Warabeya Chilled Water Pump Testing

Pumps Running at 100%

Asset	Service	Scenario	Water Pressure Drop			Pressure Drop	Calcuated GPM			Design GPM
			1	2	3	(DESIGN)	1	2	3	
P-11	Condens. Side of Chillers	1 Pump/ 1 Chiller on	60 ft	46.5 ft	43.1 ft	70 ft	1418	1611	1673	1313
P-12	Condens. Side of Chillers	2 Pump/ 2 Chillers on		44.2 ft	42.5 ft	70 ft		1652	1685	1313
P-13	Condens. Side of Chillers	3 Pump/ 3 Chillers on			41.9 ft	70 ft			1697	1313
Chiller-2	Condens. Side of Chillers	1 Pump/ 1 Chiller on	25.8	22.2 ft	15.8 ft	19.6 ft	1506	1397	1178	1313
Chiller-3	Condens. Side of Chillers	2 Pump/ 2 Chillers on		23.6 ft	16.9 ft	19.6 ft		1440	1219	1313
Chiller-4	Condens. Side of Chillers	3 Pump/ 3 Chillers on			16.2 ft	19.6 ft			1193	1313
P-15	Evap. Side of Chillers	1 Pump/ 1 Chiller on	41.8 FT	46.2 ft	67.6 FT	70 ft	1649	1568	1296	1274
P-16	Evap. Side of Chillers	2 Pump/ 2 Chillers on		46.8 ft	65.8 FT	70 ft		1588	1314	1274
P-17	Evap. Side of Chillers	3 Pump/ 3 Chillers on			66.9 FT	70 ft			1303	1274
Chiller-2	Evap. Side of Chillers	1 Pump/ 1 Chiller on	41.2 ft	38.8 ft	36.3 ft	21.1 ft	1780	1727	1677	1274
Chiller-3	Evap. Side of Chillers	2 Pump/ 2 Chillers on		39.8 ft	37.2 ft	21.1 ft		1749	1691	1274
Chiller-4	Evap. Side of Chillers	3 Pump/ 3 Chillers on			35.8 ft	21.1 ft			1659	1274

Cond Side

Final #s Running pumps at 90%

Asset	Service	Scenario	Water Pressure Drop			Pressure Drop	Calcuated GPM			Design GPM
			1	2	3	(DESIGN)	1	2	3	
P-11	Condens. Side of Chillers	1 Pump/ 1 Chiller on	57.8 ft	41.8 ft	38.9 ft	70 ft	1276	1450	1506	1313
P-12	Condens. Side of Chillers	2 Pump/ 2 Chillers on		40.2 ft	39.1 ft	70 ft		1487	1517	1313
P-13	Condens. Side of Chillers	3 Pump/ 3 Chillers on			38.5 ft	70 ft			1527	1313
Chiller-2	Condens. Side of Chillers	1 Pump/ 1 Chiller on	23.6 ft	19.8 ft	14.4 ft	19.6 ft	1355	1257	1060	1313
Chiller-3	Condens. Side of Chillers	2 Pump/ 2 Chillers on		20.5 ft	15.2ft	19.6 ft		1296	1097	1313
Chiller-4	Condens. Side of Chillers	3 Pump/ 3 Chillers on			15.0 ft	19.6 ft			1074	1313

Evap Side

Final #s Running pumps at 70%

P-15	Evap. Side of Chillers	1 Pump/ 1 Chiller on	35.2 FT	39.8 ft	48.9 FT	70 ft	1154	1098	907	1274
P-16	Evap. Side of Chillers	2 Pump/ 2 Chillers on		40.2 ft	46.2 FT	70 ft		1112	920	1274
P-17	Evap. Side of Chillers	3 Pump/ 3 Chillers on			47.1 FT	70 ft			912	1274
Chiller-2	Evap. Side of Chillers	1 Pump/ 1 Chiller on	33.8 ft	22.6 ft	21.9 ft	21.1 ft	1246	1209	1282	1274
Chiller-3	Evap. Side of Chillers	2 Pump/ 2 Chillers on		21.9 ft	22.2 ft	21.1 ft		1224	1294	1274
Chiller-4	Evap. Side of Chillers	3 Pump/ 3 Chillers on			22.8 ft	21.1 ft			1305	1274

Summary: Each chiller and pump were tested in scenarios of "1 and 1" with numbers in the top chart show all 3 scenarios in initial, bottom chart shows final repor readings. Found that Condensate pumps are underperforming and overamping at 60hz. Reduced to 90% for testing to keep pumps on. Pumps do not meet flow in scenario 3 (all 3 chillers running). -Evap Pumps were oversupplying water in all 3 run scenarios, so pumps were reduced to 70% to obtain final readings.