Labadie

Heat Rate Performance Reports

Attachment D

July 10, 2009

To: David Fox
From: Jeff Shelton
Cc: Bob Meiners, Mark Litzinger, Kevin Stumpe, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace, Scott Hixson, Jim Barnett, Glenn Tiffin, Cuong Pham

Subject: Labadie June 2009 Performance Report

Executive Summary

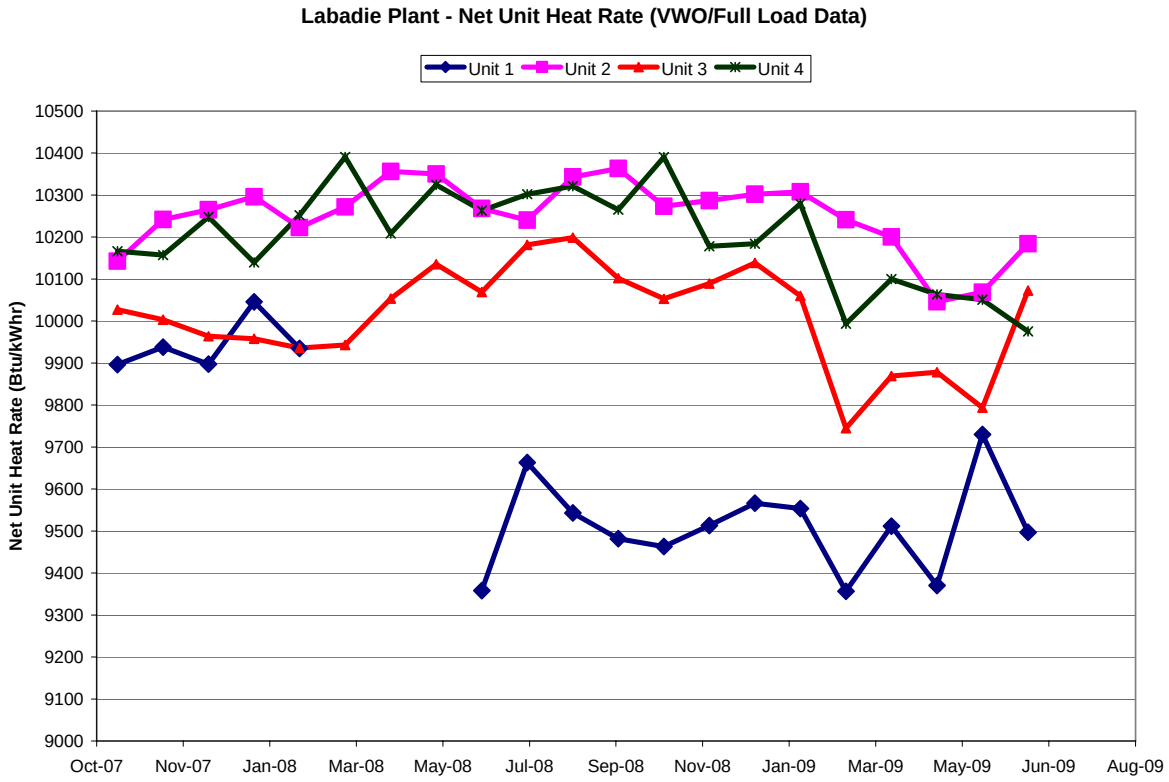
The most notable items regarding Labadie unit performance were:

- The Unit 2 HPBFPs are running near maximum speed to achieve full load on the unit. The B pump performance factor took two recent step changes down (5/28 and 6/4) coincident with spikes in vibration on the pump. The pump suction spool was removed during an SBO last week but the suction strainer was clean and no issues were found in the eye of the pump. On 6/26, a JR was written that the recirculation flow valve 2-FV8B would not close. Temperature data taken on 7/8 confirm that the valve is not closed. Investigation of the cause of the drop in pump performance on the 2B pump will continue. In addition, performance on all 8 HPBFPs at Labadie will be reviewed to determine any other potential issues.
- The heat rate calculation on Unit 1 was changed to use the condensate flow rate instead of the measured feedwater flow rate. This new calculation provides a more reasonable value for heat rate on the unit as compared to the other units, the unit's design heat rate, and the heat rate based on fuel flow.

The following table shows the instrument deficiencies for all four units.

Tag	Unit	Issue	Resolution	Carryover or New
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004	JR164407 to investigate and correct	Carryover
1BFWSTM-08318, EXTRACT PRESS HTR 4A	1	Flat-lined on 1/29	JR164611	Carryover
3TURB-23963, CROSSOVER WEST TEMP(B)	3	Has been bad since at least 1/1/2008		Carryover
3CONDTURB-08128 CNDSR VAC PMP A TOTAL FLOW	3	Flow varies significantly (from 40 to 160 scfm) since 6/23/09		New

Numerous changes occurred that led to changes in the heat rate of each unit (see plot below). Condenser pressure is starting to climb due to the increased river temperatures and will lead to higher heat rates during the summer. Unit 1 had both HPBFPs and the top FWHs in service at the end of the month allowing for a higher load and a lower heat rate. Unit 2 had a higher heat rate due to rising backpressure (increased river temperature). Unit 3 was higher due to a higher backpressure and having the top 3 FWHs OOS for a period of 4 days. Unit 4's heat rate dropped due to a reduction in aux. load following the outage and restoring the 4-1 FWH.



Heat Rate KPI

A trend only heat rate KPI has been created for 2009 with the intent of having a pay heat rate KPI in 2010. Below is a table showing the actual performance of the plant through May.

Plant	2009 Actual	Threshold	Target	Stretch
Labadie	9873	9888	9807	9764

A separate e-mail was sent to the plant describing how the trend only KPI targets were derived for 2009. An alternative approach for the heat rate KPI was discussed with the plant during the last quarterly performance meeting. In this meeting, a target band approach was discussed. Using this methodology for 2009 would be providing the following results.

Plant	2009 Actual	Modified Target Band
Labadie	9873	9690 - 9990

Action Items:

- Performance Engineering would like to create some PI tags to better monitor turbine and plant performance. An estimated 1000 Pi tags is requested for this purpose. The plant requested a meeting to discuss this request. ***Labadie plant is requested to provide a specific list of who should be involved in this meeting.*** A discussion of why the creation of these additional tags is important is provided at the end of the report. It is noted that Performance Engineering could most likely give up an equivalent number of OPM tags that would no longer be beneficial. In addition, Performance Engineering can create the tags directly from EtaPro.
- Performance Engineering will review the performance of all 8 HPBFPs and provide any observations made from the data.

Unit 1 Observations

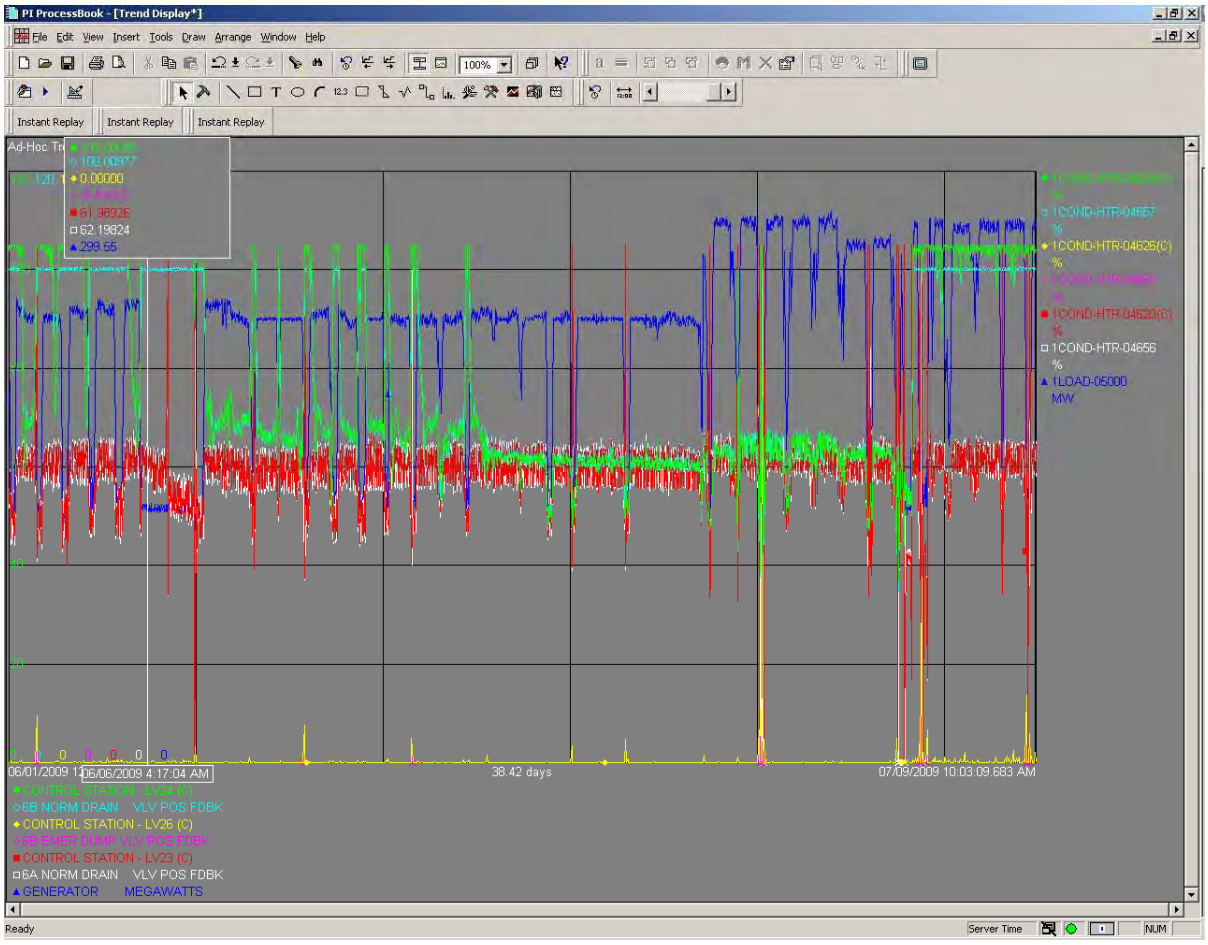
The following observations were made regarding Unit 1 operation and performance:

- Unit 1 put the 1B HPBFP and the top 3 FWHs back in service at the end of June.
- In the previous report, there was a discussion regarding the low heat rate being calculated on Unit 1. It was noted that the feedwater flow indication being used in the determination of the turbine cycle heat rate was lower than the other available indications. The proposal was to switch to using the flow based on the condensate flow. After the return of the 1B HPBFP, the condensate flow indication is much higher than the other indications. However, the heat rate calculated from the condensate flow shows much better agreement to the fuel based heat rate. The heat rate calculation was changed on 7/9/09 and now uses the condensate based flow rate. Performance engineering will investigate the difference in indicated flow and determine further potential calibration checks.
- In the beginning of June, the normal drainer position and demand on the 6B heater was at 100% most of the time. On 6/8/09, the normal drainer went to about 70% at full load and then increased to 100% on load drops. On 6/18/09, the position went to about 60% and started to behave like the 6A normal drainer. It did this until 7/4/09. Since then, the normal drainer has essentially indicated 100% open. The emergency drain has remained closed for most of this time period. The DCA of the 6B FWH is higher than that of the 6A FWH (although it is only higher by a couple of degrees) when the normal drainer indicates 100% open and did drop down to the same value as 6A in mid-June when the normal drainer indicated the same position as the 6A normal drainer. The plant should investigate the reason for the varying normal drainer position and demand.
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. The following tables show the indications that are indicating potential issues (either high temperatures or potential TC problems):

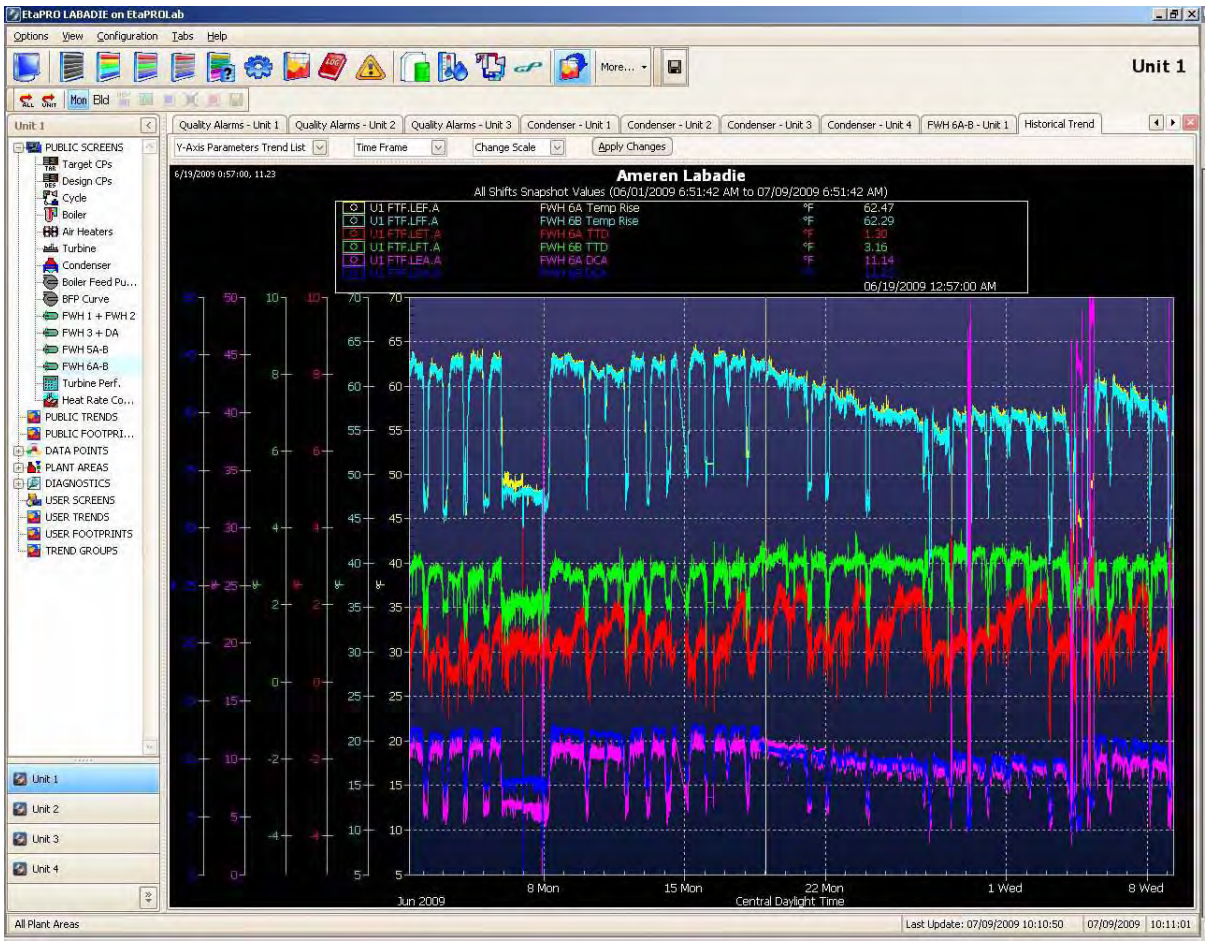
Pi Tag	Issue	JR
1STM-16179 MAIN STM BEFORE MO-137A TEMP	Reading 800F for the past year. Labadie stated that they close both the root valves and MO. Temperature before 137B is about 200F.	JR158443
1STM-16178 MAIN STM AFTER MO-137A TEMP	Reading close to 400F for the past year. This temperature increased about 100F following a short outage at the end of March. It appears both the root and MO valve are leaking.	JR158443?
1STM-16181 MAIN STM DRAIN MO-5B TEMP	Reading about 250F for the past year	
1STM-16103 MAIN STM LD DRN FV-26 TEMP	Reading too low since the end of March. Went from about 100F to 0F following the short outage at the end of March and has drifted back up since then.	

Summary of Performance Report for:						
Plant	Labadie					
Unit	1					
Period	6/1/09	to	7/1/09			
			Jun-09		May-09	Jun-08
Full Load Performance						
Hours of Data (>90% Monthly Capability)			72		222	39
			Averages		**Averages**	**Averages**
GENERATOR MEGAWATTS	MW		631.9		538.0	650.1
AUX POWER	MW		28.3		25.4	26.1
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9496.7		9729.6	9357.9
Boiler Efficiency Actual	%		84.0		84.5	85.3
CONTROL VALVE POSITION LVDT	%		90.7		80.9	99.9
FEEDWATER TEMP TO ECON	degF		492.7		317.3	492.8
FEEDWATER TEMP TO HTR 1	degF		438.3		317.8	437.8
HP Turbine Efficiency Actual	%		87.4		86.9	87.2
IP Turbine Efficiency Corrected	%		90.8		90.4	90.8
Condenser Pressure HP	inHga		3.3		2.1	2.6
Condenser Pressure LP	inHga		2.2		1.3	2.1
AIRHTR-A GAS OUTLET TEMP	degF		351.9		311.1	339.3
AIRHTR-B GAS OUTLET TEMP	degF		326.2		300.5	324.3
AMBIENT AIR TEMP	degF		81.5		65.3	75.2
CIRC WTR TEMP TO LP CONDB	degF		81.7		62.7	74.5
CIRC WTR TEMP TO LP CONDB	degF		82.6		63.6	75.5
CIRC WTR TEMP TO LP CONDB	degF		82.8		64.6	75.2
CIRC WTR TEMP TO LP CONDB	degF		81.9		65.9	74.7
Minimum River Temperature	degF		81.7		62.7	74.5
FWH 1 Temperature Rise	degF		54.4		-0.5	55.0
Net Load	MW		603.5		512.6	624.1
Average Cond Press	inHga		2.8		1.7	2.3
Average Exit Gas Temperature	degF		339.0		305.8	331.8
Aux Power	%		4.5		4.7	4.0
Gross Unit Heat Rate	BTU/KW-HR		9070.8		9269.8	8982.8
Gross Turbine Heat Rate	BTU/KW-HR		7620.9		7831.3	7666.7
Feedwater Flow	KPPH		3930.9		2531.8	
No data at >90% Monthly Capability - Used Data above 530 MWs						

The data for June is for after the return of the 1B HPBFP at the end of the month. The HP condenser pressure is up by about 0.7 inHgA compared to last year. Aux. load is down from last month (the gross load was is error last year due to a 4% CT change issue last year following the outage). The A side gas outlet temperature is 10F higher than last year.



The top plot shows the normal and emergency drainer demand and position for the 6B FWH and the normal drainer demand and position for the 6A FWH since 6/1/2009. As shown, the 6B normal drainer position and demand (light blue and green lines) have been up and down quite a bit over the time period.



The bottom plot shows the TTD, DCA, and temperature rise for the 6A and 6B FWHs since 6/1/2009. For the most past, the performance of the two heaters has been about the same. However, the DCA of the 6B FWH (dark blue line) is higher than that on the 6A (pink line) when the valve demand and position indicate 100% open.

Unit 2 Observations

The following observations were made regarding Unit 2 operation and performance:

- During the quarterly performance meeting held at the end of June at Labadie plant, Mr. Litzinger raised an issue regarding the performance of the Unit 2 HPBFPs. Specifically, he stated that the speed on the two HPBFPs on Unit 2 was much higher than the speed of the HPBFPs on the other units. He stated that this condition has existed since the later part of May. Performance Engineering reviewed some performance and vibration data and noted some step changes down in the pump performance factor that occurred in conjunction with step changes in vibration levels on the 2B HPBFP. Plots are given in the attached e-mail that show two step changes; one on 5/28 at about 7:12 am and the other on 6/4 at around 8:15 pm. The pump suction spool piece was removed during an SBO on 7/2. No debris was found in the pump suction strainer and no issues were found in the eye of the pump. Performance Engineering walked down the pump on 7/8/09. The HPBFP recirculation valve, 2FV8B, was found to be partially open as the temperature upstream and downstream of the valve was reading about 440F with a temperature gun. In talking with Mr. Balestreri, it is believed that this condition may have occurred on the shutdown in the end of June to clamp a leak on the pump. He stated that the configuration of the valve allows material to get stuck in the valve cage and this prevents the valve from shutting all of the way. JR168175 was written on 6/26/09 indicating that the valve could not be closed. Labadie plant intends to run a test this weekend in which the HPBFP recirc line stop valve will be closed. The performance of the pump will be reviewed during this test. Performance engineering will review the performance of all 8 HPBFPs and provide details in the next monthly report.

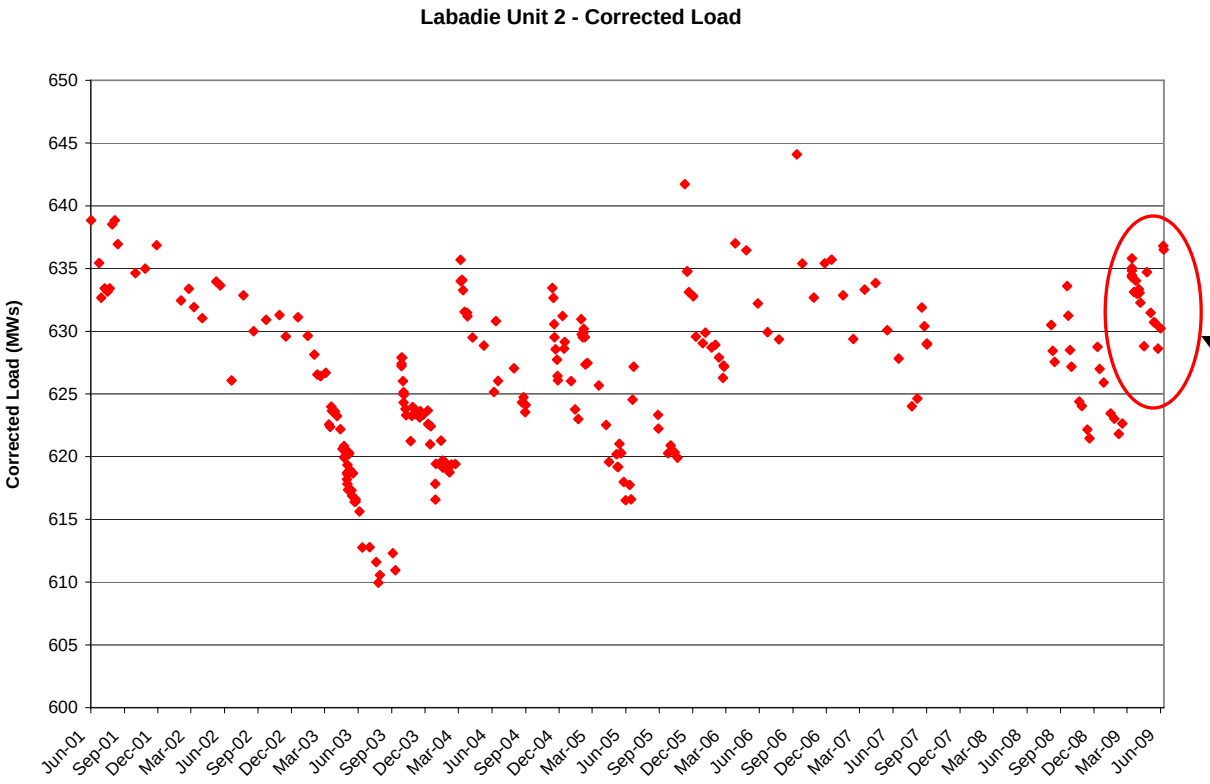

RE U2 HPBFPs.msg

- Condenser vacuum flow dropped from about 50 scfm to about 35 scfm in June. As seen in past years, condenser cleanliness has started to rise with the rising river temperature.
- The unit continues to see a decline in corrected load and turbine efficiencies during continuous online runs. The load and efficiencies recover during SBOs. This will continue to be monitored.
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. The following tables show the indications that are indicating potential issues (either high temperatures or potential TC problems):

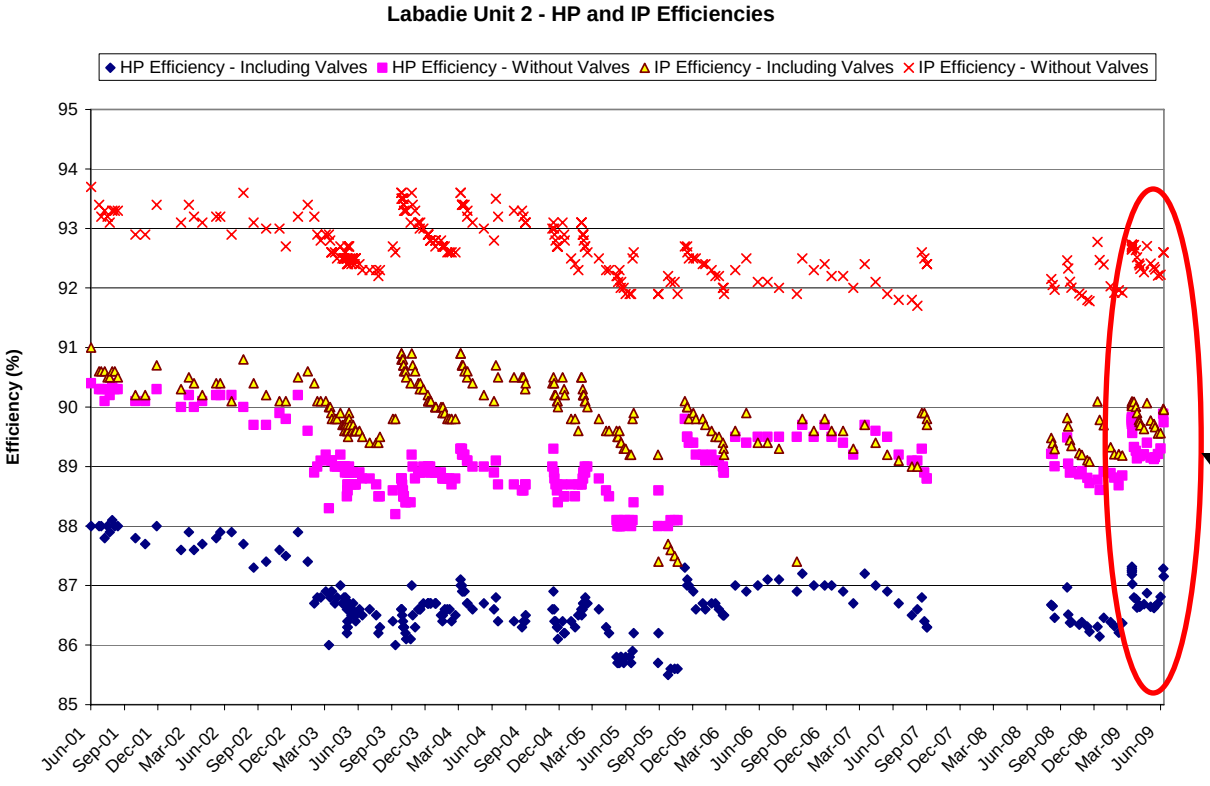
Pi Tag	Issue	JR
2turb-16216 Gland Steam Spillover Temp	Reading 300F since August of 2008. Parts are on order to repair valve	
2STM-16180 MAIN STM DRAIN MO-5A TEMP	Reading about 200F since April	JR166476 JR166477
2STM-16103 MAIN STM LD DRN FV-26 TEMP	Reading about 175F for the past year	JR134214
2STM-16177 MAIN STM DRAIN FV-27 TEMP	Reading about 200F for the past year	JR134215

Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	6/1/09	to	7/1/09			
Full Load Performance			Jun-09		May-09	Jun-08
Hours of Data (>90% Monthly Capability)			524		530	266
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		618.7		619.7	629.3
AUX POWER	MW		30.0		29.2	30.6
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10184.1		10068.7	10268.0
Boiler Efficiency Actual	%		85.4		85.4	85.3
CONTROL VALVE POSITION LVDT	%		94.2		82.4	99.9
FEEDWATER TEMP TO ECON	degF		494.1		493.2	495.8
FEEDWATER TEMP TO HTR 1	degF		444.7		443.8	447.6
HP Turbine Efficiency Actual	%		86.4		85.9	86.8
IP Turbine Efficiency Corrected	%		90.1		90.9	90.5
Condenser Pressure HP	inHga		3.1		2.4	3.0
Condenser Pressure LP	inHga		2.6		2.1	2.4
AIRHTR-A GAS OUTLET TEMP	degF		347.7		335.0	342.0
AIRHTR-B GAS OUTLET TEMP	degF		346.0		335.9	347.9
AMBIENT AIR TEMP	degF		79.4		69.2	79.1
CIRC WTR TEMP TO LP CONDB	degF		75.9		64.9	74.5
CIRC WTR TEMP TO LP CONDB	degF		76.2		65.6	75.3
CIRC WTR TEMP TO LP CONDB	degF		76.1		66.1	75.2
CIRC WTR TEMP TO LP CONDB	degF		75.6		68.4	74.6
Minimum River Temperature	degF		75.6		64.9	74.5
FWH 1 Temperature Rise	degF		49.3		49.5	48.1
Net Load	MW		588.7		590.5	598.6
Average Cond Press	inHga		2.9		2.3	2.7
Average Exit Gas Temperature	degF		346.9		335.4	345.0
Aux Power	%		4.8		4.7	4.9
Gross Unit Heat Rate	BTU/KW-HR		9690.6		9594.9	9767.9
Gross Turbine Heat Rate	BTU/KW-HR		8276.1		8193.8	8335.0
Feedwater Flow	KPPH		4136.8		4081.3	

The heat rate increased from May to June due mainly to higher condenser backpressure.



Note that corrected load took a step change up following the most recent outage.



Note the increase in turbine efficiency following this past spring outage followed by a continuous decrease until subsequent SBOs.

Unit 3 Observations

The following observations were made regarding Unit 3 operation and performance:

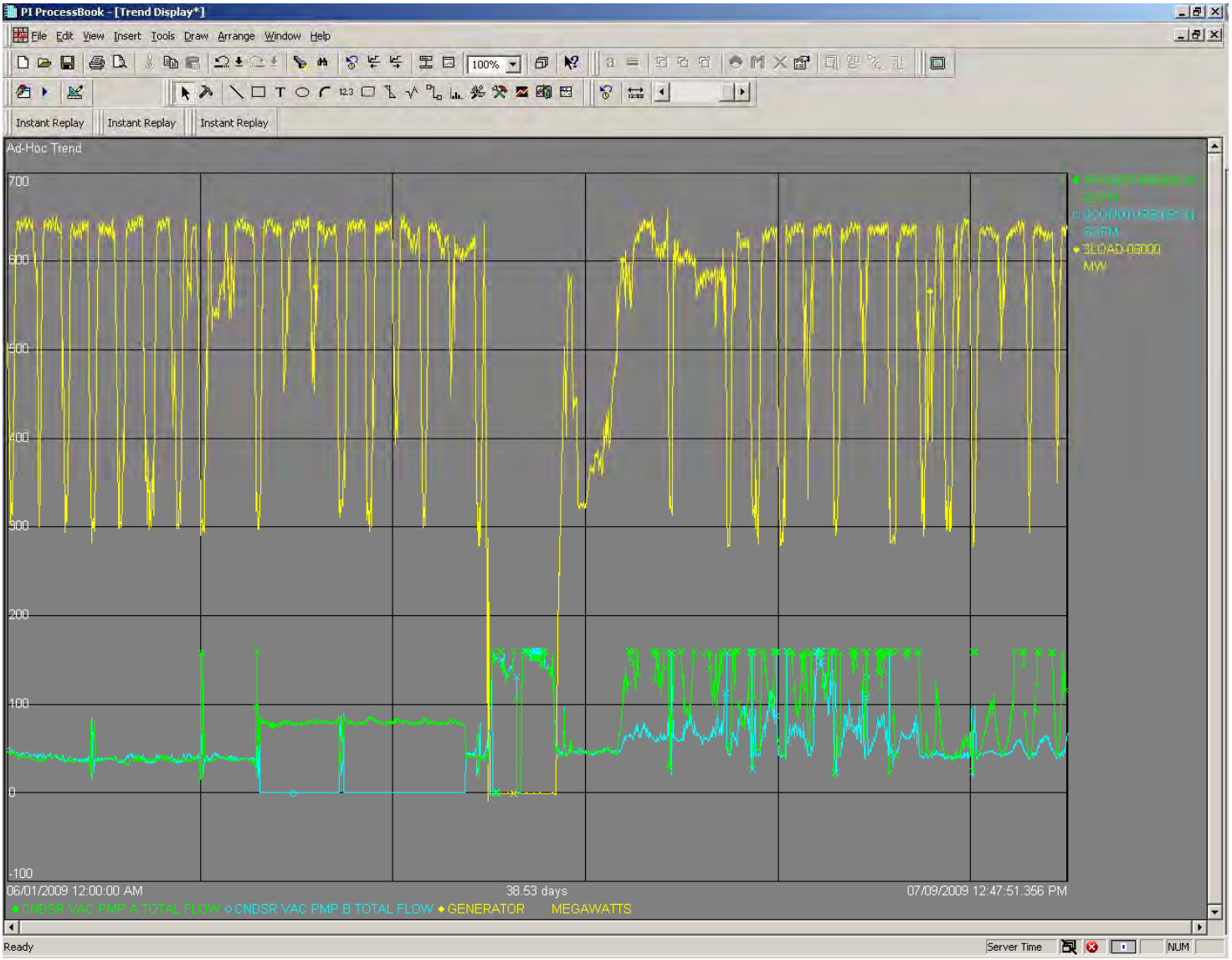
- The Unit had an SBO in mid-June. Following the outage, the top 3 FWHs were OOS for about 4 days to deal with various issues on the unit (silica spiked after cutting in 3-2 FWH following cleaning and work on 3-MO100).
- The gas side pressure drop across the A air heater increased by about an inch in June whereas the B side showed very little increase.
- The A condenser vacuum flow has been bouncing around quite a bit (from 40 to over 160 scfm) since the SBO in mid-June. The flow seems to be on scale at low load and then trends high when the unit is up on load. The 4B pump is exhibiting this same trend but to a much lesser degree.
- The unit continues to see a decline in corrected load and turbine efficiencies during continuous online runs. The load and efficiencies recover during SBOs. This will continue to be monitored.
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. The following tables show the indications that are indicating potential issues (either high temperatures or potential TC problems):

Pi Tag	Issue	JR
3STM-16109 MSSV BSD MO-110 & 112 TEMP	Reading 800F since spring outage	JR167497 JR167497
3STM-16105 MO-121B & 105B TEMP	Reading high since SBO in June. Reached about 350F and has drifted down to about 200F as of 7/9/09. This temperature is higher than prior to the SBO in mid-June.	
3stm-16104 MO-121A & 105A TEMP	Reading high since SBO in June. Reached about 200F and has drifted down to about 140F. This temperature is higher than prior to the SBO in mid-June.	
3STM-16106 MO-122A TEMP 3STM-16107 MO-122B TEMP	Has been reading high (above 200F) since the spring outage. Note from JR159234 indicates that the line has a ¼" orifice to allow for continuous flow through the line (and for MO-122A). MO-122A (3STM-16106) has read about 600F most of the year. On 6/23, the temperature dropped down to 100F. Has a root valve been closed on the 122A drain line?	

Summary of Performance Report for:

Plant	Labadie					
Unit	3					
Period	6/1/09	to	7/1/09			
Full Load Performance			Jun-09		May-09	Jun-08
Hours of Data			412		306	546
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		624.6		633.3	636.7
AUX POWER	MW		28.4		28.8	30.8
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10072.4		9793.4	10068.8
Boiler Efficiency Actual	%		85.3		85.1	85.5
CONTROL VALVE POSITION LVDT	%		99.2		101.1	104.8
FEEDWATER TEMP TO ECON	degF		455.2		485.9	486.7
FEEDWATER TEMP TO HTR 1	degF		414.5		435.4	438.7
HP Turbine Efficiency Actual	%		85.0		86.6	87.3
IP Turbine Efficiency Corrected	%		95.2		95.4	93.8
Condenser Pressure HP	inHga		3.5		2.7	3.4
Condenser Pressure LP	inHga		2.8		2.3	2.7
AIRHTR-A GAS OUTLET TEMP	degF		362.1		363.5	340.6
AIRHTR-B GAS OUTLET TEMP	degF		341.1		339.8	336.0
AMBIENT AIR TEMP	degF		78.0		71.6	78.4
CIRC WTR TEMP TO LP CONDB	degF		75.8		67.5	74.0
CIRC WTR TEMP TO LP CONDB	degF		76.0		68.2	75.0
CIRC WTR TEMP TO LP CONDB	degF		75.8		68.0	74.7
CIRC WTR TEMP TO LP CONDB	degF		75.4		70.2	74.3
Minimum River Temperature	degF		75.4		67.5	74.0
FWH 1 Temperature Rise	degF		40.7		50.5	48.0
Net Load	MW		596.1		604.6	605.8
Average Cond Press	inHga		3.1		2.5	3.0
Average Exit Gas Temperature	degF		351.6		351.6	338.3
Aux Power	%		4.6		4.5	4.8
Gross Unit Heat Rate	BTU/KW-HR		9613.7		9348.6	9581.0
Gross Turbine Heat Rate	BTU/KW-HR		8201.5		7959.8	8190.6
Feedwater Flow	KPPH		3735.7		3809.7	

The heat rate increased from May for several reasons. First, the average condenser pressure was up about 0.6 in HgA which leads to about a 1% increase in heat rate. Second, the average feedwater temperature was down for the month due to having the top 3 heaters OOS for several days. This caused an average heat rate impact of about 0.7% for the month. Third, the average HP efficiency for the month was down about 1.6% which correlates to about a 0.25% in heat rate. The average efficiency was down due to pinching down on the control valves during the time period the top 3 FWHs were OOS.



The above plot shows condenser vacuum pump flow and load since 6/1. As shown, the indicated flow from the A pump has bounced between about 40 SCFM and over 160 SCFM since the SBO in mid-June.

Unit 4 Observations

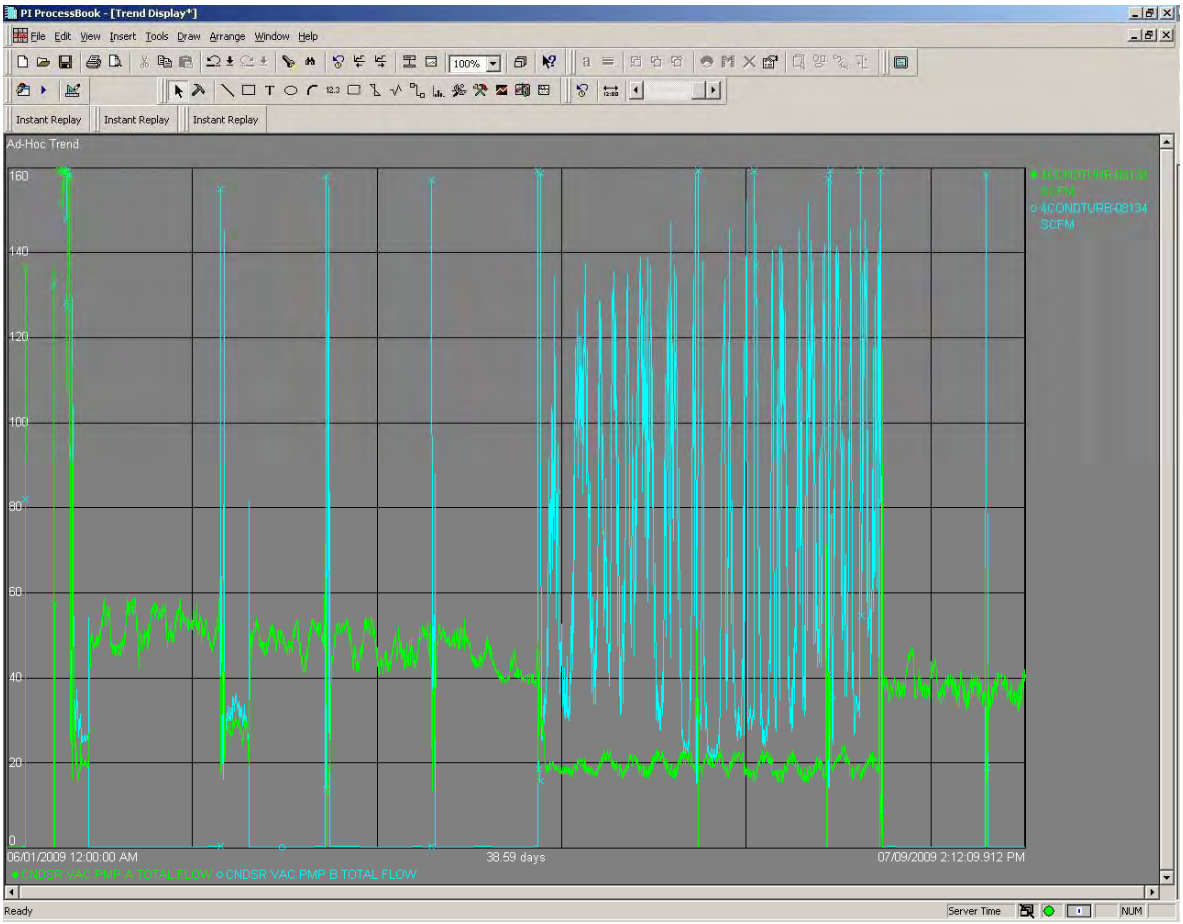
The following observations were made regarding Unit 4 operation and performance:

- The average heat rate in June is lower than the May data due to the spring outage. During the outage, repairs were made to the 4-1 FWH which was OOS prior to the outage. Operating without the top heater in service was about a 1.1% hit on heat rate. In addition, the auxiliary load on the unit is down.
- There was no VWO data in June.
- The indicated flow from the B condenser vacuum pump was erratic for the last half of June (see plot below).
- The tube leaks in the 4-5A FWH continue to get worse. The emergency drainer on both the 6A and 5A FWHs has increased in the month of June. The DCA is high on the 4-5A FWH which could indicate leaks on the outlet side of the FWH.
- The normal drainer on the 4-3 FWH took a step change up on 6/22. The step change occurred about 12 hours after all three IPBFPs were running and at a steady high load. The drainer position did not change once the 3rd IPBFP was removed from service.
- The normal drainer indications on the 4-2 FWH (4BFW-HTR-04604(C) and 4BFW-HTR-04652) started swinging in the later part of June. The DCA has gone from about 10F in the beginning of the month to over 30F at the end of the month. Mr. Balestreri wrote JR165033 to address the issue.
- The normal drainer feedback (4bfw-htr-04650) took a step change up to about 100% open on the 4-1 FWH on 6/1//09. After 6/21, it has read bad input (off scale high).
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. The following tables show the indications that are indicating potential issues (either high temperatures or potential TC problems):

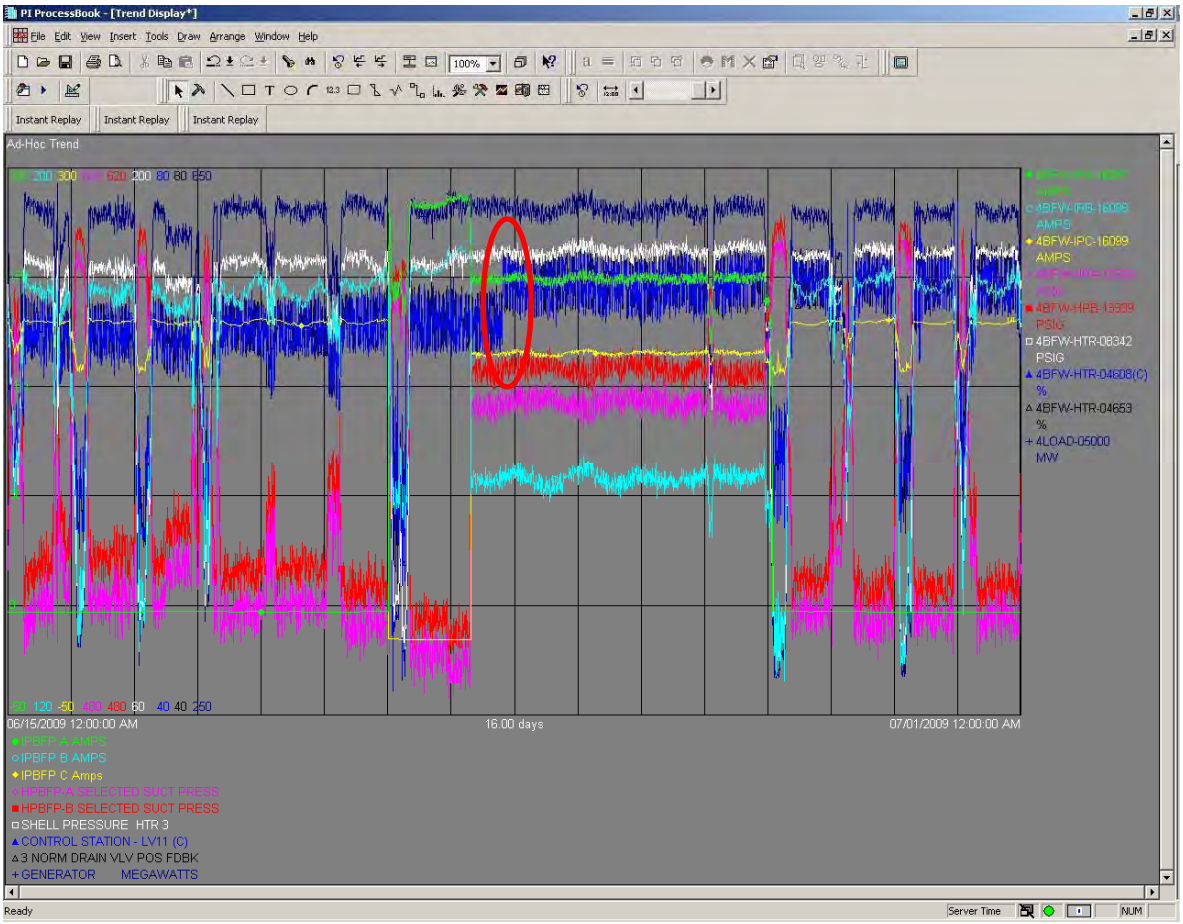
Pi Tag	Issue	JR
4STM-16106 FV-634A TEMP 4STM-16107 FV-634B TEMP	634A was reading about 550 for a year until June when it dropped to 100F. 634B has been reading about 450F for at least a year. Notes from JR159234 indicate that the line has a ¼" orifice to allow for continuous flow. Was a root valve to 634A closed in late June? This occurred 3 hours after the temperature for MO-122A dropped to 100F.	JR159234
4BFW-HPA-16042 BFPT-A FV-215A TEMP	Reading about 250F for at least a year	JR126163
4BFW-HPB-16043 BFPT-B FV-215B TEMP	Reading about 250F for at least a year	JR126164

Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	6/1/09	to	7/1/09			
Full Load Performance			Jun-09		May-09	Jun-08
Hours of Data (>90% Monthly Capability)			460		89	157
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		616.5		612.0	641.0
AUX POWER	MW		26.9		30.7	29.9
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9975.3		10050.8	10263.0
Boiler Efficiency Actual	%		85.3		85.3	85.3
CONTROL VALVE POSITION LVDT	%		84.0		75.1	98.7
FEEDWATER TEMP TO ECON	degF		484.7		432.6	484.5
FEEDWATER TEMP TO HTR 1	degF		434.8		433.7	423.3
HP Turbine Efficiency Actual	%		84.9		82.2	87.3
IP Turbine Efficiency Corrected	%		95.6		94.8	93.7
Condenser Pressure HP	inHga		3.0		2.4	3.4
Condenser Pressure LP	inHga		2.5		2.3	2.6
AIRHTR-A GAS OUTLET TEMP	degF		349.7		334.6	339.5
AIRHTR-B GAS OUTLET TEMP	degF		343.7		320.0	332.9
AMBIENT AIR TEMP	degF		81.0		62.5	78.3
CIRC WTR TEMP TO LP CONDB	degF		76.5		60.4	75.4
CIRC WTR TEMP TO LP CONDB	degF		76.7		61.3	76.3
CIRC WTR TEMP TO LP CONDB	degF		76.6		61.6	76.0
CIRC WTR TEMP TO LP CONDB	degF		76.0		60.7	75.5
Minimum River Temperature	degF		76.0		60.4	75.4
FWH 1 Temperature Rise	degF		49.9		-1.1	61.2
Net Load	MW		589.7		581.2	611.1
Average Cond Press	inHga		2.8		2.3	3.0
Average Exit Gas Temperature	degF		346.7		327.3	336.2
Aux Power	%		4.4		5.0	4.7
Gross Unit Heat Rate	BTU/KW-HR		9540.8		9546.4	9783.7
Gross Turbine Heat Rate	BTU/KW-HR		8139.4		8141.9	8344.3
Feedwater Flow	KPPH		3707.3		3551.1	

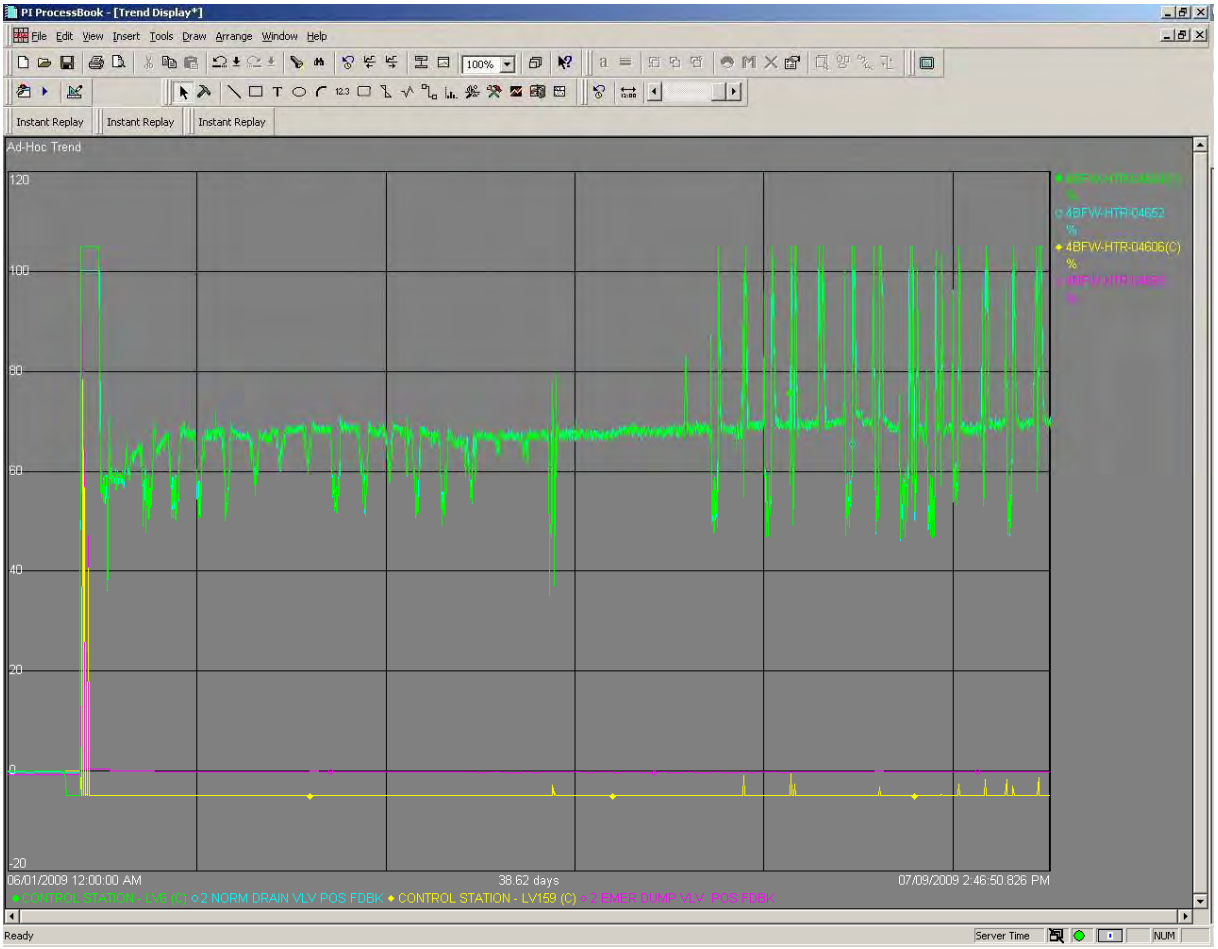
The data for June shows a heat rate improvement following the outage. This is due to a reduced auxiliary load on the unit and having the top FWH back in service. Condenser pressure is up by about 0.5 in HgA and will continue to rise as the river temperature goes up.



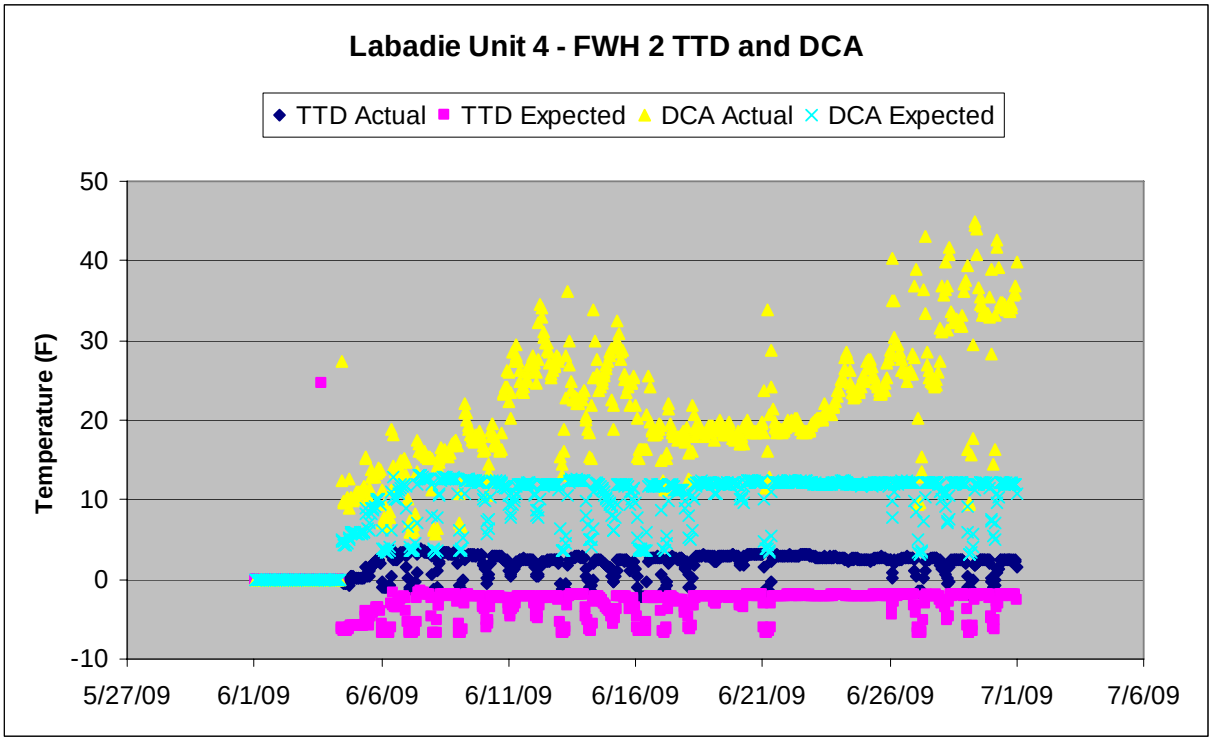
The top plot shows the B vacuum pump cycling while it was on in June.



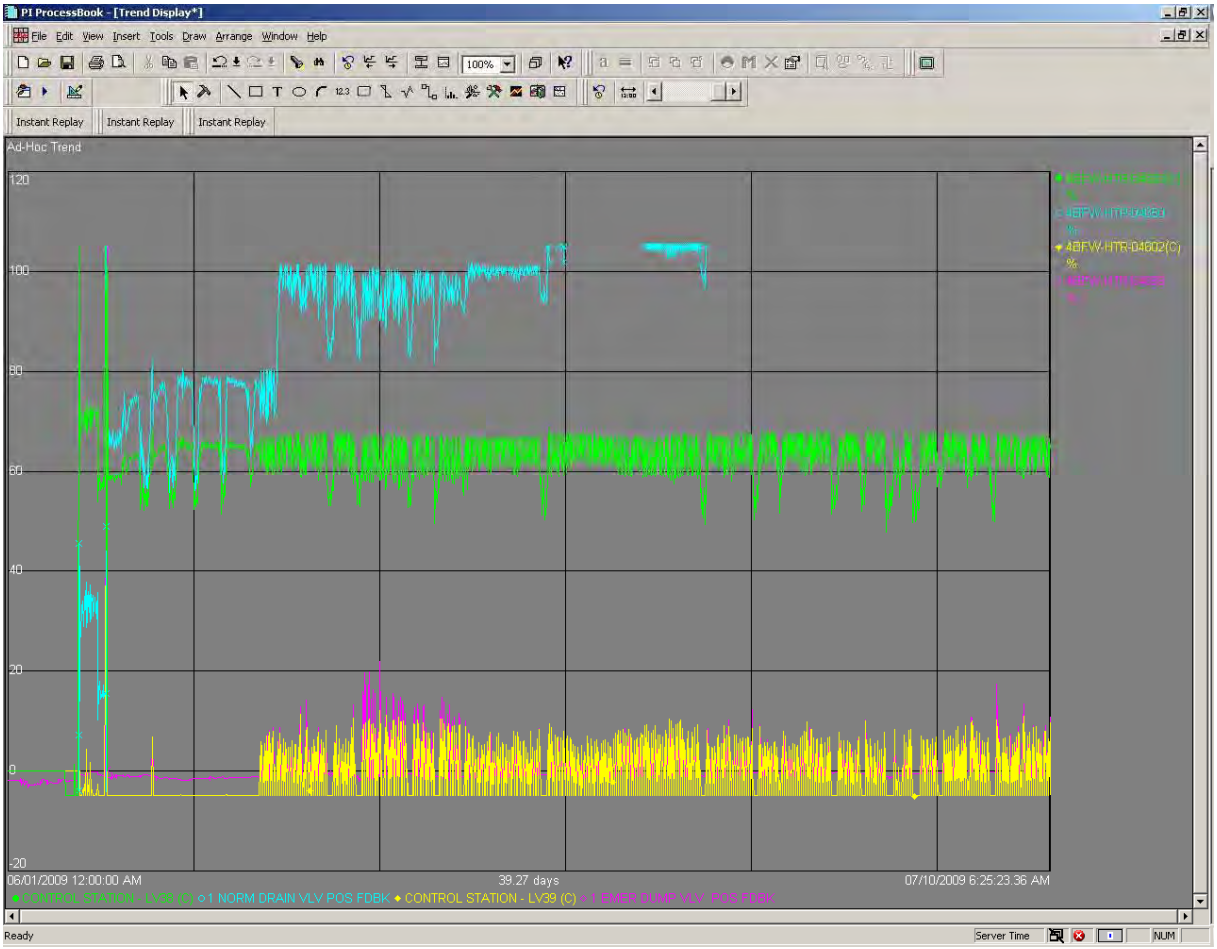
The bottom plot shows a step change up in the normal drainer position on the 4-3 FWH in the middle of June.



The top plot shows the normal drainer position and demand from the 4-2 FWH cycling at the end of the month.



The bottom plot shows that the DCA has gone up on the 4-2 FWH over the month of June and especially at the end of the month when the normal drainer was cycling.



This plot shows that the normal drainer position has gone off-scale the last half of June on the 4-1 FWH.

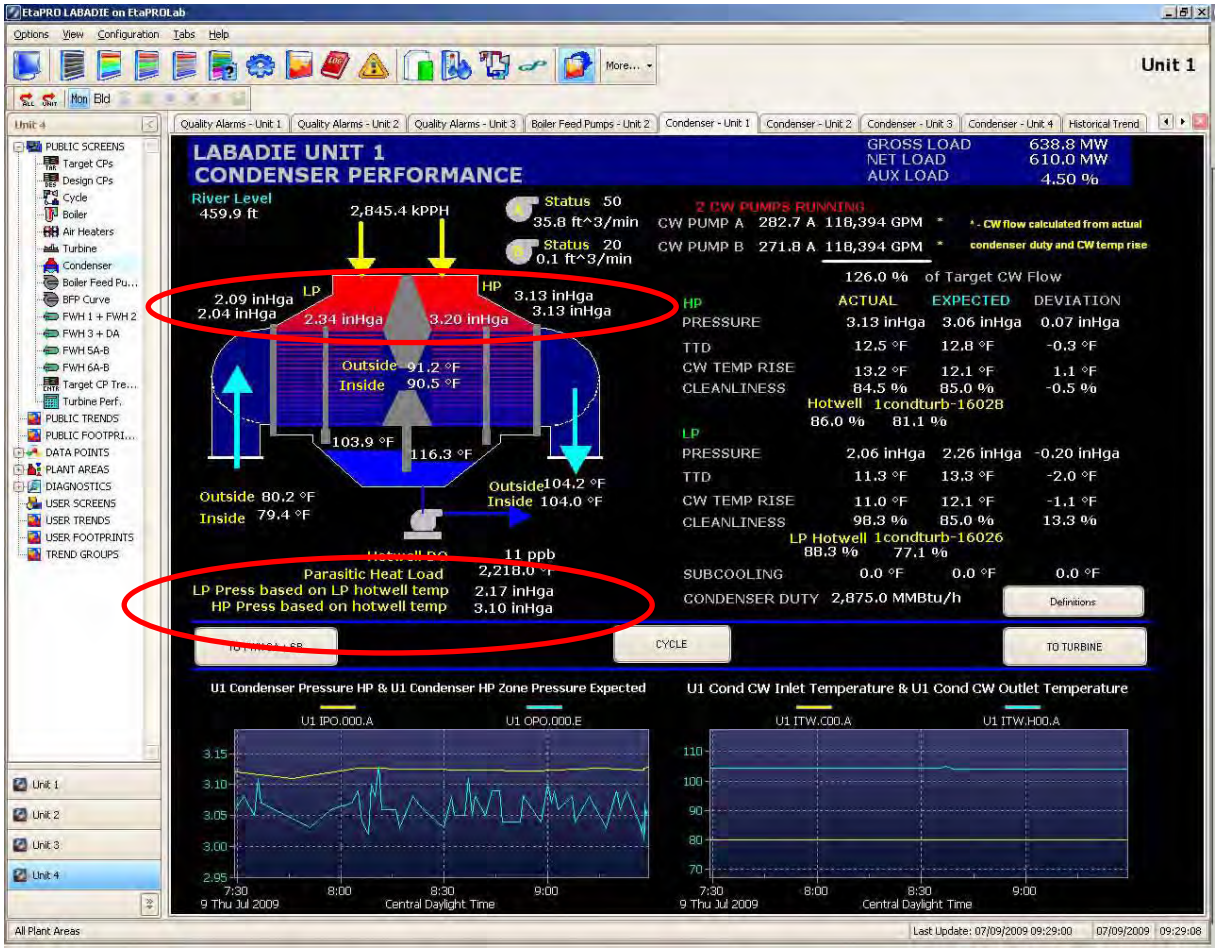
General Observations

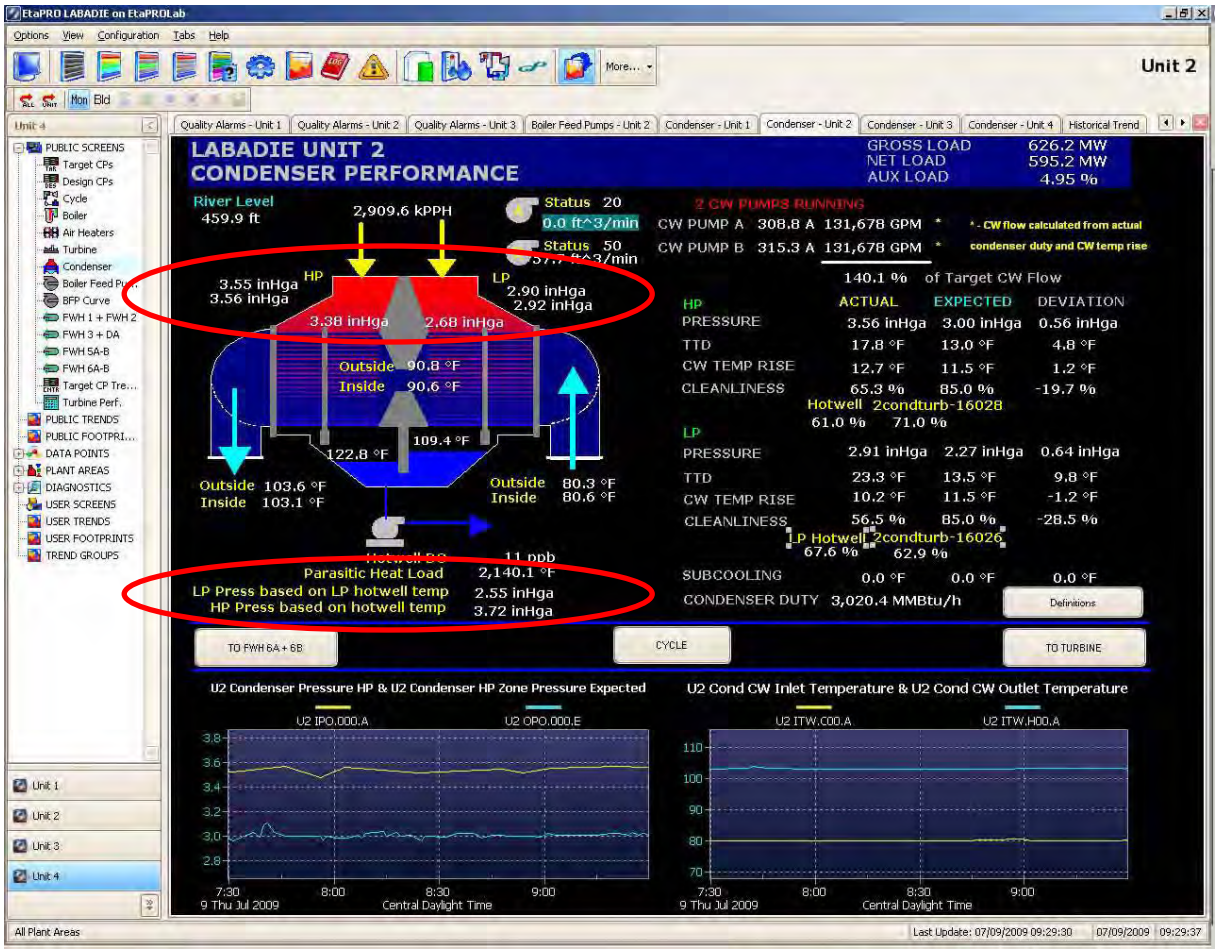
The following general observations were made:

- A review of condenser pressure indications was performed on all units. Each unit has four turbine exhaust pressure indications (two on the IP condenser side and two on the HP condenser side). In addition, each unit has an indication of pressure closer to the tube sheet. Finally, an estimate of pressure can be obtained by looking at the hotwell temperatures in the two condenser shells. The following observations were noted from reviewing these indications:
    - One would expect that the two LP condenser turbine exhaust tags to show good agreement with each other on each unit. This is also expected from the HP condenser turbine exhaust tags. These indications agree within 0.05 in HgA on all units except for the HP condenser turbine exhaust tags on Unit 3 and 4. On Unit 3, the difference between the tags is about 0.4 in HgA. Tag 3TURB-23965 is the one suspected to be in error due to being lower than 3CONDTURB-16028 (condenser pressure closer to the tube sheet). On Unit 4, the difference between the tags is about 0.6 in HgA. Tag 4TURB-23965 is the one suspected to be in error due to being lower than 4CONDTURB-16028 (condenser pressure closer to the tube sheet).
    - The next check was to compare the turbine exhaust tags to the pressure closer to the tube sheet. The exhaust pressure is expected to be equal to or higher than the pressure at the tube sheet. This is true on most units except for Unit 1 where the LP condenser turbine exhaust tags are about 0.2 in HgA lower than the corresponding 1condturb-16026. It is noted that on the other units, the turbine exhaust tags are about 0.2 in HgA higher than the corresponding condturb tags.
    - The next check was to compare the turbine exhaust and CONDTURB tags to the pressure estimated using the hotwell temperatures. The pressure estimated from the hotwell was expected to compare well with the CONDTURB tag pressures. For most condenser shells, agreement within 0.1 in HgA was observed. The indications that stood out were the LP condenser on Unit 1 and the HP side on Unit 2.
    - Mr. Balestreri forwarded two completed FUs that covered checking the calibration of the 6 pressure indications on Unit 3 and 4 during the recent spring outages. On Unit 3, FU083100 indicated no changes were required. On Unit 4, FU084726 just states the FU was completed. ***Were the sensing lines vented during this work?***
    - Recommendations:
        - The first step in verifying the condenser pressure indications would be to vent the sensing lines on all of the pressure indications. If this does not change any of the indications, then the following steps would be recommended:
        - Check all 6 pressure indications on Unit 1. Be sure to vent the sensing lines to remove any trapped moisture. In addition, the hotwell TCs

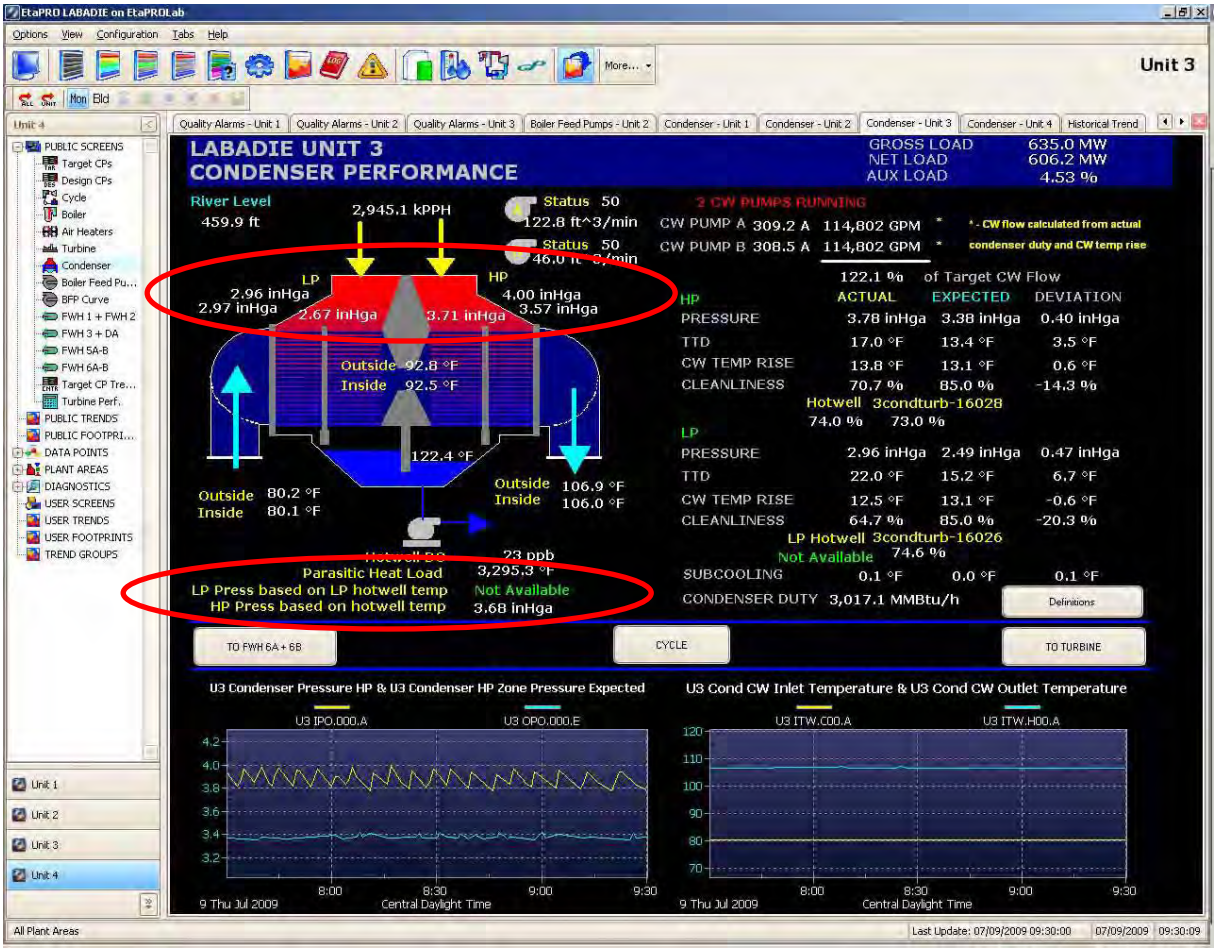
(both the LP false floor hotwell (1CONDTURB-16242) and the main hotwell (1COND-08168)) should also be checked.

- Check the 3 pressure indications on the HP condenser (be sure to vent the sensing lines to remove any trapped moisture) on Unit 2 as well as the main hotwell temperature TC.
- Check the pressures associated with 3TURB-23965 and 4TURB-23965. Be sure to vent the sensing lines to remove any trapped moisture.



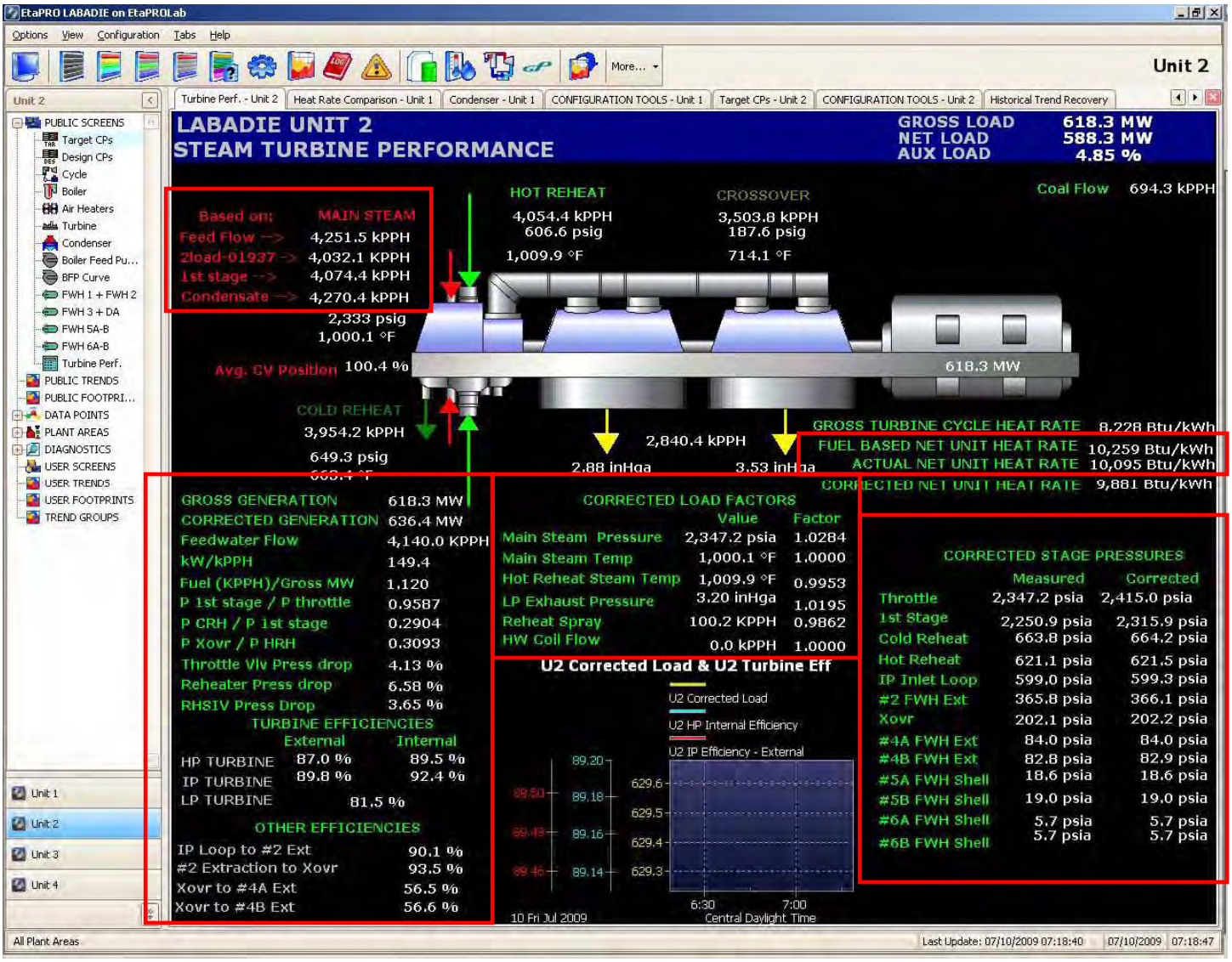


The screen shots on this and the next page show the various indications of condenser pressure for all four units (highlighted in red).


EtaPRO LABADIE on EtaPROLab
Unit 3
LABADIE UNIT 3
CONDENSER PERFORMANCE
GROSS LOAD 635.0 MW
NET LOAD 606.2 MW
AUX LOAD 4.53 %
River Level 459.9 ft
2,945.1 kPPH
Status 50 122.8 ft^3/min
Status 50 46.0 ft^3/min
2 CW PUMPS RUNNING
CW PUMP A 309.2 A 114,802 GPM *
CW PUMP B 308.5 A 114,802 GPM *
* - CW flow calculated from actual condenser duty and CW temp rise
122.1 % of Target CW Flow
HP ACTUAL EXPECTED DEVIATION
PRESSURE 3.78 inHga 3.38 inHga 0.40 inHga
TTD 17.0 °F 13.4 °F 3.5 °F
CW TEMP RISE 13.8 °F 13.1 °F 0.6 °F
CLEANLINESS 70.7 % 85.0 % -14.3 %
Hotwell 3condturb-16028
74.0 % 73.0 %
LP
PRESSURE 2.96 inHga 2.49 inHga 0.47 inHga
TTD 22.0 °F 15.2 °F 6.7 °F
CW TEMP RISE 12.5 °F 13.1 °F -0.6 °F
CLEANLINESS 64.7 % 85.0 % -20.3 %
LP Hotwell 3condturb-16026
Not Available 74.6 %
SUBCOOLING 0.1 °F 0.0 °F 0.1 °F
CONDENSER DUTY 3,017.1 MMBtu/h
Definitions
LP 2.96 inHga 2.97 inHga
HP 4.00 inHga 3.57 inHga
2.67 inHga 3.71 inHga
Outside 92.8 °F
Inside 92.5 °F
122.4 °F
Outside 80.2 °F
Inside 80.1 °F
Outside 106.9 °F
Inside 106.0 °F
23 ppb
Parasitic Heat Load 3,295.3 °F
LP Press based on LP hotwell temp Not Available
HP Press based on hotwell temp 3.68 inHga
TO FWH 6A + 6B
CYCLE
TO TURBINE
U3 Condenser Pressure HP & U3 Condenser HP Zone Pressure Expected
U3 IPO.000.A
U3 OPO.000.E
U3 Cond CW Inlet Temperature & U3 Cond CW Outlet Temperature
U3 ITW.C00.A
U3 ITW.H00.A
9 Thu Jul 2009
Central Daylight Time
All Plant Areas
Last Update: 07/09/2009 09:30:00


EtaPRO LABADIE on EtaPROLab
Unit 4
LABADIE UNIT 4
CONDENSER PERFORMANCE
GROSS LOAD 624.6 MW
NET LOAD 596.5 MW
AUX LOAD 4.51 %
River Level 459.9 ft
2,830.7 kPPH
Status 50 37.1 ft^3/min
Status 20 0.3 ft^3/min
2 CW PUMPS RUNNING
CW PUMP A 278.5 A 107,643 GPM *
CW PUMP B 263.0 A 107,643 GPM *
* - CW flow calculated from actual condenser duty and CW temp rise
114.5 % of Target CW Flow
HP ACTUAL EXPECTED DEVIATION
PRESSURE 3.47 inHga 3.38 inHga 0.09 inHga
TTD 13.4 °F 14.2 °F -0.7 °F
CW TEMP RISE 15.0 °F 13.3 °F 1.6 °F
CLEANLINESS 85.5 % 85.0 % 0.5 %
Hotwell 4condturb-16028
81.4 % 77.4 %
LP
PRESSURE 2.79 inHga 2.47 inHga 0.32 inHga
TTD 20.7 °F 14.9 °F 5.8 °F
CW TEMP RISE 11.7 °F 13.3 °F -1.6 °F
CLEANLINESS 67.8 % 85.0 % -17.2 %
LP Hotwell 4condturb-16026
82.8 % 80.3 %
SUBCOOLING 0.0 °F 0.0 °F 0.0 °F
CONDENSER DUTY 2,870.8 MMBtu/h
Definitions
HP 3.79 inHga 3.14 inHga
LP 2.80 inHga 2.77 inHga
3.67 inHga 2.49 inHga
Outside 92.0 °F
Inside 91.6 °F
121.2 °F 107.9 °F
Outside 107.2 °F
Inside 106.3 °F
Outside 80.6 °F
Inside 79.6 °F
16 ppb
Parasitic Heat Load 2,845.3 °F
LP Press based on LP hotwell temp 2.44 inHga
HP Press based on hotwell temp 3.56 inHga
TO FWH 6A + 6B
CYCLE
TO TURBINE
U4 Condenser Pressure HP & U4 Condenser HP Zone Pressure Expected
U4 IPO.000.A
U4 OPO.000.E
U4 Cond CW Inlet Temperature & U4 Cond CW Outlet Temperature
U4 ITW.C00.A
U4 ITW.H00.A
9 Thu Jul 2009
Central Daylight Time
All Plant Areas
Last Update: 07/09/2009 09:30:10

- Performance Engineering would like to be allocated about 1000 Pi tags to better trend the performance of the Labadie units. The majority of these tags will be used to monitor turbine performance (additional efficiency calculations, stage pressure calculations, corrected load, etc – see screen shot below). These tags will allow us to trend the performance of the machines as well as identify potential issues more efficiently. In addition, these new tags will be used to replace some values currently being calculated by the old performance monitor, OPM, which will eventually be phased out. From a quick look through the current list of OPM tags, it is judged that Performance Engineering could give up at least 700 OPM tags that aren't or would not be used in the future. With close scrutiny, we could probably give up many more OPM tags that would not be needed in the future.
    - These new tags would all use the EtaPro format. In other words, the tags would start with either Lx.V. or Lx.Q (where x would be either 1, 2, 3, or 4 depending on the unit).
    - Performance Engineering can create the tags automatically from EtaPro.
    - Performance Engineering would also update any Processbook screens that would be impacted by any OPM tag deletions.



June 15, 2009

To: David Fox
From: Jeff Shelton
Cc: Bob Meiners, Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace, Scott Hixson, Jim Barnett, Glenn Tiffin

Subject: Labadie May 2009 Performance Report

Executive Summary

The most notable items regarding Labadie unit performance were:

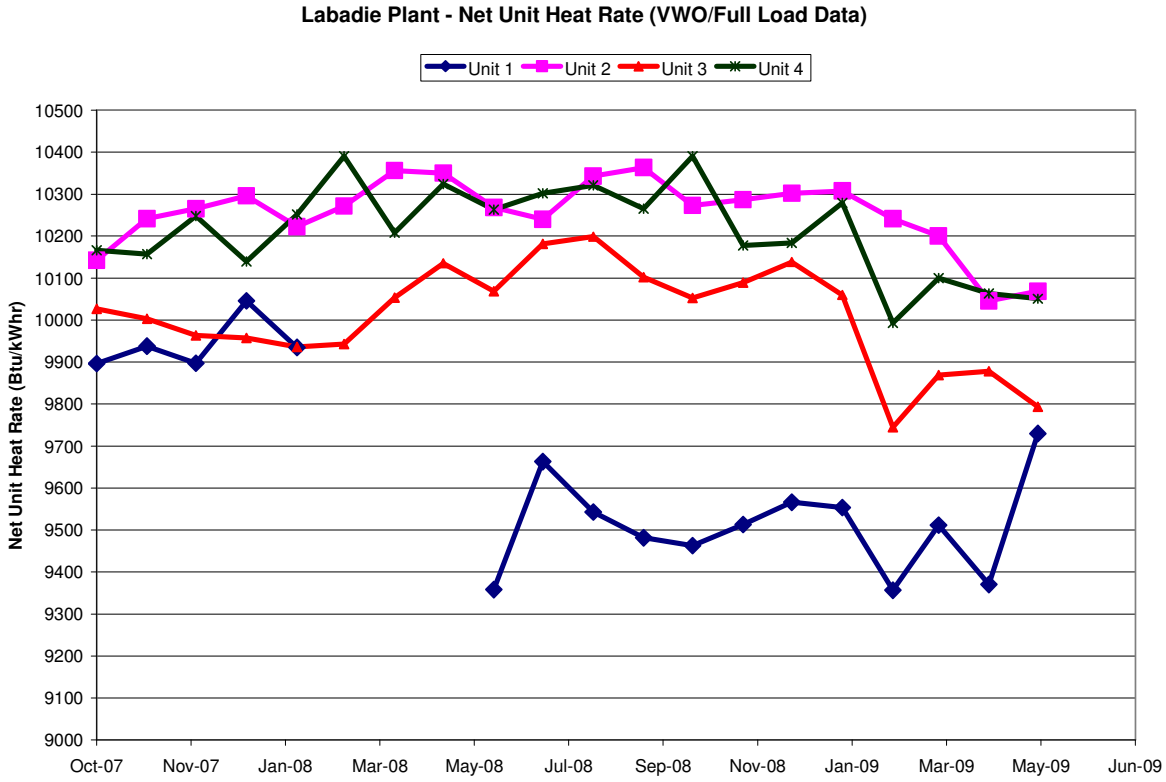
- Unit 3 returned from its spring outage with a higher corrected load and lower heat rate. An air in-leakage source was discovered on the normal drainer of the 3-5B feedwater heater and has corrected performance issues seen on the 3-6B heater since January 2007. The drainer positions on the 3-5A and 3-3 feedwater heaters have been increasing since startup and indicate potential tube leaks or some other drain issue (valve control problem or obstruction).
- Performance engineering is now monitoring the individual temperatures that feed into the condenser parasitic heat load determination. Elevated temperatures were found on each unit that should be investigated further.
- Superheat spray flow was elevated upon the return of Unit 4 from its spring outage. This same trend was observed on Unit 3 following its outage and declined over time. Superheat spray flow on Unit 4 is expected to drop-off as observed on Unit 3.
- Unit 1 operated the entire month with only one high pressure boiler feed pump.

The following table shows the instrument deficiencies for all four units.

Tag	Unit	Issue	Resolution	Carryover or New
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004	JR164407 to investigate and correct	Carryover
1BFWSTM-08318, EXTRACT PRESS HTR 4A	1	Flat-lined on 1/29	JR164611	Carryover
4STM-16195, PARASITIC HEAT LOAD	4	Went negative back in Oct. 08	JR167102	Fixed on 5/28/09
3TURB-23963, CROSSOVER WEST TEMP(B)	3	Has been bad since at least 1/1/2008		New

A plot of monthly unit heat rates for all four units is included on the following page.

The most notable item is the increase in heat rate on Unit 1 since the loss of the 1B HPBFPT (note that this heat rate data is not full load but rather a high load with only one BFP available). Unit 3 also showed a slight decrease in heat rate following its spring outage.



Heat Rate KPI

A trend only heat rate KPI has been created for 2009 with the intent of having a pay heat rate KPI in 2010. Below is a table showing the actual performance of the plant through May.

Plant	2009 Actual	Threshold	Target	Stretch
Labadie	9860	9888	9807	9764

A separate e-mail was sent to the plant describing how the trend only KPI targets were derived for 2009. Performance engineering intends to do more work in this area and present the proposed methodology for the heat rate KPI at our quarterly heat rate meeting in the summer (scheduled for June 30 at 10 am).

Action Items:

- Performance Engineering will setup a separate meeting with the plant to discuss phasing out the OPM performance monitor and creating more PI tags related to EtaPro.
- Labadie plant should inspect the 3-5A and 3-3 FWHs for tube leaks at the next available opportunity.
- Labadie plant should investigate the elevated temperatures that feed into the condenser parasitic heat load determination as detailed in this report.
- Performance Engineering will review the condenser pressure indications on all four units and determine what indications may be in error.

