



TOWER TECH ENERGY ANALYSIS REPORT



LOCATION DATA	
CITY:	Anytown, USA
ALTITUDE (ft.):	887
AVERAGE WET BULB TEMPERATURE (F):	48.4

PHYSICAL DETAILS	
TOWER TECH	
NUMBER OF CELLS:	6
CELL LENGTH (ft.):	30
CELL WIDTH (ft.):	12
TOWER LENGTH (ft.):	72
TOWER WIDTH (ft.):	30
SUBSTRUCTURE HEIGHT (ft.):	6
MOTOR TYPE:	Single-Speed
MOTOR BHP:	7.5
TOTAL TOWER BHP:	450
TRANSMISSION EFFIECIENCY:	100%
NUMBER OF FANS PER CELL:	10
FAN DIAMETER (ft.):	4.75
HUB DIAMETER (ft.):	1
FAN EFFIECIENCY(%):	70
FAN MOTOR EFFICIENCY(%):	82.5
PUMP EFFICIENCY(%):	80
PUMP MOTOR EFFICIENCY(%):	90
CYCLES OF CONCENTRATION:	4.5
FILL TYPE:	CF1900
FILL DEPTH (ft.):	5
TOTAL SYSTEM PUMP HEAD (ft.):	41.39

COMPETITOR	
NUMBER OF CELLS:	6
CELL LENGTH (ft.):	18.97
CELL WIDTH (ft.):	18.97
TOWER LENGTH (ft.):	113.84
TOWER WIDTH (ft.):	18.97
MOTOR TYPE:	Single-Speed
MOTOR BHP:	75
TOTAL TOWER BHP:	450
TRANSMISSION EFFIECIENCY:	96%
NUMBER OF FANS PER CELL:	1
FAN DIAMETER (ft.):	15.02
HUB DIAMETER (ft.):	3.16
FAN EFFIECIENCY(%):	70
FAN MOTOR EFFICIENCY(%):	82.5
PUMP EFFICIENCY(%):	80
PUMP MOTOR EFFICIENCY(%):	90
CYCLES OF CONCENTRATION:	3
TOTAL SYSTEM PUMP HEAD (ft.):	50

DESIGN CONDITIONS	
FLOW RATE (gpm):	15690
NOZZLE FLOW RATE (gpm):	261.5
HOT WATER TEMPERATURE (F):	97
DESIGN COLD WATER TEMPERATURE (F):	85
MINIMUM COLD WATER TEMPERATURE (F):	78
WET BULB TEMPERATURE (F):	78
RANGE (F):	12
APPROACH (F):	7
RELATIVE HUMIDITY:	70%

TOWER TECH DESIGN-POINT THERMAL DATA	
HEAT LOAD (million Btu/hr):	94.1
WATER LOADING (gpm/ft²):	7
BHP:	7.51
LIQUID TO GAS RATIO (L/G):	1.28
EVAPORATION RATE (%):	110%
INLET VELOCITY (fpm):	1306.6
FAN VELOCITY (fpm):	1416.5
FILL VELOCITY (fpm):	683.3
CELL AIR FLOW (cfm):	239804.3
TOWER AIR FLOW (cfm):	1438826
AIR DENSITY (lb/ft³):	0.07
DYNAMIC PRESSURE (wig):	0.116
STATIC PRESSURE (wig):	1.15
EXIT WET BULB TEMPERATURE (F):	90.85
DESIGN SAFETY FACTOR (%):	0%

UNIT COST	
ELECTRICITY (\$/kW-hr):	0.06
WATER PURCHASE (\$/1000-gal):	1.54
WATER DISPOSAL (\$/1000-gal):	2.14

COST SUMMARY			
	COMPETITOR		TOWER TECH
INITIAL COST			
TOWER COST:	\$ 360,000.00		\$ 440,000.00
HEAD DIFFERENTIAL PUMP COST:	\$ 9,200.00		
NUMBER DIFFERENTIAL PUMP COST:	\$ -		
TOTAL	\$ 369,200.00		\$ 440,000.00
ANNUAL COST			
PUMP ENERGY:	\$ 66,000.00		\$ 54,600.00
WATER TREATMENT:	\$ 84,200.00		\$ 51,900.00
FAN ENERGY:	\$ 43,600.00		\$ 16,700.00
WATER PURCHASE AND DISPOSAL:	\$ 116,300.00		\$ 88,500.00
TOTAL	\$ 310,100.00		\$ 211,700.00
COST PER YEAR PER TON:	\$ 115.46		\$ 78.82
TOWER TECH BREAK EVEN MONTHS:		9.0	
10 YEAR TOTAL COST:	\$ 3,470,200.00		\$ 2,557,000.00
10 YEAR COST SAVINGS:		\$ 913,200.00	
% SAVINGS (base=competitor's initial cost):		247	