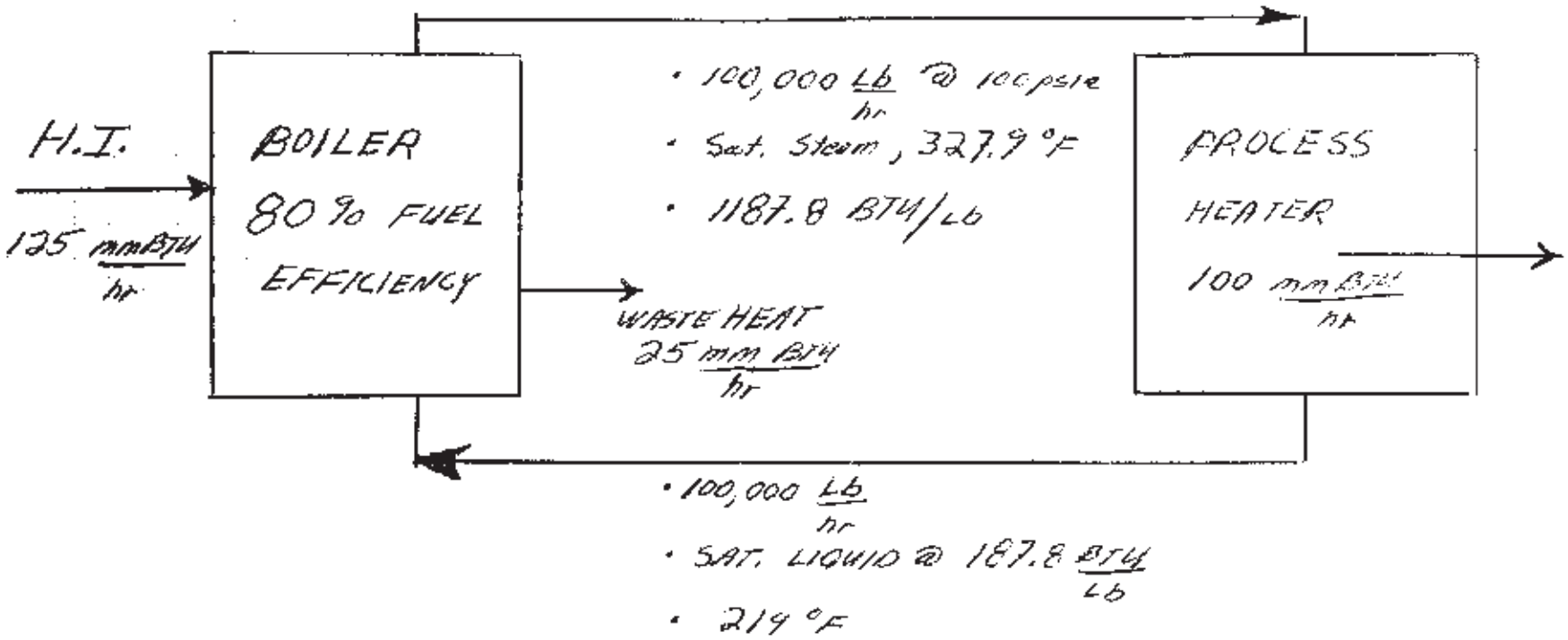
STEAM BOILER & PROCESS HEATER WITH CONDENSATE RECYCLE



- HEAT DELIVERED BY PROCESS HEATER

$$100{,}000\ \text{Lb/hr} \times (1187.8 - 187.8)\ \frac{\text{BTU}}{\text{Lb}} = 100{,}000{,}000\ \text{BTU/hr} = 100\ \text{mm BTU/hr}$$

