516	65.68	14	53	198	246	924	
	4.75	17,043	80.95	23	107	509	385	1,826	
	5.35	16,919	90.51	29	153	819	484	2,591	
	5.75	16,902	97.19	33	190	1093	559	3,213	
6/16/2004	1.76	16,980	29.89	3	5	10	53	93	
	2.76	16,613	45.85	8	21	58	127	349	
	3.76	16,358	61.51	14	53	200	231	870	
	4.75	16,215	77.02	23	107	509	366	1,738	
	5.34	16,183	86.42	29	152	813	461	2,464	
	5.74	16,184	92.89	33	189	1086	533	3,061	
8/16/2004	1.76	17,278	30.41	3	5	10	54	94	
	2.96	16,591	49.11	9	26	77	145	430	
	3.96	16,115	63.81	16	62	246	253	1,001	
	4.75	15,797	75.03	23	107	509	356	1,693	
10/4/2004	1.80	16,349	29.43	3	6	10	53	95	
	2.80	15,724	44.03	8	22	61	123	345	
	3.80	15,266	58.01	14	55	209	220	838	
	4.77	14,975	71.43	23	109	518	341	1,625	
	5.37	14,881	79.91	29	155	832	429	2,304	
	5.74	14,852	85.25	33	189	1086	489	2,809	
3/12/2005	1.76	15,278	26.89	3	5	10	47	83	
	2.76	14,984	41.36	8	21	58	114	315	
	3.76	15,000	56.40	14	53	200	212	797	
	4.76	15,325	72.95	23	108	513	347	1,653	
	5.36	15,668	83.98	29	154	825	450	2,413	
	5.76	15,959	91.93	33	191	1101	529	3,050	
6/2/2005	1.76	16,005	28.17	3	5	10	50	87	
	2.76	15,564	42.96	8	21	58	119	327	
	3.75	15,231	57.11	14	53	198	214	803	
	4.75	15,005	71.27	23	107	509	339	1,608	
	5.35	14,922	79.83	29	153	819	427	2,285	
	5.75	14,888	85.60	33	190	1093	492	2,830	
10/3/2005	1.79	17,359	31.07	3	6	10	56	100	
	2.99	15,987	47.80	9	27	80	143	427	
	3.98	15,333	61.03	16	63	251	243	967	
	4.77	15,131	72.17	23	109	518	344	1,642	
11/21/2005	1.76	17,557	30.90	3	5	10	54	96	
	2.76	16,336	45.09	8	21	58	124	343	
	3.75	15,667	58.75	14	53	198	220	826	
	4.75	15,549	73.86	23	107	509	351	1,666	
	5.35	15,743	84.22	29	153	819	451	2,411	
	5.75	15,982	91.90	33	190	1093	528	3,038	
2/13/2006	1.77	15,705	27.80	3	6	10	49	87	
	2.77	15,036	41.65	8	21	59	115	320	
	3.77	14,712	55.47	14	54	202	209	788	
	4.77	14,735	70.28	23	109	518	335	1,599	
	5.37	14,914	80.09	29	155	832	430	2,310	
	5.77	15,103	87.14	33	192	1108	503	2,901	
5/4/2006	1.78	17,104	30.44	3	6	10	54	96	
	2.78	16,082	44.71	8	21	60	124	346	
	3.78	15,443	58.38	14	54	204	221	834	
	4.77	15,187	72.44	23	109	518	346	1,648	
	5.36	15,217	81.57	29	154	825	437	2,343	
	5.76	15,314	88.21	33	191	1101	508	2,927	
8/1/2006	1.78	16,376	29.15	3	6	10	52	92	
	2.98	15,882	47.33	9	26	79	141	420	
	3.97	15,806	62.75	16	63	248	249	989	
	4.77	15,965	76.15	23	109	518	363	1,733	
									det =
									12,181,751.93
	547.64		8,972	2,445	11,747	59,043	39,797	190,646	


K2 Net Heat Rate
2001-06AVG
1/8/2001
1/31/2001
6/8/2001
9/19/2001
12/26/2001
2/1/2002
4/24/2002
8/14/2002
12/23/2002
1/20/2003
6/23/2003
8/27/2003
10/25/2003
2/13/2004
6/16/2004
8/16/2004
10/4/2004
3/12/2005
6/2/2005
10/3/2005
11/21/2005
2/13/2006
5/4/2006
8/1/2006
23000
22000
21000
20000
19000
18000
17000
16000
15000
14000
btu/kwh
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
MW

NETK3
2007TY Rate Case
A 21.1064
B 9.6550
C 0.1402

	NET INPUT VALUES* (MW)	Heat rate (BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y
1/10/2001	6.05	13698	82.88	37	221	1340	501	3,033
	7.55	13386	101.06	57	430	3249	763	5,761
	8.54	13229	112.98	73	623	5319	965	8,240
	9.54	13114	125.11	91	868	8283	1,194	11,386
	11.02	13018	143.46	121	1338	14748	1,581	17,421
	12.00	13005	156.06	144	1728	20736	1,873	22,473
6/14/2001	6.07	14163	85.97	37	224	1358	522	3,168
	7.57	13571	102.73	57	434	3284	778	5,887
	8.57	13342	114.34	73	629	5394	980	8,398
	9.57	13246	126.77	92	876	8388	1,213	11,610
	11.04	13352	147.41	122	1346	14855	1,627	17,966
	12.01	13589	163.21	144	1732	20805	1,960	23,541
9/20/2001	6.07	13847	84.05	37	224	1358	510	3,097
	7.57	13318	100.82	57	434	3284	763	5,777
	8.55	13088	111.90	73	625	5344	957	8,180
	9.54	12956	123.60	91	868	8283	1,179	11,249
	11.02	12942	142.62	121	1338	14748	1,572	17,319
	12.00	13055	156.66	144	1728	20736	1,880	22,559
11/8/2001	5.96	14735	87.82	36	212	1262	523	3,120
	7.46	14158	105.62	56	415	3097	788	5,878
	8.48	13898	117.86	72	610	5171	999	8,475
	9.49	13739	130.38	90	855	8111	1,237	11,742
	10.96	13687	150.00	120	1317	14429	1,644	18,019
	11.97	13777	164.91	143	1715	20529	1,974	23,628
1/2/2002	6.04	13395	80.91	36	220	1331	489	2,952
	7.54	13210	99.60	57	429	3232	751	5,663
	8.54	13099	111.87	73	623	5319	955	8,159
	9.53	12999	123.88	91	866	8248	1,181	11,251
	11.00	12869	141.56	121	1331	14641	1,557	17,128
	12.00	12795	153.54	144	1728	20736	1,842	22,110
5/9/2002	6.09	16131	98.24	37	226	1376	598	3,644
	7.59	14690	111.50	58	437	3319	846	6,423
	8.59	13973	120.03	74	634	5445	1,031	8,857
	9.54	13451	128.32	91	868	8283	1,224	11,679
	11.03	13033	143.76	122	1342	14801	1,586	17,489
	12.01	12998	156.11	144	1732	20805	1,875	22,517
8/15/2002	6.05	15133	91.56	37	221	1340	554	3,351
	7.55	14152	106.85	57	430	3249	807	6,091
	8.54	13675	116.79	73	623	5319	997	8,517
	9.49	13341	126.60	90	855	8111	1,201	11,402
	11.03	13105	144.55	122	1342	14801	1,594	17,586
	12.01	13126	157.64	144	1732	20805	1,893	22,738
9/9/2002	6.05	13983	84.60	37	221	1340	512	3,097
	7.55	13614	102.79	57	430	3249	776	5,859
	8.50	13430	114.16	72	614	5220	970	8,248
	9.53	13297	126.72	91	866	8248	1,208	11,509
	11.00	13192	145.11	121	1331	14641	1,596	17,558
	12.00	13184	158.21	144	1728	20736	1,899	22,782
12/16/2002	6.10	13770	83.99	37	227	1385	512	3,125
	7.60	13412	101.93	58	439	3336	775	5,888
	8.60	13259	114.02	74	636	5470	981	8,433
	9.52	13173	125.40	91	863	8214	1,194	11,365
	11.01	13170	145.00	121	1335	14694	1,596	17,577
	11.99	13253	158.90	144	1724	20667	1,905	22,844
1/16/2003	6.06	14094	85.41	37	223	1349	518	3,136
	7.56	13703	103.60	57	432	3267	783	5,921
	8.56	13505	115.60	73	627	5369	990	8,470
	9.55	13355	127.54	91	871	8318	1,218	11,632
	11.03	13223	145.85	122	1342	14801	1,609	17,745
	12.01	13197	158.50	144	1732	20805	1,904	22,862
5/30/2003	6.06	13467	81.61	37	223	1349	495	2,997
	7.56	13178	99.62	57	432	3267	753	5,694
	8.56	13036	111.59	73	627	5369	955	8,177
	9.56	12937	123.68	91	874	8353	1,182	11,303
	11.01	12866	141.66	121	1335	14694	1,560	17,172
	12.00	12871	154.45	144	1728	20736	1,853	22,241
8/20/2003	6.05	14368	86.93	37	221	1340	526	3,182
	7.55	14102	106.47	57	430	3249	804	6,069
	8.55	13966	119.41	73	625	5344	1,021	8,729
	9.54	13863	132.26	91	868	8283	1,262	12,037
	11.01	13772	151.63	121	1335	14694	1,669	18,380
	12.00	13752	165.03	144	1728	20736	1,980	23,764
10/15/2003	6.04	14145	85.44	36	220	1331	516	3,117
	7.54	13744	103.63	57	429	3232	781	5,891
	8.54	13549	115.71	73	623	5319	988	8,439
	9.53	13413	127.82	91	866	8248	1,218	11,609
	11.01	13317	146.62	121	1335	14694	1,614	17,773
	12.00	13326	159.91	144	1728	20736	1,919	23,027
12/17/2003	6.10	13623	83.10	37	227	1385	507	3,092

n= 160

	Heat Rate Constant
A	21.1064
B	9.6550
C	0.1402

Heat Rate Curve MW	btu/kwh
6	14013.87
7	13651.53
8	13414.81
9	13261.86
10	13167.53
11	13115.84
12	13096.13

