

Mt. Sinai Hospital Flow Verification

On August 23, 2012, we were able to verify the flows in the low and high grade loops at Mt. Sinai Hospital using an ultrasonic flow meter. A comparison between the values obtained using the Onicon flow meter and the ultrasonic flow meter for both the high and low grade can be found below.

Low Grade Verification				
2.5" Schedule 40				
	Onicon	Ultrasonic	Difference	% Difference
	20.0	20.9	0.9	4.4%
	20.0	20.7	0.7	3.2%
	35.6	36.8	1.3	3.4%
	20.6	19.9	-0.7	-3.3%
	19.9	19.9	0.0	-0.1%
	19.2	20.4	1.2	5.9%
	20.0	19.4	-0.6	-3.0%
	18.9	19.6	0.7	3.6%
	19.4	20.5	1.1	5.5%
	19.6	19.1	-0.5	-2.6%
Avg:	21.3	21.7	0.4	1.7%

High Grade Verification				
3" Schedule 40				
	Onicon	Ultrasonic	Difference	% Difference
	20.0	20.9	0.9	4.4%
	20.0	20.7	0.7	3.2%
	35.6	36.8	1.3	3.4%
	20.6	19.9	-0.7	-3.3%
Avg:	24.0	24.6	0.5	1.9%

As can be seen, the values obtained using both the ultrasonic flow meter and the Onicon are consistently within 5% of each other. We consider these flows to be successfully verified.

We were unable to verify the flow in the cooling module loop with the ultrasonic flow meter, and have concluded that this flow is not measurable with our instrumentation. However, we were able to perform a heat balance on the system using the values obtained from the thermistors and flow meters we have installed, and the flow in the cooling loop produced reasonable values. We generally expect the total heat rejected from the system to be approximately 50-60% of the total energy in the natural gas being used in the fuel cell. We found the total rejected heat since our visit to be 51% of the total energy going into the fuel cell, which is in line with the other UTC fuel cells that we monitor.