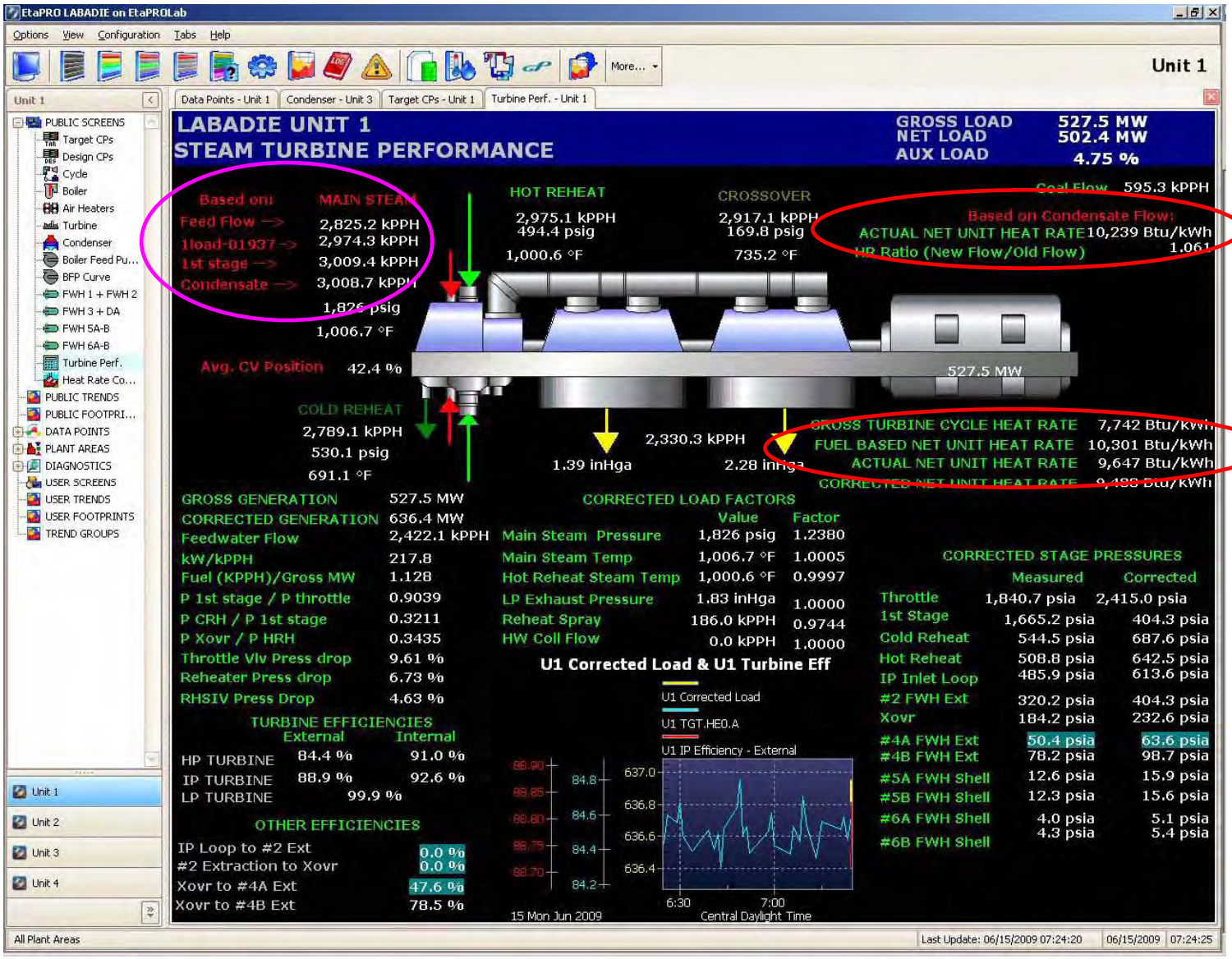
Unit 1 Observations

The following observations were made regarding Unit 1 operation and performance:

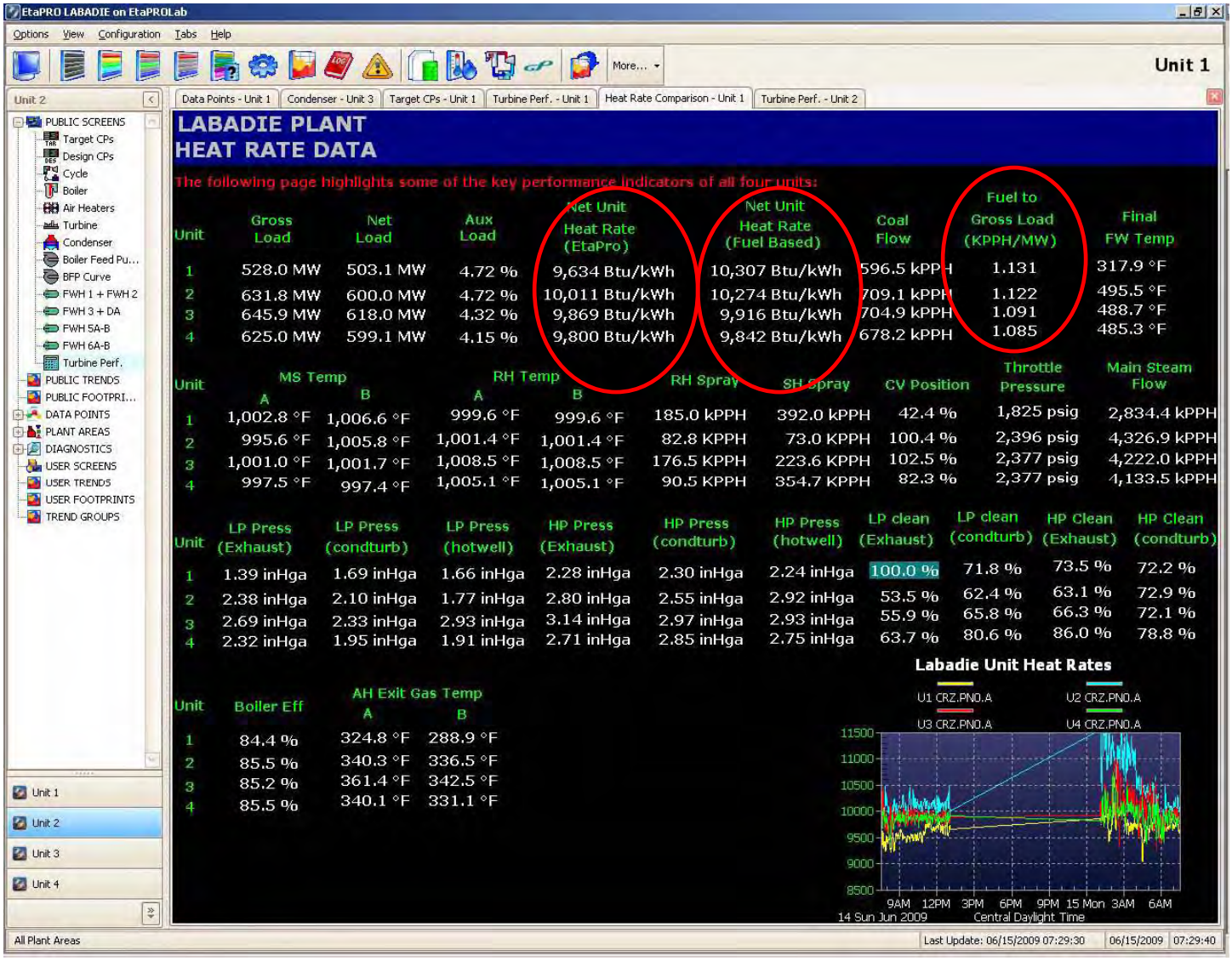
- No "full load" data existed in the month of May due to the 1B HPBFP being OOS. The data provided in the table below represents hours in which the average load was above 530 MWs.
- Note that even at this lower load, the calculated heat rate for Unit 1 is still better than the other three units. In addition, the heat rate on the unit at full load prior to the pump being out-of-service was at or better than the design value. Since neither of these conditions is credible, a review of the feedwater flow indications on the unit was performed. This review showed that the flow provided by 1BFW-13099-6minavg (currently used in EtaPro) is one of the lowest compared to other methods (e.g. using 1st stage pressure, using condensate flow and adding various heater extractions, etc). OPM currently estimates the feedwater flow from the measured condensate flow and accounts for feedwater heater extractions, spray flow, and hot water coil flow to come up with a feedwater flow rate. A heat rate calculation has been built into EtaPro using this same methodology. As shown on the screen shot below, this new calculation provides a more reasonable heat rate value and has better agreement with the heat rate estimated from fuel flow. Performance engineering is going to wait until the 1B HPBFP is back online before any official changes to the unit heat rate calculation is made. However, it is our intent to change the unit 1 heat rate calculation such that it is using the condensate flow.
- A condenser tube cleaning was performed in the beginning of June. This cleaning has improved condenser cleanliness. The LP and HP cleanliness factors are calculated to be between 70-75% (up from around 60%).
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. The temperatures associated with the A side main steam start-up bypass valves (MO-137A) are much higher on Unit 1 than on Unit 2.

Summary of Performance Report for:						
Plant	Labadie					
Unit	1					
Period	5/1/09	to	6/1/09			
			May-09		Apr-09	May-08
Full Load Performance						
Hours of Data (>90% Monthly Capability)			222		355	MBO
			Averages		**Averages**	
GENERATOR MEGAWATTS	MW		538.0		637.8	
AUX POWER	MW		25.4		27.9	
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9729.6		9370.0	
Boiler Efficiency Actual	%		84.5		84.1	
CONTROL VALVE POSITION LVDT	%		80.9		88.1	
FEEDWATER TEMP TO ECON	degF		317.3		492.2	
FEEDWATER TEMP TO HTR 1	degF		317.8		437.6	
HP Turbine Efficiency Actual	%		86.9		87.3	
IP Turbine Efficiency Corrected	%		90.4		91.1	
Condenser Pressure HP	inHga		2.1		1.9	
Condenser Pressure LP	inHga		1.3		1.3	
AIRHTR-A GAS OUTLET TEMP	degF		311.1		335.6	
AIRHTR-B GAS OUTLET TEMP	degF		300.5		318.0	
AMBIENT AIR TEMP	degF		65.3		51.5	
CIRC WTR TEMP TO LP CONDB	degF		62.7		50.2	
CIRC WTR TEMP TO LP CONDB	degF		63.6		52.9	
CIRC WTR TEMP TO LP CONDB	degF		64.6		54.0	
CIRC WTR TEMP TO LP CONDB	degF		65.9		50.7	
Minimum River Temperature	degF		62.7		50.2	
FWH 1 Temperature Rise	degF		-0.5		54.6	
Net Load	MW		512.6		609.9	
Average Cond Press	inHga		1.7		1.6	
Average Exit Gas Temperature	degF		305.8		326.8	
Aux Power	%		4.7		4.4	
Gross Unit Heat Rate	BTU/KW-HR		9269.8		8960.6	
Gross Turbine Heat Rate	BTU/KW-HR		7831.3		7537.1	
Feedwater Flow	KPPH		2531.8		3874.7	
No data at >90% Monthly Capability - Used Data above 530 MWs						

As stated above, the data for May is for all hours in which the average load was above 530 MWs.



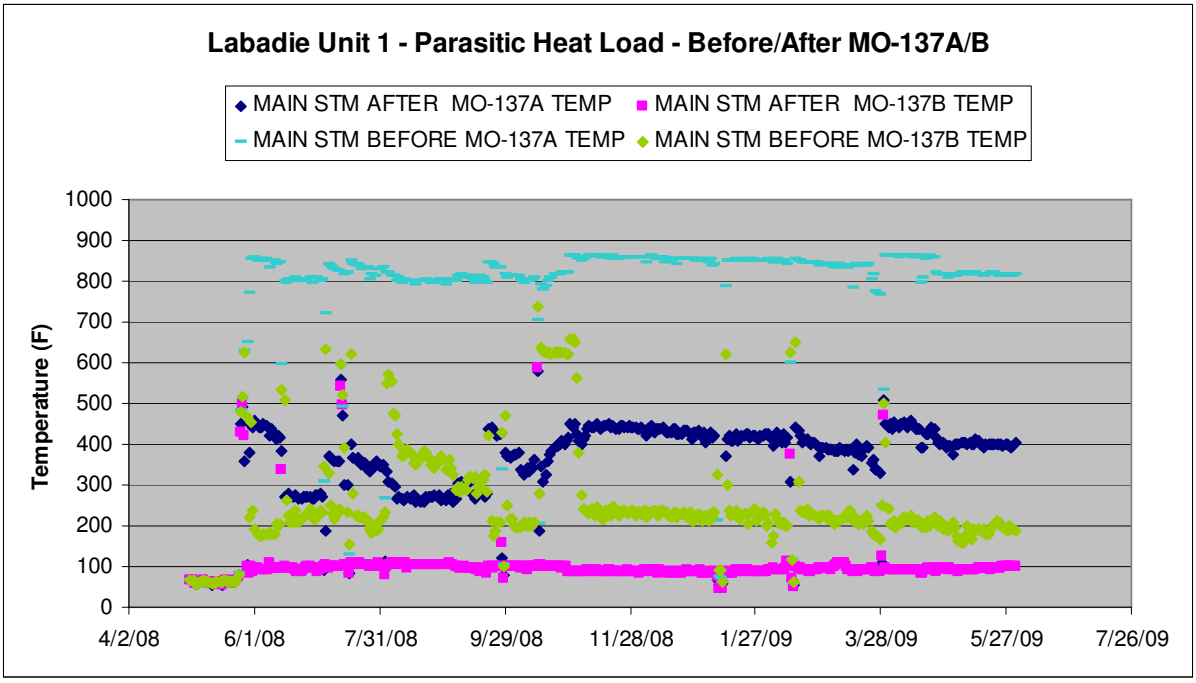
The above screen shot shows various data related to flow and heat rate on Unit 1. The data circled in pink shows four different estimates of steam flow (the top based on measured feedwater, the second based on measured steam flow, the third based on 1st stage pressure, and the bottom based on the measured condensate flow). Note that the feedwater flow based value is about 6% lower than the other three indications. The data highlighted in red shows three different calculations of heat rate. The top red circle shows the heat rate based on the condensate flow. In the bottom circle, the top value is a heat rate based on measured fuel flow while the bottom value is that based on the feedwater flow rate. The heat rate calculated using condensate flow agrees much closer with the fuel based heat rate.

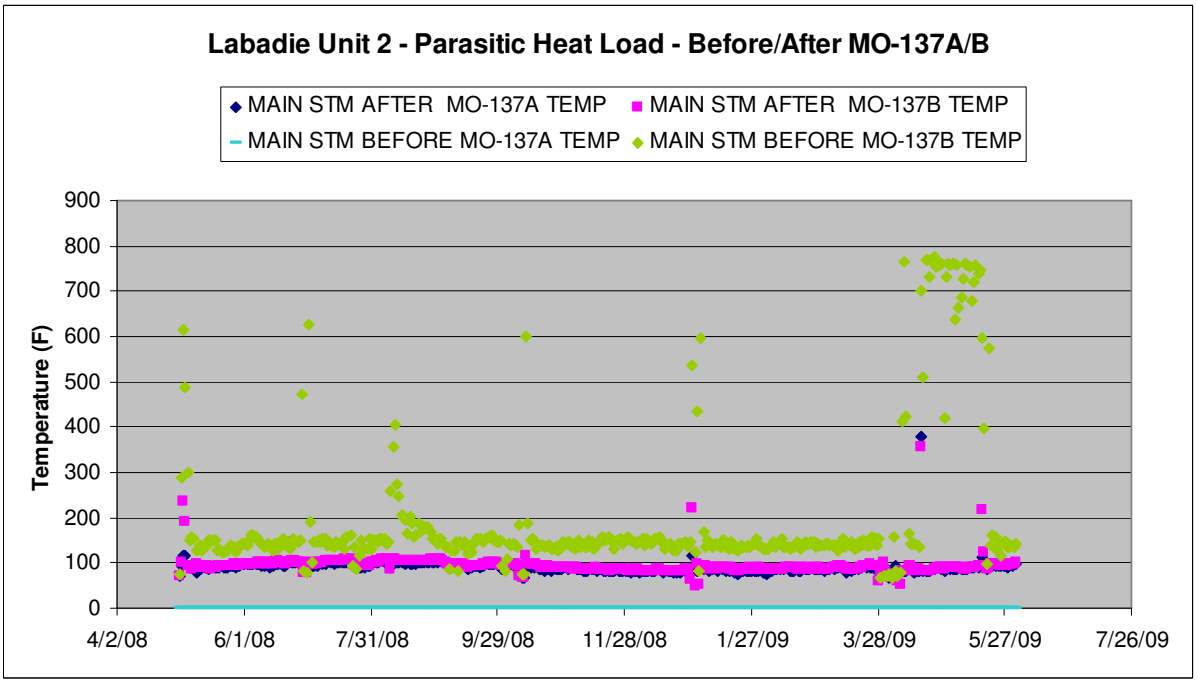


The above screen shot is from a heat rate comparison page in EtaPro. The left highlighted area shows the current EtaPro estimate of heat rate. The middle highlighted data shows the heat rate as estimated using measured coal flow. The right highlighted data shows the ratio of fuel flow (in KPPH) to gross load (MW). Note that the two heat rate values on units 3&4 agree fairly well. The heat rates on unit 2 in this screen shot is about 2.5% different and unit 1 has about a 6% difference. As mentioned on the previous page, Performance Engineering intends to make a change to the unit 1 heat rate calculation which should make its value more reasonable and in line with the fuel based heat rate. Performance Engineering will review the Unit 2 calculation to see if a change is also warranted on this unit. Note that the fuel based heat rate is based on an assumed heating value of 8694 Btu/lbm and is constant. Therefore, the fuel based heat rate is used as a check on the EtaPro turbine cycle input based heat rate and not as the primary indicator of heat rate on the unit.

The above plot shows the condenser pressures and cleanliness factors before and after the condenser cleaning performed 6/6 to 6/8. On the HP condenser, the pressure (pink line) dropped about 0.3 in Hga and the cleanliness (yellow line) improved about 10% to 75%. On the LP condenser, the pressure (green line) dropped about 0.4 in HgA. The cleanliness factor on the LP side (blue line) is currently above 100%. The condenser cleanliness calculation in EtaPro is currently based on LP turbine exhaust pressures. On the low pressure condenser side, these pressures are reading very low and thus the condenser cleanliness value for the LP condenser is greater than 100%. However, using the other indications of condenser pressure (pressure tap near the tube sheet and LP false floor hotwell temp), the cleanliness of the LP condenser is about 75%.

Performance Engineering has action to review the condenser pressure indications and provide the plant with a list of instruments that should be investigated due to potential issues. For example, the LP turbine exhaust pressures are expected to be slightly higher than the pressure indicated near the top of the condenser tube bundle. For the most part, this is observed on units 2, 3, and 4. On unit 1 however, the LP turbine exhaust pressures read about 0.3 in HgA lower than the pressure at the top of the tubes on the low pressure condenser side and about the same as the pressure at the top of the tubes on the high pressure condenser side.





The top plot shows the temperature data from the main steam start-up bypass valves from Unit 1 while the bottom plot shows the corresponding data from Unit 2. As shown, the temperatures from MO-137A on unit 1 are much higher than those from MO-137A on unit 2. Performance engineering recommends that the valve lineups and thermocouples on Unit 1 be checked. Valve inspection/repair may be necessary if no problems are found.

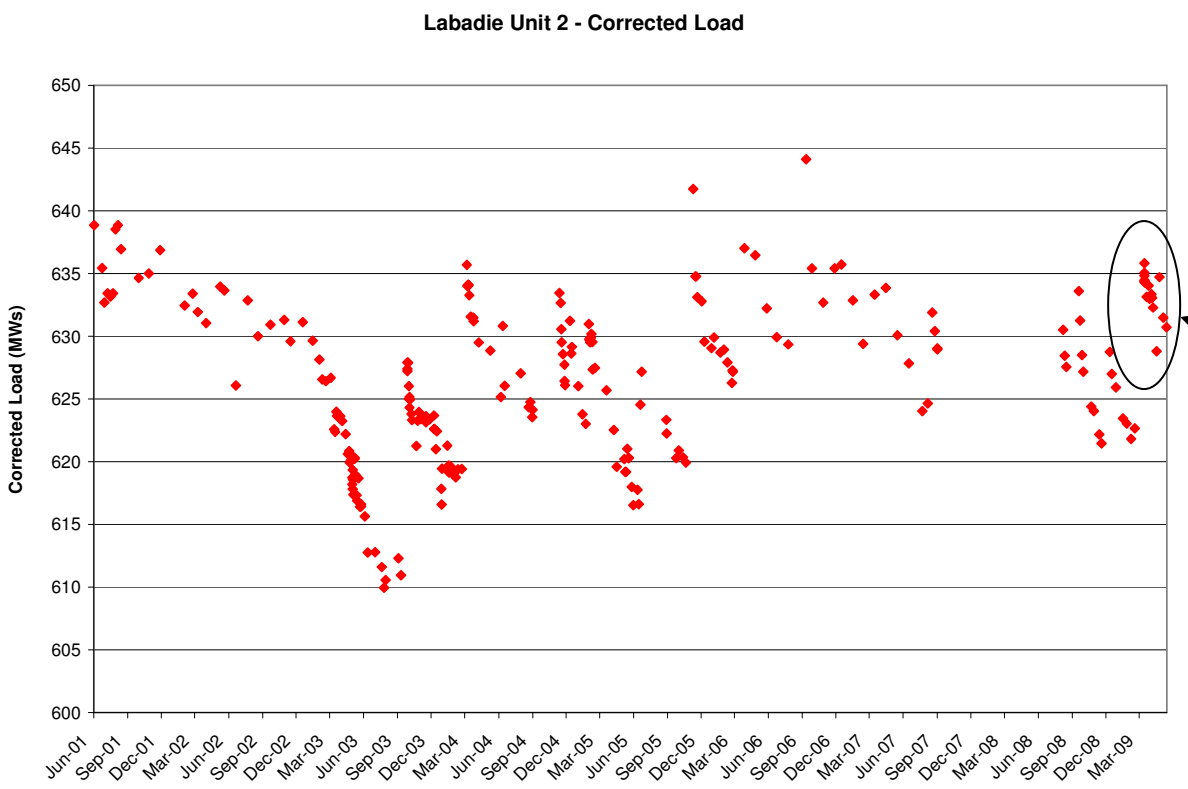
Unit 2 Observations

The following observations were made regarding Unit 2 operation and performance:

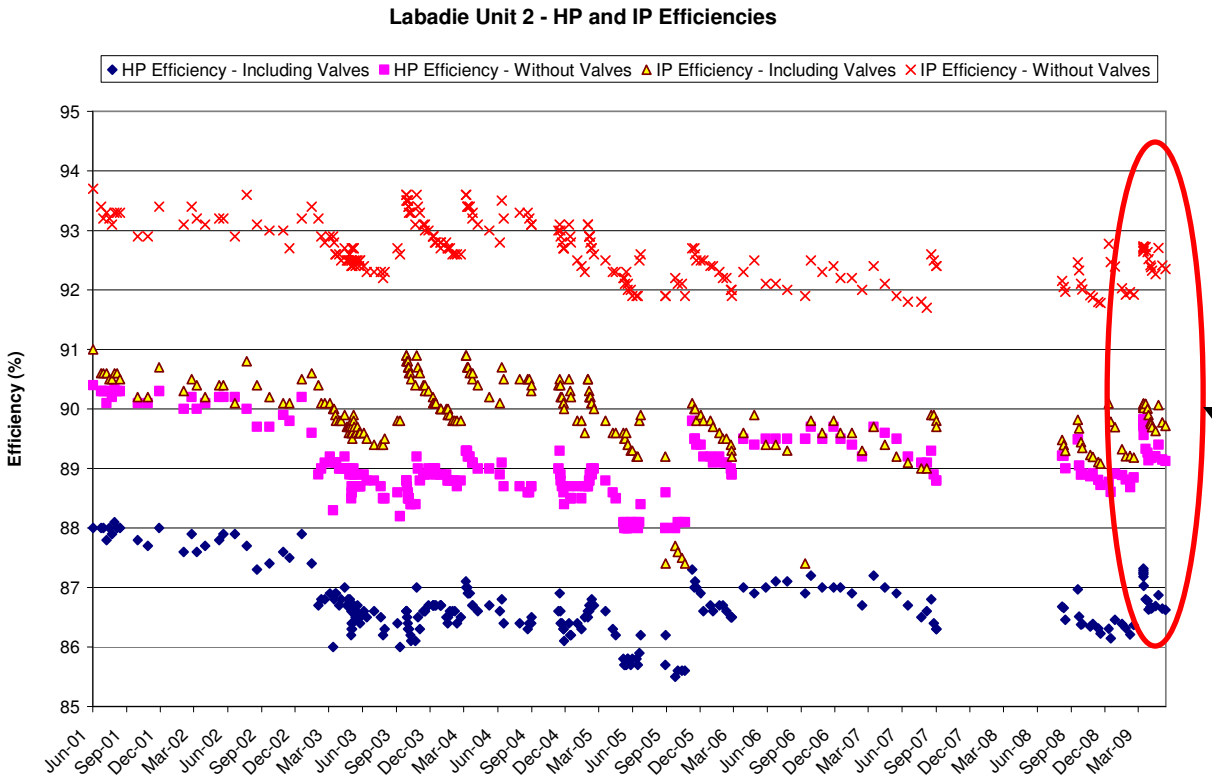
- Since 5/10, the unit has been operated VWO at full load. Great job!
- Most performance parameters remained similar to April values with the exception of condenser backpressure going up about 0.3 in HgA due to increased river temperatures.
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. One elevated temperature was noted in this review as detailed below (gland steam spillover to the condenser).
- The unit continues to see a decline in corrected load and turbine efficiencies during continuous online runs. The load and efficiencies recover during SBOs. This will continue to be monitored.

Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	5/1/09	to	6/1/09			
Full Load Performance			May-09		Apr-09	May-08
Hours of Data (>90% Monthly Capability)			530		395	123
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		619.7		613.5	621.5
AUX POWER	MW		29.2		28.6	30.0
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10068.7		10045.8	10350.1
Boiler Efficiency Actual	%		85.4		85.3	85.3
CONTROL VALVE POSITION LVDT	%		82.4		68.1	99.9
FEEDWATER TEMP TO ECON	degF		493.2		491.7	491.3
FEEDWATER TEMP TO HTR 1	degF		443.8		442.1	443.4
HP Turbine Efficiency Actual	%		85.9		85.3	87.1
IP Turbine Efficiency Corrected	%		90.9		90.8	91.0
Condenser Pressure HP	inHga		2.4		2.1	2.5
Condenser Pressure LP	inHga		2.1		1.8	2.1
AIRHTR-A GAS OUTLET TEMP	degF		335.0		335.9	331.6
AIRHTR-B GAS OUTLET TEMP	degF		335.9		327.5	341.9
AMBIENT AIR TEMP	degF		69.2		60.6	71.6
CIRC WTR TEMP TO LP CONDB	degF		64.9		55.1	66.8
CIRC WTR TEMP TO LP CONDB	degF		65.6		55.7	65.5
CIRC WTR TEMP TO LP CONDB	degF		66.1		62.2	65.3
CIRC WTR TEMP TO LP CONDB	degF		68.4		55.6	64.8
Minimum River Temperature	degF		64.9		55.1	64.8
FWH 1 Temperature Rise	degF		49.5		49.6	47.9
Net Load	MW		590.5		584.8	591.5
Average Cond Press	inHga		2.3		1.9	2.3
Average Exit Gas Temperature	degF		335.4		331.7	336.7
Aux Power	%		4.7		4.7	4.8
Gross Unit Heat Rate	BTU/KW-HR		9594.9		9576.8	9851.0
Gross Turbine Heat Rate	BTU/KW-HR		8193.8		8170.5	8407.6
Feedwater Flow	KPPH		4081.3		3996.9	

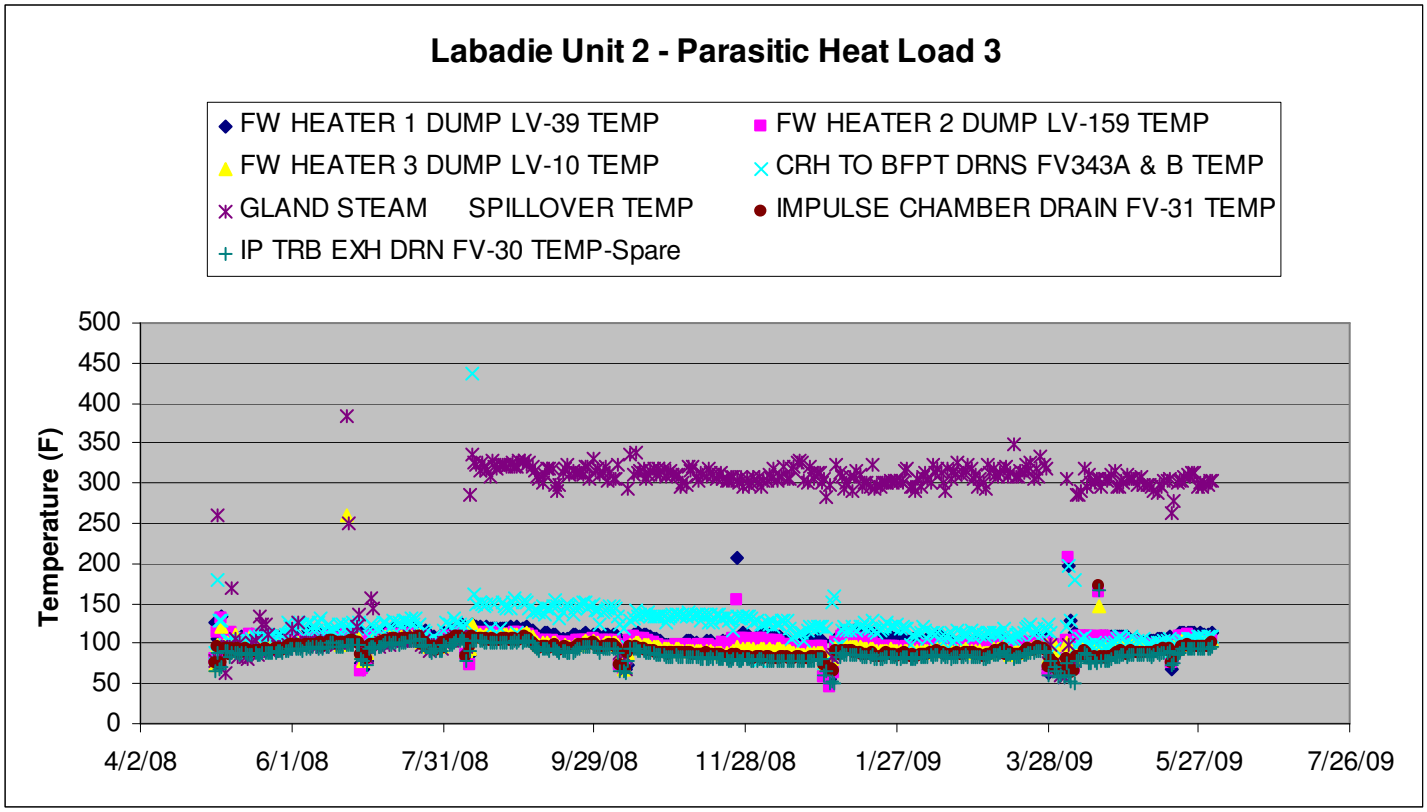
Most parameters did not change considerably from April to May. Condenser pressure was up by 0.3 in HgA. HP efficiency was up due to the control valves being more open.



Note that corrected load took a step change up following the outage. Since then, the corrected load has started to drop off as seen during previous continuous runs. Note the step change back up following the SBO that ended on 5/17.



Note the increase in turbine efficiency following this past spring outage followed by a continuous decrease since then.



Starting with this report, Performance Engineering will begin to monitor all of the tags that feed into the parasitic heat load calculation. During this review on Unit 2, it was noticed that the gland steam spillover temp (Pi tag 2turb-16216) has been elevated since last August (went from 100F up to 300F during the startup from an SBO). This same temperature on Unit 1 is reading 100F as Unit 2 did before last August. It appears that the temperature increased during several cycles of MO-42 (GS Spillover Bypass Vlv) during the startup from the SBO. MO-42 appeared to go back to the same state but the temperature remained elevated. The gland steam spillover valve (PV-32) appears to be closed (and has been for most of the last year – it did not change position during the above noted timeframe). It also appears that the MO-42 has been cycled several times since last August but the temperature has remained elevated. It is noted that following this last outage, MO-42 was cycled open. The valve state then showed the valve was in travel (going closed). The valve state never showed the valve closed and it remains in this state. Performance Engineering requests that the plant review the status and operation of MO-42 on unit 2.

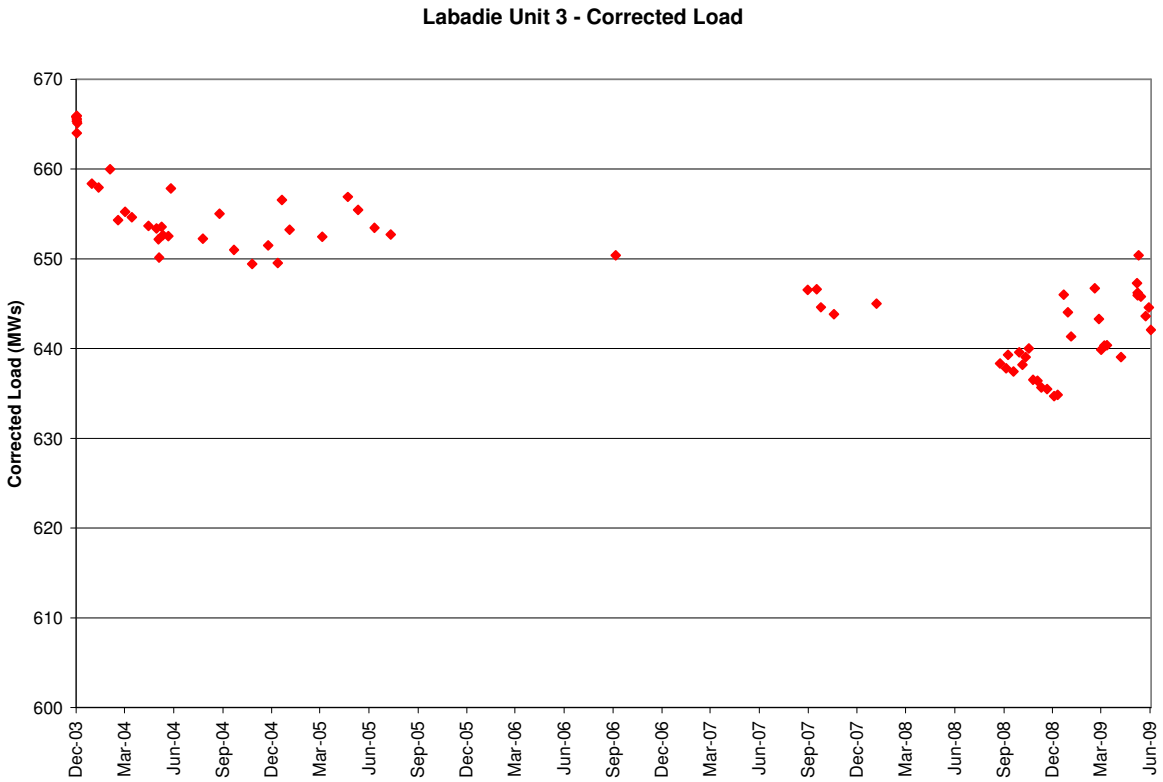
Unit 3 Observations

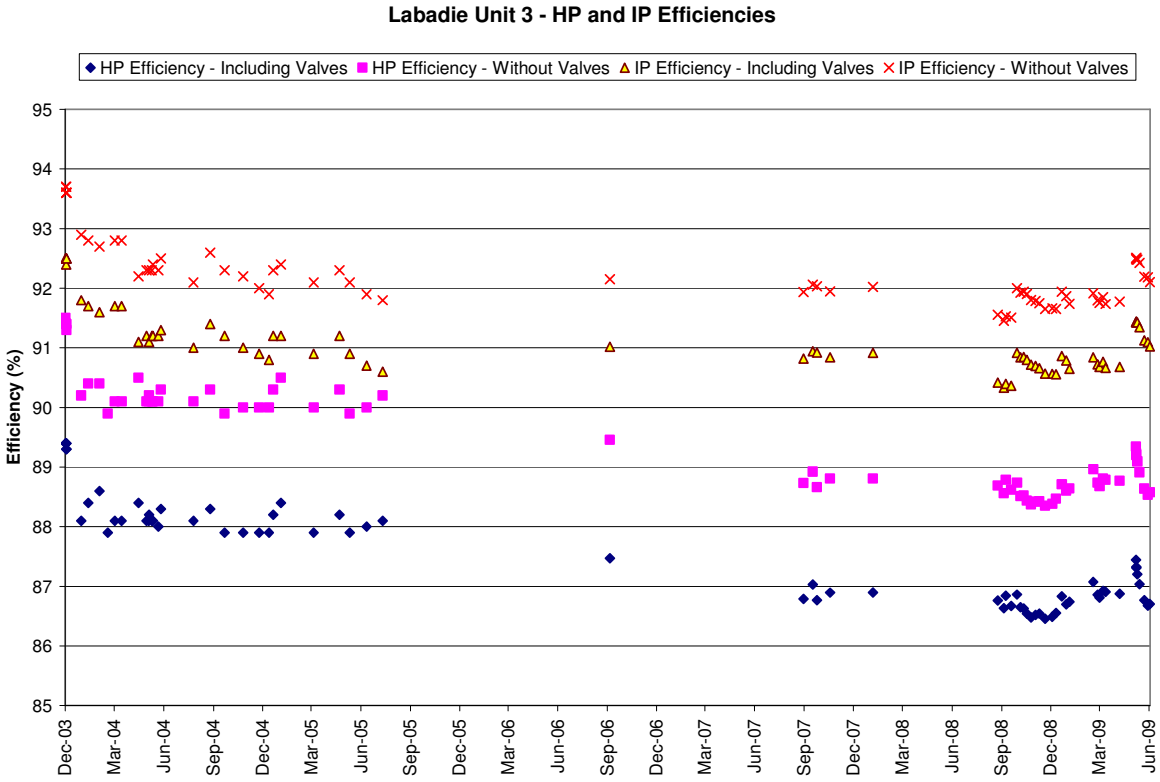
The following observations were made regarding Unit 3 operation and performance:

- Heat rate did improve following the outage this spring. The average heat rate in May was down about 1% compared to the pre-outage average in April.
- Since the startup from the outage, the unit has been operated VWO at full load. Greta job!
- Corrected load following the outage was up about 7 MWs (to 647 MWs) from prior to the outage. The HP efficiencies are up about 0.4% and the IP efficiencies are up about 0.7%. Note that the HP and IP efficiencies are as high as they have been in quite some time.
- The unit continues to see a decline in corrected load and turbine efficiencies during continuous online runs. The load and efficiencies recover during SBOs. This will continue to be monitored.
- The condenser cleaning improved the cleanliness factor by about 15% (LP) and 20% (HP). In addition, an air in-leakage source was found on the 5B drain line to the number 6B heater which appears to be the source of performance problems the 6B heater has seen for some time. A plot below shows the temperature rise of the 6B FWH is now consistent with the 6A FWH.
- The gas side pressure across the air heater has decreased from about 14 and 11 inches to about 5 inches on both sides.
- The 3-5A FWH appears to have tube leaks as indicated by the normal drain valve position and should be leak checked at the next available opportunity. In addition, the normal drainer position on the 3-3 FWH has been increasing. It is recommended that the cause of this be investigated further (drainer valve control issue, obstruction in the drain line, potential tube leak).
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. Two elevated temperature were noted in this review as detailed below.

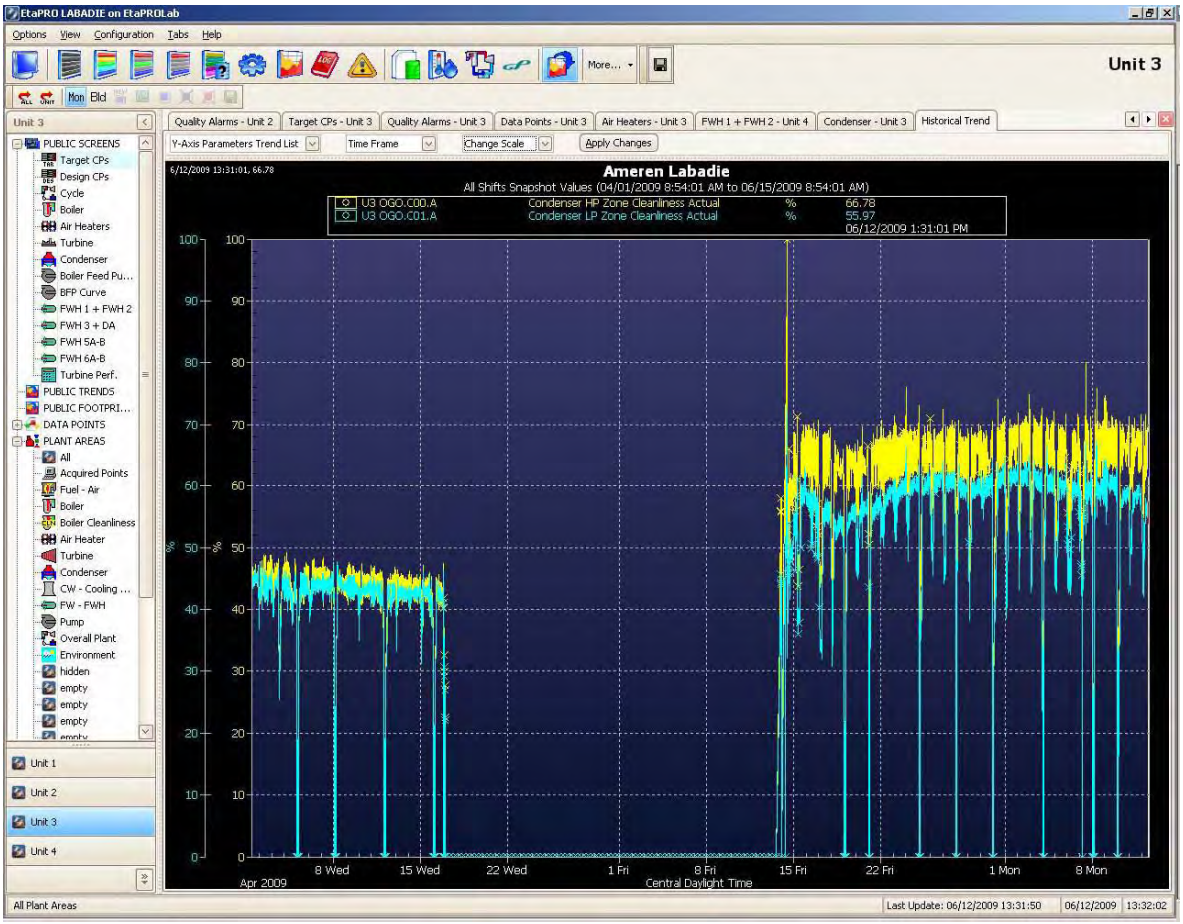
Summary of Performance Report for:						
Plant	Labadie					
Unit	3					
Period	5/1/09	to	6/1/09			
Full Load Performance			May-09		Apr-09	May-08
Hours of Data			306		275	465
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		633.3		591.1	633.5
AUX POWER	MW		28.8		28.9	30.8
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9793.4		9877.9	10135.5
Boiler Efficiency Actual	%		85.1		85.4	85.3
CONTROL VALVE POSITION LVDT	%		101.1		94.0	104.4
FEEDWATER TEMP TO ECON	degF		485.9		479.2	486.5
FEEDWATER TEMP TO HTR 1	degF		435.4		430.0	438.2
HP Turbine Efficiency Actual	%		86.6		83.7	87.3
IP Turbine Efficiency Corrected	%		95.4		94.9	93.9
Condenser Pressure HP	inHga		2.7		2.4	3.5
Condenser Pressure LP	inHga		2.3		2.1	2.8
AIRHTR-A GAS OUTLET TEMP	degF		363.5		325.1	334.9
AIRHTR-B GAS OUTLET TEMP	degF		339.8		321.7	325.4
AMBIENT AIR TEMP	degF		71.6		49.7	65.9
CIRC WTR TEMP TO LP CONDB	degF		67.5		49.0	64.4
CIRC WTR TEMP TO LP CONDB	degF		68.2		52.2	64.1
CIRC WTR TEMP TO LP CONDB	degF		68.0		49.3	63.5
CIRC WTR TEMP TO LP CONDB	degF		70.2		48.9	63.8
Minimum River Temperature	degF		67.5		48.9	63.5
FWH 1 Temperature Rise	degF		50.5		49.2	48.3
Net Load	MW		604.6		562.2	602.7
Average Cond Press	inHga		2.5		2.3	3.1
Average Exit Gas Temperature	degF		351.6		323.4	330.2
Aux Power	%		4.5		4.9	4.9
Gross Unit Heat Rate	BTU/KW-HR		9348.6		9394.6	9643.4
Gross Turbine Heat Rate	BTU/KW-HR		7959.8		8023.1	8230.0
Feedwater Flow	KPPH		3809.7		3660.2	

Average gross load on the unit is now consistent with full load from June 2008. Other observations are that aux. load is down as compared to a year ago and air heater gas outlet temperatures are higher (by 30F and 15F) as compared to a year ago. Condenser pressure was down from last May (a tube cleaning was not performed until 5-16-08 through 5-19-08).