	7.60	13495	102.56	58	439	3336	779	5,924
	8.60	13381	115.07	74	636	5470	990	8,511
	9.54	13243	126.34	91	868	8283	1,205	11,498
	11.03	12994	143.32	122	1342	14801	1,581	17,437
	12.03	12799	153.97	145	1741	20944	1,852	22,283
2/9/2004	6.10	15690	95.71	37	227	1385	584	3,561
	7.60	14309	108.75	58	439	3336	827	6,281
	8.60	13661	117.48	74	636	5470	1,010	8,689
	9.55	13230	126.34	91	871	8318	1,207	11,523
	11.01	12990	143.02	121	1335	14694	1,575	17,337
	12.01	13103	157.36	144	1732	20805	1,890	22,698
5/27/2004	6.08	13914	84.60	37	225	1367	514	3,127
	7.58	13688	103.75	57	436	3301	786	5,961
	8.57	13574	116.33	73	629	5394	997	8,544
	9.55	13489	128.82	91	871	8318	1,230	11,749
	11.03	13417	147.98	122	1342	14801	1,632	18,004
	12.03	13405	161.26	145	1741	20944	1,940	23,338
9/17/2004	6.03	13741	82.86	36	219	1322	500	3,013
	7.53	13555	102.07	57	427	3215	769	5,788
	8.53	13477	114.96	73	621	5294	981	8,365
	9.53	13435	128.04	91	866	8248	1,220	11,628
	11.00	13440	147.84	121	1331	14641	1,626	17,889
	11.99	13489	161.74	144	1724	20667	1,939	23,251
11/11/2004	6.06	13751	83.33	37	223	1349	505	3,060
	7.56	13628	103.02	57	432	3267	779	5,888
	8.55	13547	115.82	73	625	5344	990	8,467
	9.56	13467	128.74	91	874	8353	1,231	11,766
	11.01	13349	146.98	121	1335	14694	1,618	17,816
	12.00	13272	159.27	144	1728	20736	1,911	22,935
2/2/2005	6.06	13601	82.42	37	223	1349	499	3,027
	7.56	13355	100.96	57	432	3267	763	5,770
	8.54	13261	113.25	73	623	5319	967	8,259
	9.54	13223	126.15	91	868	8283	1,203	11,481
	11.01	13271	148.11	121	1335	14694	1,609	17,712
	11.99	13373	160.35	144	1724	20667	1,923	23,052
6/22/2005	6.04	14763	89.17	36	220	1331	539	3,253
	7.54	14222	107.24	57	429	3232	809	6,097
	8.54	13962	119.23	73	623	5319	1,018	8,696
	9.54	13780	131.46	91	868	8283	1,254	11,965
	11.01	13658	150.37	121	1335	14694	1,656	18,228
	11.99	13676	163.97	144	1724	20667	1,966	23,572
7/20/2005	6.04	14978	90.47	36	220	1331	546	3,300
	8.04	14027	112.78	65	520	4179	907	7,290
	10.03	13647	136.88	101	1009	10121	1,373	13,770
	11.01	13671	150.52	121	1335	14694	1,657	18,246
11/24/2005	6.04	12636	76.32	36	220	1331	461	2,784
	8.04	13012	104.62	65	520	4179	841	6,763
	10.04	13075	131.27	101	1012	10161	1,318	13,232
	11.02	12989	143.14	121	1338	14748	1,577	17,382
11/25/2005	6.05	13835	83.70	37	221	1340	506	3,064
	7.55	13308	100.48	57	430	3249	759	5,728
	8.55	13055	111.62	73	625	5344	954	8,159
	9.55	12878	122.99	91	871	8318	1,175	11,217
	11.03	12759	140.73	122	1342	14801	1,552	17,122
	12.01	12776	153.45	144	1732	20805	1,843	22,133
1/7/2006	6.03	13494	81.37	36	219	1322	491	2,959
	7.53	13200	99.40	57	427	3215	748	5,636
	8.53	13048	111.30	73	621	5294	949	8,098
	9.53	12930	123.22	91	866	8248	1,174	11,191
	11.01	12819	141.14	121	1335	14694	1,554	17,109
	12.01	12789	153.59	144	1732	20805	1,845	22,154
4/26/2006	6.03	13007	78.43	36	219	1322	473	2,852
	8.03	12778	102.61	64	518	4158	824	6,616
	10.01	12546	125.59	100	1003	10040	1,257	12,584
	11.01	12429	136.84	121	1335	14694	1,507	16,588
5/12/2006	6.03	12429	74.95	36	219	1322	452	2,725
	8.03	12476	100.18	64	518	4158	804	6,460
	10.01	12408	124.21	100	1003	10040	1,243	12,445
	10.99	12331	135.52	121	1327	14588	1,489	16,368
5/29/2006	6.04	13102	79.14	36	220	1331	478	2,887
	7.54	12582	94.87	57	429	3232	715	5,393
	8.54	12357	105.52	73	623	5319	901	7,696
	9.54	12228	116.66	91	868	8283	1,113	10,617
	11.02	12217	134.63	121	1338	14748	1,484	16,350
	12.01	12331	148.10	144	1732	20805	1,779	21,362
7/22/2006	6.05	13207	79.90	37	221	1340	483	2,925
	7.55	12740	96.19	57	430	3249	726	5,483
	8.55	12514	107.00	73	625	5344	915	7,822
	9.54	12358	117.89	91	868	8283	1,125	10,729
	11.01	12252	134.89	121	1335	14694	1,485	16,351
	12.01	12267	147.32	144	1732	20805	1,769	21,250
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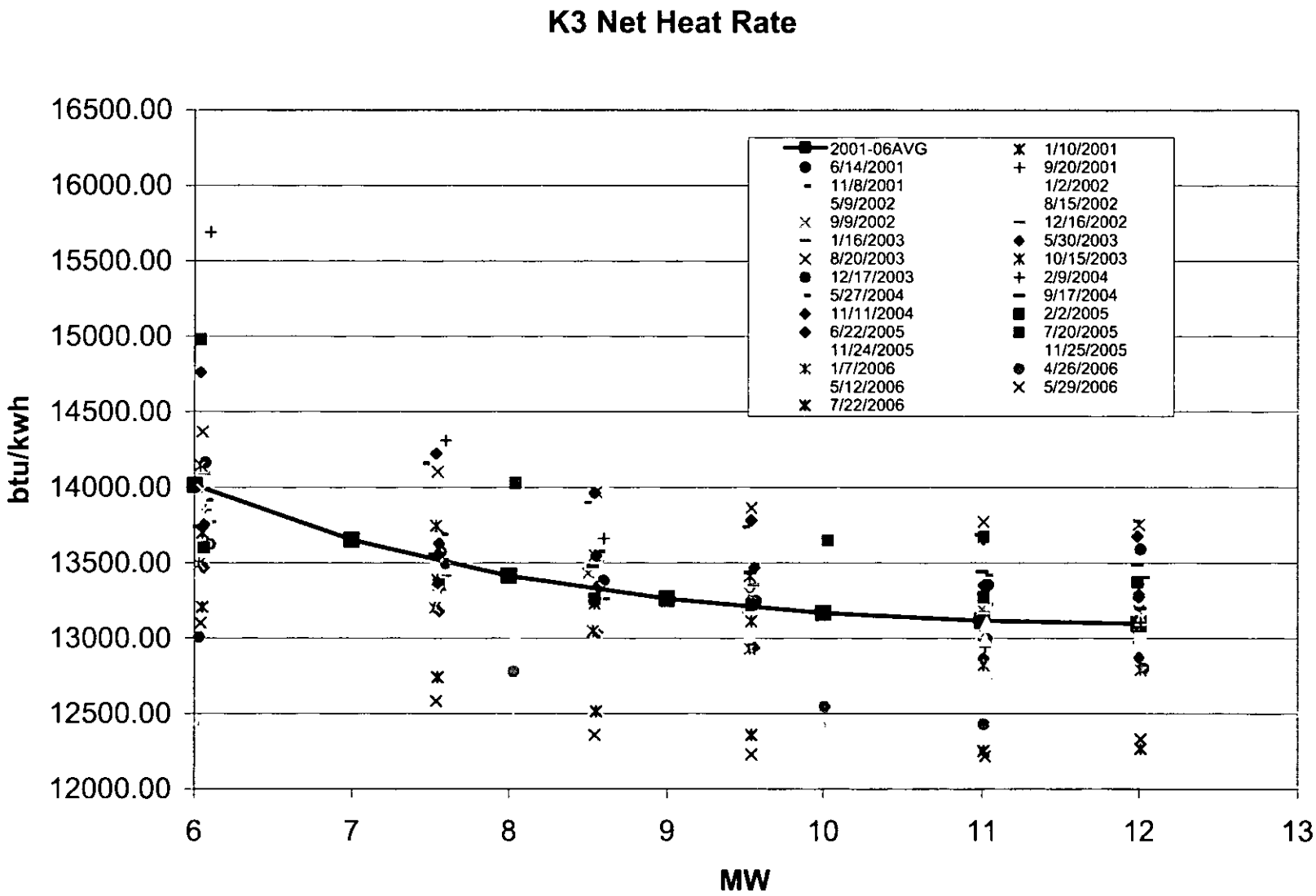
K3 Net Heat Rate
16500.00
16000.00
15500.00
15000.00
14500.00
14000.00
13500.00
13000.00
12500.00
12000.00
btu/kwh
6
7
8
9
10
11
12
13
MW
2001-06AVG
6/14/2001
11/8/2001
5/9/2002
9/9/2002
1/16/2003
8/20/2003
12/17/2003
5/27/2004
11/11/2004
6/22/2005
11/24/2005
1/7/2006
5/12/2006
7/22/2006
1/10/2001
9/20/2001
1/2/2002
8/15/2002
12/16/2002
5/30/2003
10/15/2003
2/9/2004
9/17/2004
2/2/2005
7/20/2005
11/25/2005
4/26/2006
5/29/2006

