Blowdown Heat Recovery Process - Temperature Evaluation
One Minute Time Stamp Intervals from Externally Mounted Thermocouples
Two x CB 300 HP Boilers Manual and Conductivity Controlled Blowdown
August 1st to August 31th, 2009

	Flash Steam Temp. (Deg. F)		Make-up Water Temp. (Deg. F)		Delta T Make-up Temp. (Deg. F)	
Minimum	134.8		79.2		7.2	
Maximum	268.9		157.8		85.8	
Average	170.1		94.3		22.3	
Standard Deviation	20.2		9.2		9.2	
Data Range Count	**130**	**175**	**75**	**100**	**0**	**20**
Minutes	28,227		32,751		19,414	
% of Time	73.9%		85.8%		50.9%	
	176	**200**	**101**	**125**	**21**	**40**
	5,483		4,074		13,541	
Total Minutes	14.4%		10.7%		35.5%	
Reported	**201**	**225**	**126**	**150**	**41**	**60**
	2,983		705		1,609	
38,171	7.8%		1.8%		4.2%	
	226	**250**	**151**	**175**	**61**	**81**
	487		3		359	
	1.3%		0.01%		0.9%	
	251	**275**				
	72					
	0.2%					

Notes: To calculate the percent of time any of the data sets are within a fixed temperature range, the number of data points counted between th low and high number are divided into the total number of minutes (data points collected) for each set.

On the following Graphics page, the Red lines represent the Flash Steam Outlet Temperature, the Blue line represents the Make-up Out Temperature and the Yellow line represents the average inlet water temperature during the period reported.

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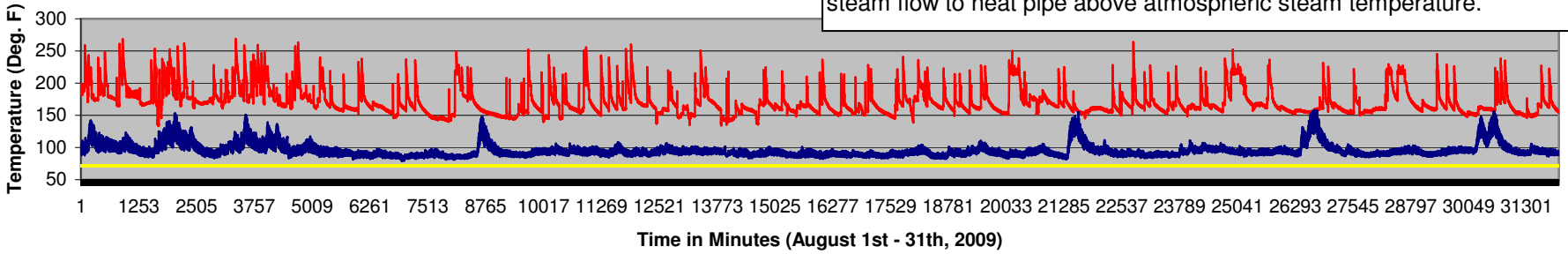
2 x CB-300HP Boilers / Manual and Conductivity Controlled Blowdown

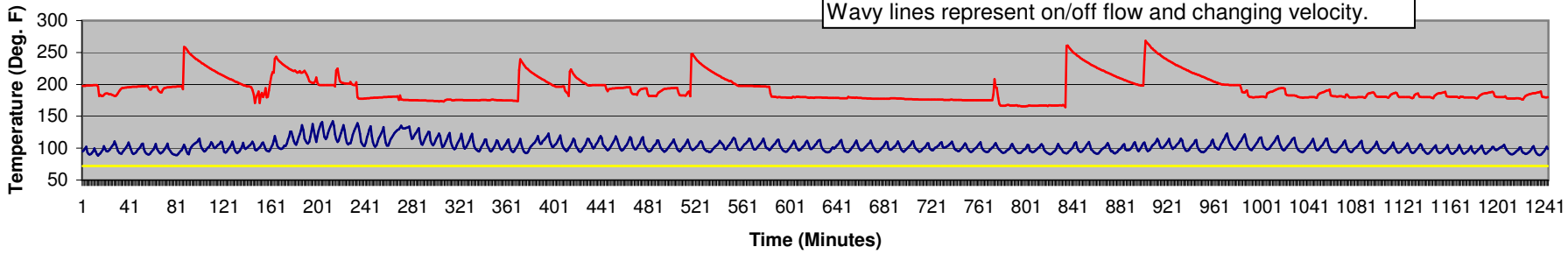
Flash Steam and Make-up Outlet Temperatures

Red Line = Flash Steam Outlet Temperature
Thermocouple on outside of piping. Temperatures above 212F confirm steam flow to heat pipe above atmospheric steam temperature.



Flash Steam and Make-up Outlet Temperatures
August 1st

Blue Line = Make-up Outlet Temperature
Thermocouple on outside of piping.
Wavy lines represent on/off flow and changing velocity.



Detail - Flash Steam and Make-up Outlet Temperatures
Minutes 750 - 1050, August 1st Above

Yellow Line = Average City Water Temperature
Manual reading by Operations personnel