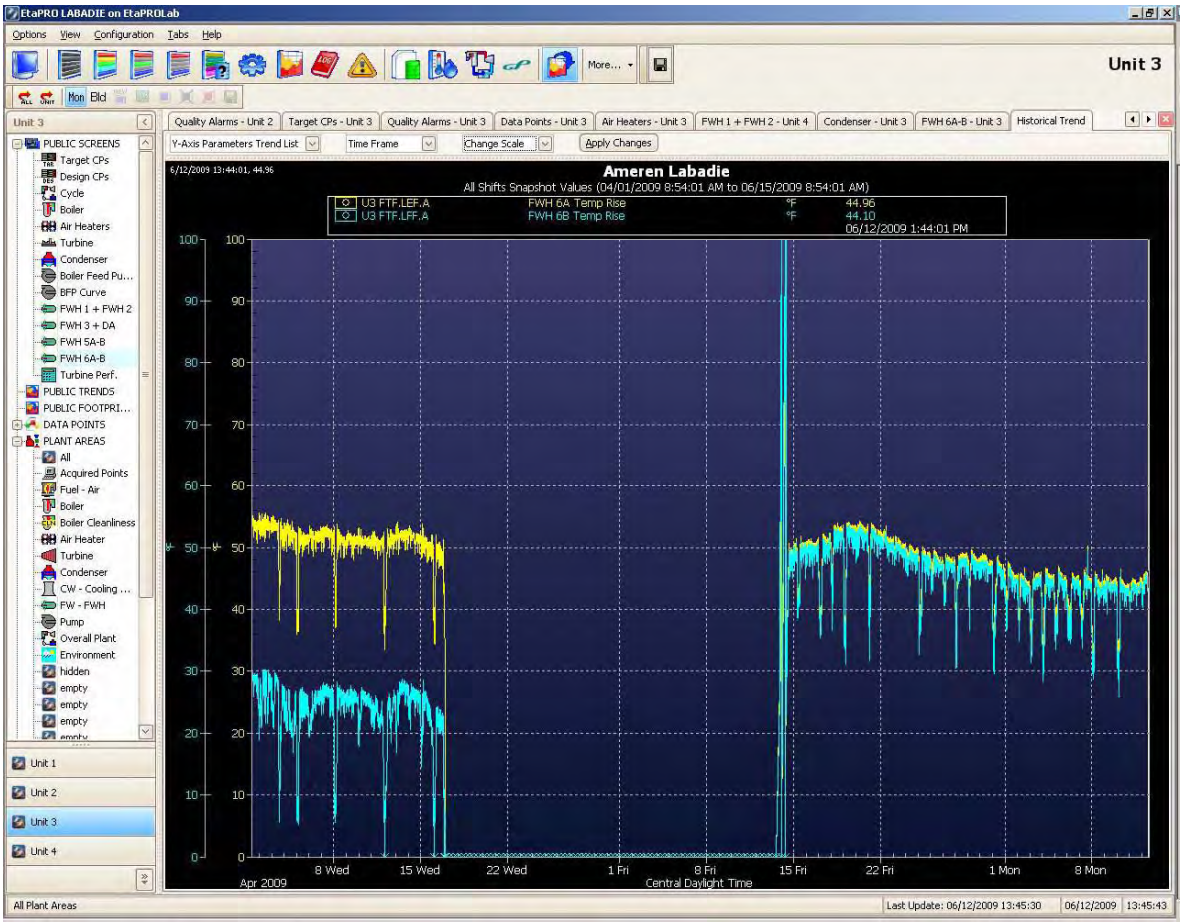




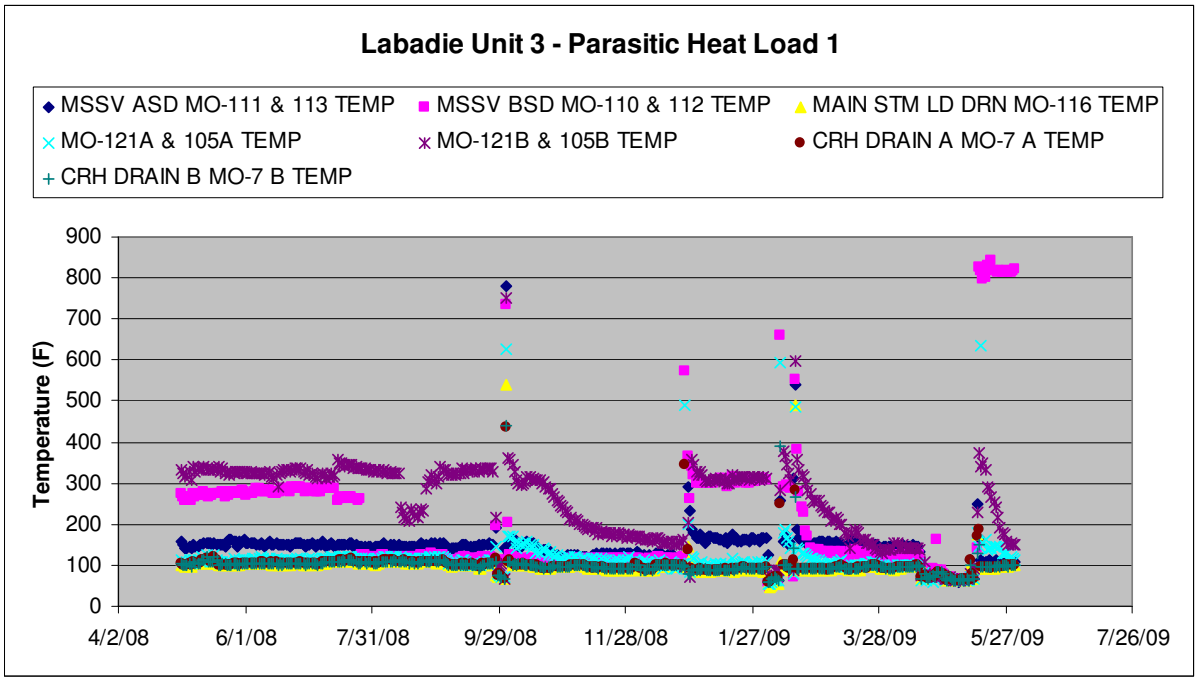
As seen on Unit 2, corrected load and turbine efficiencies decline during long runs and recover following SBOs.

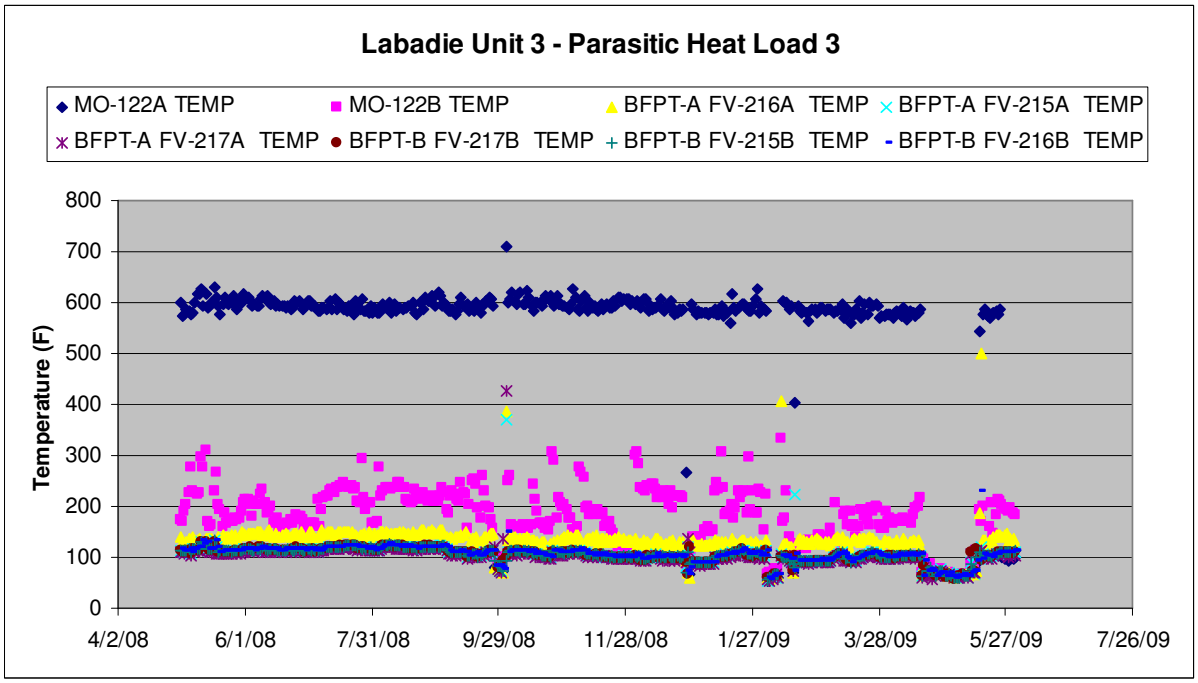


The top plot shows the condenser cleanliness factors on Unit 3 from before and after the outage. As shown, the cleanliness factors improved about 15% on the LP side (blue line) and about 20% on the HP side (yellow line).



The bottom plot shows the temperature rise across the 6A and 6B feedwater heaters. Before the outage, the 6B heater provided only about ½ of the temperature rise of the 6A heater. Air inleakage was suspected as the issue with the 6B heater and has caused performance issues since January 2007. An air in-leakage source on the 5B normal drainer was found during the outage that appears to have been the cause of the performance issues.





The top plot shows that the temperature from MO-110 & MO-112 (Before Seat Drains on Main Stop Valves) has been elevated since the unit came back online from its outage this spring. The bottom plot shows that the temperature from MO-122A (HPBFP Turbine HP Stop Valve Below Seat Drain Valve) has been elevated for quite some time but dropped from 580F down to 100F in about 5 hours (at full load) on 5/24/2009. No change was noted in the valve status at the time. Performance Engineering recommends that the valve lineups and thermocouples be checked for these two temperature indications.

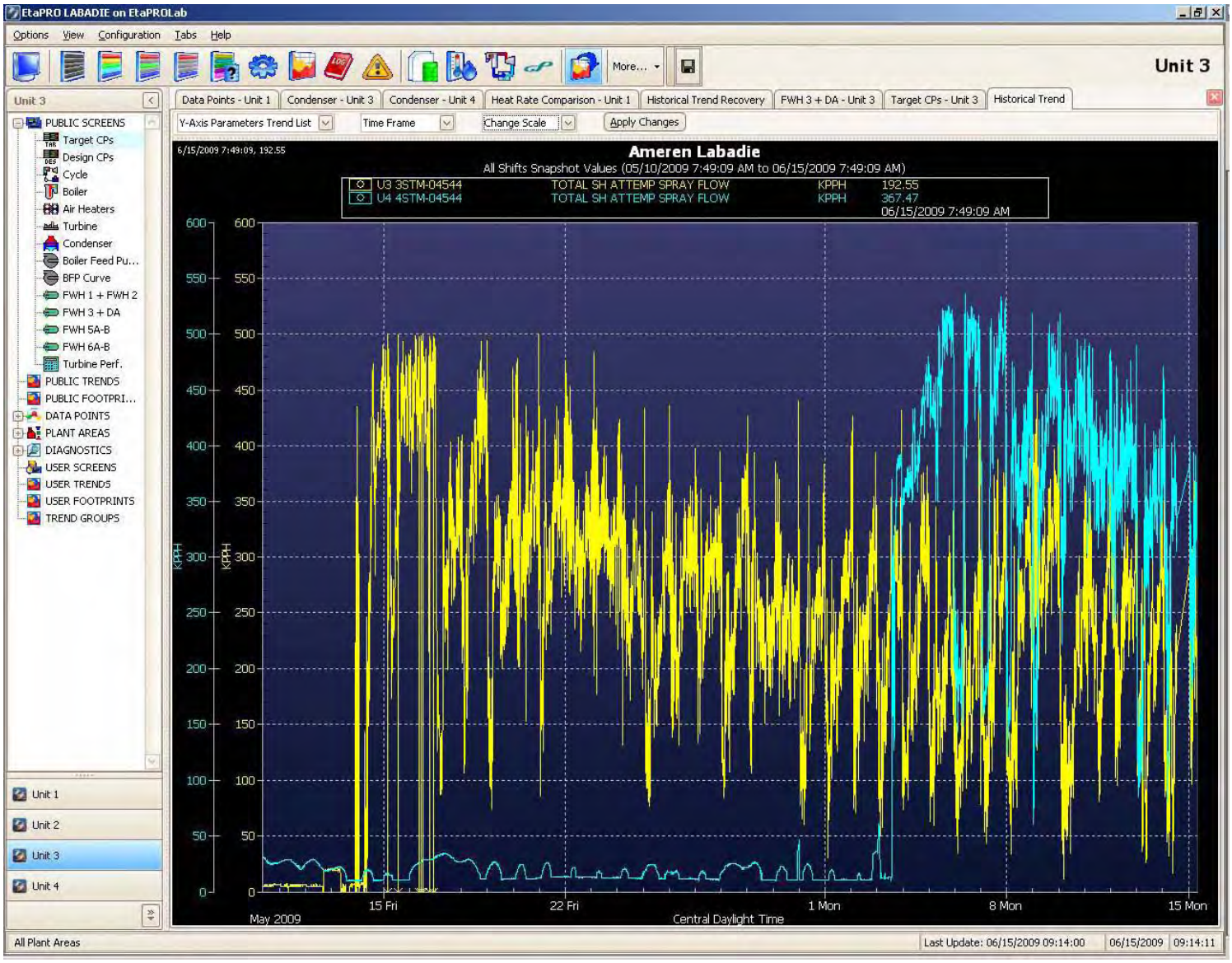
Unit 4 Observations

The following observations were made regarding Unit 4 operation and performance:

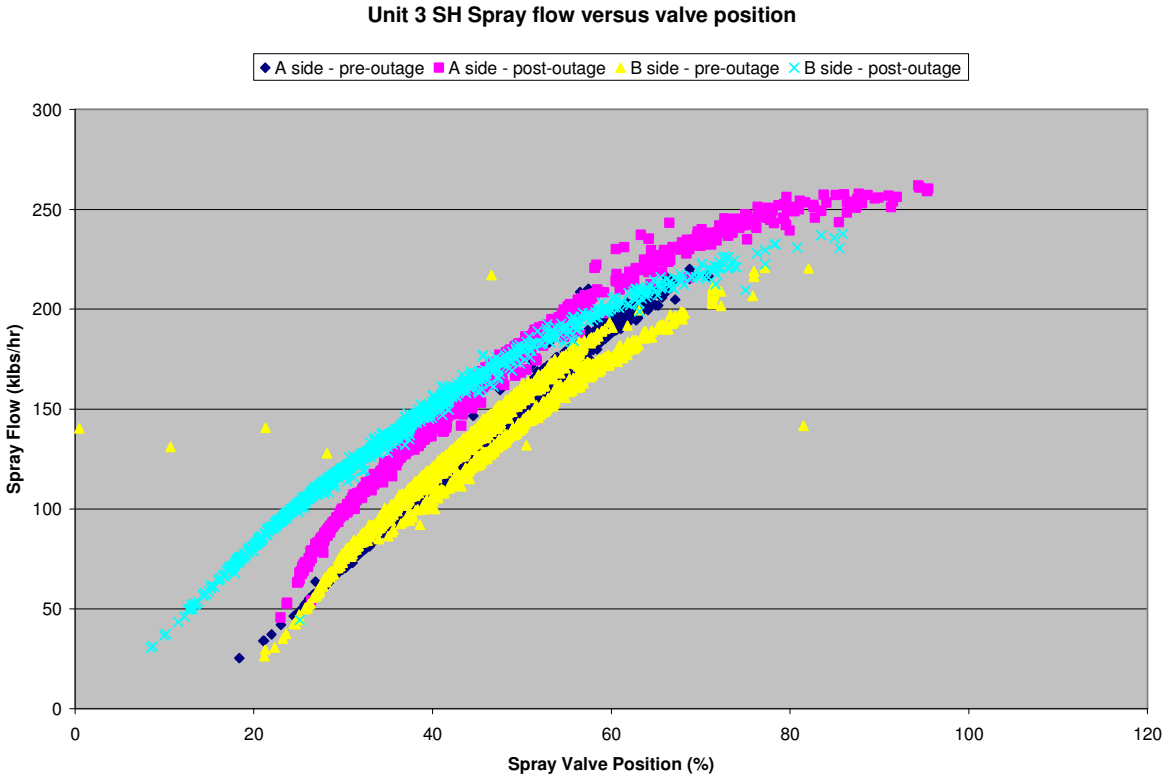
- The Unit was in an outage except for the first week of May.
- Following the startup of the unit in the first week of June, an excessive amount of superheat spray was indicated. Performance Engineering was asked to review the data and provide any observations on high spray flows. The review indicated that the superheat spray flow was a valid indication. A review of data from Unit 3s startup this spring indicated that it had excessive spray flows following its outage that eventually decreased with runtime. It is anticipated that Unit 4 will follow this trend and the required superheat spray flow will decrease. It is noted that the superheat spray valve trims were replaced on both units during the outage. Both units appear capable of more spray flow for the same valve position as compared to prior to the outage. The stem and plug on the B side of Unit 3 was replaced with a modified stem and plug from Units 1&2. The flow characteristic of this valve looks different from the other valves on Units 3&4 in that more flow is available in the first 20% of the valve stroke.
- Performance engineering is now monitoring the individual temperatures feeding the condenser parasitic heat load calculation. Several elevated temperature were noted in this review as detailed below.
- A detailed review of performance will be completed once the LP FWH tube leaks have been fixed and the unit is back at full load. The LP FWH leaks require flow to be bypassed around the #5 and #6 FWHs. This bypass flow requires a load reduction per the turbine vendor.

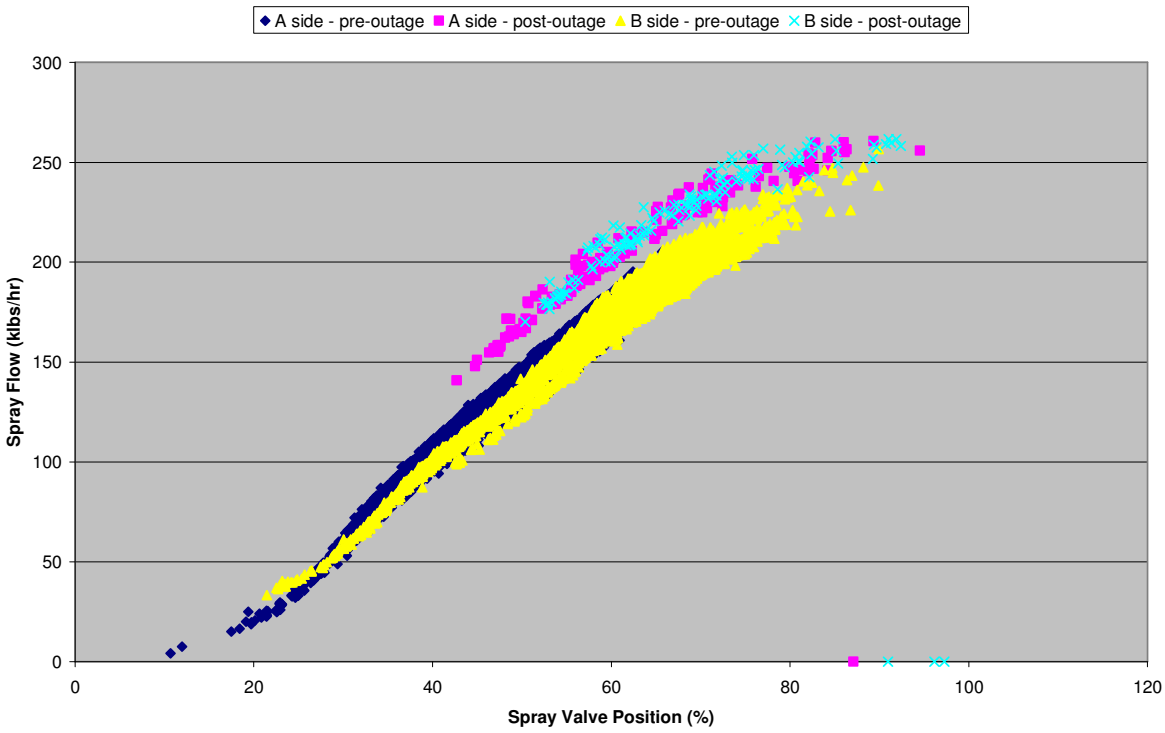
Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	5/1/09	to	6/1/09			
Full Load Performance			May-09		Apr-09	May-08
Hours of Data (>90% Monthly Capability)			89		510	36
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		612.0		601.2	627.2
AUX POWER	MW		30.7		29.2	29.6
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10050.8		10063.5	10324.4
Boiler Efficiency Actual	%		85.3		85.2	85.0
CONTROL VALVE POSITION LVDT	%		75.1		74.5	98.5
FEEDWATER TEMP TO ECON	degF		432.6		431.3	454.2
FEEDWATER TEMP TO HTR 1	degF		433.7		432.3	432.8
HP Turbine Efficiency Actual	%		82.2		81.9	87.4
IP Turbine Efficiency Corrected	%		94.8		95.0	93.6
Condenser Pressure HP	inHga		2.4		2.6	2.7
Condenser Pressure LP	inHga		2.3		2.3	2.2
AIRHTR-A GAS OUTLET TEMP	degF		334.6		337.1	335.5
AIRHTR-B GAS OUTLET TEMP	degF		320.0		324.8	323.5
AMBIENT AIR TEMP	degF		62.5		59.7	63.3
CIRC WTR TEMP TO LP CONDB	degF		60.4		53.2	62.3
CIRC WTR TEMP TO LP CONDB	degF		61.3		55.4	61.0
CIRC WTR TEMP TO LP CONDB	degF		61.6		58.0	60.7
CIRC WTR TEMP TO LP CONDB	degF		60.7		53.2	60.4
Minimum River Temperature	degF		60.4		53.2	60.4
FWH 1 Temperature Rise	degF		-1.1		-1.0	21.5
Net Load	MW		581.2		572.0	597.6
Average Cond Press	inHga		2.3		2.4	2.4
Average Exit Gas Temperature	degF		327.3		331.0	329.5
Aux Power	%		5.0		4.9	4.7
Gross Unit Heat Rate	BTU/KW-HR		9546.4		9574.5	9837.2
Gross Turbine Heat Rate	BTU/KW-HR		8141.9		8161.1	8365.7
Feedwater Flow	KPPH		3551.145		3489.1	

The data shown for May was prior to the outage. A detailed review of performance since the unit startup will be provided once the LP FWHs leaks are corrected and the unit is back at full load.

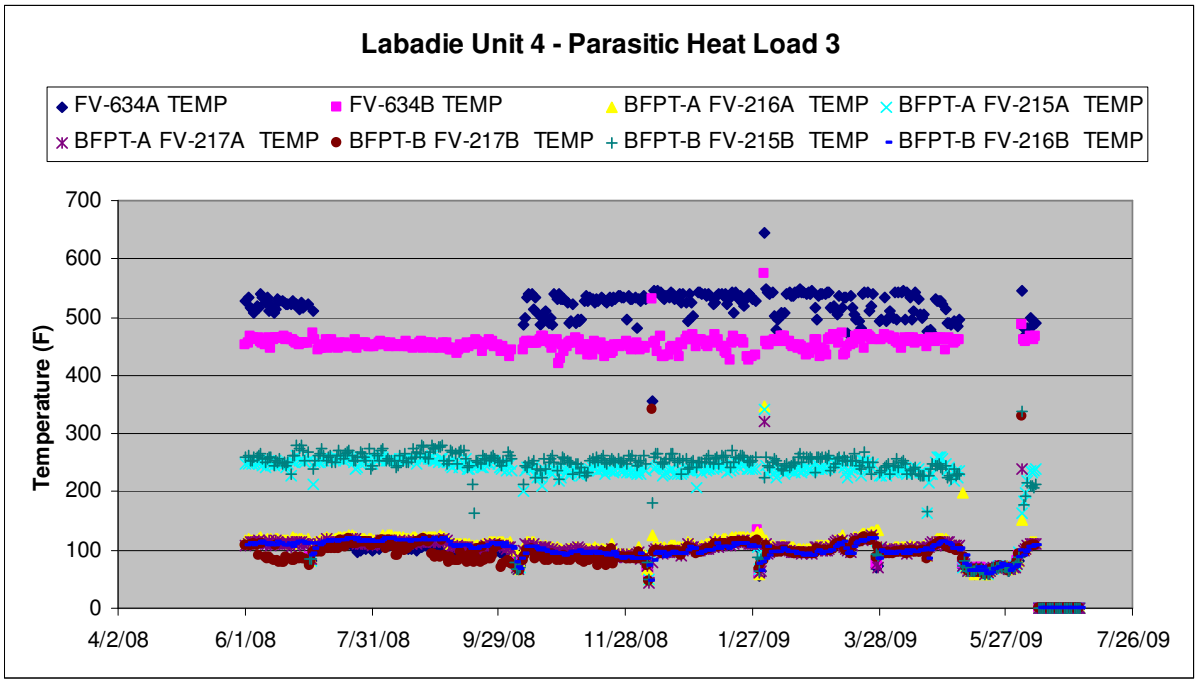


The above plot shows the superheat spray flows on Unit 3 (yellow line) and Unit 4 (blue line) following their respective outages. As shown, superheat spray flow on both units was elevated at the beginning of operation after the outages. The unit 3 superheat spray flow dropped off for the first two weeks of runtime and has leveled off. Unit 4 is expected to show the same trend and has fact dropped off from the peak flow seen just after startup.

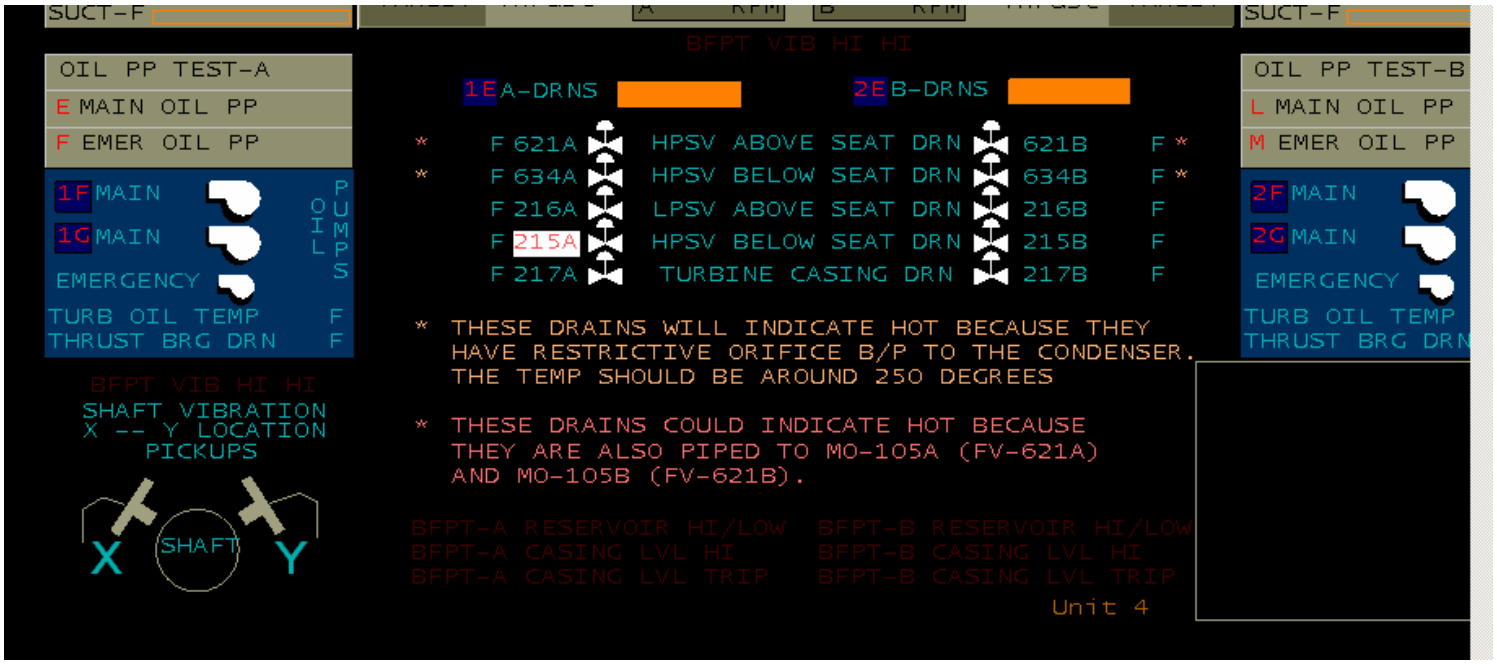




These plots show the flow characteristic of the superheat spray valves on Units 3 and 4 before and after the spring 2009 outages. As shown, the spray flow of all four valves has gone up. In addition, the flow characteristic of the 3B valve differs from the other three due to a different plug/stem used.



FV-634A/B are stop valve below seat drains on the HPBPT. A note in the DCS DB Doc on Scholar (see screen shot below) states that these drains will indicate hot because they have restrictive orifices back to the condenser and that they should indicate around 250F. Both indications are much higher than 250F. In addition, the temperatures from FV-215A and B are higher than the corresponding temperatures on Unit 2 (250F versus 100F). Performance Engineering recommends the valve lineups for these valves be checked and to verify that the note found in the DCS DB document is accurate.



May 8, 2009

To: David Fox
From: Jeff Shelton
Cc: Bob Meiners, Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace, Scott Hixson, Jim Barnett, Glenn Tiffin

Subject: Labadie April 2009 Performance Report

Executive Summary

The most notable items regarding Labadie unit performance were:

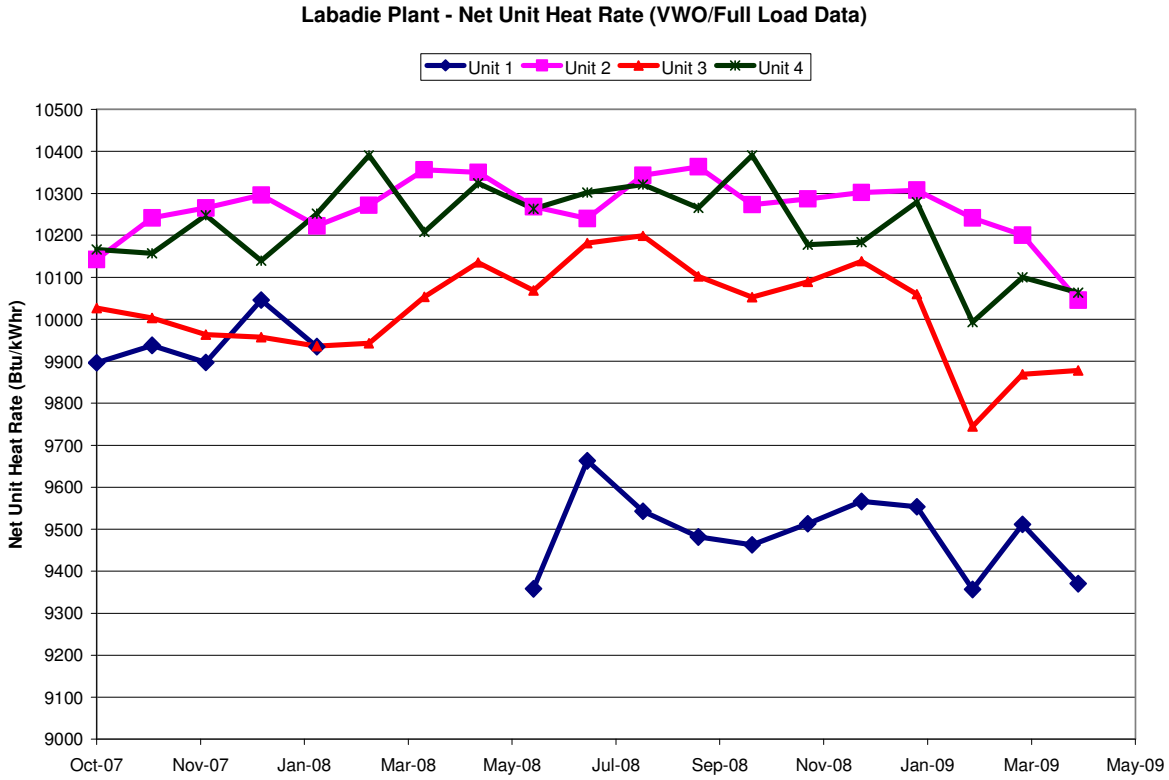
- Unit 2's performance has improved following the spring outage. The load limitations are no longer present and the heat rate is down about 1.5% following the outage.
- Operating without the top heater in service on Unit 4 was costing about $50,000/month in fuel related costs.

The following table shows the instrument deficiencies for all four units. 4STM-16195 is not an instrument issue but rather an indication of the heat load (in terms of temperatures) on the condenser. It has been bad since October 2008.

Tag	Unit	Issue	Resolution	Carryover or New
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004	JR164407 to investigate and correct	Carryover
1BFWSTM-08318, EXTRACT PRESS HTR 4A	1	Flat-lined on 1/29	JR164611	Carryover
4STM-16195	4	Went negative back in Oct. 08	JR167102	New

A plot of monthly unit heat rates for all four units is included on the following page.

The most notable item is the decrease in heat rate on Unit 2 following the spring outage. Unit 1 also showed a decrease in heat rate due to having both circulating water pumps available and operating with control valves more open.



Heat Rate KPI

A trend only heat rate KPI has been created for 2009 with the intent of having a pay heat rate KPI in 2010. Below is a table showing the actual performance of the plant through April.

Plant	2009 Actual	Threshold	Target	Stretch
Labadie	9868	9888	9807	9764

A separate e-mail was sent to the plant describing how the trend only KPI targets were derived for 2009. Performance engineering intends to do more work in this area and present the proposed methodology for the heat rate KPI at our quarterly heat rate meeting in the summer (to be scheduled).

Action Items:

- Performance Engineering will review performance on each unit following the spring outages on Units 3 and 4 (Unit 2 is evaluated in this report).
- Performance Engineering will setup a meeting with the plant after the Unit 4 outage to discuss phasing out the OPM performance monitor and creating more PI tags related to EtaPro.

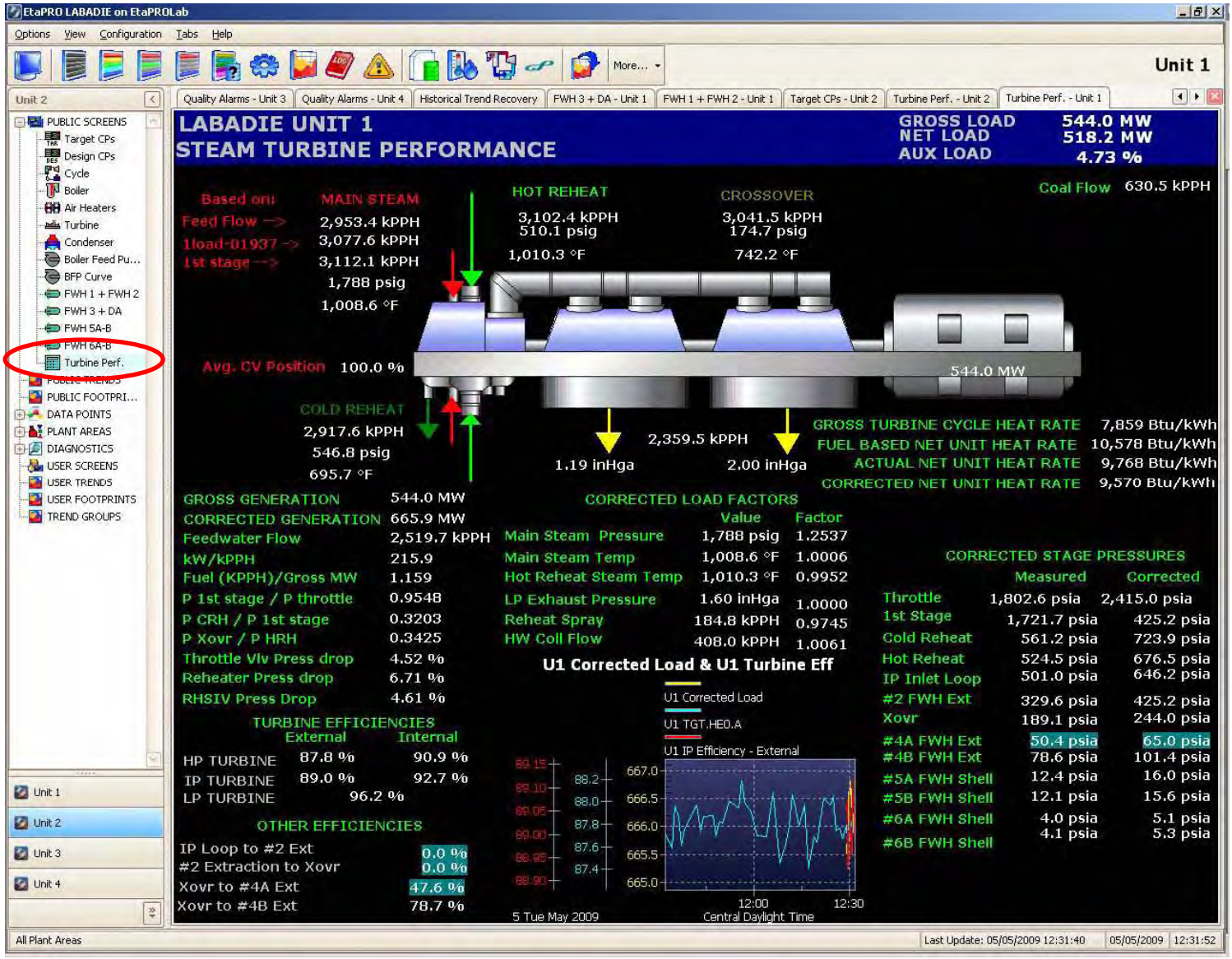
Unit 1 Observations

The following observations were made regarding Unit 1 operation and performance:

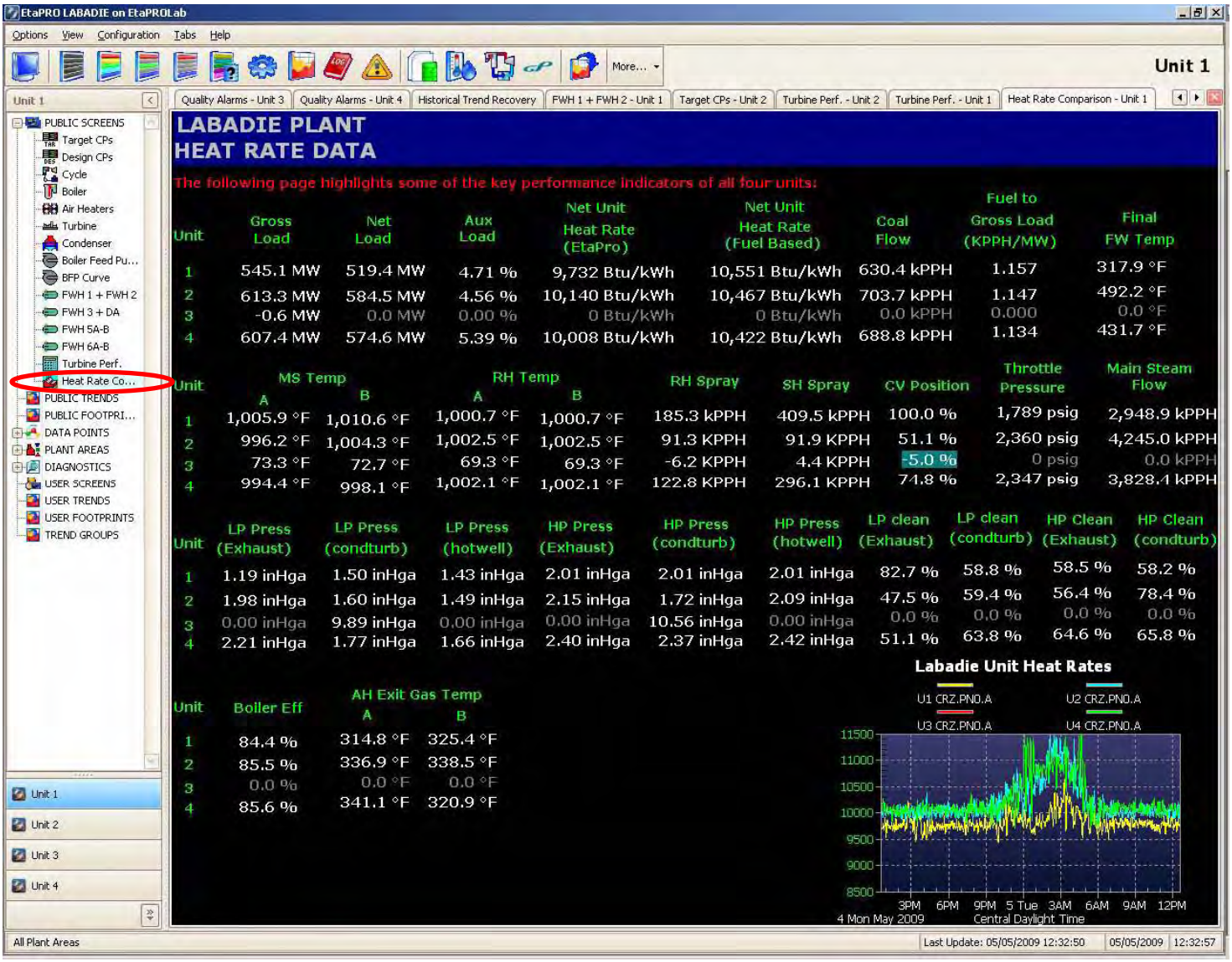
- The heat rate on the unit was lower in April than in March due to having the second circulating water pump in service the entire month (lower backpressure) and operating with the control valves more open (higher HP turbine efficiency).
- The 1B HPBFPT turbine failed in late April and will be out of service until late May.
- A turbine performance page has been created in EtaPro to better facilitate the tracking of turbine performance on the Unit. Many of the parameters presented in the new screen are not yet being archived since the corresponding PI tags have not been created. Performance Engineering will schedule a meeting with the plant to discuss the creation of the corresponding PI tags.

Summary of Performance Report for:						
Plant	Labadie					
Unit	1					
Period	4/1/09	to	5/1/09			
			Apr-09		Mar-09	Apr-08
Full Load Performance						
Hours of Data (>90% Monthly Capability)			355		411	MBO
			Averages		**Averages**	
GENERATOR MEGAWATTS	MW		637.8		623.3	
AUX POWER	MW		27.9		26.5	
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9370.0		9511.4	
Boiler Efficiency Actual	%		84.1		84.3	
CONTROL VALVE POSITION LVDT	%		88.1		71.9	
FEEDWATER TEMP TO ECON	degF		492.2		491.4	
FEEDWATER TEMP TO HTR 1	degF		437.6		436.8	
HP Turbine Efficiency Actual	%		87.3		86.5	
IP Turbine Efficiency Corrected	%		91.1		91.4	
Condenser Pressure HP	inHga		1.9		3.0	
Condenser Pressure LP	inHga		1.3		1.6	
AIRHTR-A GAS OUTLET TEMP	degF		335.6		331.8	
AIRHTR-B GAS OUTLET TEMP	degF		318.0		327.9	
AMBIENT AIR TEMP	degF		51.5		50.2	
CIRC WTR TEMP TO LP CONDB	degF		50.2		44.6	
CIRC WTR TEMP TO LP CONDB	degF		52.9		47.9	
CIRC WTR TEMP TO LP CONDB	degF		54.0		45.6	
CIRC WTR TEMP TO LP CONDB	degF		50.7		44.9	
Minimum River Temperature	degF		50.2		44.6	
FWH 1 Temperature Rise	degF		54.6		54.6	
Net Load	MW		609.9		596.8	
Average Cond Press	inHga		1.6		2.3	
Average Exit Gas Temperature	degF		326.8		329.9	
Aux Power	%		4.4		4.3	
Gross Unit Heat Rate	BTU/KW-HR		8960.6		9106.9	
Gross Turbine Heat Rate	BTU/KW-HR		7537.1		7674.5	
Feedwater Flow	KPPH		3874.7		3857.5	

As stated above, the net unit heat rate improved from March. The main contributors to the improved heat rate were the lower backpressure and the control valves being more open. One can see that the gross load on the unit went up about 14 MWs in April for virtually the same amount of feedwater flow.



The above page was created in EtaPro to monitor turbine performance. The page displays Corrected load (measured load corrected back to standard heat balance conditions), measured and corrected stage pressures, and other performance indicators. Note that the screen shot above is for a time when the 1B HPBFPT was out of service. For significantly off-normal conditions, as is the case with the BFP out-of-service, the corrected load and stage pressures may not be reliable. The page is labeled Turbine Perf. (circled in red above) and a similar page is available for all four units.



The above page was created in EtaPro (under Unit 1) to display some key performance indicators for all four units. The page is labeled as Heat Rate Comparison (circled in red above).