NET K4
2007TY Rate Case

A	39.0151
B	7.0081
C	0.3212

	NET INPUT VALUES*								
		Heat rate							
	(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y	
1/15/2001	5.98	14817	88.61	36	214	1279	530	3,169	
	7.45	14775	110.07	56	413	3081	820	6,109	
	8.45	14413	121.79	71	603	5098	1,029	8,696	
	9.43	14168	133.60	89	839	7908	1,260	11,880	
	10.91	14020	152.95	119	1299	14168	1,669	18,206	
	11.89	14067	167.26	141	1681	19988	1,989	23,646	n=
4/11/2001	5.94	16230	96.41	35	210	1245	573	3,402	204
	7.44	15575	115.88	55	412	3064	862	6,414	
	8.45	15272	129.05	71	603	5098	1,090	9,214	
	9.45	15075	142.46	89	844	7975	1,346	12,722	
	10.91	14980	163.44	119	1299	14168	1,783	19,454	
	11.86	15050	178.50	141	1668	19785	2,117	25,108	
9/17/2001	5.97	14074	84.02	36	213	1270	502	2,995	
	7.47	13660	102.04	56	417	3114	762	5,694	
	8.45	13449	113.65	71	603	5098	960	8,115	
	9.45	13291	125.60	89	844	7975	1,187	11,216	
	10.95	13152	144.02	120	1313	14377	1,577	17,268	
	11.93	13125	156.58	142	1698	20256	1,868	22,286	
12/27/2001	5.98	14817	88.61	36	214	1279	530	3,169	
	7.48	14249	106.58	56	419	3130	797	5,963	
	8.48	13974	118.50	72	610	5171	1,005	8,521	
	9.46	13780	130.36	89	847	8009	1,233	11,666	
	10.96	13645	149.55	120	1317	14429	1,639	17,964	
	11.93	13658	162.94	142	1698	20256	1,944	23,190	
2/6/2002	5.94	15445	91.75	35	210	1245	545	3,237	
	7.44	14569	108.39	55	412	3064	806	6,000	
	8.44	14162	119.53	71	601	5074	1,009	8,514	
	9.40	13898	130.64	88	831	7807	1,228	11,543	
	10.90	13768	150.07	119	1295	14116	1,636	17,830	
	11.93	13860	165.35	142	1698	20256	1,973	23,533	
4/11/2002	5.97	15646	93.41	36	213	1270	558	3,329	
	7.47	14823	110.72	56	417	3114	827	6,179	
	8.47	14453	122.42	72	608	5147	1,037	8,782	
	9.48	14227	134.59	89	847	8009	1,273	12,044	
	10.96	14157	155.16	120	1317	14429	1,701	18,638	
	11.92	14290	170.33	142	1694	20189	2,030	24,202	
4/26/2002	5.98	15444	92.36	36	214	1279	552	3,303	
	7.48	14704	109.99	56	419	3130	823	6,154	
	8.48	14324	121.47	72	610	5171	1,030	8,735	
	9.45	14036	132.64	89	844	7975	1,253	11,845	
	10.94	13773	150.68	120	1309	14324	1,648	18,034	
	11.93	13712	163.59	142	1698	20256	1,952	23,283	
8/12/2002	5.98	14805	88.53	36	214	1279	529	3,166	
	7.48	14380	107.56	56	419	3130	805	6,018	
	8.48	14145	119.95	72	610	5171	1,017	8,626	
	9.46	13948	131.95	89	847	8009	1,248	11,808	
	10.94	13724	150.15	120	1309	14324	1,643	17,970	
	11.94	13623	162.66	143	1702	20324	1,942	23,189	
11/27/2002	5.96	15595	92.95	36	212	1262	554	3,302	
	7.46	14808	110.47	56	415	3097	824	6,148	
	8.44	14416	121.67	71	601	5074	1,027	8,667	
	9.43	14130	133.24	89	839	7908	1,256	11,849	
	10.93	13899	151.91	119	1306	14272	1,660	18,148	
	11.91	13677	165.27	142	1689	20121	1,968	23,443	
1/15/2003	5.97	15367	91.74	36	213	1270	548	3,270	
	7.47	14808	110.62	56	417	3114	826	6,173	
	8.45	14519	122.69	71	603	5098	1,037	8,760	
	9.45	14297	135.11	89	844	7975	1,277	12,066	
	10.93	14089	153.99	119	1306	14272	1,683	18,397	
	11.93	14034	167.42	142	1698	20256	1,997	23,828	
4/14/2003	5.95	16459	97.93	35	211	1253	583	3,467	
	7.45	15260	113.68	56	413	3081	847	6,310	
	8.44	14750	124.49	71	601	5074	1,051	8,868	
	9.44	14474	136.63	89	841	7941	1,290	12,176	
	10.91	14494	158.12	119	1299	14168	1,725	18,821	
	11.87	14797	175.64	141	1672	19852	2,085	24,747	
4/17/2003	5.94	15737	93.48	35	210	1245	555	3,298	
	7.44	15138	112.63	55	412	3064	838	6,234	
	8.43	14861	125.28	71	599	5050	1,056	8,903	
	9.43	14680	138.43	89	839	7908	1,305	12,310	
	10.90	14591	159.04	119	1295	14116	1,734	18,896	
	11.88	14853	174.08	141	1677	19919	2,068	24,569	
6/2/2003	5.97	15109	90.20	36	213	1270	538	3,215	
	7.47	14796	110.53	56	417	3114	826	6,168	
	8.46	14640	123.86	72	605	5122	1,048	8,865	
	9.45	14526	137.27	89	844	7975	1,297	12,259	
	10.93	14433	157.76	119	1306	14272	1,724	18,846	
	11.91	14424	171.79	142	1689	20121	2,046	24,368	
8/9/2003	5.95	16147	96.08	35	211	1253	572	3,401	
	7.45	15075	112.31	56	413	3081	837	6,233	
	8.45	14554	122.98	71	603	5098	1,039	8,781	
	9.45	14189	134.09	89	844	7975	1,267	11,974	
	10.92	13933	152.15	119	1302	14220	1,662	18,144	
	11.91	13957	166.23	142	1689	20121	1,980	23,580	
8/11/2003	5.94	15119	89.81	35	210	1245	533	3,169	
	7.44	14445	107.47	55	412	3064	800	5,949	
	8.44	14117	119.15	71	601	5074	1,006	8,487	
	9.44	13886	131.08	89	841	7941	1,237	11,681	
	10.92	13720	149.82	119	1302	14220	1,636	17,865	
	11.92	13730	163.66	142	1694	20189	1,951	23,254	
8/25/2003	5.95	17190	102.28	35	211	1253	609	3,621	
	7.45	15448	115.09	56	413	3081	857	6,388	
	8.45	14597	123.34	71	603	5098	1,042	8,807	
	9.45	13995	132.25	89	844	7975	1,250	11,810	
	10.93	13558	148.19	119	1306	14272	1,620	17,703	
	11.92	13578	161.85	142	1694	20189	1,929	22,996	
11/14/2003	5.94	16052	95.35	35	210	1245	566	3,364	
	7.44	15236	113.38	55	412	3064	843	6,275	
	8.41	14857	124.94	71	595	5002	1,051	8,837	
	9.41	14608	137.48	89	833	7841	1,294	12,172	
	10.91	14482	158.00	119	1299	14168	1,724	18,807	
	11.87	14563	172.86	141	1672	19852	2,052	24,355	
12/11/2003	5.94	16421	97.54	35	210	1245	579	3,442	

	Heat Rate Constant	Heat Rate Curve kW	Heat Rate Curve btu/kwh
A	39.0151	6.0	15437.82
B	7.0081	7.0	14830.09
C	0.3212	8.0	14454.59
		9.0	14233.92
		10.0	14121.62
		11.0	14088.14
		12.0	14113.78
		13.0	14184.89
		14.0	14291.72