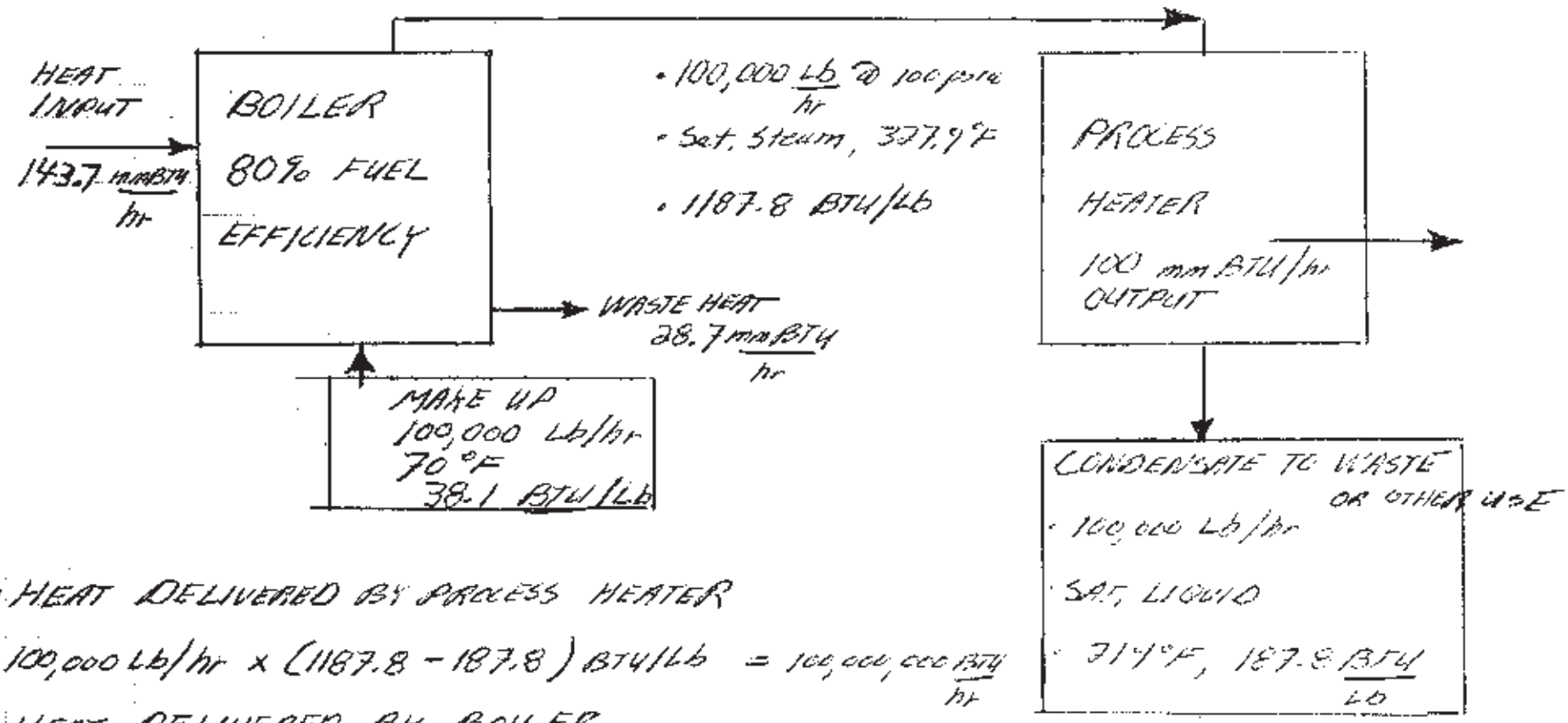
- HEAT INPUT TO BOILER

$$(HI) \times 80\% = 100{,}000{,}000\ \frac{\text{BTU}}{\text{hr}}$$

$$HI = 100{,}000{,}000\ \frac{\text{BTU}}{\text{hr}} \Big/ 80\% = 125{,}000{,}000\ \text{BTU/hr} = 125\ \frac{\text{mmBTU}}{\text{hr}}$$

J. Michael Greer, P.E.
Cinergy Corp. 12/8/99

STEAM BOILER & PROCESS HEATER WITHOUT CONDENSATE RECYCLE



- HEAT DELIVERED BY PROCESS HEATER

$100{,}000\ \text{Lb/hr} \times (1187.8 - 187.8)\ \text{BTU/Lb} = 100{,}000{,}000\ \frac{\text{BTU}}{\text{hr}}$

- HEAT DELIVERED BY BOILER

$100{,}000\ \text{Lb/hr} \times (1187.8 - 38.1)\ \text{BTU/hr} = 114{,}970{,}000\ \frac{\text{BTU}}{\text{Hr}}$

- BOILER HEAT INPUT

$$\frac{114{,}970{,}000}{80\%} = 143{,}712{,}500\ \frac{\text{BTU}}{\text{hr}}$$

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Compare Recycle & no Recycle Systems

	WITH RECYCLE	WITHOUT RECYCLE
HEAT DELIVERED BY PROCESS HEATER	(100 mmBTU/hr)	(100 mmBTU/hr)
HEAT INPUT TO BOILER	125 mmBTU/hr	143.7 mmBTU/hr
HEAT LOSS TO BOILER Exhaust gas, etc	(25 mmBTU/hr)	(28.7 mmBTU/hr)
HEAT LOSS FROM CONDENSATE NOT RECYCLED	—	(15.0 mmBTU)
	0	0

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