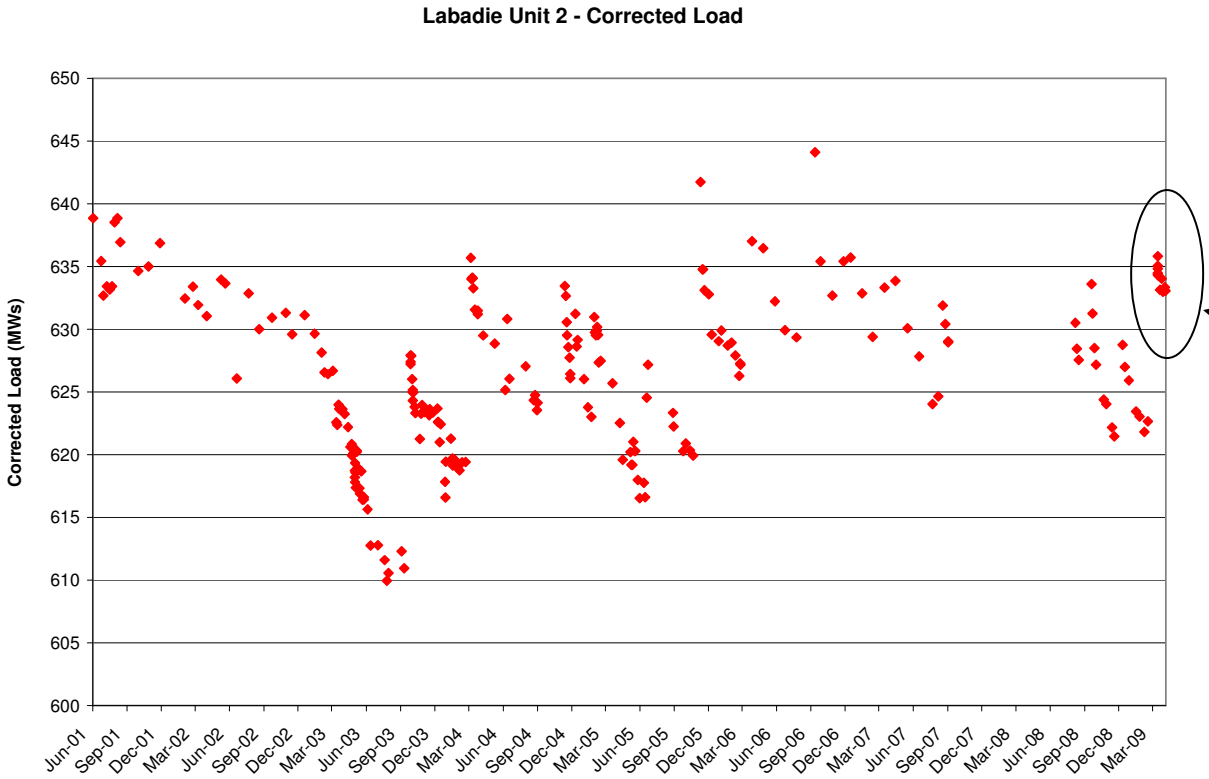
Unit 2 Observations

The following observations were made regarding Unit 2 operation and performance:

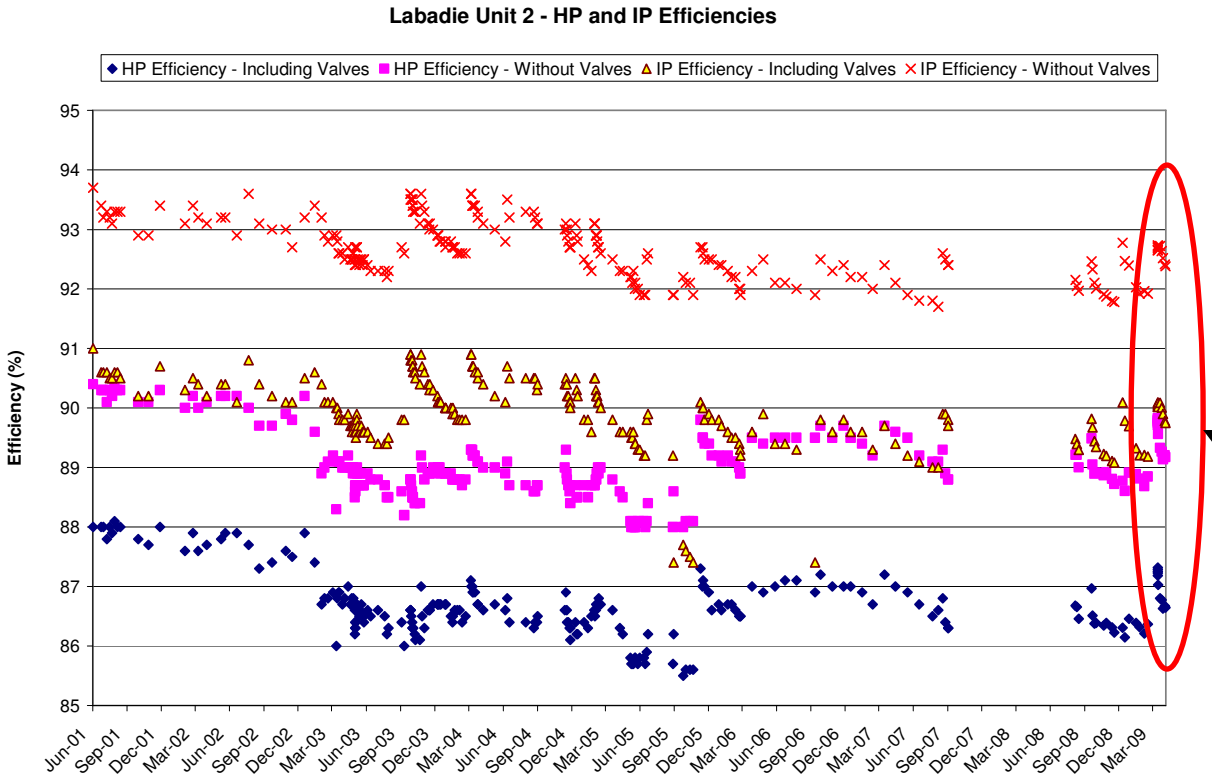
- Unit 2 had an outage from 3/27/09 until 4/8/09. Heat rate on the unit has improved by about 1.5% following the outage. HP and IP efficiencies were also up following the outage as well as corrected load. In addition, auxiliary power was down about 0.2%. Finally, the air heater gas side pressure drop was reduced about 4 inches due to the air heater wash.
- Prior to the outage, the most efficient running strategy for the unit was with control valves pinched back. A review of data after the outage now indicates that VWO is now the most efficient configuration for the unit (see plots below). However, the valves may still need to be pinched down for reheat steam temperature control. The new valve trims that would allow for more reheat spray did not arrive in time to be installed during the outage. These new valve trims will be installed in the next available window.
- A condenser cleaning was performed during the spring outage. The condenser cleanliness factor did increase due to this cleaning but not as much as expected (the cleanliness factor improved by only 5-10%, see plot below). Data from previous condenser cleanings was reviewed to determine what the typical improvement has been. This review showed that the HP cleanliness factor typically increased by 10-15% while the LP cleanliness factor typically increased by about 5-10%. In addition, the review showed that the typical cleanliness factor for Labadie is low in the winter and increases as the river temperature increases. This same trend is observed at other plants as well. An exact cause of this trend is not known. Finally, sensitivity studies showed that the cleanliness factor is highly dependent on the measured condenser pressure as expected. For example, a 0.1 in HgA error in pressure could change the calculated cleanliness factor by 7% or more. EtaPro was determining a cleanliness factor using the LP exhaust pressure taps. These were selected because they were believed to be the most reliable. However, the exhaust pressure of the turbine is at a slightly higher pressure than the pressure at the top of the tube sheet and thus indicates a lower cleanliness factor. In order to determine a more representative value for condenser cleanliness, additional cleanliness calculations were added in EtaPro that use the pressure indications at the top of the tube sheets (xCOND-16026 and xCOND-16028) and the pressure estimated from the hotwell temperatures. These cleanliness values are all displayed on the condenser pages in EtaPro for all four units (highlighted in the screen shot below).

Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	4/1/09	to	5/1/09			
Full Load Performance			Apr-09		Mar-09	Apr-08
Hours of Data (>90% Monthly Capability)			395		467	190
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		613.5		587.8	620.6
AUX POWER	MW		28.6		29.0	30.5
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10045.8		10200.4	10356.0
Boiler Efficiency Actual	%		85.3		85.1	84.9
CONTROL VALVE POSITION LVDT	%		68.1		43.6	99.9
FEEDWATER TEMP TO ECON	degF		491.7		490.0	494.6
FEEDWATER TEMP TO HTR 1	degF		442.1		442.5	446.6
HP Turbine Efficiency Actual	%		85.3		83.0	86.2
IP Turbine Efficiency Corrected	%		90.8		90.2	90.4
Condenser Pressure HP	inHga		2.1		2.2	2.5
Condenser Pressure LP	inHga		1.8		1.8	1.8
AIRHTR-A GAS OUTLET TEMP	degF		335.9		330.6	325.2
AIRHTR-B GAS OUTLET TEMP	degF		327.5		334.9	340.6
AMBIENT AIR TEMP	degF		60.6		52.0	59.7
CIRC WTR TEMP TO LP CONDB	degF		55.1		46.2	61.6
CIRC WTR TEMP TO LP CONDB	degF		55.7		46.5	51.9
CIRC WTR TEMP TO LP CONDB	degF		62.2		46.6	51.8
CIRC WTR TEMP TO LP CONDB	degF		55.6		46.0	51.4
Minimum River Temperature	degF		55.1		46.0	51.4
FWH 1 Temperature Rise	degF		49.6		47.6	48.1
Net Load	MW		584.8		558.8	590.1
Average Cond Press	inHga		1.9		2.0	2.2
Average Exit Gas Temperature	degF		331.7		332.7	332.9
Aux Power	%		4.7		4.9	4.9
Gross Unit Heat Rate	BTU/KW-HR		9576.8		9697.1	9846.8
Gross Turbine Heat Rate	BTU/KW-HR		8170.5		8256.3	8362.9
Feedwater Flow	KPPH		3996.9		3863.4	

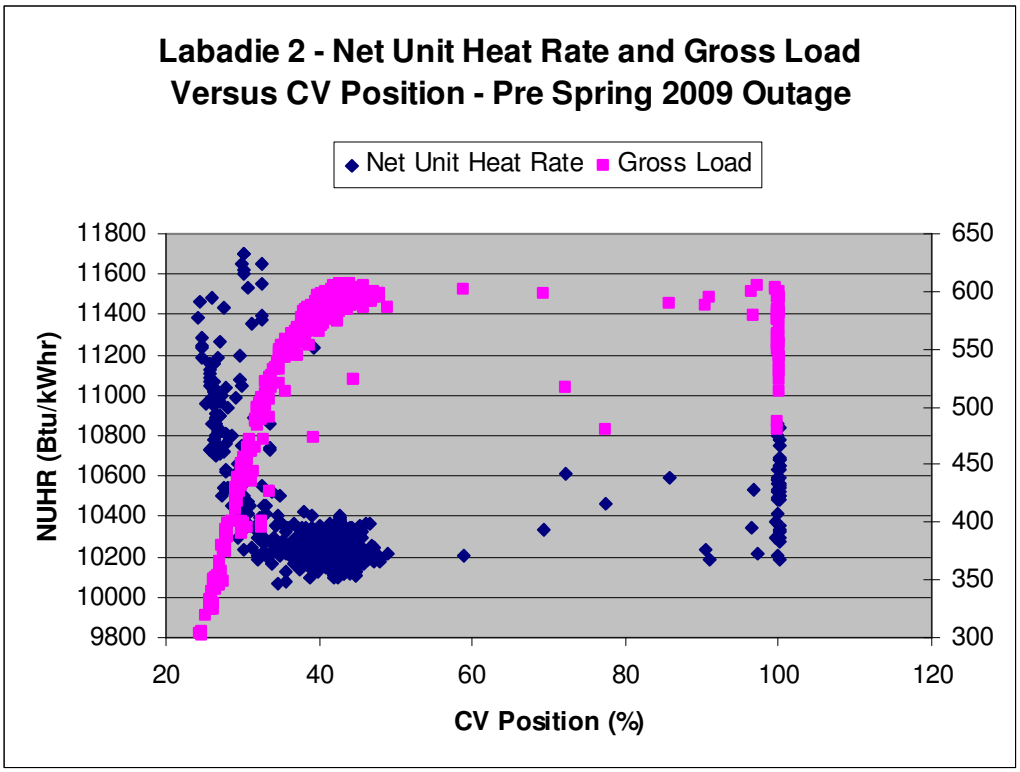
As shown, the heat rate has decreased by about 1.5%. Since the unit is no longer duct pressure limited, the gross load was up significantly in April as compared to March.

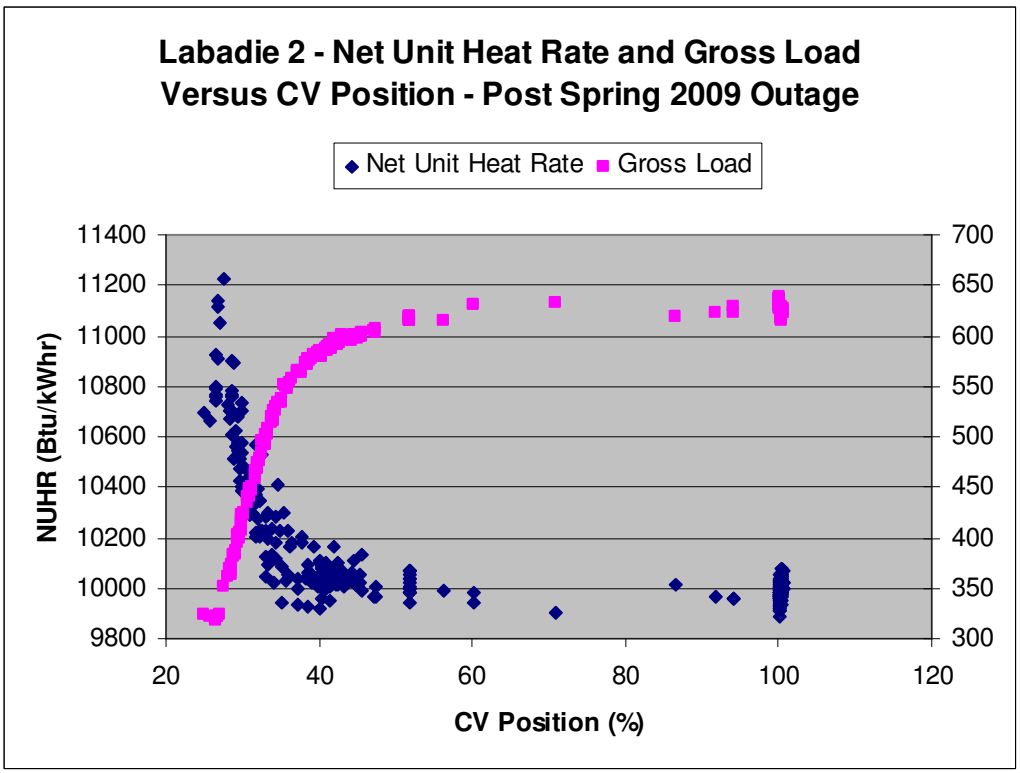


Note that corrected load took a step change up following the outage. Since then, the corrected load has started to drop off as seen during previous continuous runs.

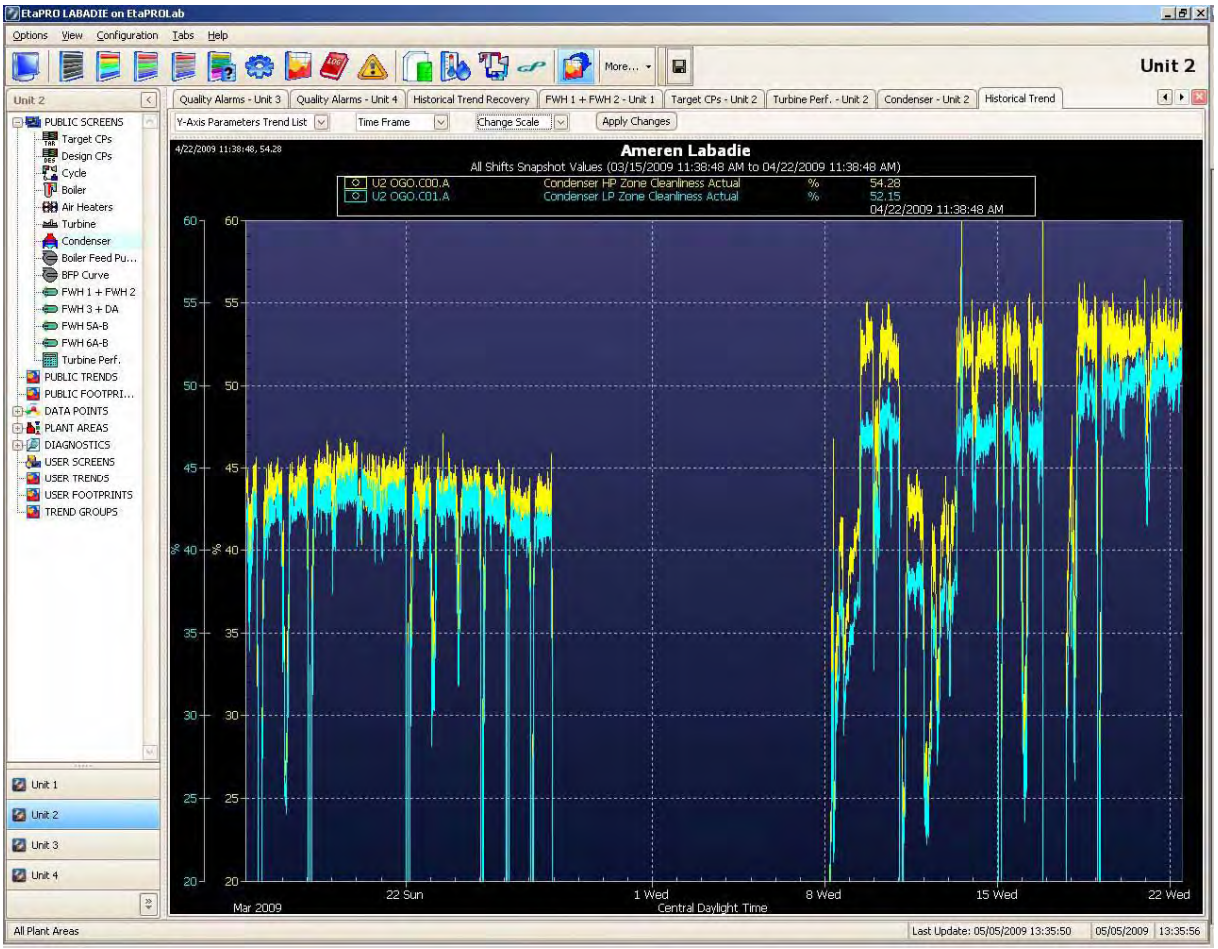


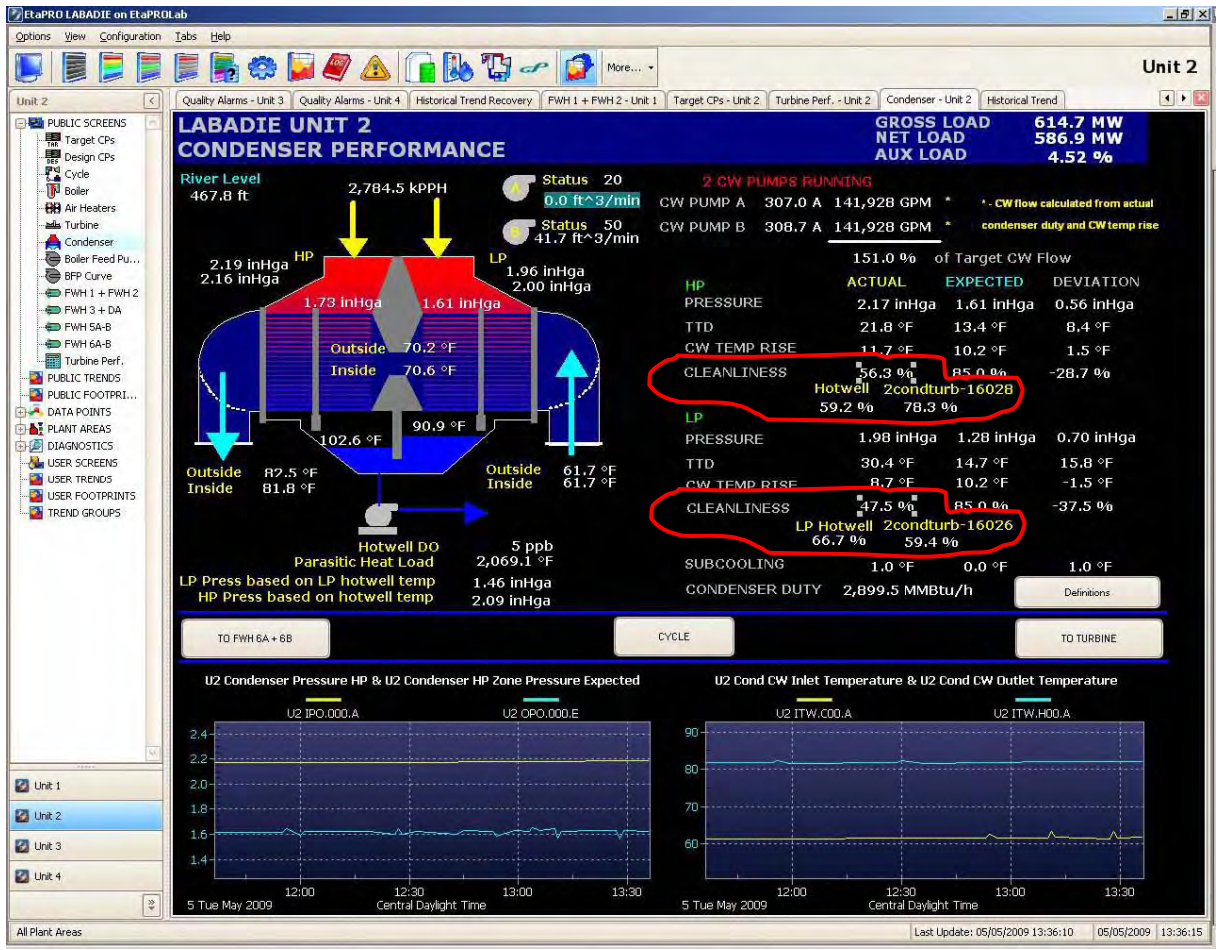
Note the increase in turbine efficiency following this past outage followed by a continuous decrease since then.





Both plots show the Net Unit Heat Rate and Gross Load versus control valve position. The top plot shows data prior to the spring outage and the bottom graph shows data after the spring outage. The top plot shows that the most efficient configuration prior to the outage was with the control valves pinched back to between 40 and 50% open. The bottom plot shows that VWO is now the most efficient configuration on the unit.





The top plot shows the condenser cleanliness values before and after the outage. The bottom plot shows the three condenser cleanliness calculations available in EtaPro. As shown for Unit 2, the cleanliness factor is highly dependent on which pressure indication is used in the calculation. If the xcond-16026 and xcond-16028 tags are reliable, these should provide the best indication of condenser cleanliness and should be close to that estimated using the hotwell temperatures. The various pressure indications will be reviewed to determine if any instrument issues exist.

Unit 3 Observations

The following observations were made regarding Unit 3 operation and performance:

- Unit 3 came offline on April 16th for a spring outage. Prior to that shutdown, there were no major changes in performance on the unit as compared to March. The unit was duct pressure limited which kept the gross load on the unit down.
- A review of performance will be conducted after startup of the unit.

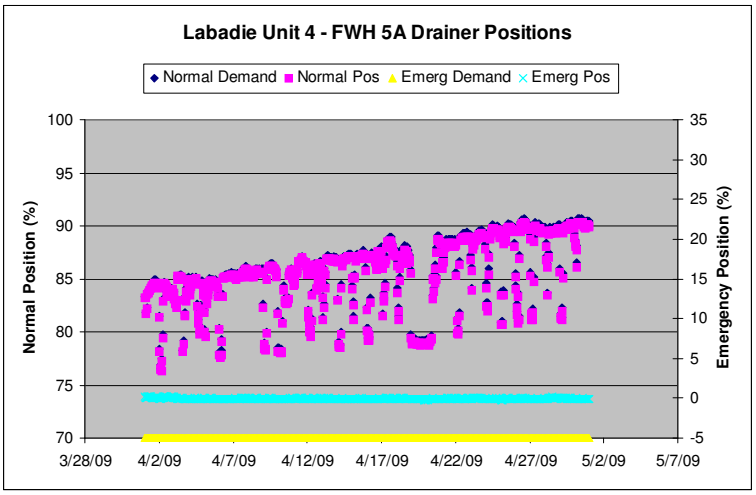
Summary of Performance Report for:						
Plant	Labadie					
Unit	3					
Period	4/1/09	to	5/1/09			
Full Load Performance			Apr-09		Mar-09	Apr-08
Hours of Data			275		587	600.0
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		591.1		600.3	643.3
AUX POWER	MW		28.9		29.7	29.7
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9877.9		9869.3	10053.4
Boiler Efficiency Actual	%		85.4		85.4	85.2
CONTROL VALVE POSITION LVDT	%		94.0		98.1	104.8
FEEDWATER TEMP TO ECON	degF		479.2		480.6	487.2
FEEDWATER TEMP TO HTR 1	degF		430.0		431.1	438.6
HP Turbine Efficiency Actual	%		83.7		85.1	87.4
IP Turbine Efficiency Corrected	%		94.9		95.0	93.9
Condenser Pressure HP	inHga		2.4		2.4	3.0
Condenser Pressure LP	inHga		2.1		2.1	2.4
AIRHTR-A GAS OUTLET TEMP	degF		325.1		327.3	335.4
AIRHTR-B GAS OUTLET TEMP	degF		321.7		323.8	317.6
AMBIENT AIR TEMP	degF		49.7		51.6	56.8
CIRC WTR TEMP TO LP CONDB	degF		49.0		46.8	61.4
CIRC WTR TEMP TO LP CONDB	degF		52.2		49.8	53.9
CIRC WTR TEMP TO LP CONDB	degF		49.3		47.2	53.2
CIRC WTR TEMP TO LP CONDB	degF		48.9		46.8	52.8
Minimum River Temperature	degF		48.9		46.8	52.8
FWH 1 Temperature Rise	degF		49.2		49.5	48.7
Net Load	MW		562.2		570.5	613.6
Average Cond Press	inHga		2.3		2.2	2.7
Average Exit Gas Temperature	degF		323.4		325.5	326.5
Aux Power	%		4.9		4.9	4.6
Gross Unit Heat Rate	BTU/KW-HR		9394.6		9380.8	9589.2
Gross Turbine Heat Rate	BTU/KW-HR		8023.1		8012.8	8174.3
Feedwater Flow	KPPH		3660.2		3692.3	

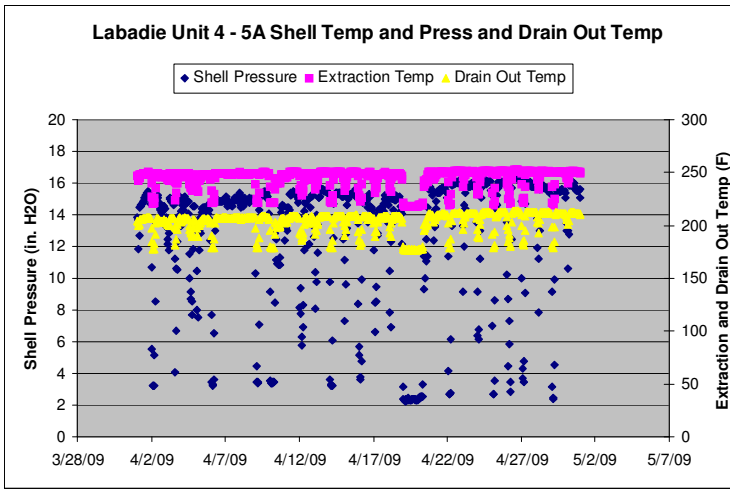
Unit 4 Observations

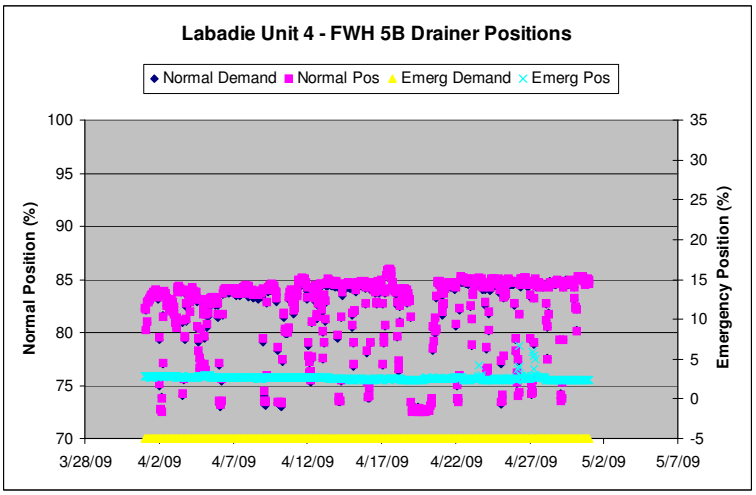
The following observations were made regarding Unit 4 operation and performance:

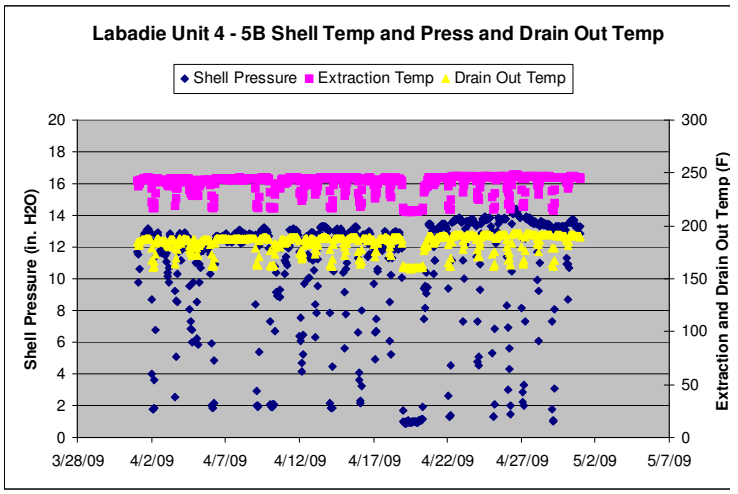
- The performance of the unit in April was similar to that of March. The most noticeable changes were a drop in HP efficiency (due in part to the control valves being pinched down more) and the lower backpressure due to having both circulating water pumps available the entire month of April versus only half of March.
- The #1 FWH was out of service for the entire month of April and will be repaired during the outage this spring. It is noted that operation without the top feedwater heater in service is about an 85 Btu/kWhr heat rate penalty and equates to a $50,000 per month increase in fuel costs (or about $150,000 since the heater was taken OOS for a tube leak back on Feb. 20).
- The 5A drainer position has been steadily increasing since the beginning of the year indicating additional tube leaks in the feedwater heater. The inlet section of the tubes will be sleeved during the spring outage (JR164096). A leak check will be performed following this work to ensure no tubes are leaking.
- The 5B drainer position has been increasing since the beginning of April. In addition, the shell side pressure has also increased since the beginning of the month. A leak check will be performed during the spring outage (JR164100).

Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	4/1/09	to	5/1/09			
Full Load Performance			Apr-09		Mar-09	Apr-08
Hours of Data (>90% Monthly Capability)			510		549	79
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		601.2		606.2	640.1
AUX POWER	MW		29.2		28.4	30.0
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10063.5		10099.9	10208.4
Boiler Efficiency Actual	%		85.2		85.2	85.0
CONTROL VALVE POSITION LVDT	%		74.5		78.3	98.7
FEEDWATER TEMP TO ECON	degF		431.3		433.5	431.5
FEEDWATER TEMP TO HTR 1	degF		432.3		434.5	432.6
HP Turbine Efficiency Actual	%		81.9		82.9	87.6
IP Turbine Efficiency Corrected	%		95.0		94.6	93.2
Condenser Pressure HP	inHga		2.6		3.1	2.4
Condenser Pressure LP	inHga		2.3		2.4	2.2
AIRHTR-A GAS OUTLET TEMP	degF		337.1		336.0	331.1
AIRHTR-B GAS OUTLET TEMP	degF		324.8		318.7	311.9
AMBIENT AIR TEMP	degF		59.7		52.5	51.3
CIRC WTR TEMP TO LP CONDB	degF		53.2		46.0	58.2
CIRC WTR TEMP TO LP CONDB	degF		55.4		49.0	51.1
CIRC WTR TEMP TO LP CONDB	degF		58.0		46.4	50.8
CIRC WTR TEMP TO LP CONDB	degF		53.2		45.7	50.0
Minimum River Temperature	degF		53.2		45.7	50.0
FWH 1 Temperature Rise	degF		-1.0		-1.0	-1.1
Net Load	MW		572.0		577.8	610.2
Average Cond Press	inHga		2.4		2.7	2.3
Average Exit Gas Temperature	degF		331.0		327.4	321.5
Aux Power	%		4.9		4.7	4.7
Gross Unit Heat Rate	BTU/KW-HR		9574.5		9626.4	9730.6
Gross Turbine Heat Rate	BTU/KW-HR		8161.1		8203.2	8268.8
Feedwater Flow	KPPH		3489.1		3566.2	









The top left and bottom left graphs show the drainer positions for the 5A and 5B FWHs respectively. As shown, the drainer has been going more open on both FWHs during the month of April. The top right and bottom right graphs show the shell side pressure of the 5A and 5B FWHs respectively. As shown, the shell pressure on both heaters has also gone up in April.

April 9, 2009

To: David Fox
From: Jeff Shelton
Cc: Bob Meiners, Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace, Scott Hixson, Jim Barnett, Glenn Tiffin

Subject: Labadie March 2009 Performance Report

Executive Summary

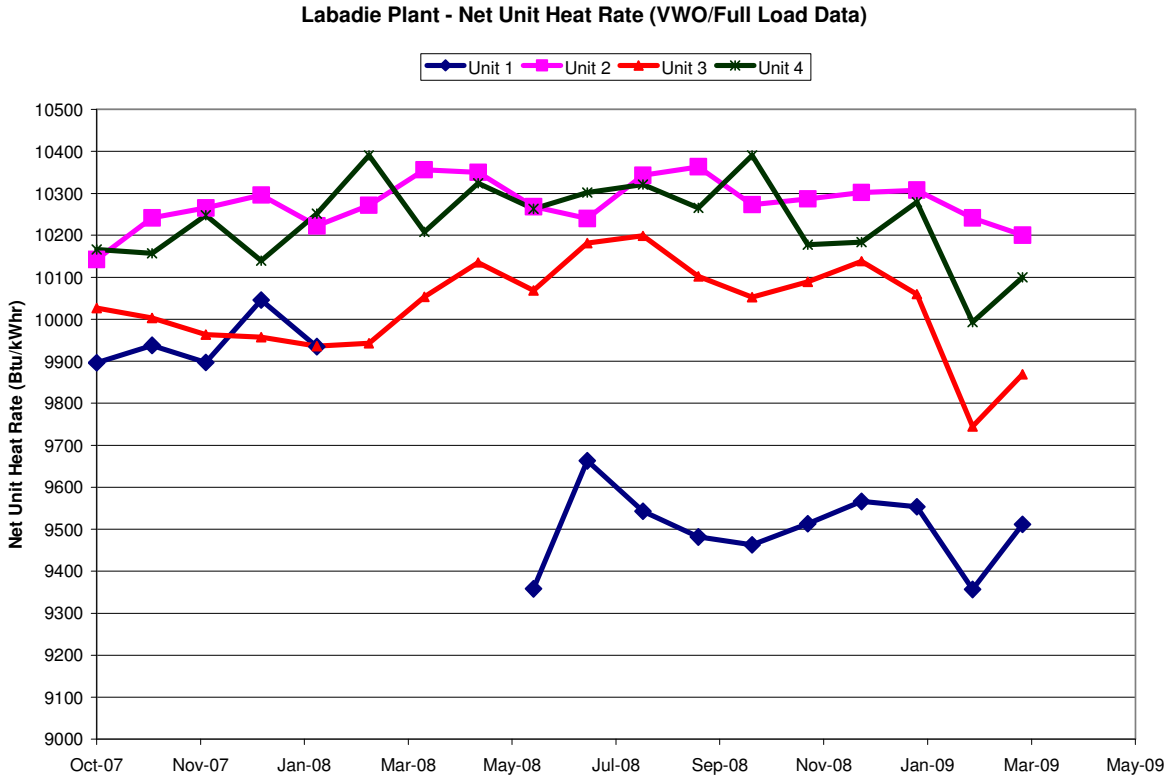
The most notable items regarding Labadie unit performance were:

- Increased water cannon use on Unit 1 has led to a decrease in boiler efficiency of about 2%.
- Operating without the top heater in service on Unit 4 is costing about $50,000/month in fuel related costs.
- A detailed review of performance will be conducted following each of the spring outages on Units 2, 3, and 4.

The following table shows the instrument deficiencies for all four units (no new items were added from the last report):

Tag	Unit	Issue	Resolution	Carryover or New
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004	JR164407 to investigate and correct	Carryover
1BFWSTM-08318, EXTRACT PRESS HTR 4A	1	Flat-lined on 1/29	JR164611	Carryover

A plot of monthly unit heat rates for all four units is included on the following page.



Heat Rate KPI

A trend only heat rate KPI has been created for 2009 with the intent of having a pay heat rate KPI in 2010. Below is a table showing the actual performance of the plant through March.

Plant	2009 Actual	Threshold	Target	Stretch
Labadie	9878	9888	9807	9764

A separate e-mail was sent to the plant describing how the trend only KPI targets were derived for 2009. Performance engineering intends to do more work in this area and present the proposed methodology for the heat rate KPI at our quarterly heat rate meeting in the summer (to be scheduled).

Action Items:

- Performance Engineering will review performance on each unit following the spring outages on Units 2, 3, and 4.

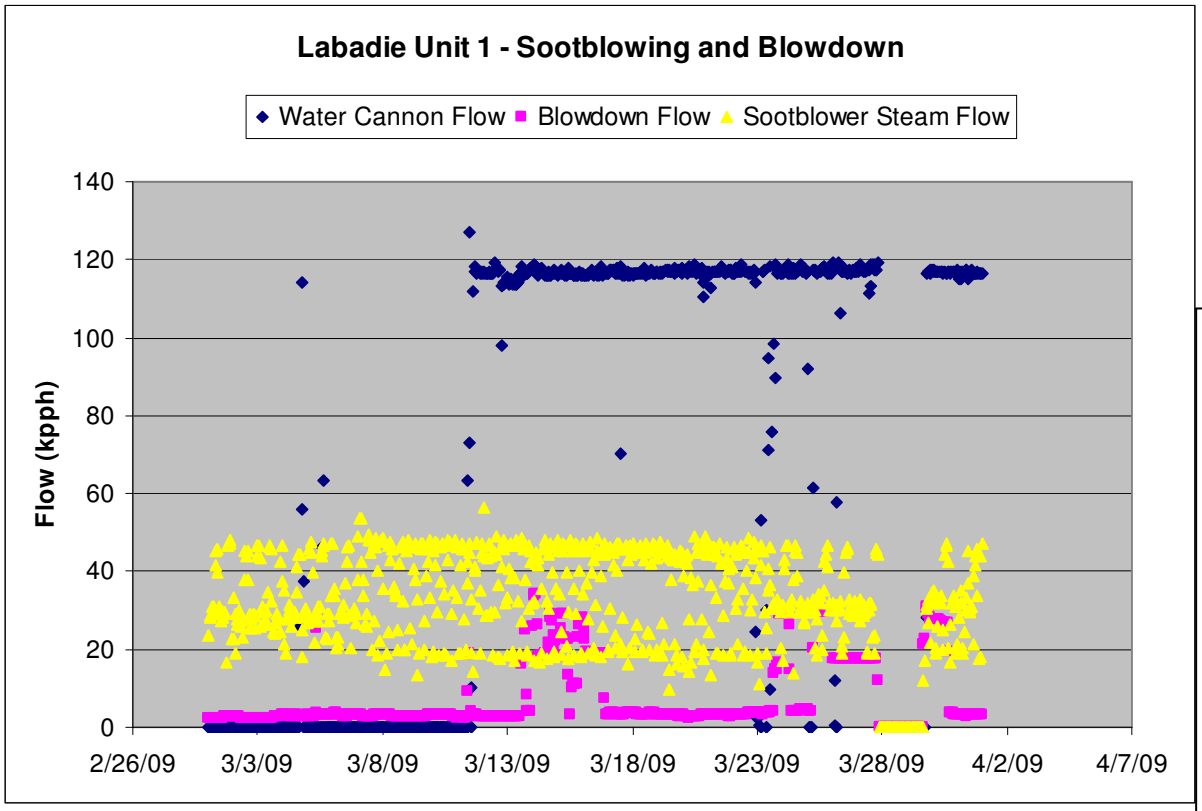
Unit 1 Observations

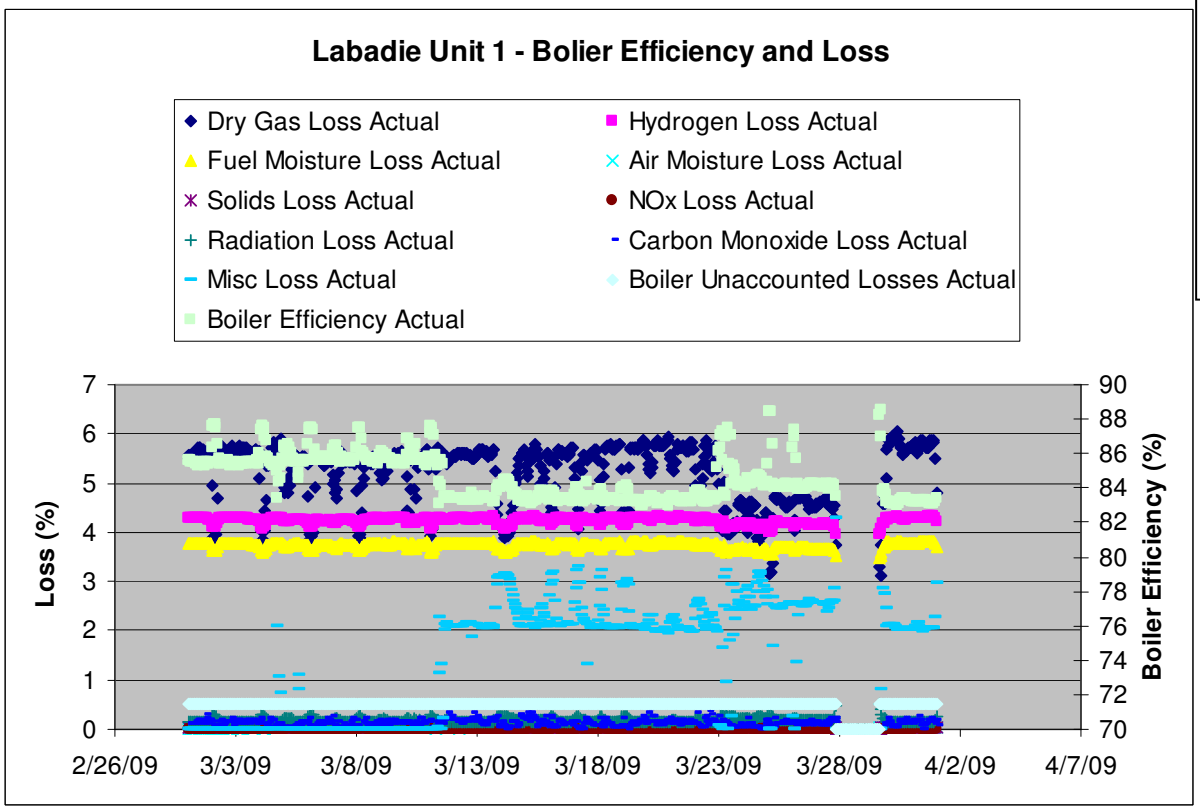
The following observations were made regarding Unit 1 operation and performance:

- The increased water cannon use caused a step decrease in boiler efficiency for the last part of March. A plot of water cannon use shows a change from no flow to approximately 120,000 lb/hr flow in the middle of the month. This amount of water flow to the boiler equates to about a 2% decrease in boiler efficiency (which equates to about a 2% increase in heat rate). The water cannon use on Unit 1 appears to be different than the other Units in that it is a constant flow versus a periodic flow for the other units.
- Unit 1 always seems to have some amount of blowdown flow whereas the other units typically have intermittent blowdown. Does Unit 1 have chemistry issues requiring continuous blowdown or is there a potential leaking blowdown valve?

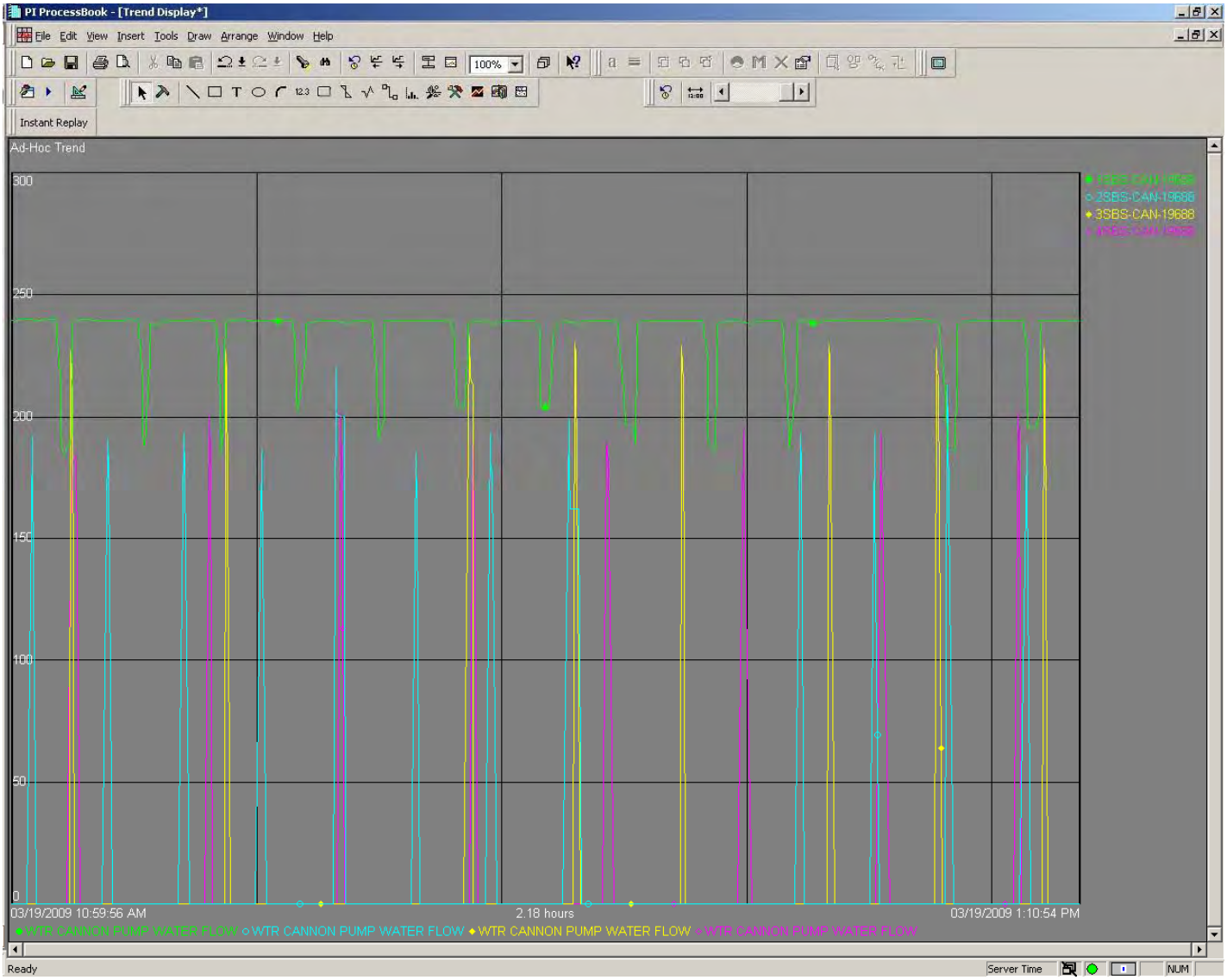
Summary of Performance Report for:						
Plant	Labadie					
Unit	1					
Period	3/1/09	to	4/1/09			
			Mar-09		Feb-09	Mar-08
Full Load Performance						
Hours of Data (>90% Monthly Capability)			411		461	MBO
			Averages		**Averages**	
GENERATOR MEGAWATTS	MW		623.3		636.1	
AUX POWER	MW		26.5		25.9	
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9511.4		9356.3	
Boiler Efficiency Actual	%		84.3		85.4	
CONTROL VALVE POSITION LVDT	%		71.9		82.7	
FEEDWATER TEMP TO ECON	degF		491.4		485.9	
FEEDWATER TEMP TO HTR 1	degF		436.8		439.0	
HP Turbine Efficiency Actual	%		86.5		87.1	
IP Turbine Efficiency Corrected	%		91.4		91.6	
Condenser Pressure HP	inHga		3.0		3.1	
Condenser Pressure LP	inHga		1.6		1.3	
AIRHTR-A GAS OUTLET TEMP	degF		331.8		329.4	
AIRHTR-B GAS OUTLET TEMP	degF		327.9		327.6	
AMBIENT AIR TEMP	degF		50.2		40.0	
CIRC WTR TEMP TO LP CONDB	degF		44.6		39.0	
CIRC WTR TEMP TO LP CONDB	degF		47.9		41.4	
CIRC WTR TEMP TO LP CONDB	degF		45.6		40.5	
CIRC WTR TEMP TO LP CONDB	degF		44.9		39.7	
Minimum River Temperature	degF		44.6		39.0	
FWH 1 Temperature Rise	degF		54.6		46.9	
Net Load	MW		596.8		610.2	
Average Cond Press	inHga		2.3		2.2	
Average Exit Gas Temperature	degF		329.9		328.5	
Aux Power	%		4.3		4.1	
Gross Unit Heat Rate	BTU/KW-HR		9106.9		8974.9	
Gross Turbine Heat Rate	BTU/KW-HR		7674.5		7664.3	
Feedwater Flow	KPPH		3857.5			

As stated above, the boiler efficiency dropped from February to March due to the increased water cannon use. The HP turbine efficiency was also slightly lower and is due in part to the average control valve position over the month.