	7.44	15312	113.92	55	412	3064	848	6,306
	8.43	14796	124.73	71	599	5050	1,051	8,864
	9.43	14458	136.34	89	839	7908	1,286	12,124
	10.89	14286	155.58	119	1291	14064	1,694	18,450
	11.87	14395	170.87	141	1672	19852	2,028	24,075
2/20/2004	5.95	16018	95.31	35	211	1253	567	3,374
	7.45	15230	113.48	56	413	3081	845	6,297
	8.45	14897	125.88	71	603	5098	1,064	8,988
	9.43	14718	138.79	89	839	7908	1,309	12,342
	10.91	14738	160.79	119	1299	14168	1,754	19,138
	11.88	14943	177.52	141	1677	19919	2,109	25,064
6/7/2004	5.99	17284	103.53	36	215	1287	620	3,715
	7.49	15108	113.16	56	420	3147	848	6,348
	8.47	14553	123.26	72	608	5147	1,044	8,843
	9.42	14713	138.60	89	836	7874	1,306	12,299
	10.91	16296	177.78	119	1299	14168	1,940	21,161
	11.91	18245	217.30	142	1689	20121	2,588	30,824
6/8/2004	5.99	15617	93.55	36	215	1287	560	3,356
	7.49	14889	111.52	56	420	3147	835	6,256
	8.49	14600	123.95	72	612	5196	1,052	8,934
	9.43	14467	136.43	89	839	7908	1,286	12,132
	10.90	14562	158.73	119	1295	14116	1,730	18,859
	11.88	14822	176.08	141	1677	19919	2,092	24,851
7/28/2004	6.01	14896	89.52	36	217	1305	538	3,234
	7.51	14111	105.97	56	424	3181	796	5,977
	8.50	13764	117.00	72	614	5220	994	8,453
	9.45	13560	128.14	89	844	7975	1,211	11,444
	10.93	13520	147.78	119	1306	14272	1,615	17,654
	11.92	13671	162.96	142	1694	20189	1,942	23,154
8/2/2004	6.01	15137	90.97	36	217	1305	547	3,286
	7.51	14336	107.66	56	424	3181	809	6,072
	8.49	13975	118.65	72	612	5196	1,007	8,552
	9.45	13754	129.98	89	844	7975	1,228	11,607
	10.93	13684	149.57	119	1306	14272	1,635	17,868
	11.93	13811	164.77	142	1698	20256	1,966	23,450
8/7/2004	5.99	14832	88.85	36	215	1287	532	3,188
	7.49	14201	106.36	56	420	3147	797	5,967
	8.49	13904	118.04	72	612	5196	1,002	8,508
	9.48	13706	129.93	90	852	8077	1,232	11,677
	10.94	13595	148.73	120	1309	14324	1,627	17,800
	11.91	13645	162.51	142	1689	20121	1,936	23,052
8/12/2004	5.97	15275	91.19	36	213	1270	544	3,250
	7.47	14609	109.13	56	417	3114	815	6,089
	8.47	14283	120.98	72	608	5147	1,025	8,679
	9.47	14053	133.08	90	849	8043	1,260	11,935
	10.93	13886	151.77	119	1306	14272	1,659	18,131
	11.92	13893	165.61	142	1694	20189	1,974	23,531
12/16/2004	5.98	14905	89.13	36	214	1279	533	3,187
	7.48	14442	108.03	56	419	3130	808	6,044
	8.48	14244	120.79	72	610	5171	1,024	8,686
	9.42	14135	133.15	89	836	7874	1,254	11,815
	10.91	14137	154.23	119	1299	14168	1,683	18,358
	11.89	14248	169.41	141	1681	19986	2,014	23,950
2/17/2005	5.93	16514	97.93	35	209	1237	581	3,444
	7.43	15343	114.00	55	410	3048	847	6,293
	8.43	14804	124.80	71	599	5050	1,052	8,869
	9.43	14460	136.36	89	839	7908	1,286	12,126
	10.92	14307	156.23	119	1302	14220	1,706	18,630
	11.88	14447	171.64	141	1677	19919	2,039	24,224
4/13/2005	5.96	15029	89.58	36	212	1262	534	3,182
	7.46	14887	111.06	56	415	3097	829	6,181
	8.46	14839	125.54	72	605	5122	1,062	8,985
	9.48	14829	140.28	89	847	8009	1,327	12,554
	10.92	14883	162.53	119	1302	14220	1,775	19,381
	11.91	14967	178.26	142	1689	20121	2,123	25,285
5/24/2005	5.98	14223	85.05	36	214	1279	509	3,041
	7.48	13824	103.40	56	419	3130	773	5,785
	8.48	13618	115.48	72	610	5171	979	8,305
	9.48	13462	127.62	90	852	8077	1,210	11,469
	10.95	13318	145.83	120	1313	14377	1,597	17,486
	11.93	13283	158.47	142	1698	20256	1,891	22,554
8/27/2005	5.97	17114	102.17	36	213	1270	610	3,641
	7.47	15780	117.88	56	417	3114	881	6,578
	8.47	15036	127.35	72	608	5147	1,079	9,136
	9.47	14407	136.44	90	849	8043	1,292	12,236
	10.94	13682	149.68	120	1309	14324	1,638	17,914
	11.94	13343	159.32	143	1702	20324	1,902	22,713
12/22/2005	5.95	13394	79.69	35	211	1253	474	2,821
	7.45	13504	100.61	56	413	3081	750	5,584
	8.45	13548	114.48	71	603	5098	967	8,174
	9.45	13568	128.22	89	844	7975	1,212	11,450
	10.94	13553	148.27	120	1309	14324	1,622	17,746
	11.91	13514	160.95	142	1689	20121	1,917	22,830
1/21/2006	5.95	15081	89.73	35	211	1253	534	3,177
	7.45	14288	106.43	56	413	3081	793	5,907
	8.45	13898	117.43	71	603	5098	992	8,385
	9.45	13621	128.72	89	844	7975	1,216	11,495
	10.94	13419	146.80	120	1309	14324	1,606	17,570
	11.94	13425	160.30	143	1702	20324	1,914	22,852
4/15/2006	5.98	14406	86.15	36	214	1279	515	3,081
	7.48	14143	105.79	56	419	3130	791	5,919
	8.48	14005	118.76	72	610	5171	1,007	8,540
	9.47	13897	131.61	90	849	8043	1,246	11,803
	10.96	13793	151.17	120	1317	14429	1,657	18,158
	11.96	13760	164.57	143	1711	20461	1,968	23,541
8/31/2006	5.94	14129	83.93	35	210	1245	499	2,961
	7.44	13882	103.28	55	412	3064	768	5,717
	8.44	13758	116.12	71	601	5074	980	8,271
	9.44	13667	129.01	89	841	7941	1,218	11,497
	10.94	13591	148.89	120	1309	14324	1,627	17,796
	11.92	13582	161.89	142	1694	20189	1,930	23,003

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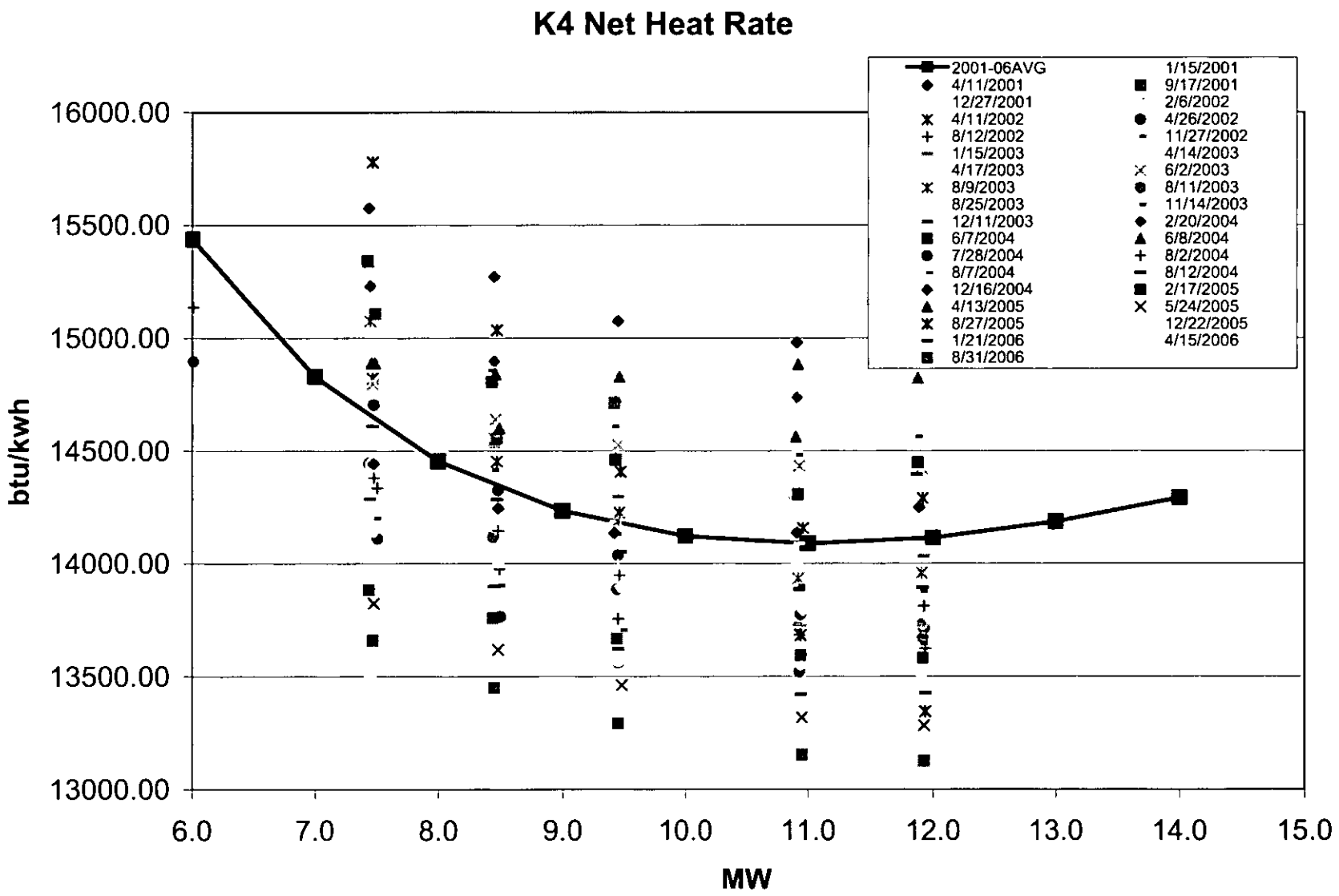

