MONTHLY STEAM BOILER PLANT OPERATING LOG

1. COMMAND:

2. BASE AND LOCATION:

3. BUILDING:

4. MONTH/YEAR (MMM YYYY):

DATE	5. FUEL								6. STEAM					7. EFFICIENCY ANALYSIS DATA												8. FEEDWATER SYSTEM				9. PLANT DAILY TOTALS			
	1		2		3		4							1			2			3			4										
	TYPE	AMOUNT USED	TYPE	AMOUNT USED	TYPE	AMOUNT USED	TYPE	AMOUNT USED	PLANT STEAM PRESS *(psig)*	1 OUTPUT *(Mlbm)*	2 OUTPUT *(Mlbm)*	3 OUTPUT *(Mlbm)*	4 OUTPUT *(Mlbm)*	O_2 % *(0.xxx)*	STACK Δ TEMP *(°F)*	COMB. EFFIC. $\eta_{c\text{-}1}$ *(0.xxx)*	O_2 % (0.xxx)	STACK Δ TEMP *(°F)*	COMB. EFFIC. $\eta_{c\text{-}2}$ *(0.xxx)*	O_2 % *(0.xxx)*	STACK Δ TEMP *(°F)*	COMB. EFFIC. $\eta_{c\text{-}3}$ *(0.xxx)*	O_2 % *(0.xxx)*	STACK Δ TEMP *(°F)*	COMB. EFFIC. $\eta_{c\text{-}4}$ *(0.xxx)*	TOTAL FLOW *(gal)*	TOTAL MAKE-UP *(gal)*	MAKE-UP % *(0.xxx)*	COND RETURN TEMP *(°F)*	TOTAL INPUT *(MMBtu)*	TOTAL OUTPUT *(MMBtu)*	COMBUST EFF. $\eta_{c\text{-}Plant}$ *(0.xxx)*	OVERALL EFF. η_{Plant} *(0.xxx)*
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TOTAL										0	0	0	0															0	0			0	0	
AVG																																	
MIN																																	
MAX																																	

10. TOTAL FUEL USED

GAS *(Mcf)* :

OIL (gal):

COAL *(lbm)* :

11. PLANT INPUT *(MMBtu)*

12. PLANT OUTPUT *(MMBtu)*

13. PLANT COMBUSTION EFFICIENCY, $\eta_{c\text{-}Plant}$ *(0.XXX)*

14. PLANT OVERALL EFFICIENCY η_{Plant} *(0.XXX)*

SIGNATURE *(Boiler Operations Supervisor):*

DATE REVIEWED:

SIGNATURE *(Base Civil Engineer):*

DATE REVIEWED:

REMARKS:

PURPOSE: Use with Air Force steam boiler plants with operating pressures greater than 15 psig IAW AFI 32-1068.

DIRECTIONS: This form is intended for recording monthly operating data on steam boiler plants. Post information on this form daily from an AF Form 1458, Daily Steam Boiler Plant Operating Log. When this form is completed, it will be reviewed and signed by the supervisor of boiler operations and the Base Civil Engineer, or delegate. Where there is more than one plant, a separate log is required for each plant.

Items 1-4. Self-explanatory.

Item 5. Enter the type of fuel, Gas (G), Oil (O), or Coal (C). Enter the daily quantity of each fuel used for the boiler. Gas is measured in thousands of cubic feet (Mcf), Oil is measured in gallons (gal) and Coal is measured in pounds (lbm). If multiple fuels are burned on a single day, enter Type1/Type2 in the Type and Amount Used boxes. Example: 10,368 gal of oil and 7260 Mcf of gas would be recorded as: O/G, 10368/7260. When operating two different gases, e.g. natural gas and propane, annotate how long each is used in the Remarks section. Enter the quantity of fuel used for each boiler.

Item 6. Steam Produced. Enter daily average Plant Steam Pressure, in psig, and total daily Steam Output for each boiler, in units of thousands of pound - mass (Mlbm). If the plant has more than four boilers, use additional sheets. Sum the monthly total steam produced for each boiler.

Item 7. Efficiency Data. Record the daily average Oxygen (O_2) percentage, recorded as 0.XXX, for each boiler. Record the average Stack Change of Temperature (Stack ΔT) by subtracting the average Combustion Air Temperature from the average Stack Temperature for each boiler from Item 7 of the AF Form 1458. Record the daily combustion efficiency, η_c, for each boiler from Item 13 of the AF Form 1458. If the plant has more than four boilers, use additional sheets.

Item 8. Feedwater System. Enter daily total feedwater flow and make-up flow in gallons and record the daily make-up percentage, recorded as 0.XXX, from Item 11 on the AF Form 1458.

Item 9. Plant Daily Totals. Using data from the AF Form 1458, enter the total daily amounts. Record the Total Input from Item 9 and the Total Output from Item 10.

Item 10. Total Fuel Used. Sum the total amount of each type of fuel used for the month listed in Item 5 on this form. When operating two different gases, e.g. natural gas and propane, annotate which gases and how much of each was used in the Remarks section.

Item 11. Plant Input. Sum the daily Total Inputs listed in Item 9 on this form and any additional sheets. Record in MMBtu.

Item 12. Plant Output. Sum the daily Total Outputs listed in Item 9 on this form and any additional sheets. Record in MMBtu

Item 13. Plant Combustion Efficiency - $\eta_{c\text{-Plant}}$. Calculate the average of the daily plant combustion efficiencies, $\eta_{c\text{-Plant}}$, listed in Item 9 on this form. Record to three decimal places (0.XXX).

Item 14. Plant Overall Efficiency - η_{Plant}. Calculate the average of the daily plant overall efficiencies, η_{Plant}, listed in Item 9 on this form. Record to three decimal places (0.XXX).

UNIT NOMENCLATURE:

gal - gallon
GJ – gigaJoule
kg – kilogram
kJ/kg – kilojoule/ kilogram
kPa – kiloPascal
L – liter
lbm - pound - mass
Mcf – thousands of cubic feet (can be incorrectly listed as kcf)
Mlbm – thousands of pound - mass
MMBtu – million (thousand thousand) British thermal unit
psig – pounds per square inch gauge
1000 m^3 – thousand cubic meters

METRIC CONVERSION

MULTIPLY	BY	TO OBTAIN
kPa	0.1450	psig
kg	2.2046	lbm
1000 m^3	35.310	Mcf
L	0.2642	gal
kJ/kg	0.4299	Btu/lbm
GJ	0.9479	MMBtu

TEMPERATURE CONVERSION TO OBTAIN DEGREES FAHRENHEIT

$T_{°F} = 1.8T_{°C} + 32$