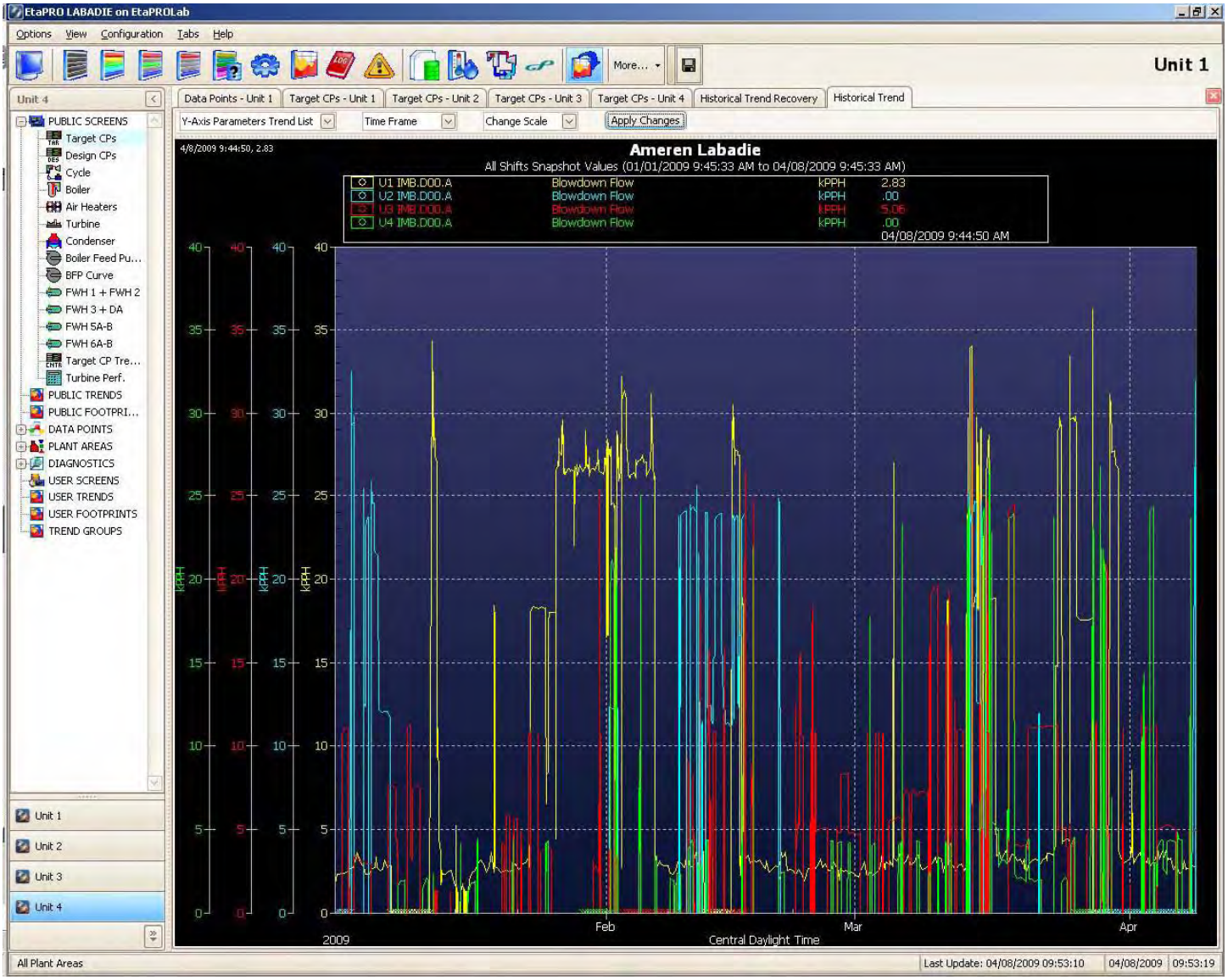




The top plot shows the change in water cannon flow in mid-March. The impact of water cannon flow is included in the Misc. loss category of the second plot. As shown in the second plot, the Misc. loss went from 0% to about 2% at the time water cannon flow was introduced in mid-March.



The above plot shows water cannon flow for all four units for a 2 hour period on 3/19/2009. As shown, cannon flow on Unit 1 never drops back to zero as seen on all of the other units.



The above plot shows blowdown flow for all four units since the beginning of the year. As shown above, the blowdown flow Unit 1 never goes to 0. The other units all show periodic blowdown flow but eventually go back to no indicated flow.

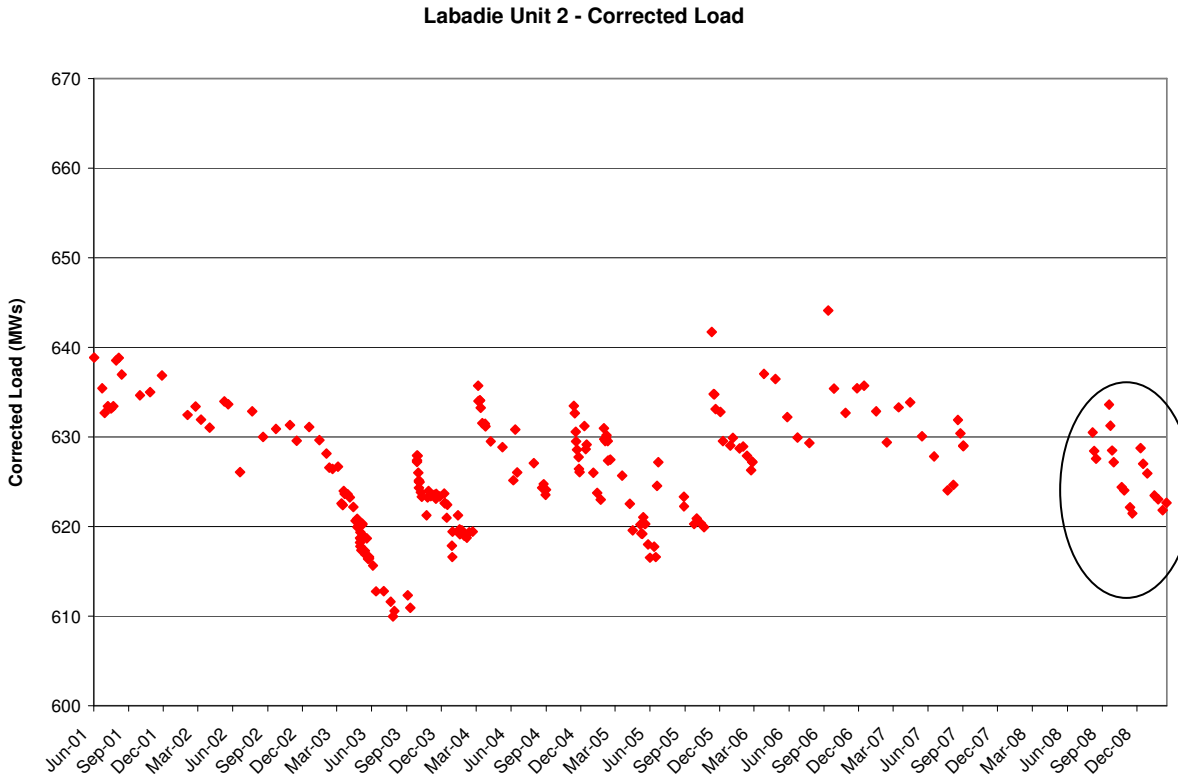
Unit 2 Observations

The following observations were made regarding Unit 2 operation and performance:

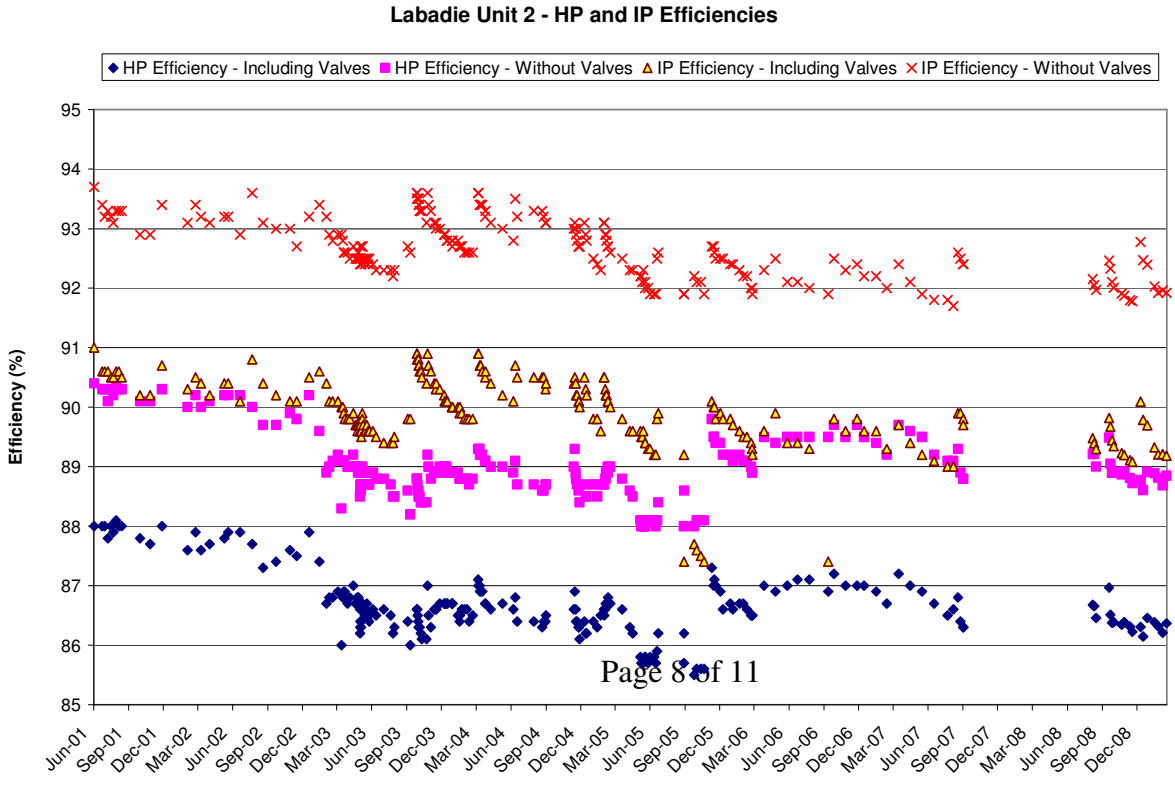
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.

Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	3/1/09	to	4/1/09			
Full Load Performance			Mar-09		Feb-09	Mar-08
Hours of Data (>90% Monthly Capability)			467		545	249
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		587.8		592.8	623.9
AUX POWER	MW		29.0		29.6	31.3
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10200.4		10241.1	10271.5
Boiler Efficiency Actual	%		85.1		85.1	85.2
CONTROL VALVE POSITION LVDT	%		43.6		45.7	100.0
FEEDWATER TEMP TO ECON	degF		490.0		490.6	494.1
FEEDWATER TEMP TO HTR 1	degF		442.5		442.7	446.1
HP Turbine Efficiency Actual	%		83.0		83.4	86.2
IP Turbine Efficiency Corrected	%		90.2		90.4	90.7
Condenser Pressure HP	inHga		2.2		2.0	2.2
Condenser Pressure LP	inHga		1.8		1.7	1.8
AIRHTR-A GAS OUTLET TEMP	degF		330.6		330.4	320.1
AIRHTR-B GAS OUTLET TEMP	degF		334.9		335.2	334.1
AMBIENT AIR TEMP	degF		52.0		40.7	47.2
CIRC WTR TEMP TO LP CONDB	degF		46.2		39.8	57.4
CIRC WTR TEMP TO LP CONDB	degF		46.5		40.7	42.1
CIRC WTR TEMP TO LP CONDB	degF		46.6		41.2	42.1
CIRC WTR TEMP TO LP CONDB	degF		46.0		40.3	44.2
Minimum River Temperature	degF		46.0		39.8	42.1
FWH 1 Temperature Rise	degF		47.6		47.9	48.0
Net Load	MW		558.8		563.2	592.7
Average Cond Press	inHga		2.0		1.9	2.0
Average Exit Gas Temperature	degF		332.7		332.8	327.1
Aux Power	%		4.9		5.0	5.0
Gross Unit Heat Rate	BTU/KW-HR		9697.1		9730.0	9756.7
Gross Turbine Heat Rate	BTU/KW-HR		8256.3		8282.7	8316.2
Feedwater Flow	KPPH		3863.427			

No significant changes were noted for Unit 2 in March.



Note the decrease in corrected load during the last several online runs on the Unit.



Note the decrease in turbine efficiencies over the same time periods.

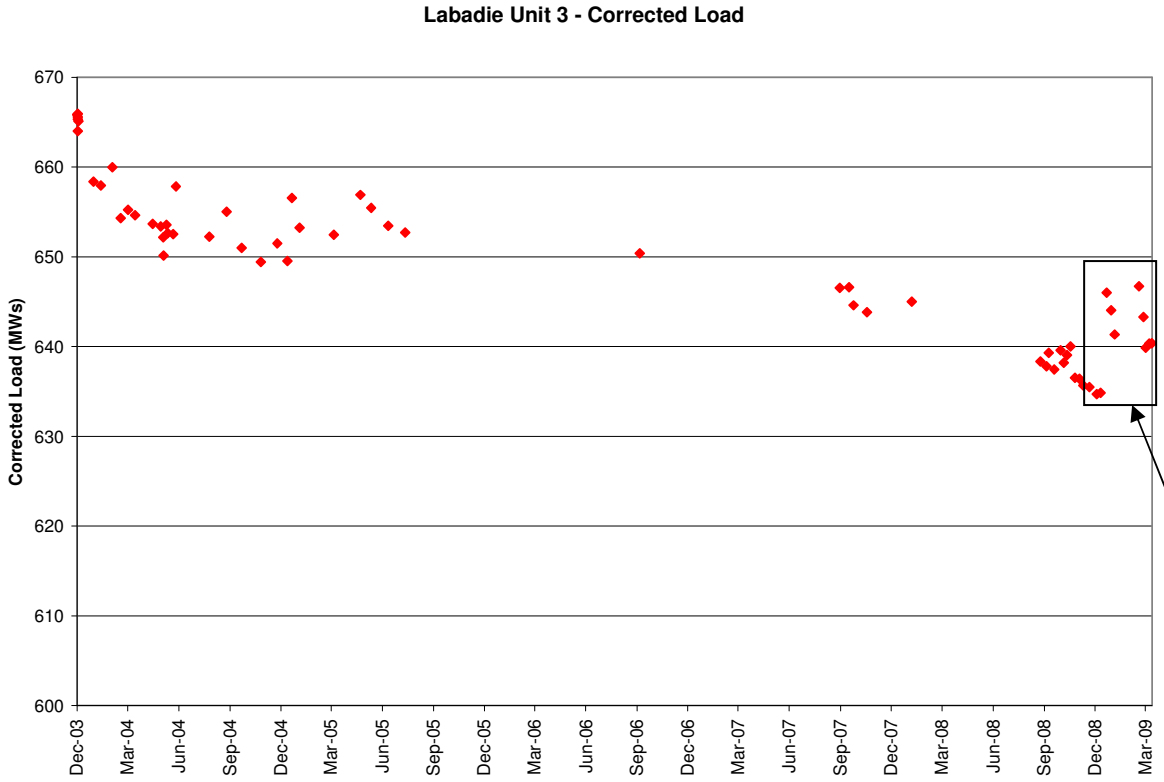
Unit 3 Observations

The following observations were made regarding Unit 3 operation and performance:

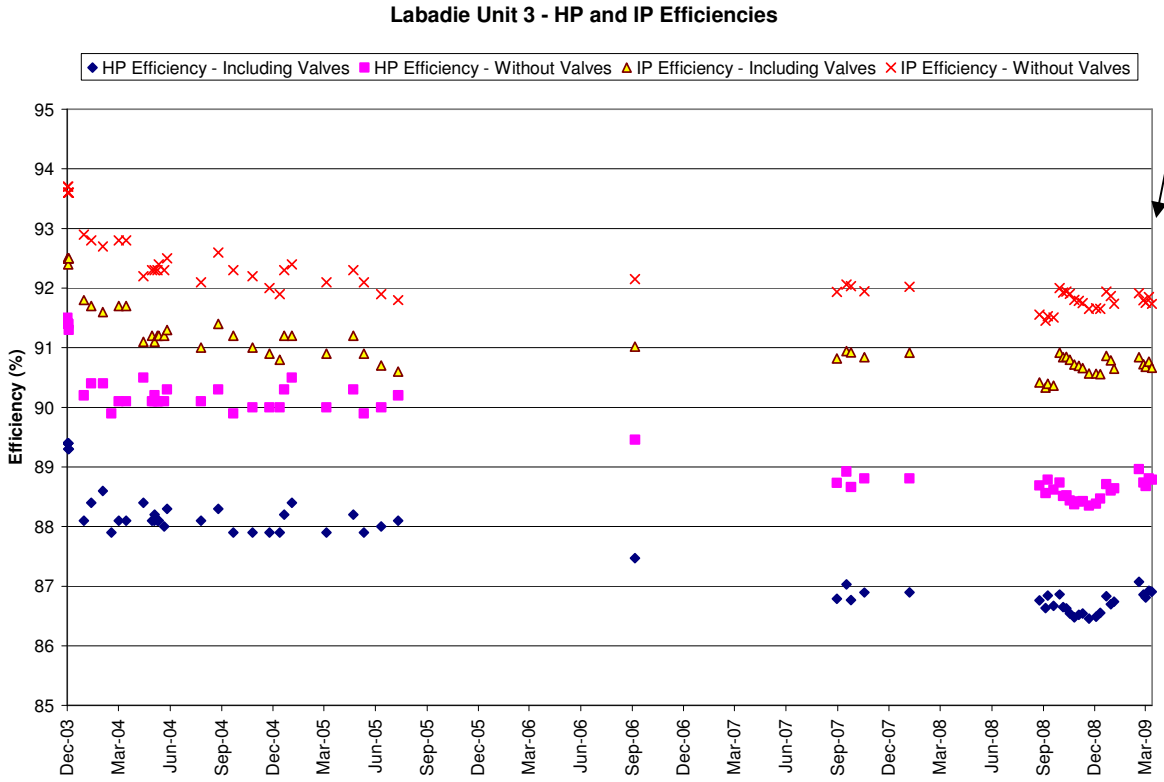
- Condenser vacuum pump flow was about 100 scfm at the end of March (down from 120 scfm at the end of February). This unit has the highest inleakage of all the Labadie Units. The plant goal is to be below 40 scfm and running on one vacuum pump.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.

Summary of Performance Report for:						
Plant	Labadie					
Unit	3					
Period	3/1/09	to	4/1/09			
Full Load Performance			Mar-09		Feb-09	Mar-08
Hours of Data			587		379	198.0
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		600.3		608.9	636.4
AUX POWER	MW		29.7		28.8	29.9
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9869.3		9744.9	9942.8
Boiler Efficiency Actual	%		85.4		85.6	85.4
CONTROL VALVE POSITION LVDT	%		98.1		95.6	103.1
FEEDWATER TEMP TO ECON	degF		480.6		481.8	485.4
FEEDWATER TEMP TO HTR 1	degF		431.1		432.1	436.5
HP Turbine Efficiency Actual	%		85.1		84.9	87.3
IP Turbine Efficiency Corrected	%		95.0		95.0	94.1
Condenser Pressure HP	inHga		2.4		2.1	2.4
Condenser Pressure LP	inHga		2.1		2.0	2.1
AIRHTR-A GAS OUTLET TEMP	degF		327.3		322.9	332.9
AIRHTR-B GAS OUTLET TEMP	degF		323.8		321.4	304.1
AMBIENT AIR TEMP	degF		51.6		41.7	51.2
CIRC WTR TEMP TO LP CONDB	degF		46.8		40.1	57.7
CIRC WTR TEMP TO LP CONDB	degF		49.8		42.5	46.8
CIRC WTR TEMP TO LP CONDB	degF		47.2		40.6	46.2
CIRC WTR TEMP TO LP CONDB	degF		46.8		40.2	46.7
Minimum River Temperature	degF		46.8		40.1	46.2
FWH 1 Temperature Rise	degF		49.5		49.7	48.9
Net Load	MW		570.5		580.2	606.5
Average Cond Press	inHga		2.2		2.1	2.3
Average Exit Gas Temperature	degF		325.5		322.1	318.5
Aux Power	%		4.9		4.7	4.7
Gross Unit Heat Rate	BTU/KW-HR		9380.8		9284.7	9476.0
Gross Turbine Heat Rate	BTU/KW-HR		8012.8		7944.0	8090.7
Feedwater Flow	KPPH		3692.345			

The duct pressure limitations continue to limit load on the unit. The combination of lower generation and increased aux. load contributed to a higher heat rate in March. The increased river temperature also led to a higher backpressure which in turn leads to a higher heat rate.



Note the decrease in load and turbine efficiencies followed by the step change up following recent SBOs



Unit 4 Observations

The following observations were made regarding Unit 4 operation and performance:

- The #1 FWH was out of service for the entire month of March and will be repaired during the outage this spring. It is noted that operation without the top feedwater heater in service is about a 95 Btu/kWhr heat rate penalty and equates to about a $50,000 per month increase in fuel costs.
- HP efficiency was down about 2% and was due to pinching back on the control valves in March.

Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	3/1/09	to	4/1/09			
Full Load Performance			Mar-09		Feb-09	Mar-08
Hours of Data (>90% Monthly Capability)			549		595	172
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		606.2		625.2	641.1
AUX POWER	MW		28.4		30.6	30.0
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10099.9		9993.5	10390.7
Boiler Efficiency Actual	%		85.2		85.0	85.0
CONTROL VALVE POSITION LVDT	%		78.3		85.4	98.6
FEEDWATER TEMP TO ECON	degF		433.5		468.0	431.5
FEEDWATER TEMP TO HTR 1	degF		434.5		433.9	432.5
HP Turbine Efficiency Actual	%		82.9		84.9	87.8
IP Turbine Efficiency Corrected	%		94.6		94.7	93.3
Condenser Pressure HP	inHga		3.1		2.2	2.1
Condenser Pressure LP	inHga		2.4		1.9	1.9
AIRHTR-A GAS OUTLET TEMP	degF		336.0		344.5	327.6
AIRHTR-B GAS OUTLET TEMP	degF		318.7		316.9	309.9
AMBIENT AIR TEMP	degF		52.5		43.5	46.2
CIRC WTR TEMP TO LP CONDB	degF		46.0		39.8	56.5
CIRC WTR TEMP TO LP CONDB	degF		49.0		41.9	44.0
CIRC WTR TEMP TO LP CONDB	degF		46.4		41.1	44.0
CIRC WTR TEMP TO LP CONDB	degF		45.7		40.0	43.3
Minimum River Temperature	degF		45.7		39.8	43.3
FWH 1 Temperature Rise	degF		-1.0		34.1	-1.0
Net Load	MW		577.8		594.6	611.1
Average Cond Press	inHga		2.7		2.0	2.0
Average Exit Gas Temperature	degF		327.4		330.7	318.8
Aux Power	%		4.7		4.9	4.7
Gross Unit Heat Rate	BTU/KW-HR		9626.4		9504.0	9905.0
Gross Turbine Heat Rate	BTU/KW-HR		8203.2		8077.9	8422.2
Feedwater Flow	KPPH		3566.229			

As noted above, heat rate in March was up and was due to several reasons. First, the top heater was out of service the entire month of March and just part of the month of February. In addition, a Circ. pump was taken off line for repairs in March and led to an increase in the average backpressure. In addition, the HP efficiency was down about 2% due to pinching back on the control valves more in March. These three changes were the main contributors to the increased heat rate in March.

March 12, 2009

To: David Fox
From: Jeff Shelton
Cc: Bob Meiners, Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace, Scott Hixson, Jim Barnett, Glenn Tiffin

Subject: Labadie February 2009 Performance Report

Executive Summary

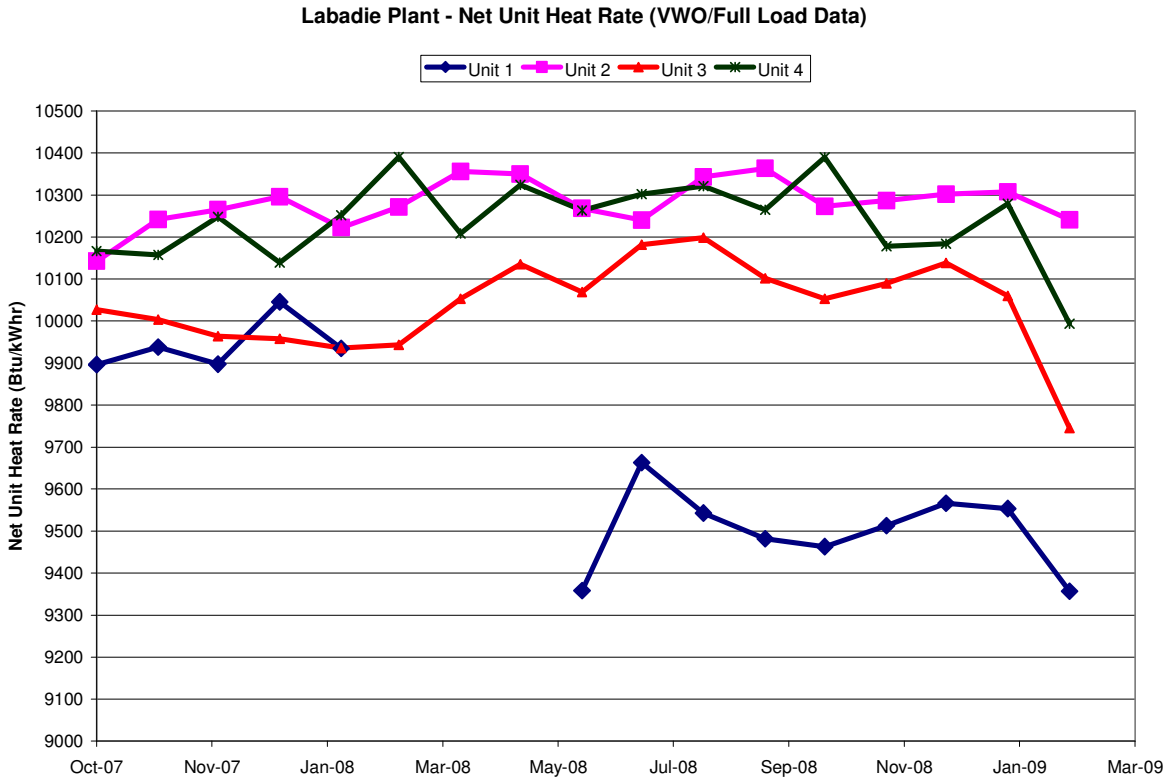
The most notable items regarding Labadie unit performance were:

- All units exhibit some form of turbine efficiency degradation over time that is recovered following SBOs. The suspected cause is water soluble deposits and will continue to be monitored.
- Unit 3 operation with valves pinched backed appears to be slightly more efficient than operating in VWO with the current duct pressure limitations on the unit. Observations on control valve position and its impact on load and heat rate for all four units are presented in the Unit 3 section of this report.
- Unit 3 6B FWH has an issue that is limiting performance. The plant has checked temperature readings and looked for leaks on both the steam side and feedwater side of the heater. It is recommended that the plant inspect the expansion joints on the heater during the spring outage on Unit 3.

The following table shows the instrument deficiencies for all four units (no new items were added from the last report):

Tag	Unit	Issue	Resolution	Carryover or New
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004	JR164407 to investigate and correct	Carryover
1BFWSTM-08318, EXTRACT PRESS HTR 4A	1	Flat-lined on 1/29	JR164611	Carryover

A plot of monthly unit heat rates for all four units is included on the following page. As discussed in the last performance report, the heat rate calculation in EtaPro was modified at the end of January. An incorrect temperature was previously being used in EtaPro and correcting this caused an approximate 2% to 3% decrease in heat rate across all four units.



Action Items:

- Labadie should search for air inleakage sources on the Unit 3 condenser.
- Labadie should inspect the expansion joints on the 6B FWH on Unit 3 during the spring outage. If nothing is found on that inspection, it may be prudent to once again inspect the partition plate of the feedwater heater looking for sources of bypass flow.
- Performance Engineering will check the EtaPro heat rate calculations to ensure they are as accurate as possible.
- Performance Engineering will develop a “best-achievable” heat rate for each unit to determine the potential improvement available on each unit. This will also be used in the determination of the heat rate KPI for the plant.
- Performance Engineering will develop plans and help conduct a cycle isolation check on all four units in 2009/2010. The intent is to have a Coop student in Performance Engineering perform this task on the entire UE fleet.
- Performance Engineering will create screens in EtaPro that better monitor turbine performance. Calculations will include corrected load, corrected turbine stage pressures, and more detailed turbine efficiencies (internal and external). A working example for Unit 3 is currently available and is labeled “Turbine Perf.”
- Performance Engineering will be phasing out the use of OPM.

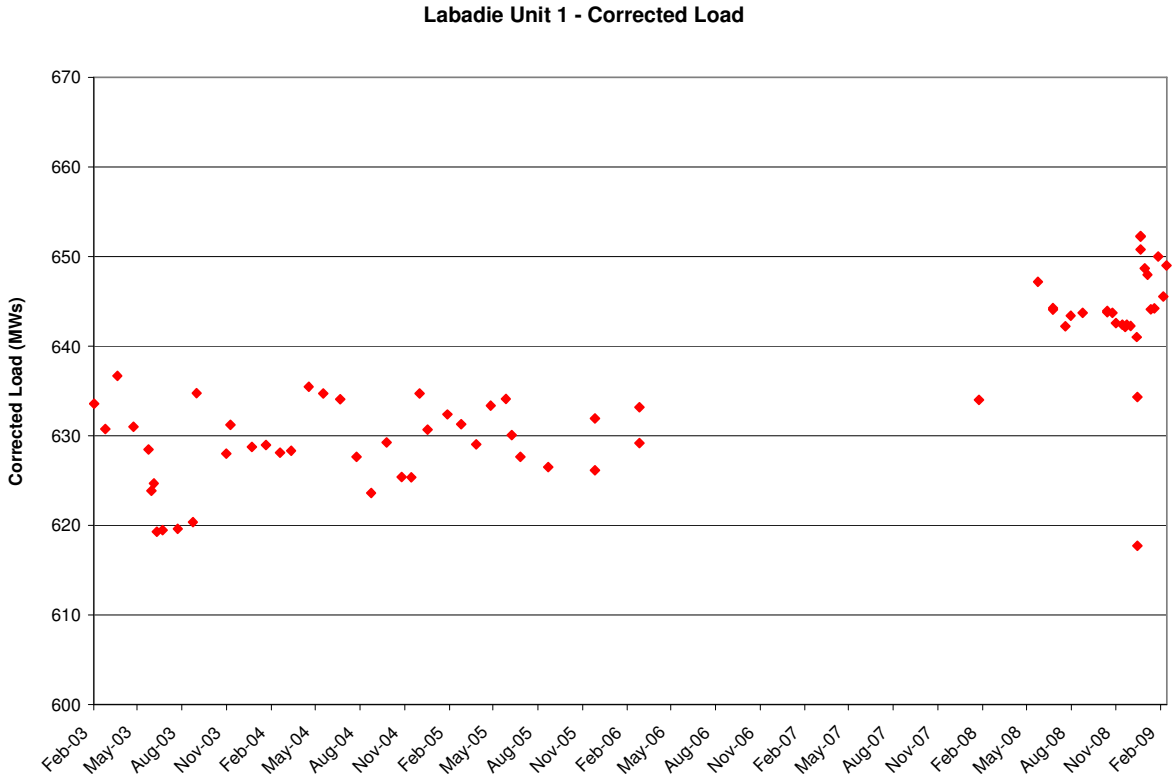
Unit 1 Observations

The following observations were made regarding Unit 1 operation and performance:

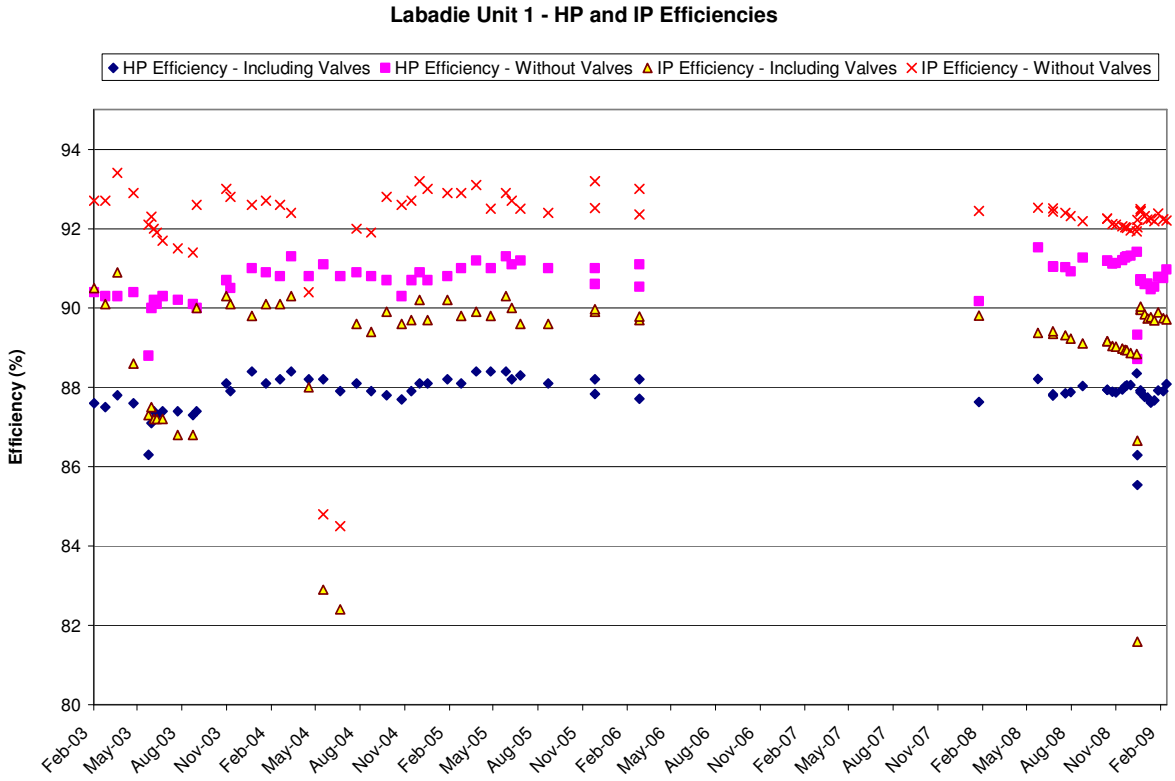
- The performance reports are being changed such that all data from hours in which the gross load is greater than 90% of the monthly capability will be compiled (previously VWO data was used in the reports).
- Condenser Cleanliness (both HP and LP) dropped approximately 20% (gradual decrease not instantaneous) in the last week of February. The HP cleanliness factor has leveled off at approximately 45%. The LP condenser cleanliness continues to drop and is currently at approximately 60%. The average HP condenser pressure increased from 1.6 in Hga in January to 3.1 in HgA in February due to having only one circulating water pump running.

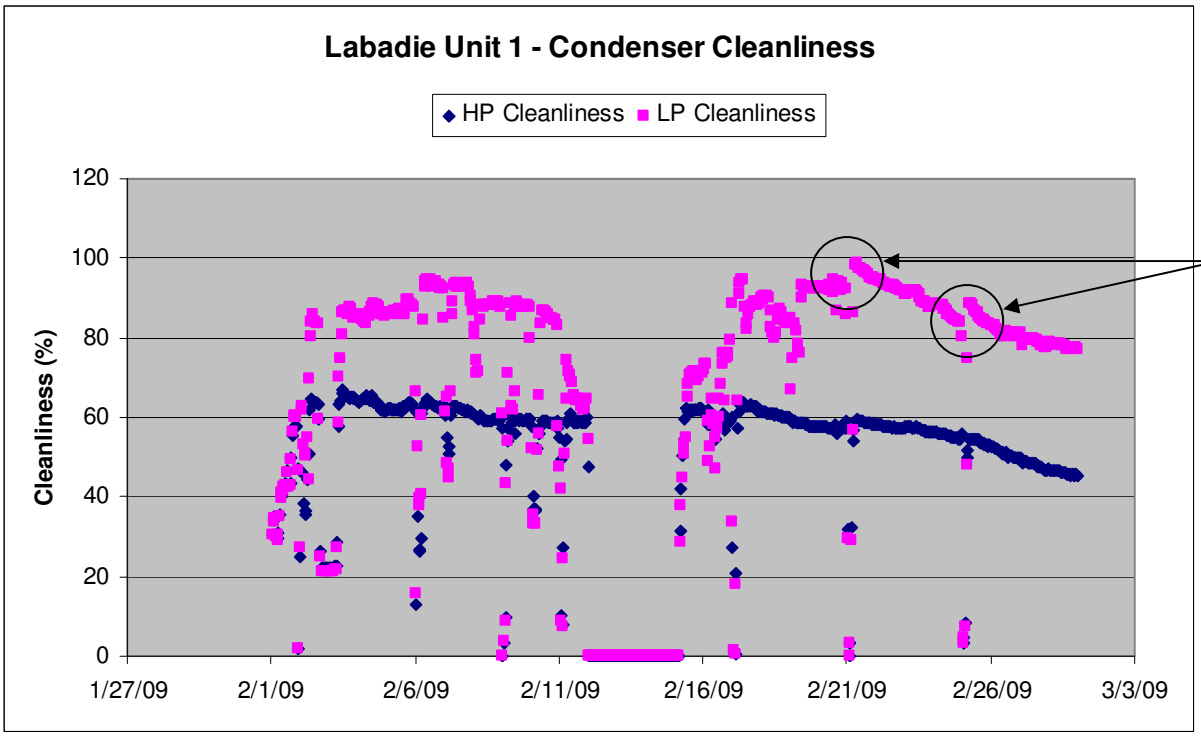
Summary of Performance Report for:						
Plant	Labadie					
Unit	1					
Period	2/1/09	to	3/1/09			
			Feb-09		Jan-09	Feb-08
Full Load Performance						
Hours of Data (>90% Monthly Capability)			461		397	257
			Averages		**Averages**	**Averages**
GENERATOR MEGAWATTS	MW		636.1		640.5	628.1
AUX POWER	MW		25.9		28.3	27.5
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9356.3		9553.6	9935.0
Boiler Efficiency Actual	%		85.4		85.2	85.2
CONTROL VALVE POSITION LVDT	%		82.7		100.0	100.4
FEEDWATER TEMP TO ECON	degF		485.9		492.6	491.0
FEEDWATER TEMP TO HTR 1	degF		439.0		437.6	439.4
HP Turbine Efficiency Actual	%		87.1		87.8	90.7
IP Turbine Efficiency Corrected	%		91.6		91.3	92.9
Condenser Pressure HP	inHga		3.1		1.6	2.8
Condenser Pressure LP	inHga		1.3		1.2	1.9
AIRHTR-A GAS OUTLET TEMP	degF		329.4		330.2	331.8
AIRHTR-B GAS OUTLET TEMP	degF		327.6		329.2	296.3
AMBIENT AIR TEMP	degF		40.0		28.4	34.4
CIRC WTR TEMP TO LP CONDB	degF		39.0		35.7	37.1
CIRC WTR TEMP TO LP CONDB	degF		41.4		38.5	38.2
CIRC WTR TEMP TO LP CONDB	degF		40.5		37.4	37.8
CIRC WTR TEMP TO LP CONDB	degF		39.7		37.8	36.6
Minimum River Temperature	degF		39.0		35.7	36.6
FWH 1 Temperature Rise	degF		46.9		55.0	51.6
Net Load	MW		610.2		612.2	600.6
Average Cond Press	inHga		2.2		1.4	2.4
Average Exit Gas Temperature	degF		328.5		329.7	314.0
Aux Power	%		4.1		4.4	4.4
Gross Unit Heat Rate	BTU/KW-HR		8974.9		9131.5	9500.3
Gross Turbine Heat Rate	BTU/KW-HR		7664.3		7777.8	8093.1

The average final feedwater temperature was lower in February than in January due to the top heater being out of service during parts of February. The HP efficiency dropped by 0.7% and is due in part to including data in which the valves were pinched down (note the average CV position for the February data is 82.7% while the average CV position for January was 100.0%). Note also that heat rate is lower by about 2% due to the EtaPro heat rate calculation change made in late January.



The plots of corrected load and turbine efficiencies for all four units use only VWO data. As with the other units, the corrected load and turbine efficiencies tend to decrease during long runs with no outages.



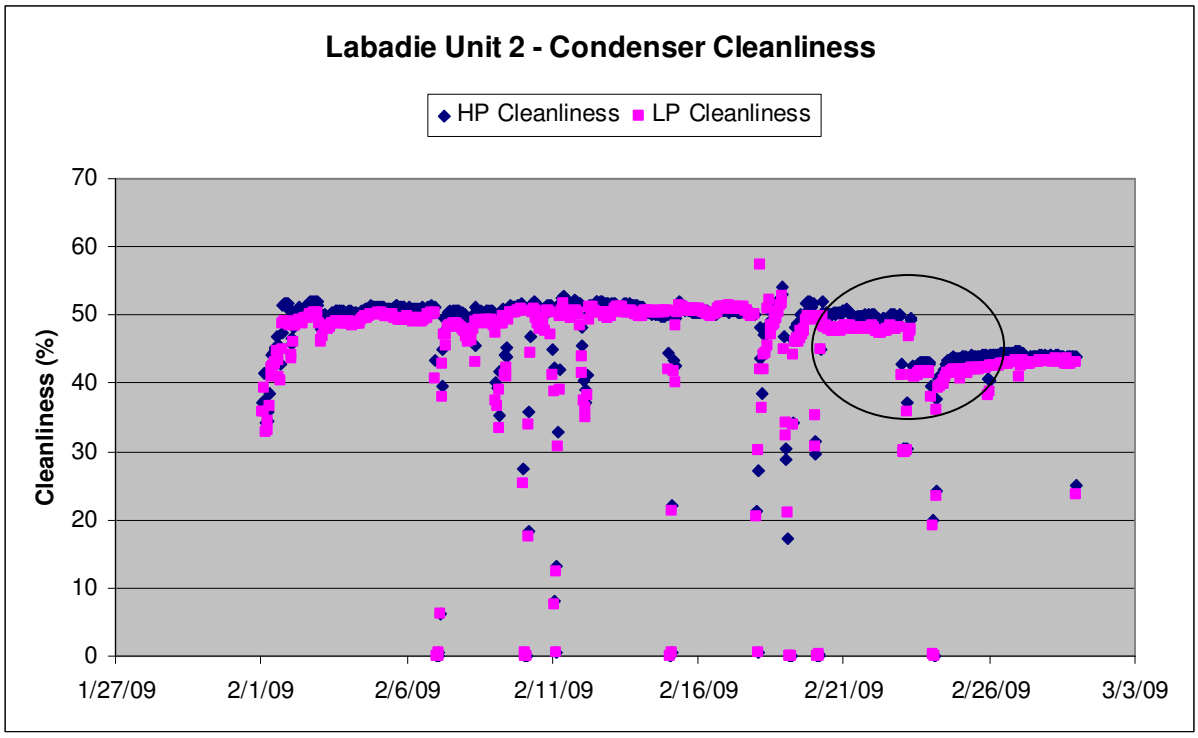


These two step increases in LP cleanliness correspond to condenser backwashes.