K4 Net Heat Rate
2001-06AVG
1/15/2001
4/11/2001
9/17/2001
12/27/2001
2/6/2002
4/11/2002
4/26/2002
8/12/2002
11/27/2002
1/15/2003
4/14/2003
4/17/2003
6/2/2003
8/9/2003
8/11/2003
8/25/2003
11/14/2003
12/11/2003
2/20/2004
6/7/2004
6/8/2004
7/28/2004
8/2/2004
8/7/2004
8/12/2004
12/16/2004
2/17/2005
4/13/2005
5/24/2005
8/27/2005
12/22/2005
1/21/2006
4/15/2006
8/31/2006
16000.00
15500.00
15000.00
14500.00
14000.00
13500.00
13000.00
btu/kwh
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
MW

M4-7 AVERAGE HEAT RATE (2001-2006)

NET M4-7

2007TY Rate Case

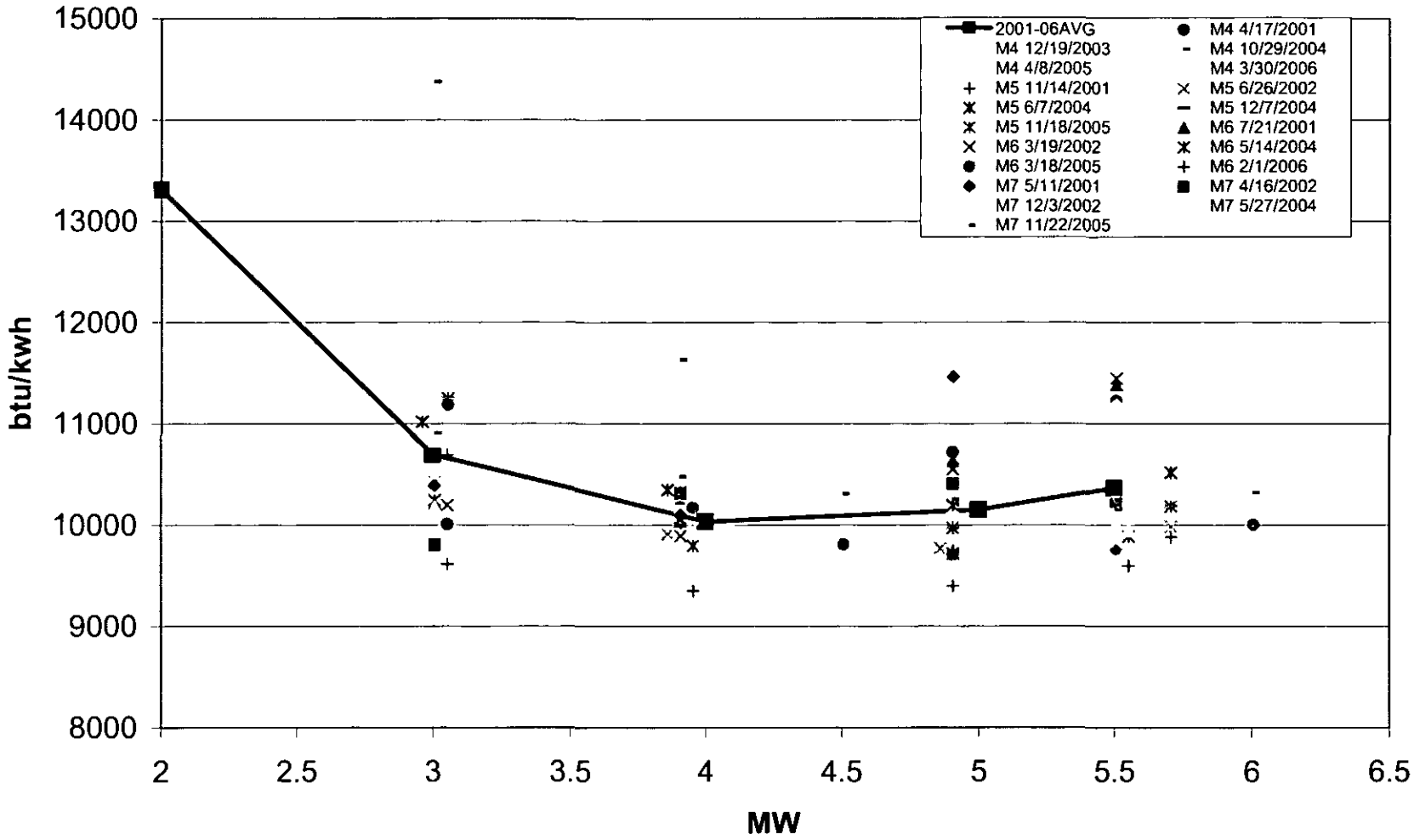
		Net	Heat rate							
A	23.3926	(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y	n=
B	-0.9545									
C	1.2846									
	M4 4/17/2001	3.0533	10005	30.55	9	28	87	93	285	
		3.9067	10174	39.75	15	60	233	155	607	
		4.9067	10718	52.59	24	118	580	258	1,266	
		5.5067	11224	61.81	30	167	920	340	1,874	
	M4 12/19/2003	3.0067	10497	31.56	9	27	82	95	285	
		3.9067	10141	39.62	15	60	233	155	605	
		4.9067	9817	48.17	24	118	580	236	1,160	
		5.5067	9658	53.19	30	167	920	293	1,613	
	M4 10/29/2004	3.0067	14376	43.22	9	27	82	130	391	
		3.9067	11633	45.45	15	60	233	178	694	
		4.9067	10200	50.05	24	118	580	246	1,205	
		5.5067	10156	55.93	30	167	920	308	1,696	
	M4 12/29/2004	3.0067	10006	30.08	9	27	82	90	272	
		3.9067	9223	36.03	15	60	233	141	550	
		4.9067	9473	46.48	24	118	580	228	1,119	
		5.4600	10187	55.62	30	163	889	304	1,658	
	M4 4/8/2005	3.0067	10087	30.33	9	27	82	91	274	
		3.9067	9642	37.67	15	60	233	147	575	
		4.5067	9871	44.49	20	92	413	200	904	
		4.9067	10258	50.33	24	118	580	247	1,212	
		5.5067	11188	61.61	30	167	920	339	1,868	
		6.0067	12285	73.79	36	217	1302	443	2,662	
	M4 3/30/2006	3.0067	10825	32.55	9	27	82	98	294	
		3.9067	10494	41.00	15	60	233	160	626	
		4.9067	10173	49.92	24	118	580	245	1,202	
		5.5067	10003	55.09	30	167	920	303	1,670	
	M5 11/14/2001	3.0533	10690	32.64	9	28	87	100	304	
		3.9067	10019	39.14	15	60	233	153	597	
		4.9067	9743	47.81	24	118	580	235	1,151	
		5.7067	9879	56.38	33	186	1061	322	1,836	
	M5 6/26/2002	3.0067	10422	31.34	9	27	82	94	283	
		3.8600	9910	38.25	15	58	222	148	570	
		4.8600	9768	47.47	24	115	558	231	1,121	
		5.7067	9980	56.95	33	186	1061	325	1,855	
	M5 6/7/2004	2.9600	11018	32.61	9	26	77	97	286	
		3.8600	10345	39.93	15	58	222	154	595	
		4.9067	10191	50.00	24	118	580	245	1,204	
		5.7067	10517	60.02	33	186	1061	343	1,955	
	M5 12/7/2004	3.0533	11249	34.35	9	28	87	105	320	
		3.9067	10330	40.36	15	60	233	158	616	
		4.9067	9970	48.92	24	118	580	240	1,178	
		5.7067	10183	58.11	33	186	1061	332	1,892	
	M5 11/18/2005	3.0533	11418	34.86	9	28	87	106	325	
		3.9067	10272	40.13	15	60	233	157	612	
		4.5067	9903	44.63	20	92	413	201	906	
		4.9067	9834	48.25	24	118	580	237	1,162	
		5.5067	9993	55.03	30	167	920	303	1,669	
		6.0067	10368	62.28	36	217	1302	374	2,247	
	M6 7/21/2001	3.0067	10206	30.69	9	27	82	92	277	
		3.9067	10035	39.20	15	60	233	153	598	
		4.9067	10629	52.15	24	118	580	256	1,256	
		5.5067	11382	62.68	30	167	920	345	1,901	
	M6 3/19/2002	3.0533	10194	31.13	9	28	87	95	290	
		3.9067	9890	38.64	15	60	233	151	590	
		4.9067	10548	51.76	24	118	580	254	1,246	
		5.5067	11447	63.03	30	167	920	347	1,911	
	M6 5/14/2004	3.0067	10243	30.80	9	27	82	93	278	
		3.9533	9793	38.72	16	62	244	153	605	
		4.9067	9717	47.68	24	118	580	234	1,148	
		5.5533	9885	54.89	31	171	951	305	1,693	
	M6 3/18/2005	3.0533	11184	34.15	9	28	87	104	318	
		3.9533	10168	40.20	16	62	244	159	628	
		4.5067	9806	44.19	20	92	413	199	898	
		4.9067	9704	47.62	24	118	580	234	1,146	
		5.5067	9761	53.75	30	167	920	296	1,630	

		Heat Rate Constant
92	A	23.3926
	B	-0.9545
	C	1.2846

Heat Rate Curve	
MW	btu/kwh
2	13311.12514
3	10696.98829
4	10032.23754
5	10147.24124
5.5	10364.23831

		6.0067	10001	60.07	36	217	1302	361	2,167	
M6	2/1/2006	3.0533	9614	29.35	9	28	87	90	274	
		3.9533	9351	36.97	16	62	244	146	578	
		4.9067	9398	46.11	24	118	580	226	1,110	
		5.5533	9597	53.29	31	171	951	296	1,644	
M7	5/11/2001	3.0067	10386	31.23	9	27	82	94	282	
		3.9067	10098	39.45	15	60	233	154	602	
		4.9067	11462	56.24	24	118	580	276	1,354	
		5.5067	13131	72.31	30	167	920	398	2,193	
M7	4/16/2002	3.0067	9804	29.48	9	27	82	89	266	
		3.9067	10308	40.27	15	60	233	157	615	
		4.9067	10404	51.05	24	118	580	250	1,229	
		5.5067	10228	56.32	30	167	920	310	1,708	
M7	12/3/2002	3.0533	10411	31.79	9	28	87	97	296	
		3.9533	9969	39.41	16	62	244	156	616	
		4.9533	9787	48.48	25	122	602	240	1,189	
		5.5067	9835	54.16	30	167	920	298	1,642	
M7	5/27/2004	3.0067	10176	30.60	9	27	82	92	277	
		3.9067	9569	37.38	15	60	233	146	571	
		4.9067	9586	47.04	24	118	580	231	1,132	
		5.5533	9947	55.24	31	171	951	307	1,704	
M7	11/22/2005	3.0067	10908	32.80	9	27	82	99	296	
		3.9067	10475	40.92	15	60	233	160	625	
		4.5067	10308	46.46	20	92	413	209	944	
		4.9067	10252	50.30	24	118	580	247	1,211	
		5.5067	10248	56.43	30	167	920	311	1,711	
		6.0067	10320	61.99	36	217	1302	372	2,237	
										det =
		407.23		4,193	1,891	9,141	45,636	19,464	94,137	462,955.94

M4-7 Net Heat Rate

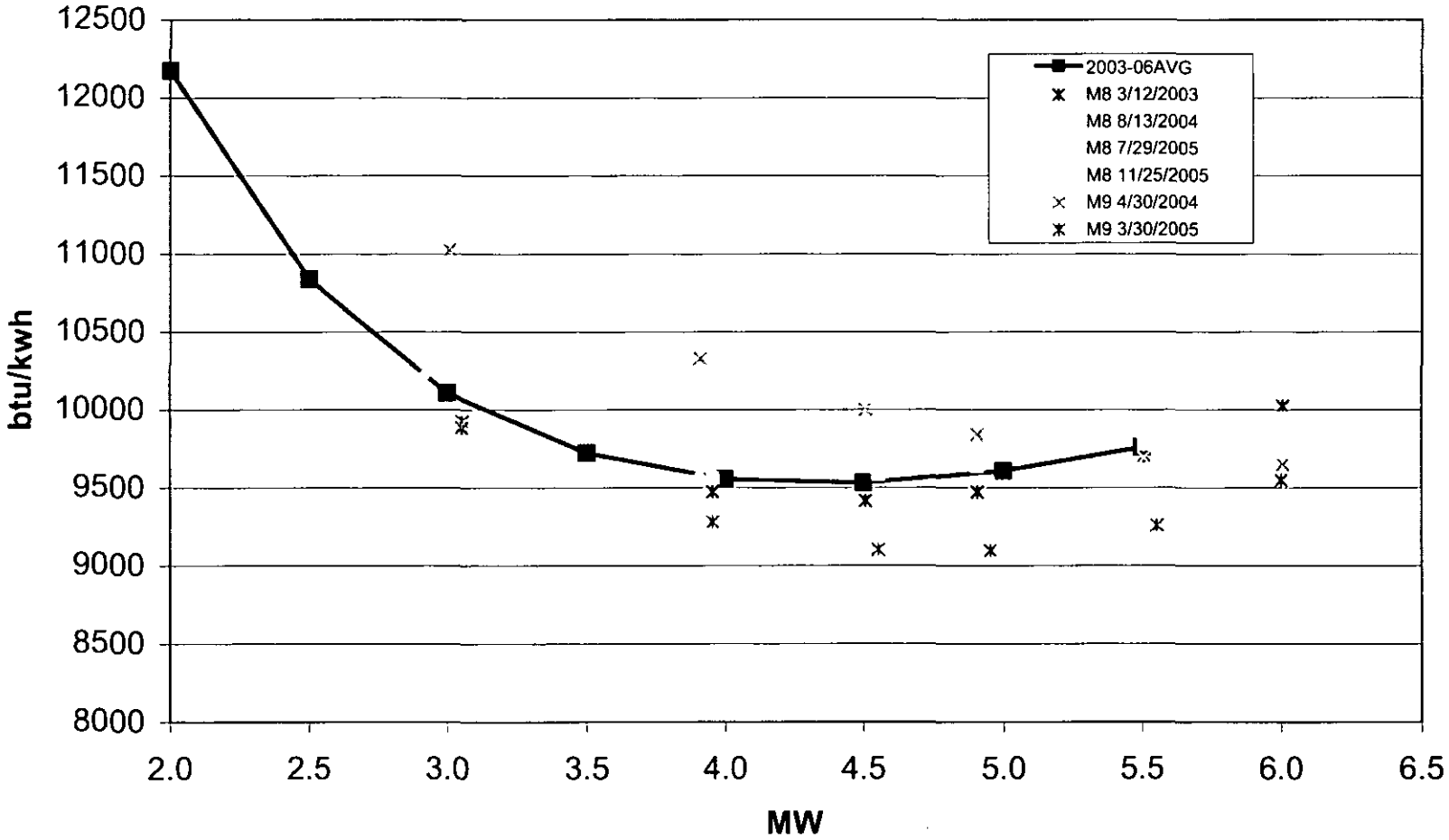


M8 & M9 AVERAGE HEAT RATE (2003-2006)
NET M89
2007TY Rate Case

				Net	Heat rate										
A	18.1852			(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y				
B	1.1548											n=			
C	0.9634	M8	3/12/2003	3.0533	9884	30.18	9	28	87	92	281		34	A	18.1852
				3.9533	9474	37.45	16	62	244	148	585			B	1.1548
				4.5067	9415	42.43	20	92	413	191	862			C	0.9634
				4.9067	9472	46.48	24	118	580	228	1,119				
				5.5067	9701	53.42	30	167	920	294	1,620				
				6.0067	10024	60.21	36	217	1302	362	2,172				
		M8	8/13/2004	2.9133	10210	29.75	8	25	72	87	252				
				3.8600	9356	36.11	15	58	222	139	538				
				4.8600	9326	45.32	24	115	558	220	1,071				
				5.5067	9772	53.81	30	167	920	296	1,632				
		M8	7/29/2005	3.0067	9657	29.04	9	27	82	87	262				
				3.9533	9561	37.80	16	62	244	149	591				
				4.5533	9585	43.64	21	94	430	199	905				
				4.9067	9639	47.30	24	118	580	232	1,139				
				5.5067	9778	53.85	30	167	920	297	1,633				
				6.0067	9948	59.75	36	217	1302	359	2,156				
		M8	11/25/2005	3.0067	9783	29.42	9	27	82	88	266				
				3.9067	9592	37.47	15	60	233	146	572				
				4.5067	9705	43.74	20	92	413	197	888				
				4.9067	9888	48.52	24	118	580	238	1,168				
				5.5067	10323	56.84	30	167	920	313	1,724				
				6.0067	10832	65.07	36	217	1302	391	2,348				
		M9	4/30/2004	3.0067	11024	33.15	9	27	82	100	300				
				3.9067	10329	40.35	15	60	233	158	616				
				4.5067	10000	45.07	20	92	413	203	915				
				4.9067	9841	48.29	24	118	580	237	1,163				
				5.5067	9692	53.37	30	167	920	294	1,618				
				6.0067	9650	57.97	36	217	1302	348	2,091				
		M9	3/30/2005	3.0533	9924	30.30	9	28	87	93	282				
				3.9533	9280	36.69	16	62	244	145	573				
				4.5533	9104	41.45	21	94	430	189	859				
				4.9533	9099	45.07	25	122	602	223	1,106				
				5.5533	9260	51.42	31	171	951	286	1,586				
				6.0533	9548	57.80	37	222	1343	350	2,118				
												det =			
				156.81		1,529	757	3,792	19,586	7,379	37,012	33,743.4			

Heat Rate Curve	
MW	btu/kwh
2	12174.20791
2.5	10837.38965
3	10106.74497
3.5	9722.485173
4	9554.71594
4.5	9531.273746
5	9608.86048
5.5	9759.922798