Unit 2 Observations

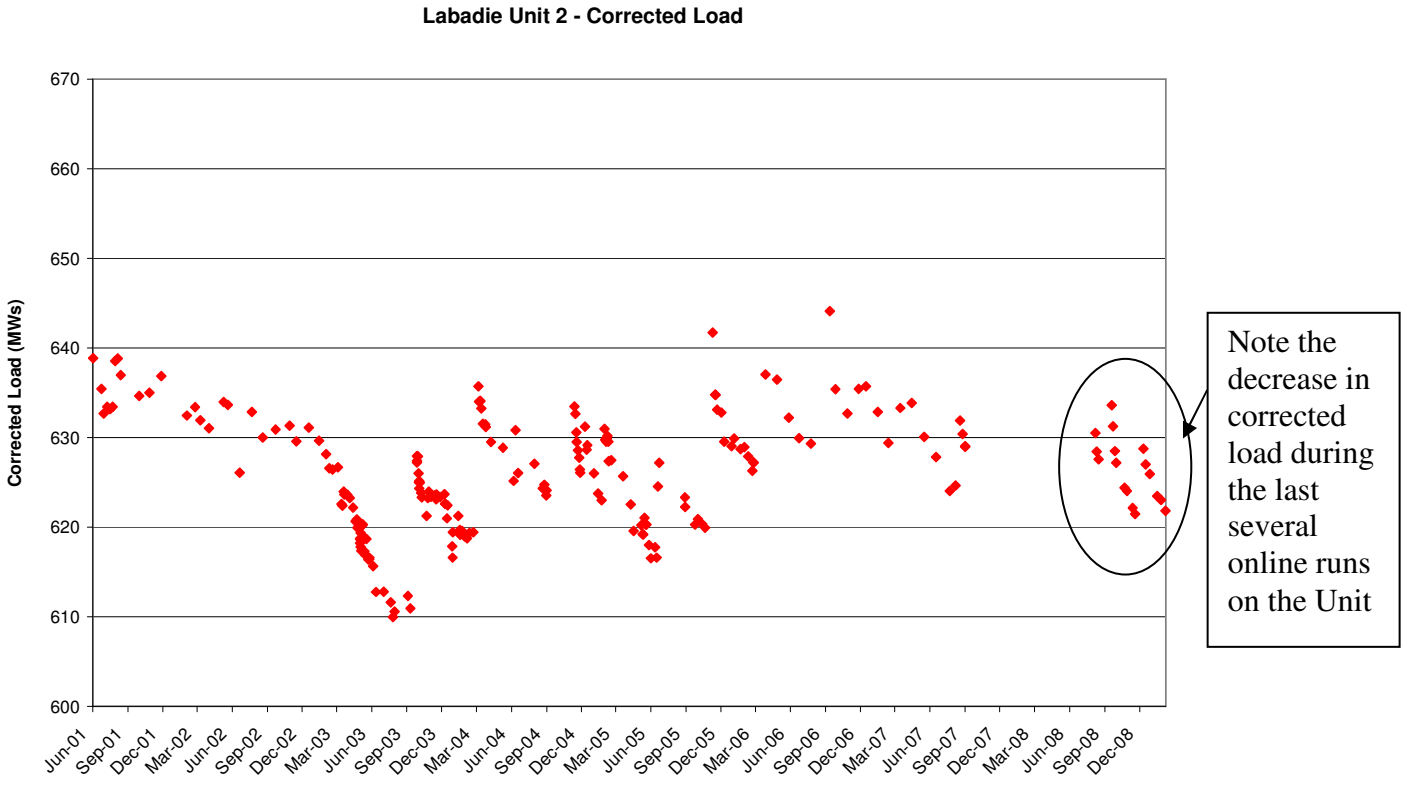
The following observations were made regarding Unit 2 operation and performance:

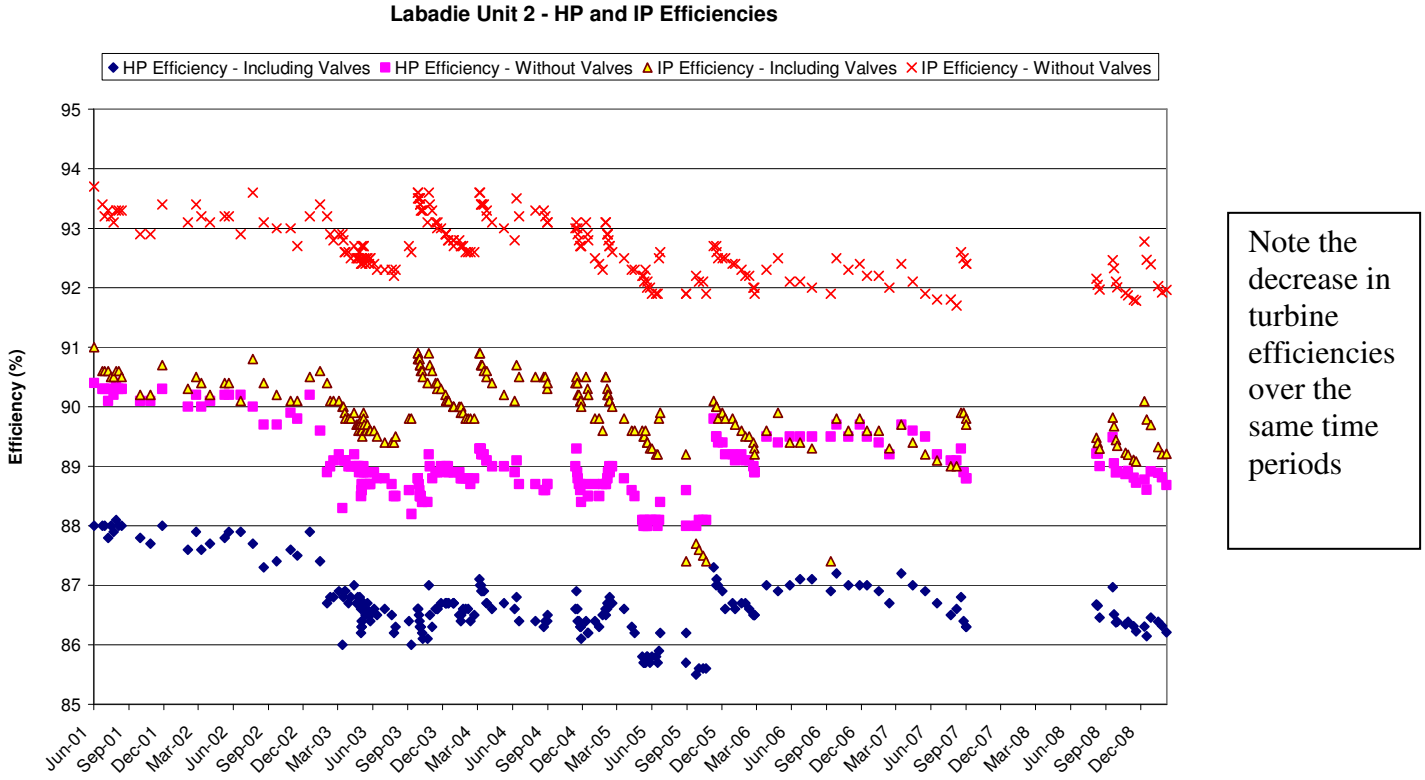
- The performance reports are being changed such that all data from hours in which the gross load is greater than 90% of the monthly capability will be compiled (previously VWO data was used in the reports).
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.
- In late February, there was a step change in the calculated condenser cleanliness due to a change made in EtaPro in the calculation of circulating water flow (see plot below). Previously, EtaPro capped the circulating water flow at the design condenser flow value of 188,000 gpm. This cap was removed on 2/23/09 and the circulating water flow estimate increased above 188,000 gpm. Since the measured condenser pressure and temperature rise across the condenser did not change, the increase in estimated circulating water flow reduced the apparent cleanliness of the condenser. This same change was made on all four units at Labadie. Unit 1 was running only one circ. pump at the time the change was made. No change in condenser cleanliness was observed since the estimated flow from one pump was below the condenser design flow of 188,000 gpm.



Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	2/1/09	to	3/1/09			
Full Load Performance			Feb-09		Jan-09	Feb-08
Hours of Data (>90% Monthly Capability)			545		63	150
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		592.8		610.1	627.8
AUX POWER	MW		29.6		29.6	30.6
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10241.1		10307.8	10222.4
Boiler Efficiency Actual	%		85.1		85.3	85.5
CONTROL VALVE POSITION LVDT	%		45.7		99.9	99.4
FEEDWATER TEMP TO ECON	degF		490.6		492.3	495.4
FEEDWATER TEMP TO HTR 1	degF		442.7		443.8	447.0
HP Turbine Efficiency Actual	%		83.4		86.1	86.3
IP Turbine Efficiency Corrected	%		90.4		90.8	90.8
Condenser Pressure HP	inHga		2.0		1.9	2.0
Condenser Pressure LP	inHga		1.7		1.8	1.8
AIRHTR-A GAS OUTLET TEMP	degF		330.4		332.7	321.5
AIRHTR-B GAS OUTLET TEMP	degF		335.2		336.2	338.2
AMBIENT AIR TEMP	degF		40.7		34.1	40.2
CIRC WTR TEMP TO LP CONDB	degF		39.8		36.3	37.0
CIRC WTR TEMP TO LP CONDB	degF		40.7		36.9	37.4
CIRC WTR TEMP TO LP CONDB	degF		41.2		37.9	37.6
CIRC WTR TEMP TO LP CONDB	degF		40.3		38.8	36.4
Minimum River Temperature	degF		39.8		36.3	36.4
FWH 1 Temperature Rise	degF		47.9		48.5	48.4
Net Load	MW		563.2		580.5	597.2
Average Cond Press	inHga		1.9		1.9	1.9
Average Exit Gas Temperature	degF		332.8		334.5	329.8
Aux Power	%		5.0		4.8	4.9
Gross Unit Heat Rate	BTU/KW-HR		9730.0		9808.0	9724.1
Gross Turbine Heat Rate	BTU/KW-HR		8282.7		8367.7	8318.9

The most notable changes here were due mostly to calculation changes in EtaPro (heat rate drop from January to February) and the inclusion of data other than just VWO data (HP efficiency drop from January to February).


Labadie Unit 2 - Corrected Load
Corrected Load (MWs)
670
660
650
640
630
620
610
600
Jun-01
Sep-01
Dec-01
Mar-02
Jun-02
Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Note the decrease in corrected load during the last several online runs on the Unit


Labadie Unit 2 - HP and IP Efficiencies
HP Efficiency - Including Valves
HP Efficiency - Without Valves
IP Efficiency - Including Valves
IP Efficiency - Without Valves
Efficiency (%)
95
94
93
92
91
90
89
88
87
86
85
Jun-01
Sep-01
Dec-01
Mar-02
Jun-02
Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Note the decrease in turbine efficiencies over the same time periods

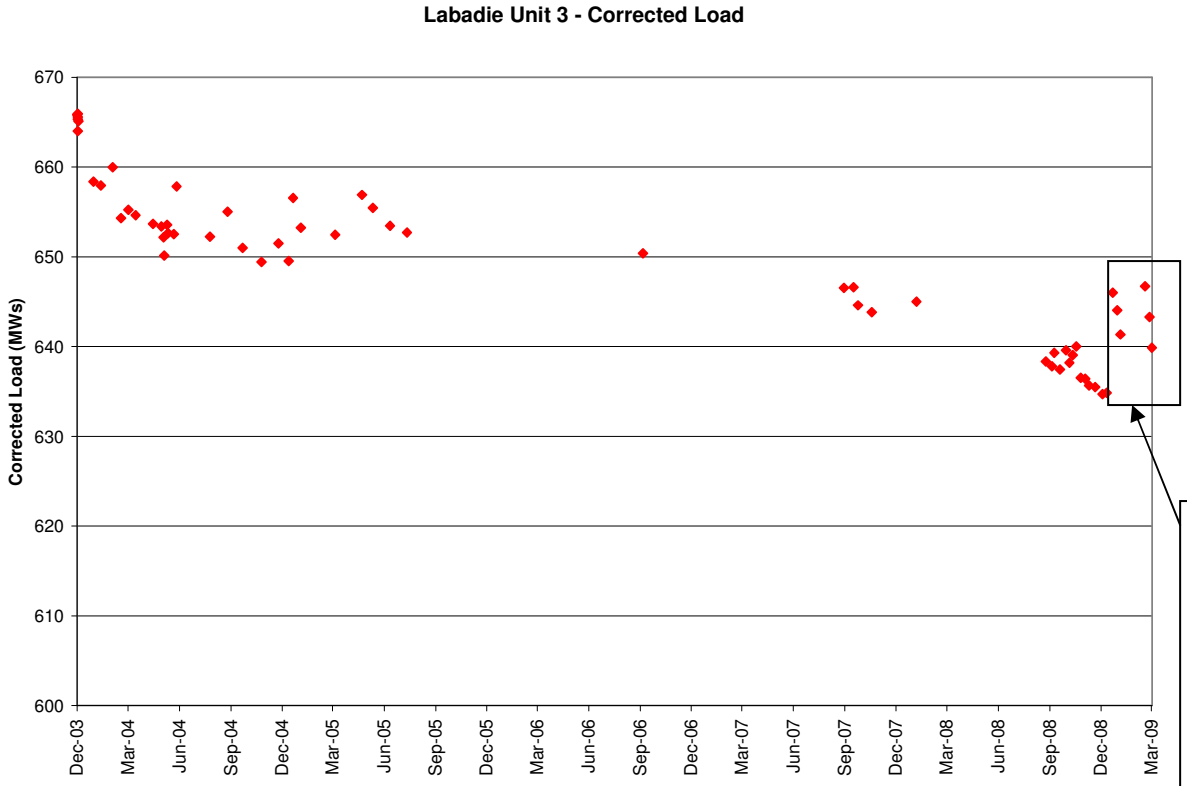
Unit 3 Observations

The following observations were made regarding Unit 3 operation and performance:

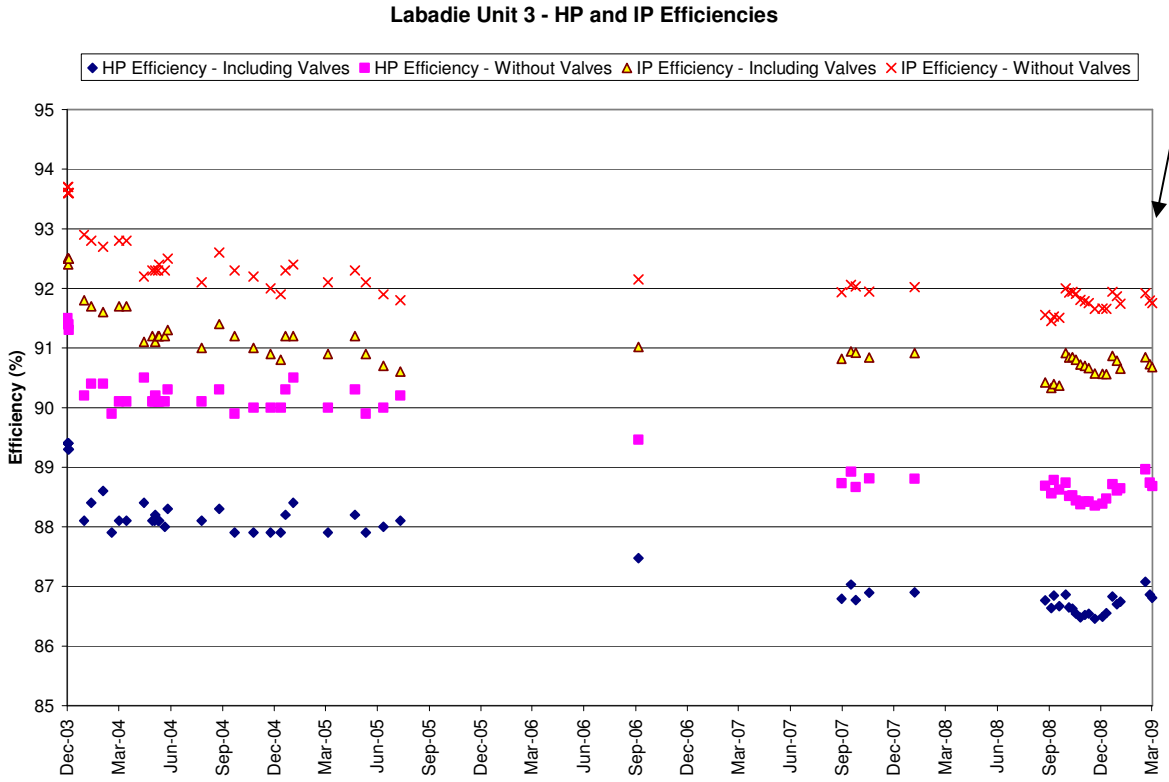
- The performance reports are being changed such that all data from hours in which the gross load is greater than 90% of the monthly capability will be compiled (previously VWO data was used in the reports).
- The plant asked Performance engineering to review VWO operation on the unit. There was an event in early March in which the unit went from valves pinched back to fully open. The unit was duct pressure limited so no additional fuel could be added. Throttle pressure dipped and the unit lost MWs. This event, along with several other time periods in which the unit went to VWO was reviewed. The other events did not show as big an impact, if any, on MWs. Plots were generated of heat rate and gross load versus control valve position. These plots (using data since Feb. 1, 2009) showed that in general, the unit maximizes output and minimizes heat rate with the valves pinched back to an indicated position of 95-96% (PI tag 3load-00550). This is believed to be impacted by the current limitations on the unit and not an indication that valves fully open is a less efficient mode of operation. In fact, the same plots for Unit 4 which is not duct pressure limited shows that the unit is more efficient at VWO. Plots for all four units, as well as further discussion, are provided below. This information will be reviewed again following the spring outages on the units.
- Condenser vacuum pump flow was about 120 scfm at the end of February. This unit has the highest inleakage of all the Labadie Units. The plant goal is to be below 40 scfm and running on one vacuum pump.
- Temperature rise of the 6B heater is much less than the 6A heater. This has been the case since January 2007. The difference in the temperature rise has gotten larger over time. The plant has inspected the tube side of the heater and has looked for air inleakage sources but have not found any obvious problems. The outlet thermocouple has also been checked. The available venting on the FWH has also been cycled. Since other causes have been investigated, performance engineering looked at the possibility of an expansion joint failure. Data from an expansion joint failure on the 5A FWH on Unit 2 in 2003 was compared to the current data from the 6B heater on Unit 3. In the 5A expansion joint failure, the FWH pressure dropped (got closer to condenser pressure) in addition to the feedwater outlet temperature decreasing. The 6B FWH pressure does not seem to be getting any lower although it is acknowledged that the 6B heater operates much more closely to the condenser pressure and thus there is a lower pressure head from the heater to the condenser. However, since other potential performance issues have already been investigated, it is recommended that the expansion joints be inspected during the spring outage. If the expansion joint inspection does not reveal any findings, it may be prudent to open the FWH and inspect the partition plate for any potential bypass flow on the tube side of the heater.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.

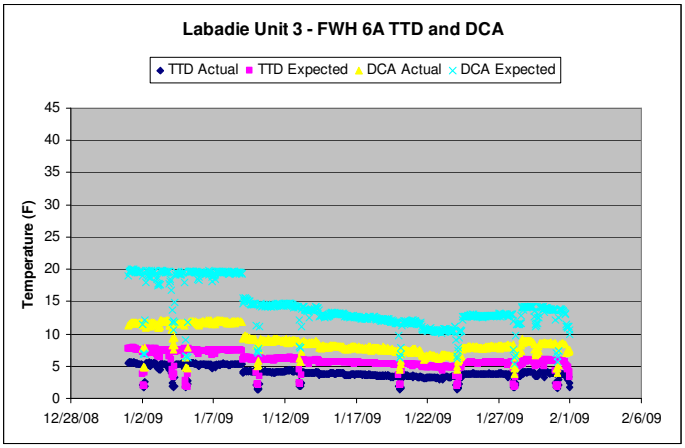
Summary of Performance Report for:						
Plant	Labadie					
Unit	3					
Period	2/1/09	to	3/1/09			
Full Load Performance			Feb-09		Jan-09	Feb-08
Hours of Data			379		65	636.0
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		608.9		617.2	645.3
AUX POWER	MW		28.8		29.5	29.2
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9744.9		10060.0	9935.9
Boiler Efficiency Actual	%		85.6		85.3	85.3
CONTROL VALVE POSITION LVDT	%		95.6		103.4	101.8
FEEDWATER TEMP TO ECON	degF		481.8		482.4	487.2
FEEDWATER TEMP TO HTR 1	degF		432.1		433.2	438.3
HP Turbine Efficiency Actual	%		84.9		86.4	87.0
IP Turbine Efficiency Corrected	%		95.0		94.9	93.9
Condenser Pressure HP	inHga		2.1		2.0	2.2
Condenser Pressure LP	inHga		2.0		1.9	2.3
AIRHTR-A GAS OUTLET TEMP	degF		322.9		327.0	321.2
AIRHTR-B GAS OUTLET TEMP	degF		321.4		317.5	304.2
AMBIENT AIR TEMP	degF		41.7		33.8	34.2
CIRC WTR TEMP TO LP CONDB	degF		40.1		36.1	37.3
CIRC WTR TEMP TO LP CONDB	degF		42.5		37.6	37.7
CIRC WTR TEMP TO LP CONDB	degF		40.6		36.1	37.2
CIRC WTR TEMP TO LP CONDB	degF		40.2		35.4	36.6
Minimum River Temperature	degF		40.1		35.4	36.6
FWH 1 Temperature Rise	degF		49.7		49.3	48.9
Net Load	MW		580.2		587.7	616.1
Average Cond Press	inHga		2.1		2.0	2.3
Average Exit Gas Temperature	degF		322.1		322.3	312.7
Aux Power	%		4.7		4.8	4.5
Gross Unit Heat Rate	BTU/KW-HR		9284.7		9579.0	9486.4
Gross Turbine Heat Rate	BTU/KW-HR		7944.0		8167.8	8088.8

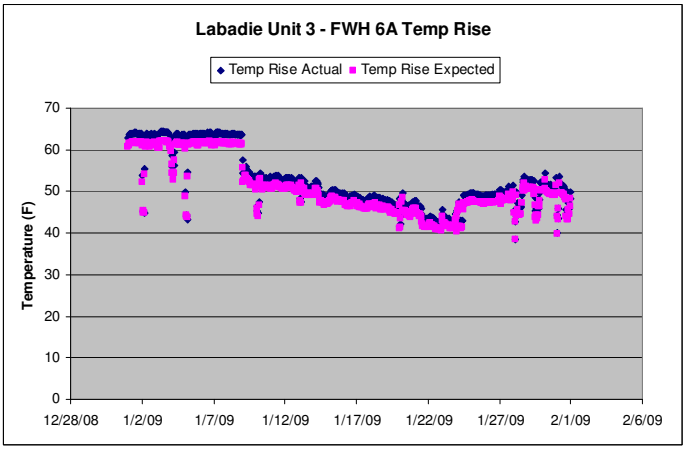
The HP efficiency dropped by 1.5% and is due in part to including data in which the valves were pinched down (note the average CV position for the February data is 95.6% while the average CV position for January was 103.4%). Note also that heat rate is down by almost 3% due to the EtaPro heat rate calculation change made in late January.

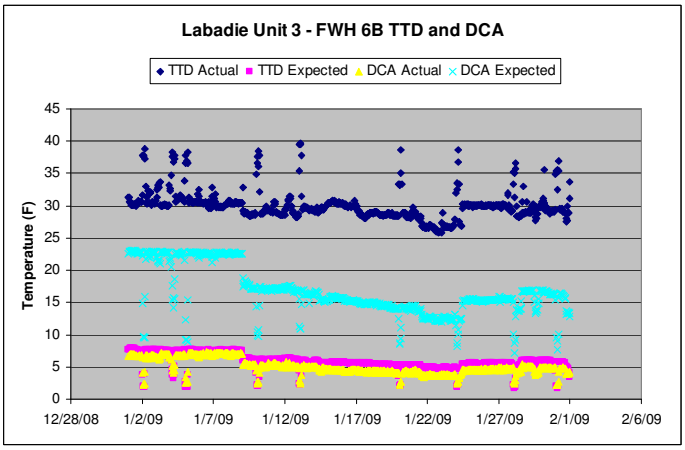


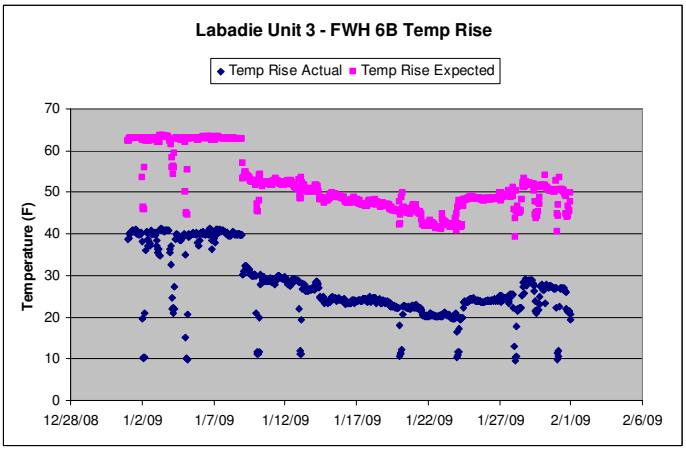
Note the decrease in load and turbine efficiencies followed by the step change up following recent SBOs

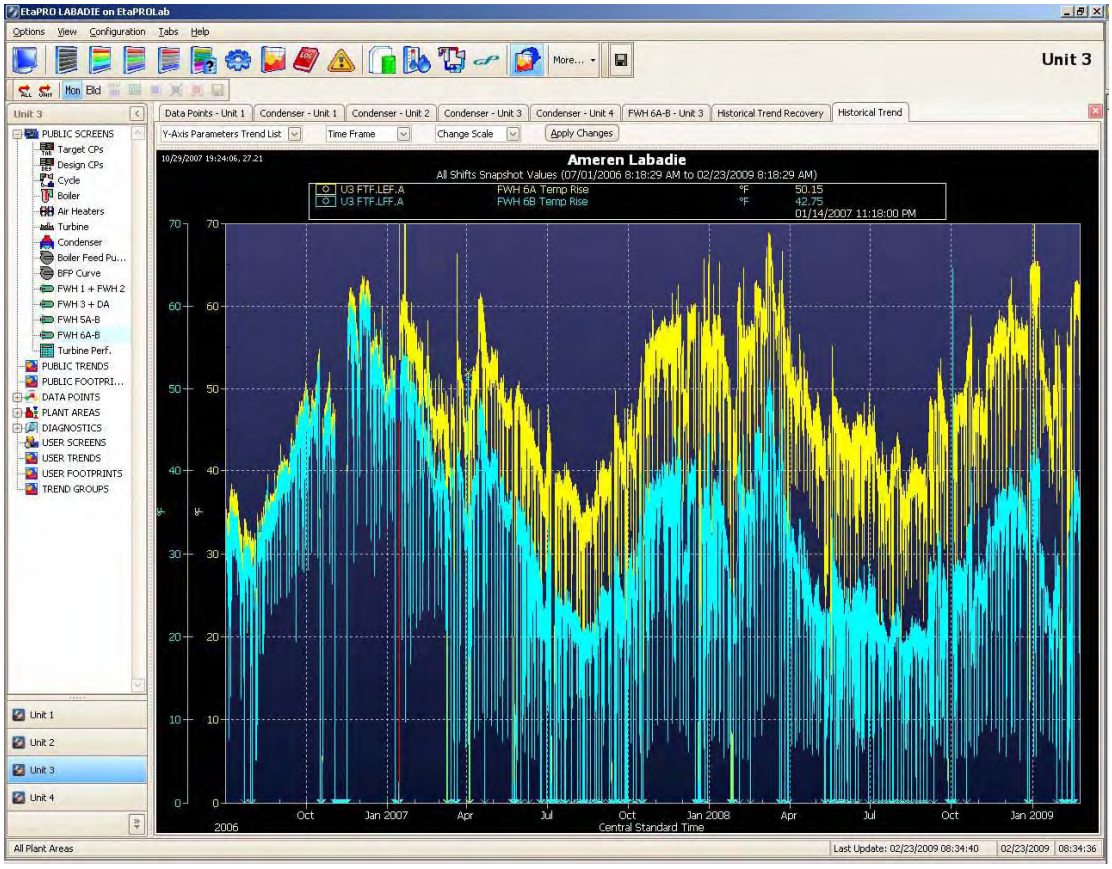




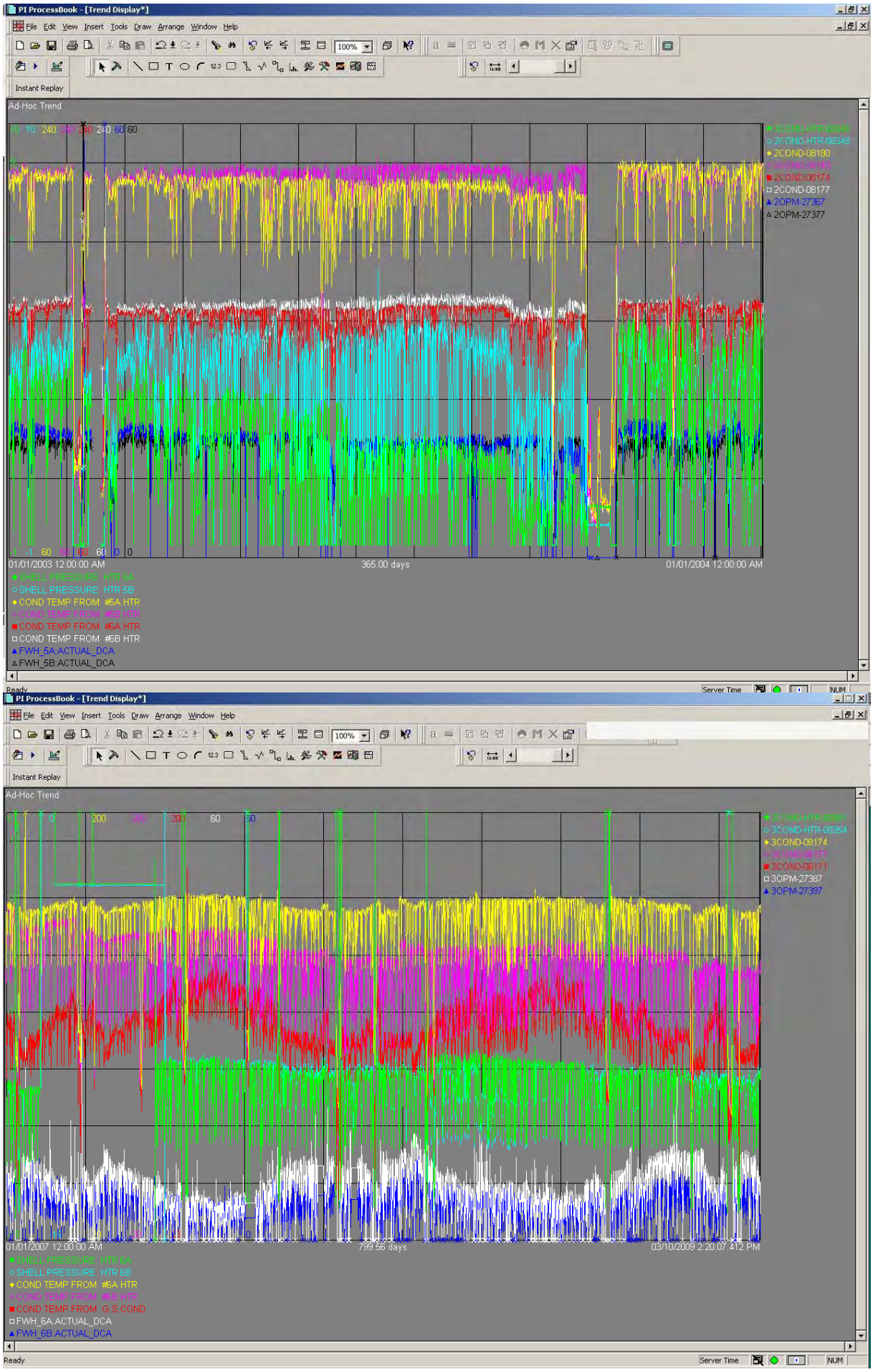






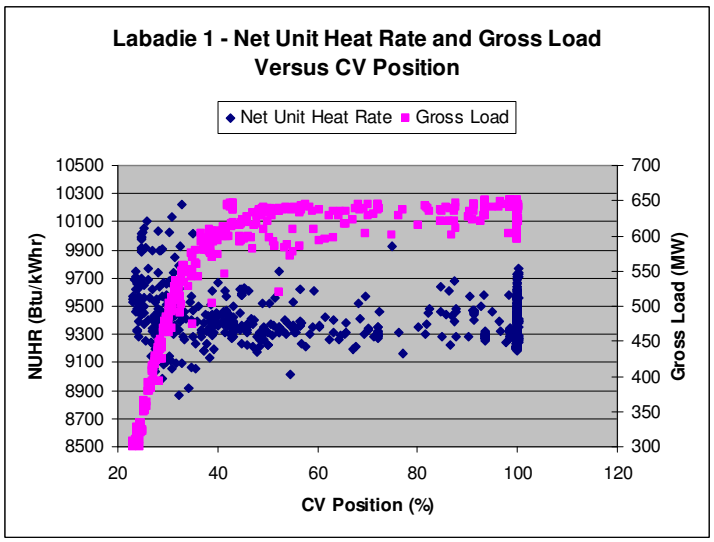


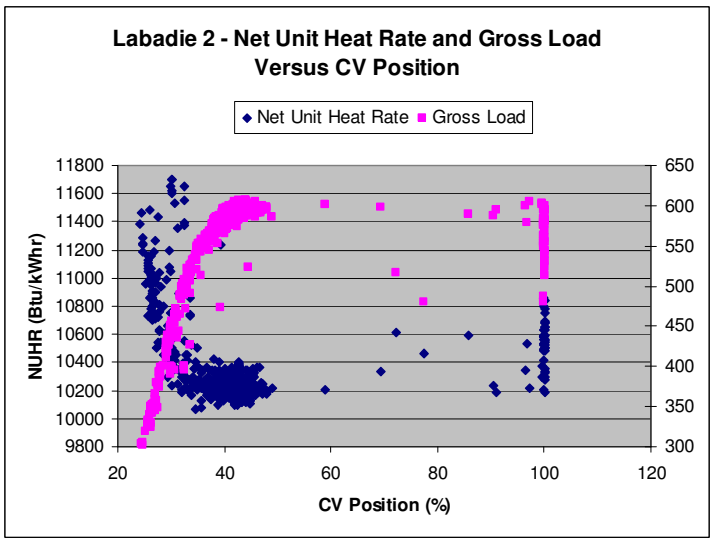
Temperature rise of the 6A and 6B heaters on Unit 3 since January 2007.

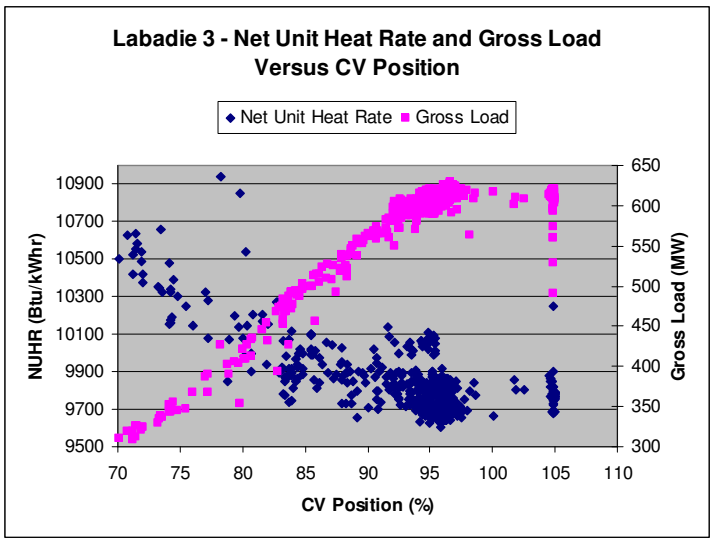


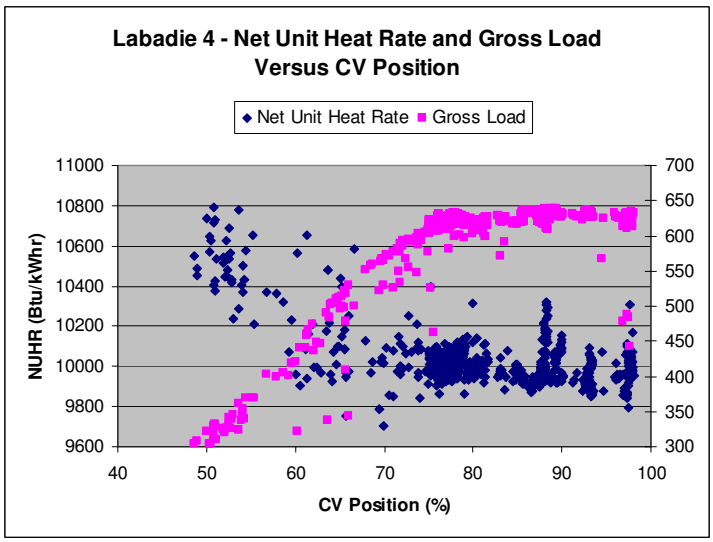
The top plot shows data from the 5A and 5B heater during a time period when an expansion joint failed on the 5A heater on Unit 2. Green is the 5A shell pressure, Blue is the 5B shell pressure, Yellow is the 5A feedwater outlet temp, and Pink is the 5B feedwater outlet temp. As shown, the pressure of the 5A heater dropped off during 2003 as did the outlet temperature.

The bottom plot shows data from the #6 heaters on Unit 3. Green is the 6A shell pressure, Blue is the 6B shell pressure, Yellow is the 6A feedwater outlet temperature, and Pink is the 6B feedwater outlet temperature. Note that the gap in outlet temperatures between the two heaters has gotten larger over time. However, there does not appear to be any difference in shell pressure between the two FWHs.









Above are plots of Net Unit Heat Rate and Gross Load versus control valve position for each unit since Feb. 1, 2009. As discussed above, Unit 3 seems to get the most MWs and lowest heat rate for a control valve position around 95-96% (Pi tag 3load-00550). Unit 1 heat rate levels off above about 50% (Pi tag 1turb-17508) open but continues to get more MWs as the valves go more open. Unit 2 seems to be the most efficient and generate the most MWs between 40 and 50% (Pi tag 2turb-17508) open. Unit 4 load seems to peak between 85 to 90% (Pi tag 4load-00550) open while heat rate, in general, continues to trend down all the way to VWO. Obviously there are many other factors that influence load and heat rate other than control valve position. From this review, it would appear that operating at VWO is the best efficiency approach for Units 1 and 4 while having the valves pinched back is the most efficient for Unit 2 (40-50% open) and Unit 3 (95-95% open). This will be looked at again following the spring outages on Units 2, 3, and 4. Performance Engineering still requests VWO operation for a minimum of 4 hours each month in order to look at VWO turbine performance.

Unit 4 Observations

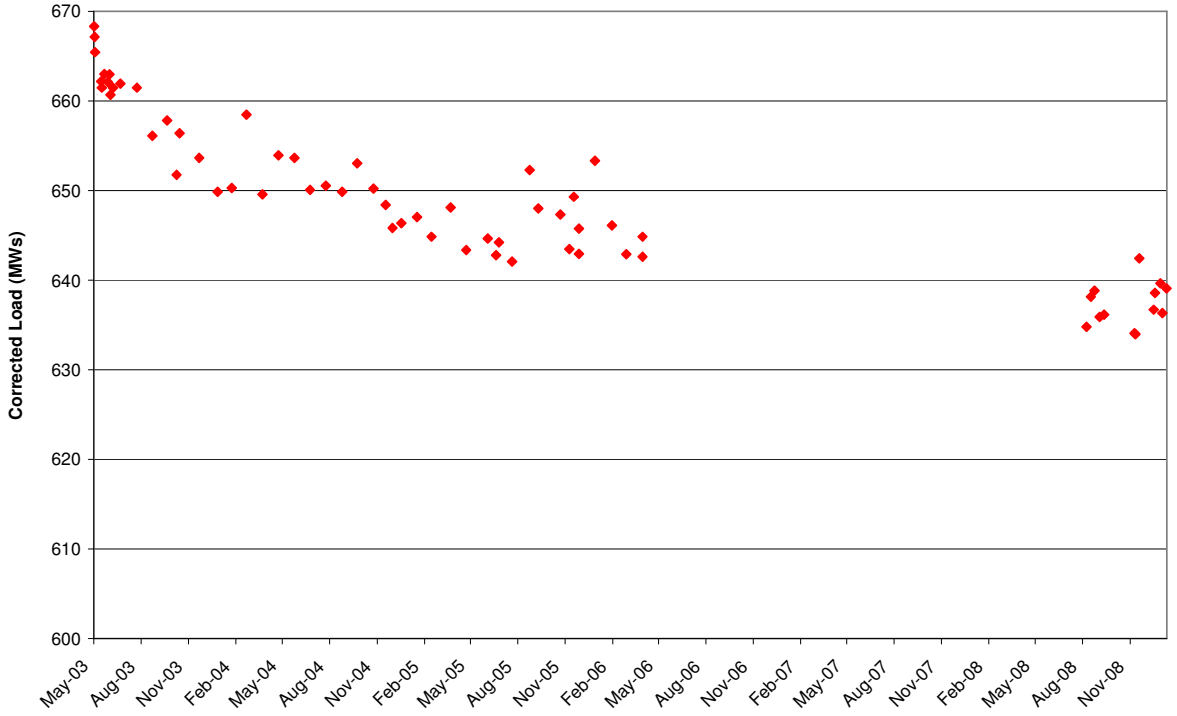
The following observations were made regarding Unit 4 operation and performance:

- The performance reports are being changed such that all data from hours in which the gross load is greater than 90% of the monthly capability will be compiled (previously VWO data was used in the reports).
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.