M89 Net Heat Rate



M10-13 AVERAGE HEAT RATE (2001-2006)
NET M10-13
2007TY Rate Case

A	26.6557	
B	3.5697	
C	0.2749	

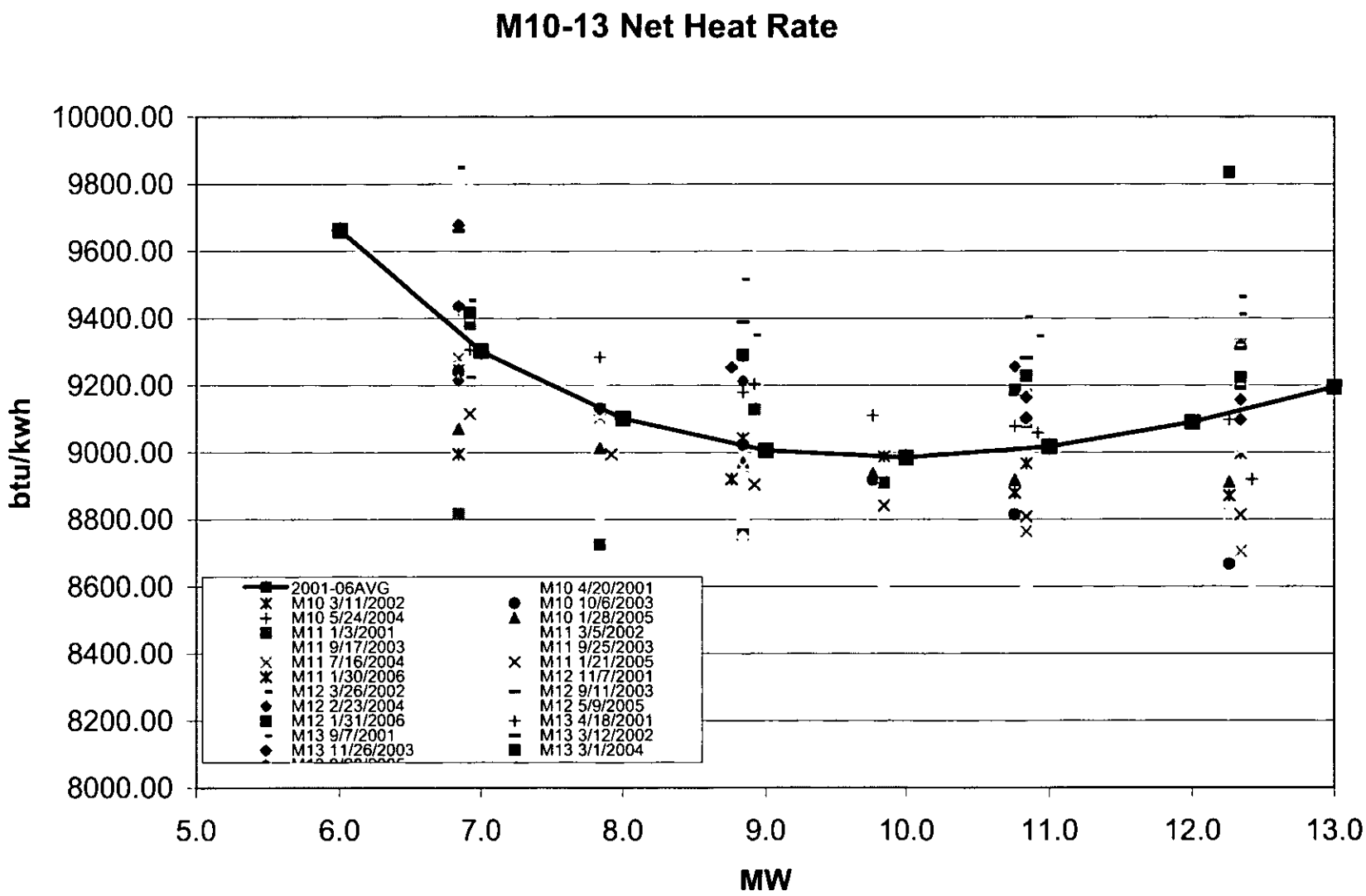
		Net (MW)	Heat rate (BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y
M10	4/20/2001	6.8400	9077	62.08	47	320	2189	425	2,905
		7.8400	8959	70.24	61	482	3778	551	4,317
		8.7600	8872	77.72	77	672	5889	681	5,964
		9.7600	8817	86.06	95	930	9074	840	8,198
		10.8400	8794	95.32	118	1274	13808	1,033	11,201
		12.2600	8817	108.09	150	1843	22592	1,325	16,247
M10	3/11/2002	6.8400	9247	63.25	47	320	2189	433	2,959
		7.8400	9128	71.56	61	482	3778	561	4,399
		8.8400	9042	79.93	78	691	6107	707	6,246
		9.8400	8988	88.44	97	953	9375	870	8,563
		10.8400	8967	97.20	118	1274	13808	1,054	11,421
		12.3400	8996	111.01	152	1879	23188	1,370	16,905
M10	10/6/2003	6.8400	9242	63.21	47	320	2189	432	2,957
		7.8400	9131	71.58	61	482	3778	561	4,400
		8.8400	9022	79.76	78	691	6107	705	6,233
		9.7600	8917	87.03	95	930	9074	849	8,290
		10.7600	8815	94.84	116	1246	13404	1,021	10,981
		12.2600	8666	106.25	150	1843	22592	1,303	15,970
M10	5/24/2004	6.8400	9426	64.47	47	320	2189	441	3,016
		7.8400	9284	72.79	61	482	3778	571	4,474
		8.8400	9179	81.14	78	691	6107	717	6,341
		9.7600	9110	88.91	95	930	9074	868	8,470
		10.7600	9077	97.67	116	1246	13404	1,051	11,308
		12.2600	9097	111.53	150	1843	22592	1,367	16,764
M10	1/28/2005	6.8400	9070	62.04	47	320	2189	424	2,902
		7.8400	9013	70.66	61	482	3778	554	4,343
		8.8400	8969	79.29	78	691	6107	701	6,196
		9.7600	8937	87.23	95	930	9074	851	8,309
		10.7600	8918	95.96	116	1246	13404	1,032	11,109
		12.2600	8912	109.26	150	1843	22592	1,339	16,422
M10	1/24/2006	6.8400	9149	62.58	47	320	2189	428	2,928
		7.8400	9016	70.69	61	482	3778	554	4,345
		8.8400	8961	79.21	78	691	6107	700	6,190
		9.7600	8982	87.67	95	930	9074	856	8,351
		10.7600	9081	97.71	116	1246	13404	1,051	11,313
		12.2600	9374	114.92	150	1843	22592	1,409	17,273
M11	1/3/2001	6.8400	8817	60.31	47	320	2189	413	2,822
		7.8400	8724	68.40	61	482	3778	536	4,204
		8.8400	8755	77.39	78	691	6107	684	6,048
		9.8400	8909	87.66	97	953	9375	863	8,488
		10.7600	9186	98.84	116	1246	13404	1,064	11,444
		12.2600	9833	120.56	150	1843	22592	1,478	18,120
M11	3/5/2002	6.8400	8894	60.84	47	320	2189	416	2,846
		7.8400	8793	68.94	61	482	3778	540	4,237
		8.8400	8747	77.32	78	691	6107	684	6,042
		9.8400	8755	86.15	97	953	9375	848	8,341
		10.8400	8818	95.58	118	1274	13808	1,036	11,232
		12.3400	9015	111.24	152	1879	23188	1,373	16,939
M11	9/17/2003	6.8400	9795	67.00	47	320	2189	458	3,135
		7.8400	9191	72.06	61	482	3778	565	4,429
		8.8400	8793	77.73	78	691	6107	687	6,074
		9.8400	8601	84.64	97	953	9375	833	8,195
		10.8400	8616	93.40	118	1274	13808	1,012	10,974
		12.3400	9024	111.35	152	1879	23188	1,374	16,956
M11	9/25/2003	6.9200	9059	62.69	48	331	2293	434	3,002
		7.9200	8748	69.28	63	497	3935	549	4,346
		8.9200	8538	76.16	80	710	6331	679	6,060
		9.9200	8429	83.62	98	976	9684	829	8,228
		10.9200	8421	91.96	119	1302	14220	1,004	10,965
		12.4200	8598	106.79	154	1916	23795	1,326	16,473
M11	7/16/2004	6.8400	9281	63.48	47	320	2189	434	2,970
		7.8400	9103	71.37	61	482	3778	560	4,386
		8.8400	8957	79.18	78	691	6107	700	6,188
		9.8400	8844	87.03	97	953	9375	856	8,426
		10.8400	8764	95.00	118	1274	13808	1,030	11,163
		12.3400	8705	107.42	152	1879	23188	1,326	16,357
M11	1/21/2005	6.9200	9115	63.08	48	331	2293	436	3,021
		7.9200	8995	71.24	63	497	3935	564	4,469
		8.9200	8903	79.42	80	710	6331	708	6,319
		9.8400	8841	87.00	97	953	9375	856	8,424
		10.8400	8808	95.48	118	1274	13808	1,035	11,219
		12.3400	8813	108.76	152	1879	23188	1,342	16,561
M11	1/30/2006	6.8400	8995	61.53	47	320	2189	421	2,879

n= 124

	Heat Rate Constant
A	26.6557
B	3.5697
C	0.2749

Heat Rate Curve	
MW	btu/kwh
6	9661.70
7	9301.94
8	9100.83
9	9005.51
10	8984.22
11	9016.79
12	9089.75
13	9193.77

		8.7600	8919	78.13	77	672	5889	684	5,996	
		10.7600	8878	95.53	116	1246	13404	1,028	11,060	
		12.2600	8871	108.75	150	1843	22592	1,333	16,346	
M12	11/7/2001	6.9200	9792	67.76	48	331	2293	469	3,245	
		8.9200	9585	85.50	80	710	6331	763	6,803	
		10.8400	9493	102.91	118	1274	13808	1,116	12,092	
		12.4200	9500	117.99	154	1916	23795	1,465	18,201	
M12	3/26/2002	6.8400	9849	67.37	47	320	2189	461	3,152	
		8.8400	9515	84.12	78	691	6107	744	6,573	
		10.8400	9403	101.93	118	1274	13808	1,105	11,977	
		12.3400	9463	116.77	152	1879	23188	1,441	17,782	
M12	9/11/2003	6.9200	9224	63.83	48	331	2293	442	3,057	
		8.9200	9123	81.38	80	710	6331	726	6,475	
		10.8400	9183	99.55	118	1274	13808	1,079	11,697	
		12.3400	9333	115.17	152	1879	23188	1,421	17,538	
M12	2/23/2004	6.8400	9214	63.03	47	320	2189	431	2,949	
		8.8400	9212	81.43	78	691	6107	720	6,364	
		10.7600	9255	99.59	116	1246	13404	1,072	11,530	
		12.3400	9318	114.98	152	1879	23188	1,419	17,509	
M12	5/9/2005	6.8400	10320	70.59	47	320	2189	483	3,302	
		8.8400	9422	83.29	78	691	6107	736	6,509	
		10.8400	9127	98.94	118	1274	13808	1,073	11,626	
		12.3400	9302	114.78	152	1879	23188	1,416	17,479	
M12	1/31/2006	6.9200	9382	64.92	48	331	2293	449	3,109	
		8.9200	9128	81.42	80	710	6331	726	6,478	
		10.8400	9090	98.53	118	1274	13808	1,068	11,578	
		12.3400	9203	113.56	152	1879	23188	1,401	17,293	
M13	4/18/2001	6.9200	9306	64.40	48	331	2293	446	3,084	
		8.9200	9204	82.10	80	710	6331	732	6,532	
		10.9200	9058	98.91	119	1302	14220	1,080	11,794	
		12.4200	8919	110.78	154	1916	23795	1,376	17,088	
M13	9/7/2001	6.9200	9453	65.42	48	331	2293	453	3,133	
		8.9200	9349	83.39	80	710	6331	744	6,635	
		10.9200	9346	102.06	119	1302	14220	1,115	12,170	
		12.3400	9411	116.13	152	1879	23188	1,433	17,684	
M13	3/12/2002	6.8400	9660	66.08	47	320	2189	452	3,091	
		8.8400	9388	82.99	78	691	6107	734	6,485	
		10.8400	9281	100.61	118	1274	13808	1,091	11,822	
		12.3400	9309	114.88	152	1879	23188	1,418	17,493	
M13	11/26/2003	6.8400	9437	64.55	47	320	2189	442	3,020	
		8.7600	9253	81.06	77	672	5889	710	6,220	
		10.8400	9163	99.32	118	1274	13808	1,077	11,671	
		12.3400	9156	112.99	152	1879	23188	1,394	17,205	
M13	3/1/2004	6.9200	9416	65.16	48	331	2293	451	3,120	
		8.8400	9289	82.12	78	691	6107	726	6,417	
		10.8400	9227	100.02	118	1274	13808	1,084	11,753	
		12.3400	9224	113.82	152	1879	23188	1,405	17,332	
M13	9/28/2005	6.8400	9678	66.20	47	320	2189	453	3,097	
		8.8400	9287	82.10	78	691	6107	726	6,416	
		10.8400	9102	98.66	118	1274	13808	1,069	11,593	
		12.3400	9096	112.25	152	1879	23188	1,385	17,093	
										det =
		1183.82		10,765	11,763	121,158	1,287,047	106,853	1,099,864	71044826.87

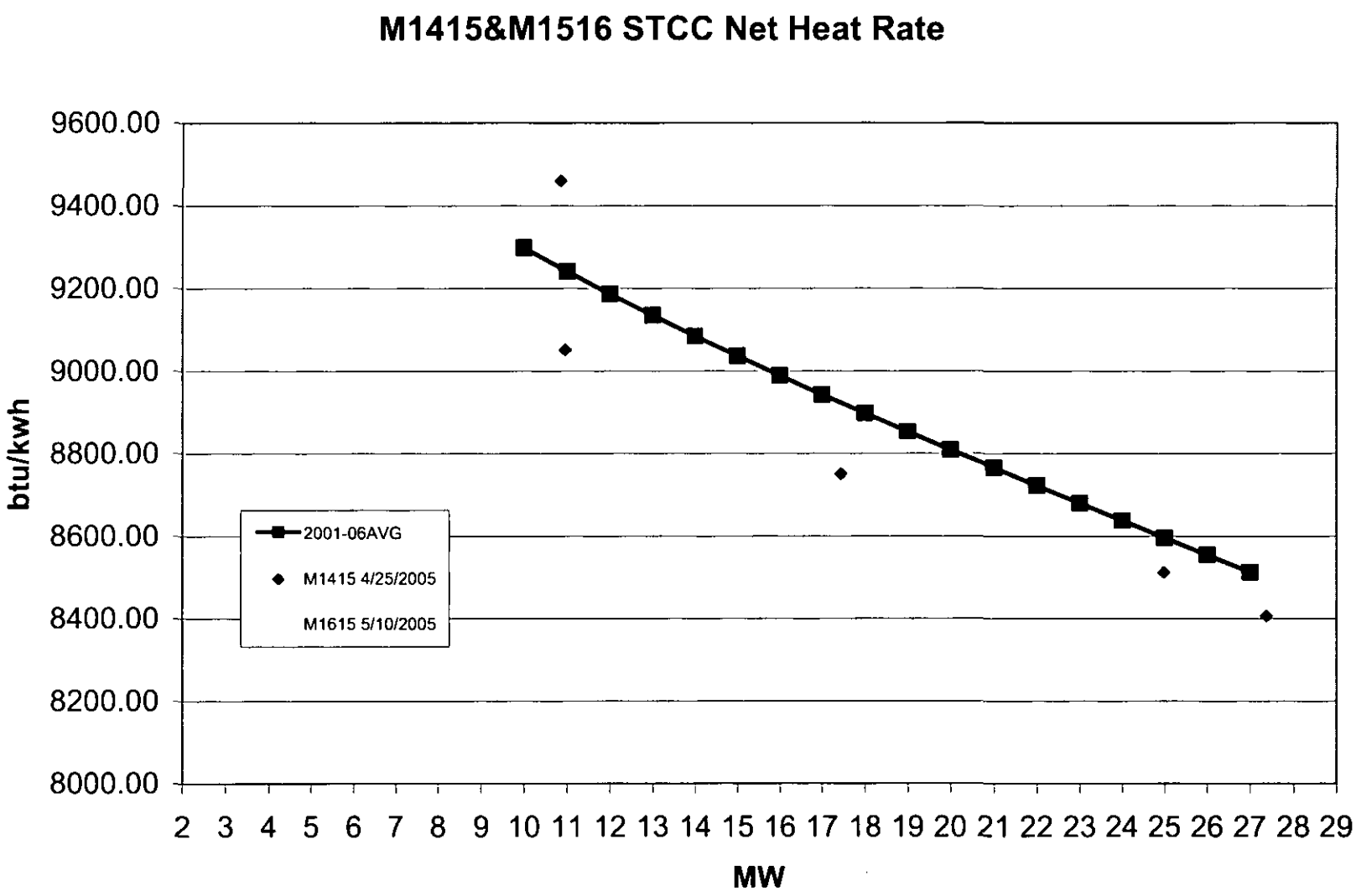

M10-13 Net Heat Rate
btu/kwh
10000.00
9800.00
9600.00
9400.00
9200.00
9000.00
8800.00
8600.00
8400.00
8200.00
8000.00
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
MW
2001-06AVG
M10 3/11/2002
M10 5/24/2004
M11 1/3/2001
M11 9/17/2003
M11 7/16/2004
M11 1/30/2006
M12 3/26/2002
M12 2/23/2004
M12 1/31/2006
M13 9/7/2001
M13 11/26/2003
M10 4/20/2001
M10 10/6/2003
M10 1/28/2005
M11 3/5/2002
M11 9/25/2003
M11 1/21/2005
M12 11/7/2001
M12 9/11/2003
M12 5/9/2005
M13 4/18/2001
M13 3/12/2002
M13 3/1/2004

M1415 & M1516 STCC AVERAGE HEAT RATE (2005)
NET

2007TY Rate Case			Net	Heat rate								
A	2.1124		(MW)	(BTU/ KWH)	(MBTU/H)	x^2	x^3	x^4	xy	x^2y	n=	
B	9.4713											
C	-0.0384											
	M1415	4/25/2005	10.9600	9051	99.20	120	1317	14429	1,087	11,916		
			17.4400	8750	152.60	304	5304	92509	2,661	46,414		
			24.9800	8512	212.62	624	15588	389376	5,311	132,677		
			27.3700	8406	230.08	749	20503	561176	6,297	172,354		
	M1615	5/10/2005	10.8400	9460	102.55	118	1274	13808	1,112	12,050		
			17.8000	9039	160.89	317	5640	100388	2,864	50,977		
			23.0200	8765	201.77	530	12199	280816	4,645	106,924		
			27.1500	8621	234.07	737	20013	543350	6,355	172,540		
			159.56		1,394	3,499	81,837	1,995,852	30,333	705,853	16,185,216.26	

	Heat Rate Constant	
B	A 2.1124	
	B 9.4713	
	C -0.0384	

Heat Rate Curve	
MW	btu/kwh
10	9298.55
11	9240.95
12	9186.54
13	9134.60
14	9084.59
15	9036.13
16	8988.93
17	8942.76
18	8897.46
19	8852.88
20	8808.92
21	8765.49
22	8722.52
23	8679.94
24	8637.71
25	8595.79
26	8554.14
27	8512.73


M1415&M1516 STCC Net Heat Rate
9600.00
9400.00
9200.00
9000.00
8800.00
8600.00
8400.00
8200.00
8000.00
btu/kwh
2001-06AVG
M1415 4/25/2005
M1615 5/10/2005
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29
MW