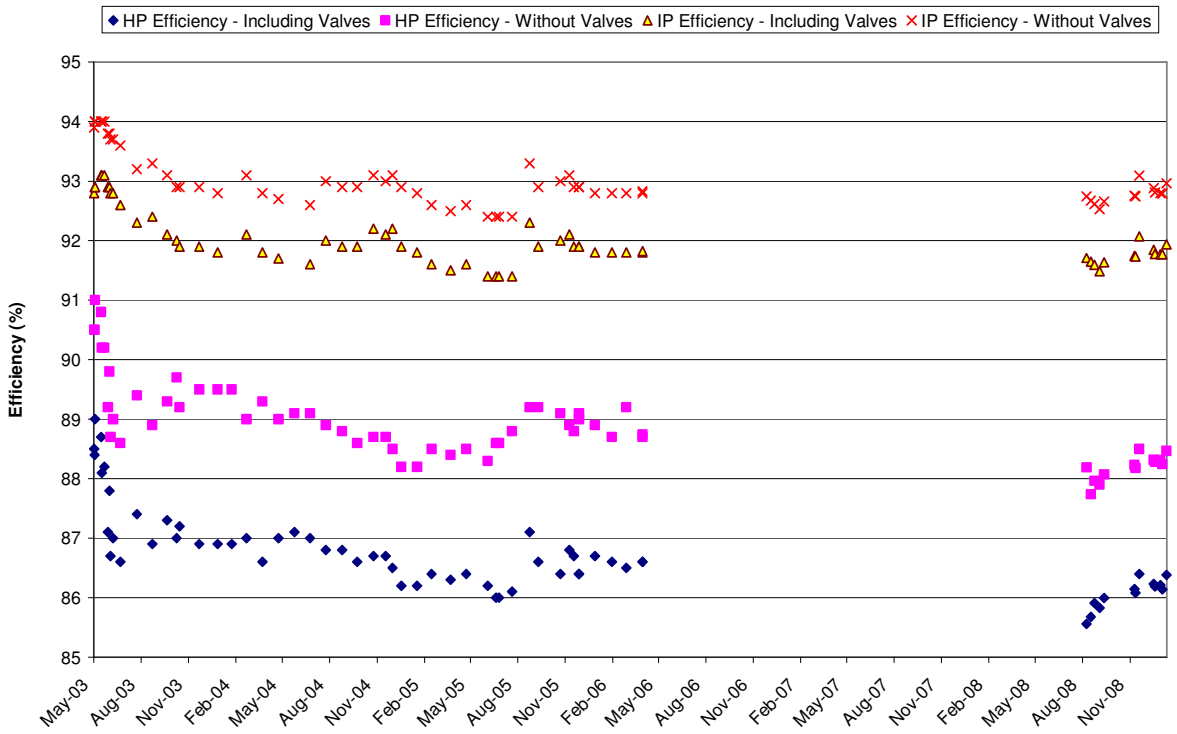
Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	2/1/09	to	3/1/09			
Full Load Performance			Feb-09		Jan-09	Feb-08
Hours of Data (>90% Monthly Capability)			595		633	433
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		625.2		621.3	644.1
AUX POWER	MW		30.6		27.9	31.0
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9993.5		10279.0	10251.8
Boiler Efficiency Actual	%		85.0		84.8	85.0
CONTROL VALVE POSITION LVDT	%		85.4		88.5	98.6
FEEDWATER TEMP TO ECON	degF		468.0		484.1	482.9
FEEDWATER TEMP TO HTR 1	degF		433.9		433.7	429.8
HP Turbine Efficiency Actual	%		84.9		86.6	87.7
IP Turbine Efficiency Corrected	%		94.7		93.6	93.6
Condenser Pressure HP	inHga		2.2		3.1	2.0
Condenser Pressure LP	inHga		1.9		2.1	2.1
AIRHTR-A GAS OUTLET TEMP	degF		344.5		349.8	328.0
AIRHTR-B GAS OUTLET TEMP	degF		316.9		311.2	310.2
AMBIENT AIR TEMP	degF		43.5		35.2	33.1
CIRC WTR TEMP TO LP CONDB	degF		39.8		36.1	37.3
CIRC WTR TEMP TO LP CONDB	degF		41.9		37.9	37.8
CIRC WTR TEMP TO LP CONDB	degF		41.1		37.3	37.4
CIRC WTR TEMP TO LP CONDB	degF		40.0		37.1	36.4
Minimum River Temperature	degF		39.8		36.1	36.4
FWH 1 Temperature Rise	degF		34.1		50.4	53.0
Net Load	MW		594.6		593.4	613.1
Average Cond Press	inHga		2.0		2.6	2.0
Average Exit Gas Temperature	degF		330.7		330.5	319.1
Aux Power	%		4.9		4.5	4.8
Gross Unit Heat Rate	BTU/KW-HR		9504.0		9817.8	9758.8
Gross Turbine Heat Rate	BTU/KW-HR		8077.9		8321.1	8299.0

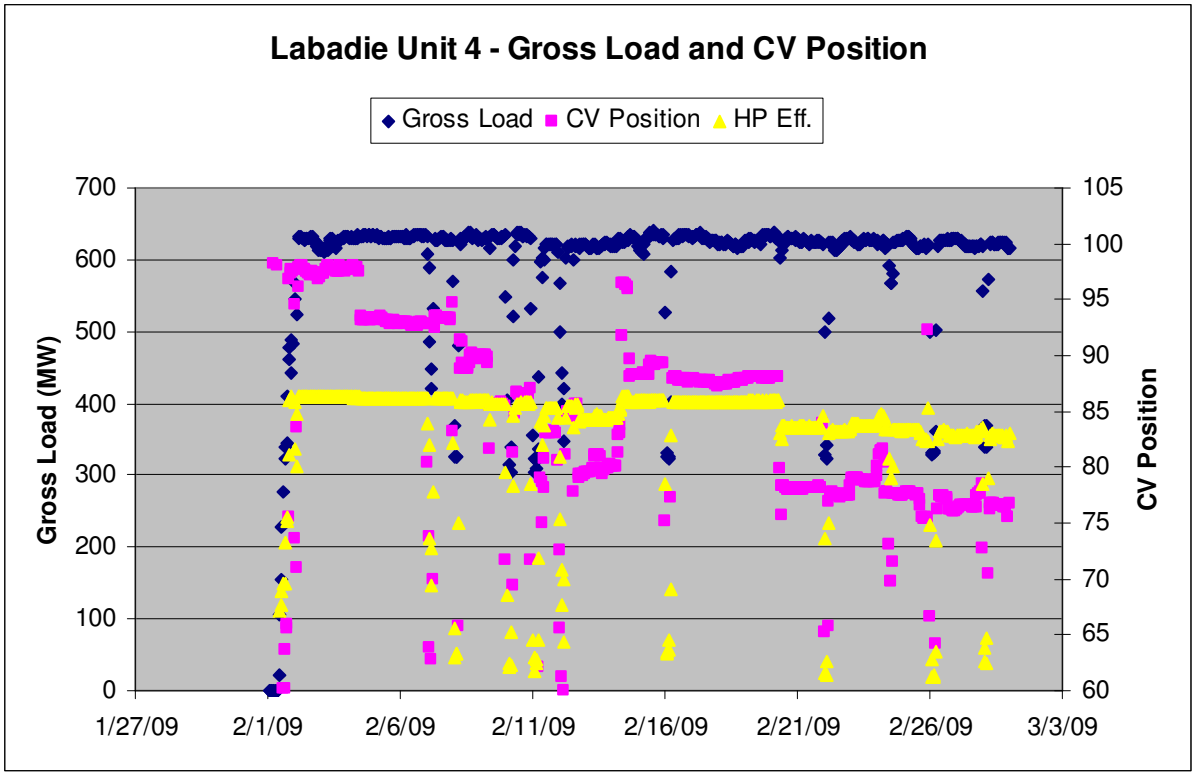
The HP efficiency dropped by 1.7% and is due in part to including data in which the valves were pinched down (note the average CV position for the February data is 85.4% while the average CV position for January was 88.5%). The change in IP efficiency was due to the inclusion of several water leg corrections in EtaPro. Note also that heat rate is down by almost 3% due to the EtaPro heat rate calculation change made in late January. Condenser pressure is down due to having two circ. water pumps running.

Labadie Unit 4 - Corrected Load



Labadie Unit 4 - HP and IP Efficiencies





The plot above shows the general trend down in HP efficiency as the control valves are pinched down. Note that the change is small near VWO open but the impact becomes more pronounced as the valves go more and more closed.

February 26, 2009

To: David Fox
From: Jeff Shelton
Cc: Bob Meiners, Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace, Scott Hixson, Jim Barnett, Glenn Tiffin

Subject: Labadie December 2008 and January 2009 Performance Report

Executive Summary

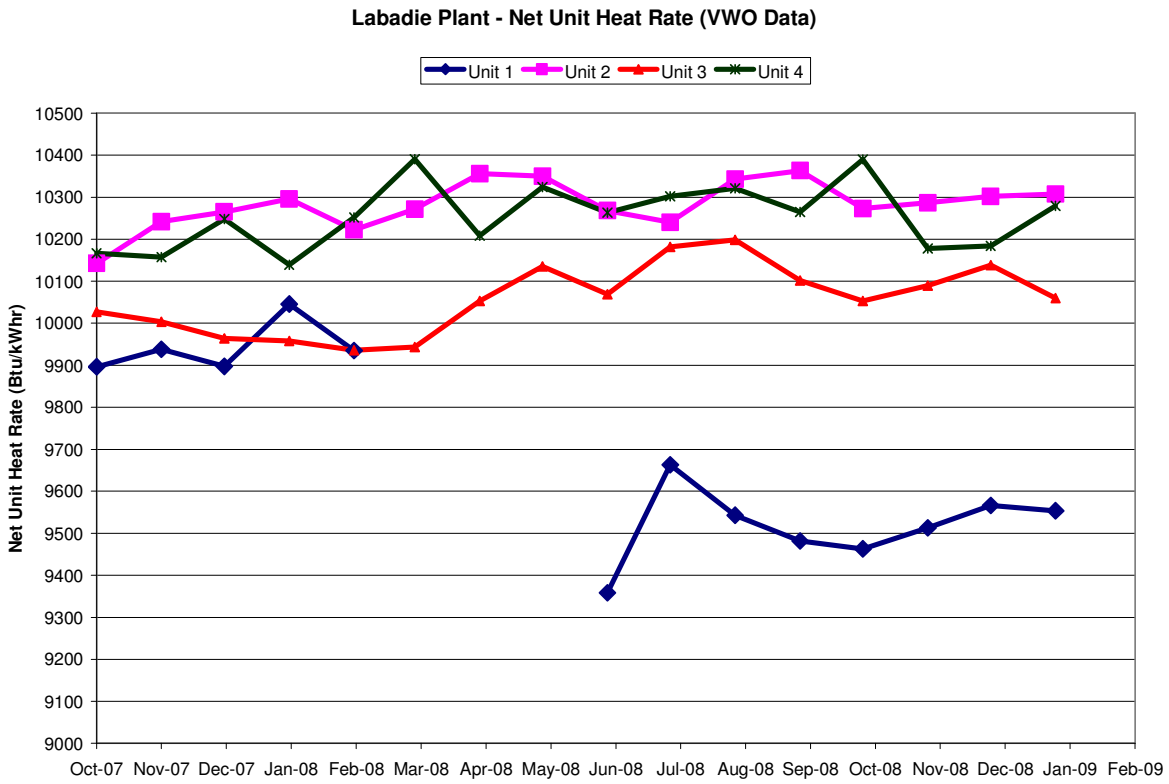
The most notable items regarding Labadie unit performance were:

- Unit 2 RH spray flow has been recovered due to work performed on the RH spray valve trim stack during an SBO in late December.
- All units exhibit some form of turbine efficiency degradation over time that is recovered following SBOs. The suspected cause is water soluble deposits and will continue to be monitored.
- A correction to the EtaPro heat rate calculation in late January reduced the calculated heat rate for all four units by 2 to 3%. The heat rate values from EtaPro now show better agreement with the values being calculated by OPM.

The following table shows the instrument deficiencies for all four units:

Tag	Unit	Issue	Resolution	Carryover or New
1TURB-08084, COLD RHT TEMP A AT TURBINE	1	Went bad at about 9:00 pm on 12/23/08	Corrected on 1/11/09 (to be removed)	Carryover
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004	JR164407 to investigate and correct	Carryover
3AUXSTM-00849, 3PT-289B COLD RH PRESSURE	3	Did not come back up to normal range following SBO this weekend	No issue (to be removed)	Carryover
1BFWSTM-08318 EXTRACT PRESS HTR 4A	1	Flat-lined on 1/29	JR164611	New

A plot of monthly unit heat rates for all four units is included on the following page.



The overall heat rate trend for Units 2, 3, and 4 is up over the time period shown above. Unit 1 had the benefit of an MBO as indicated by the step improvement in heat rate.

In checking the heat rate calculations in EtaPro on the Labadie units, it was discovered that an incorrect temperature was being used in the determination of the turbine cycle heat rate. Correcting these temperatures shifted the calculated net unit heat rate lower by 2 to 3%. The values calculated by EtaPro are now closer to those being calculated by OPM. The heat rate calculations are going to be reviewed in depth to ensure they are as accurate as possible.

Action Items:

- Labadie should search for air inleakage sources on the Unit 3 condenser (tentatively scheduled for next week).
- Performance Engineering will check the EtaPro heat rate calculations to ensure they are as accurate as possible.
- Performance Engineering will develop a “best-achievable” heat rate for each unit to determine the potential improvement in heat rate available on each unit.
- Performance Engineering will develop plans and help conduct a cycle isolation check on all four units in 2009. The intent is to have a Coop student in Performance Engineering perform this task on the entire UE fleet.
- Performance Engineering will create screens in EtaPro that better monitor turbine performance. Calculations will include corrected load, corrected turbine stage pressures, and more detailed turbine efficiencies (internal and external). A working example for Unit 3 is currently available and is labeled “Turbine Perf.”

- Performance Engineering will be phasing out the use of OPM.

Unit 1 Observations

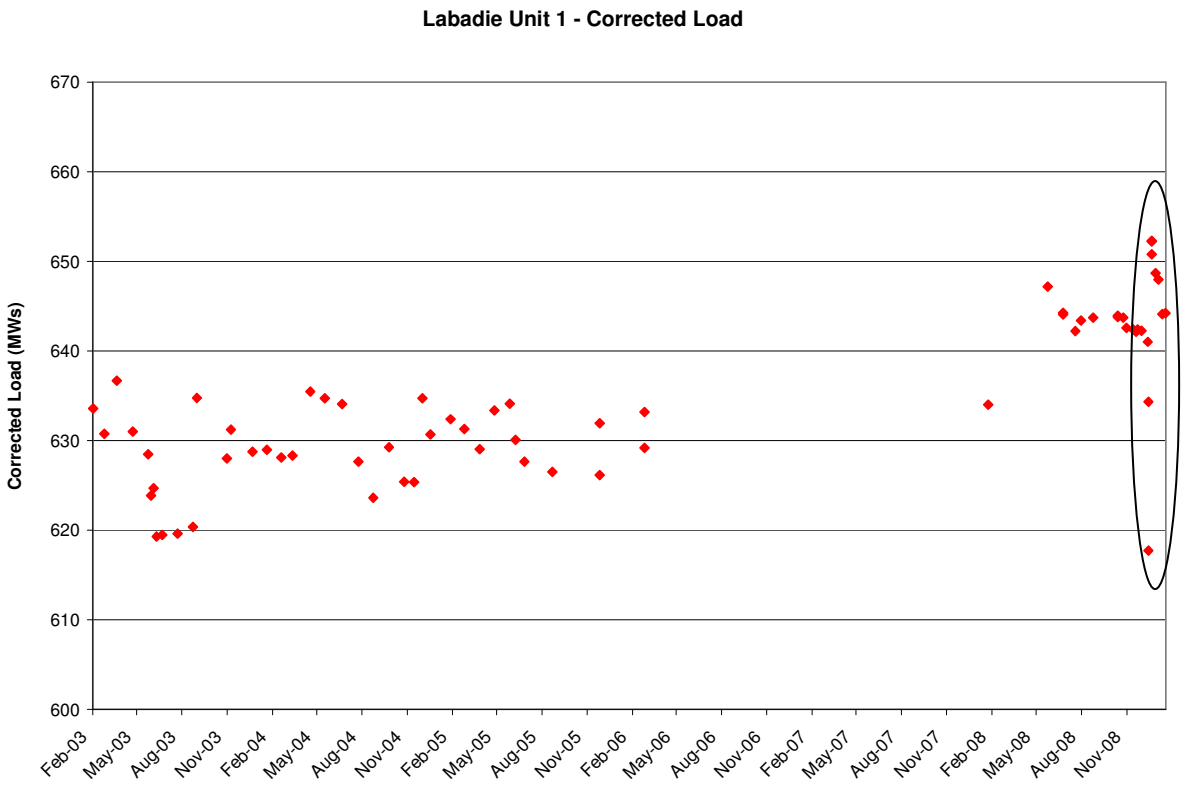
The following observations were made regarding Unit 1 operation and performance:

- There was 397 hours of VWO data for the unit in January.
- The unit had a forced outage in early January due to three failed intercept valves. Removal of the fine mesh screens from the throttle valves and intercept valves appears to have regained about 5-6 MWs due to reduced pressure drop across the valves.
- At the end of January, reheat temperature control became difficult due to reaching the upper limit on spray flows. During an SBO in February, debris believed to be from the 1A HPBFP failure last year was removed. Initial review by the plant indicates that flow was recovered following this valve cleaning.
- 2 tube leaks were repaired in the 1-1 FWH in January.

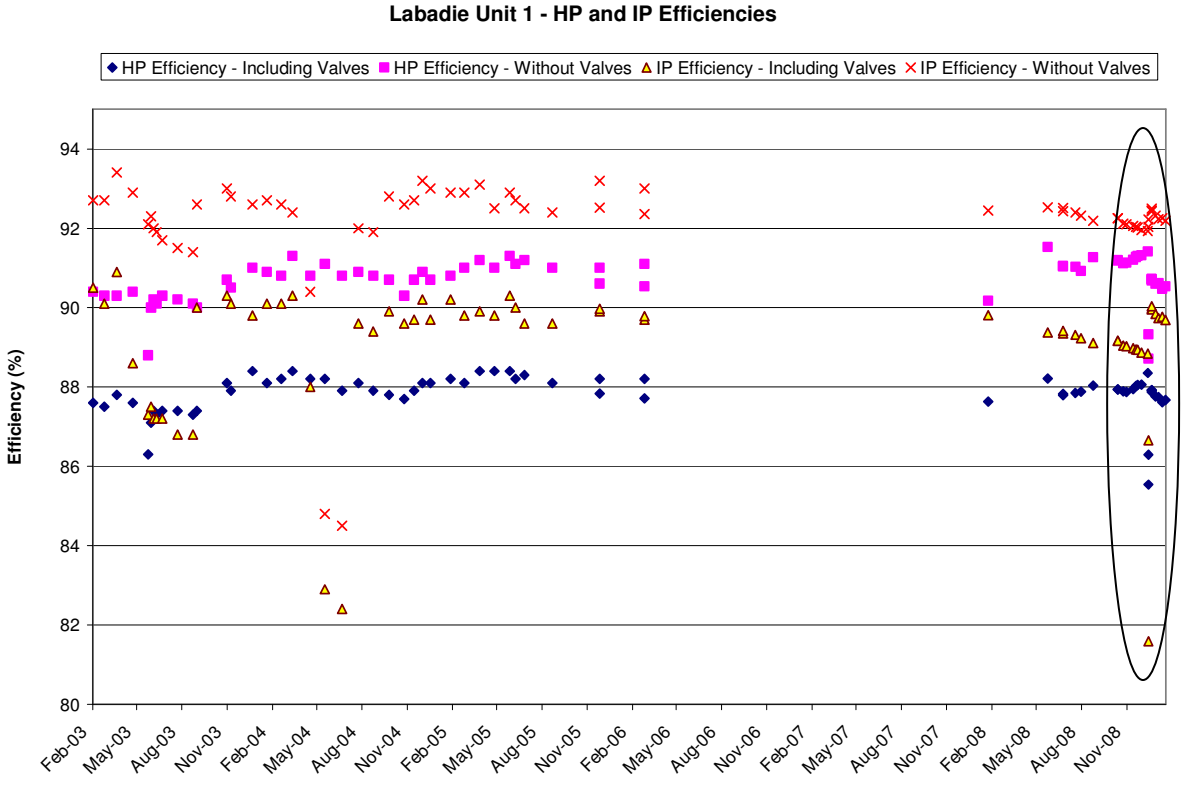
Summary of Performance Report for:

Plant	Labadie					
Unit	1					
Period	1/1/09	to	2/1/09			
			Jan-09		Dec-08	Jan-08
Full Load Performance						
Hours of Data			397		551	282
			Averages		**Averages**	**Averages**
GENERATOR MEGAWATTS	MW		640.5		636.3	628.8
AUX POWER	MW		28.3		28.0	29.7
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9553.6		9566.0	10045.9
Boiler Efficiency Actual	%		85.2		85.2	85.0
CONTROL VALVE POSITION LVDT	%		100.0		99.9	100.5
FEEDWATER TEMP TO ECON	degF		492.6		491.7	490.8
FEEDWATER TEMP TO HTR 1	degF		437.6		436.9	439.0
HP Turbine Efficiency Actual	%		87.8		87.5	91.0
IP Turbine Efficiency Corrected	%		91.3		90.7	92.9
Condenser Pressure HP	inHga		1.6		1.6	2.0
Condenser Pressure LP	inHga		1.2		1.2	1.7
AIRHTR-A GAS OUTLET TEMP	degF		330.2		337.2	333.1
AIRHTR-B GAS OUTLET TEMP	degF		329.2		329.5	299.1
AMBIENT AIR TEMP	degF		28.4		33.7	30.9
CIRC WTR TEMP TO LP CONDB	degF		35.7		36.9	36.3
CIRC WTR TEMP TO LP CONDB	degF		38.5		38.3	39.3
CIRC WTR TEMP TO LP CONDB	degF		37.4		37.9	37.9
CIRC WTR TEMP TO LP CONDB	degF		37.8		38.2	36.8
Minimum River Temperature	degF		35.7		36.9	36.3
FWH 1 Temperature Rise	degF		55.0		54.8	51.9
Net Load	MW		612.2		608.3	599.1
Average Cond Press	inHga		1.4		1.4	1.9
Average Exit Gas Temperature	degF		329.7		333.3	316.1
Aux Power	%		4.4		4.4	4.7
Gross Unit Heat Rate	BTU/KW-HR		9131.5		9144.9	9571.5
Gross Turbine Heat Rate	BTU/KW-HR		7777.8		7792.9	8135.9

The current HP turbine efficiency is lower than the Jan. 2008 value due to an erroneous main steam temperature indication that was fixed during the 2008 MBO. The HP and IP efficiencies are both up from December due to the removal of the fine mesh screens during an SBO in early January. Note that the efficiencies given in this table (calculated by EtaPro) differ from those shown on the following graphs. Performance Engineering plans to update EtaPro this year so that all efficiencies are calculated in a consistent manner.



The two lower loads correspond to the first two IV failures. The increased corrected load following the SBO shows the increased capability with the fine mesh screens removed as well as removal of any water soluble deposits. Note the steady decline in corrected load since coming back from the SBO (water soluble deposits suspected).



The two sets of lower efficiency values correspond to the first two IV failures. The HP efficiency after the SBO shows a decrease from prior to the IV failures. This is due to installation and recalibration of two thermocouples (the efficiency calculations are highly sensitive to temperature). Following removal of the screens, the IP efficiency (including the valves) went up as expected.

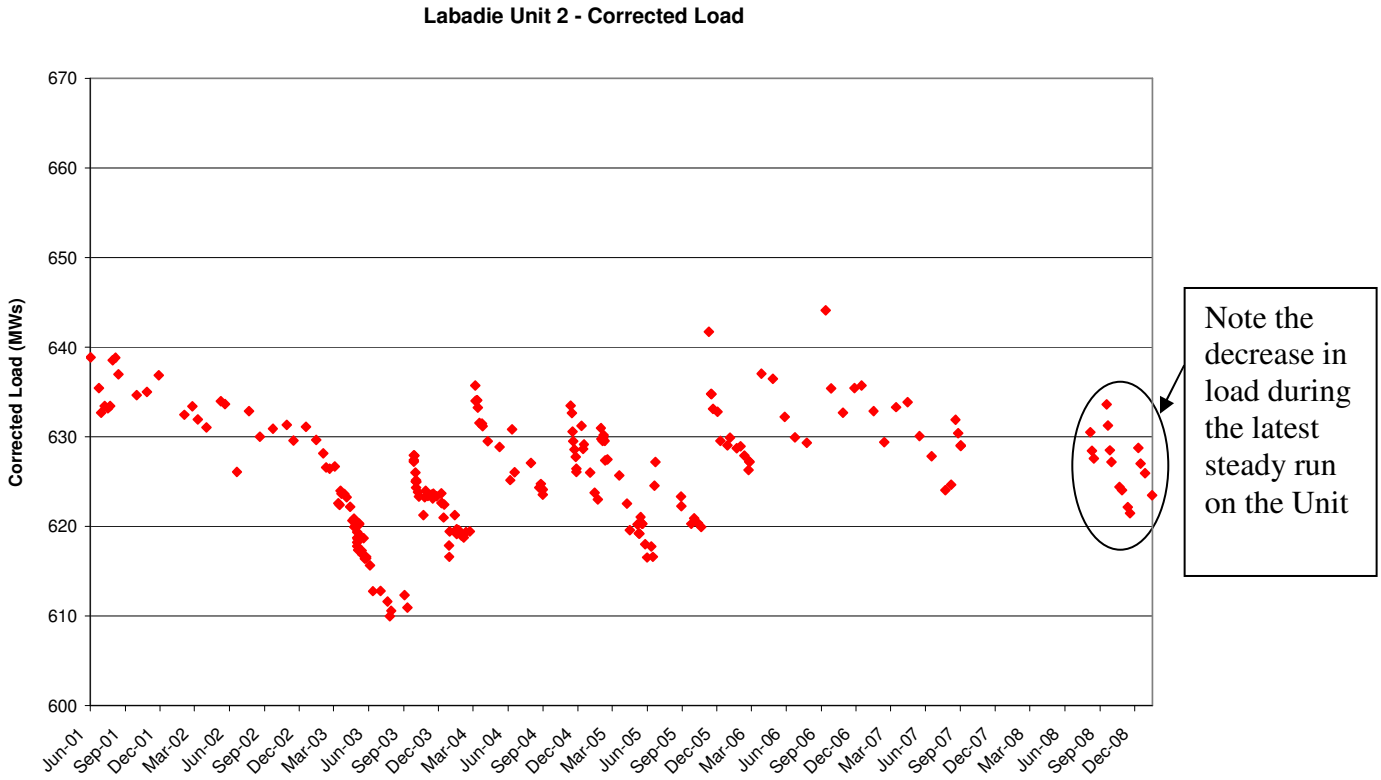
Unit 2 Observations

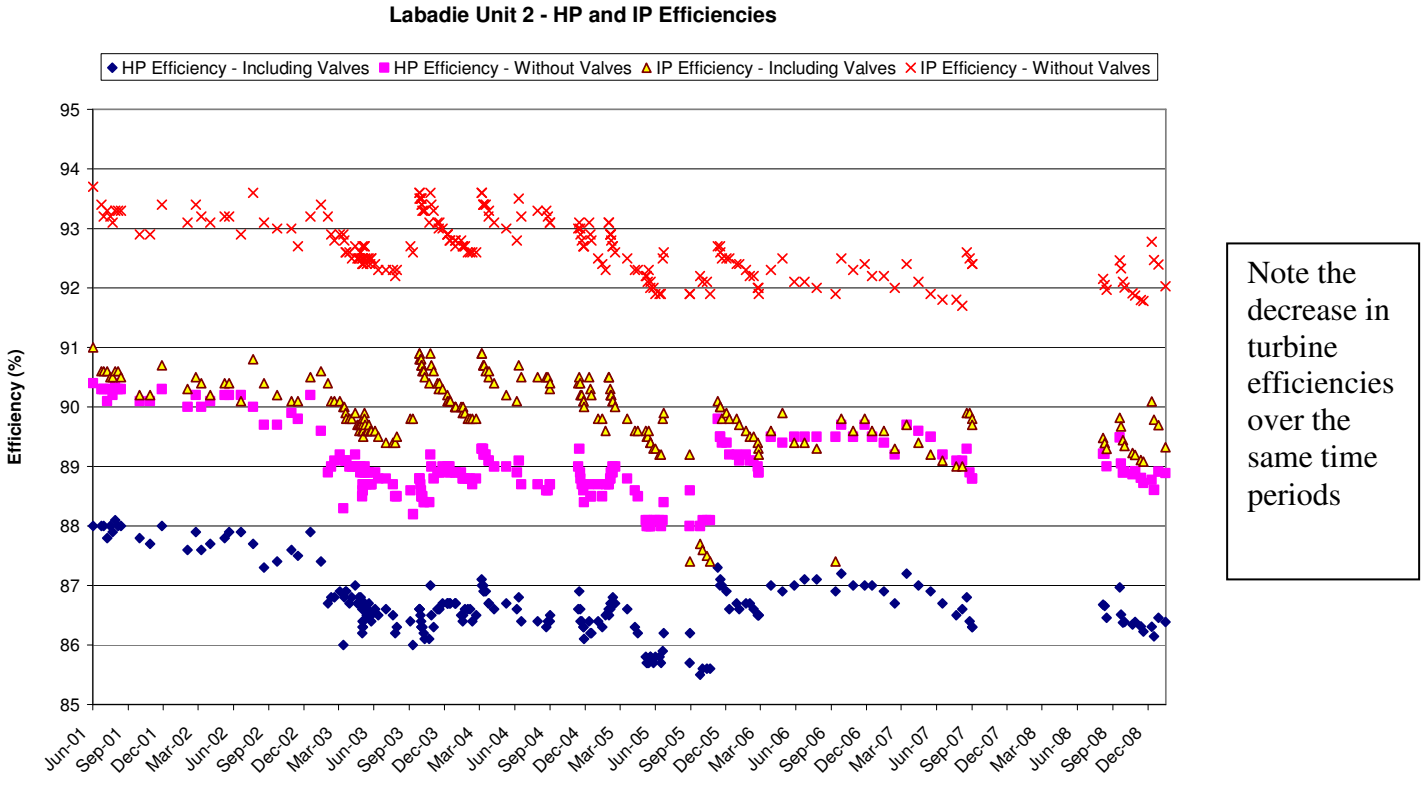
The following observations were made regarding Unit 2 operation and performance:

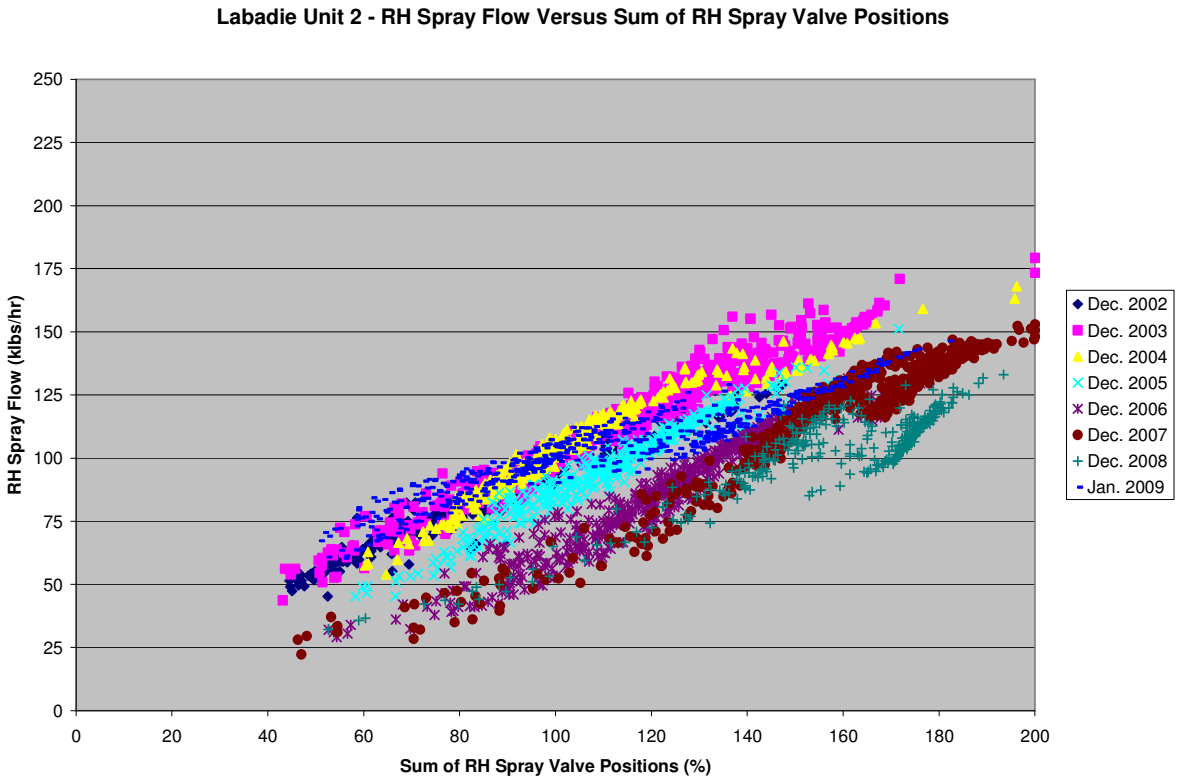
- There were only 63 hours of VWO data for the unit in January and only 19 hours in December. A switch to using all data for which gross load is greater than 90-95% of the monthly capability value will be used in future reports.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.
- The work on reheat spray valve trims during a late December SBO has regained reheat spray flow capability.

Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	1/1/09	to	2/1/09			
Full Load Performance			Jan-09		Dec-08	Jan-08
Hours of Data			63		19	173
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		610.1		617.8	623.3
AUX POWER	MW		29.6		29.4	29.4
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10307.8		10302.1	10295.7
Boiler Efficiency Actual	%		85.3		85.5	85.4
CONTROL VALVE POSITION LVDT	%		99.9		99.9	99.9
FEEDWATER TEMP TO ECON	degF		492.3		494.5	495.4
FEEDWATER TEMP TO HTR 1	degF		443.8		446.3	447.1
HP Turbine Efficiency Actual	%		86.1		86.1	86.4
IP Turbine Efficiency Corrected	%		90.8		90.2	90.5
Condenser Pressure HP	inHga		1.9		1.8	2.2
Condenser Pressure LP	inHga		1.8		1.6	1.7
AIRHTR-A GAS OUTLET TEMP	degF		332.7		331.3	322.5
AIRHTR-B GAS OUTLET TEMP	degF		336.2		338.0	340.7
AMBIENT AIR TEMP	degF		34.1		40.7	33.2
CIRC WTR TEMP TO LP CONDB	degF		36.3		37.3	37.6
CIRC WTR TEMP TO LP CONDB	degF		36.9		38.1	38.2
CIRC WTR TEMP TO LP CONDB	degF		37.9		41.7	38.8
CIRC WTR TEMP TO LP CONDB	degF		38.8		37.6	37.6
Minimum River Temperature	degF		36.3		37.3	37.6
FWH 1 Temperature Rise	degF		48.5		48.1	48.3
Net Load	MW		580.5		588.5	593.9
Average Cond Press	inHga		1.9		1.7	2.0
Average Exit Gas Temperature	degF		334.5		334.7	331.6
Aux Power	%		4.8		4.8	4.7
Gross Unit Heat Rate	BTU/KW-HR		9808.0		9812.7	9810.1
Gross Turbine Heat Rate	BTU/KW-HR		8367.7		8387.9	8380.2

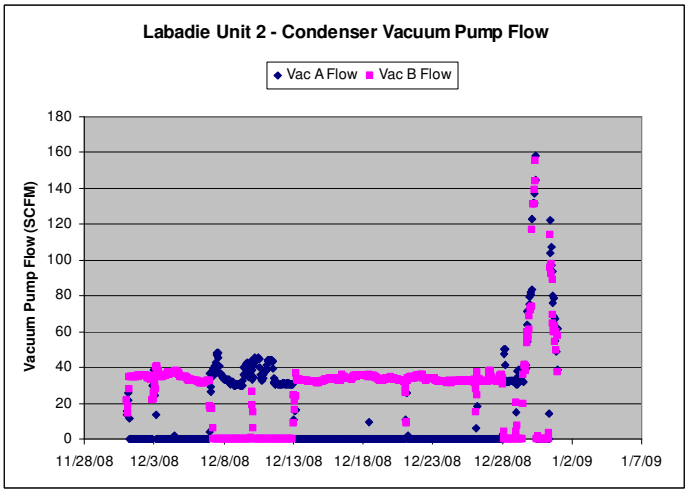
There were no significant changes in performance from December to January. Condenser pressure was up slightly even though river temperatures dropped slightly. Condenser vacuum pump flow was higher in January following the SBO in late December.

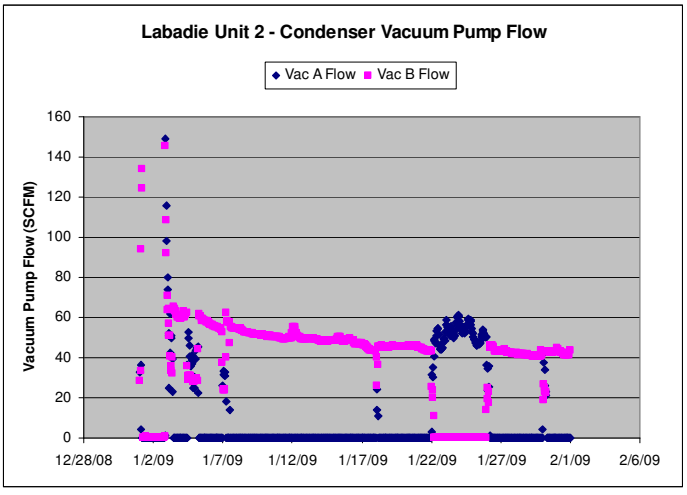

Labadie Unit 2 - Corrected Load
Corrected Load (MWs)
670
660
650
640
630
620
610
600
Jun-01
Sep-01
Dec-01
Mar-02
Jun-02
Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Note the decrease in load during the latest steady run on the Unit


Labadie Unit 2 - HP and IP Efficiencies
HP Efficiency - Including Valves
HP Efficiency - Without Valves
IP Efficiency - Including Valves
IP Efficiency - Without Valves
Efficiency (%)
95
94
93
92
91
90
89
88
87
86
85
Jun-01
Sep-01
Dec-01
Mar-02
Jun-02
Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Sep-08
Dec-08
Note the decrease in turbine efficiencies over the same time periods



Note the increase in spray flow at the same valve position from December (+) to January (-).





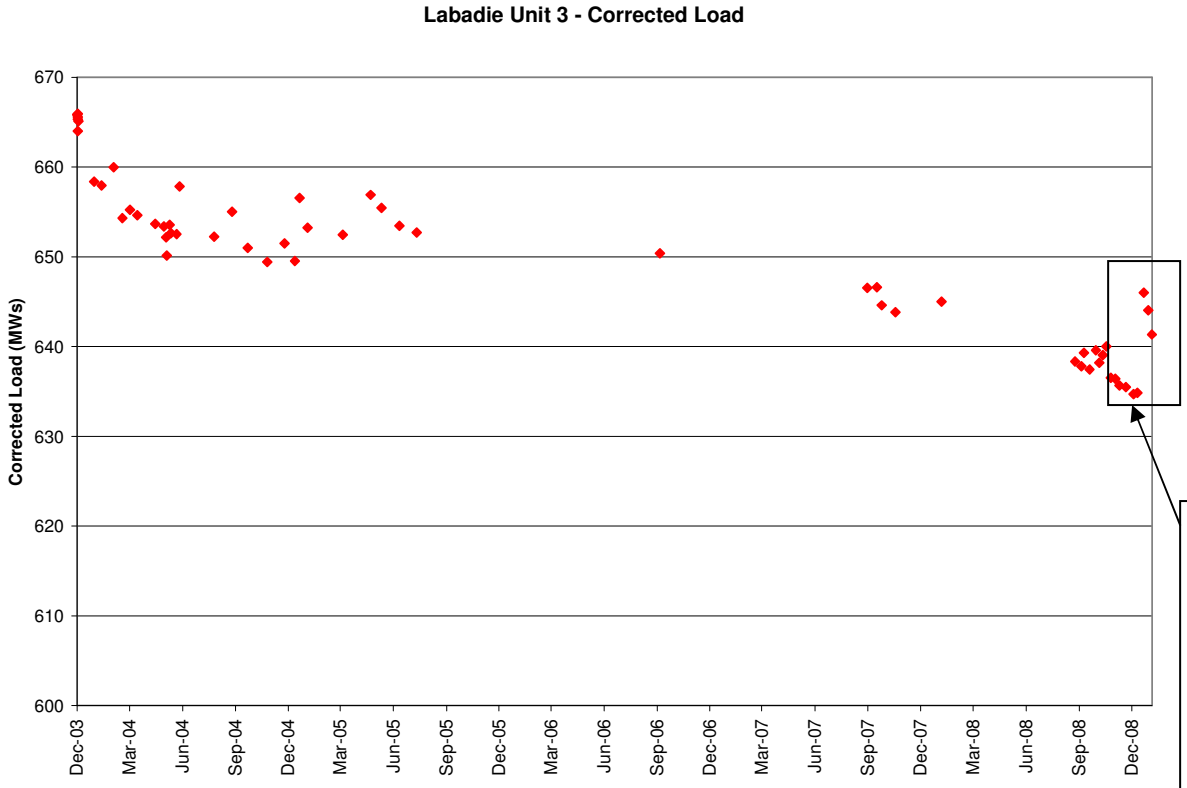
Condenser vacuum pump flow was consistently below 40 scfm in December. Flow went above 60 scfm following a late December SBO and has gradually declined to about 40 scfm.

Unit 3 Observations

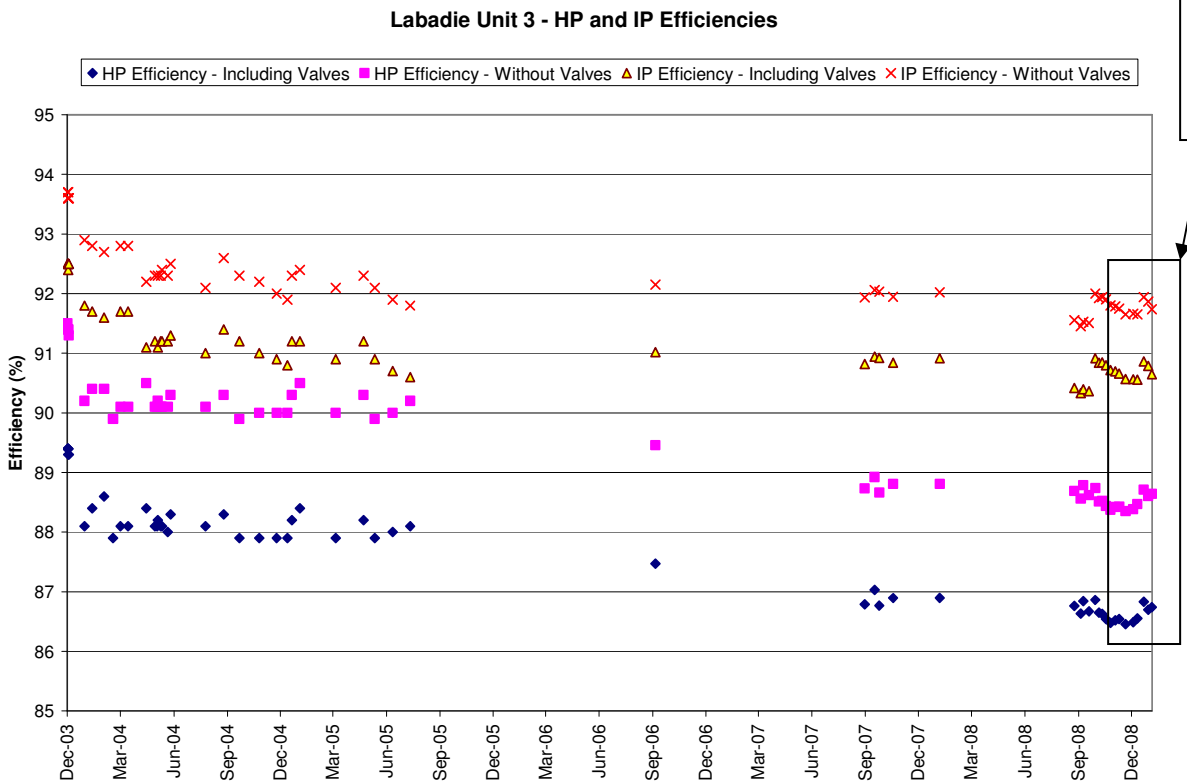
The following observations were made regarding Unit 3 operation and performance:

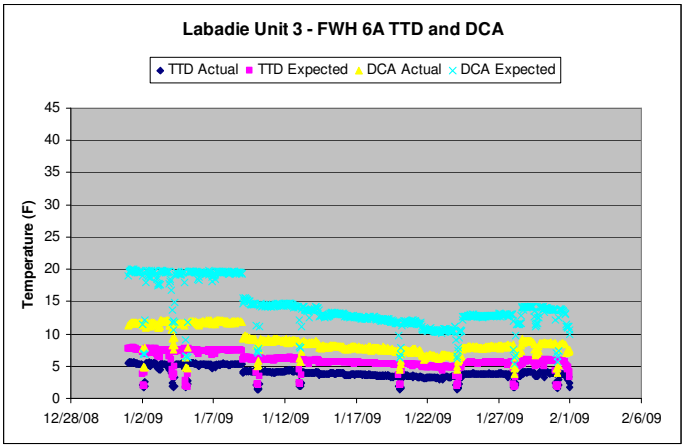
- There were only 65 hours of VWO data for January compared to 370 in December and 564 in January 2008. A switch to using all data for which gross load is greater than 90-95% of the monthly capability value will be used in future reports.
- Hot water flow appears to be going to the B side preheat coils only. According to the plant, the A side froze up a couple of winter's ago and will not be repaired until the next MBO on the unit.
- Condenser vacuum pump flow was about 100 scfm at the end of January. This unit has the highest inleakage of all the Labadie Units. The plant goal is to be below 40 scfm and running on one vacuum pump.
- Temperature rise of the 6B heater is much less than the 6A heater. This has been the case since January 2007. The difference in the temperature rise has gotten larger over time. The plant has inspected the tube side as well as look for air inleakage sources but have not found any obvious problems. This issue will be investigated further.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.

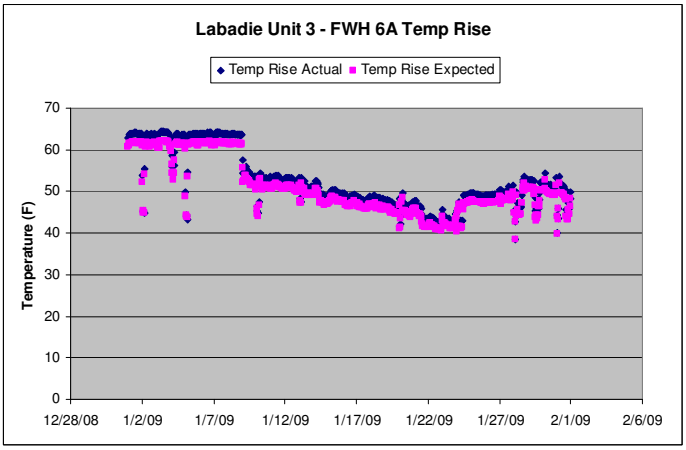
Summary of Performance Report for:						
Plant	Labadie					
Unit	3					
Period	1/1/09	to	2/1/09			
Full Load Performance			Jan-09		Dec-08	Jan-08
Hours of Data			65		370	564.0
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		617.2		617.9	646.4
AUX POWER	MW		29.5		30.0	29.2
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10060.0		10138.7	9957.4
Boiler Efficiency Actual	%		85.3		85.2	85.2
CONTROL VALVE POSITION LVDT	%		103.4		104.7	99.9
FEEDWATER TEMP TO ECON	degF		482.4		483.5	487.3
FEEDWATER TEMP TO HTR 1	degF		433.2		434.4	438.2
HP Turbine Efficiency Actual	%		86.4		86.5	87.3
IP Turbine Efficiency Corrected	%		94.9		94.8	94.1
Condenser Pressure HP	inHga		2.0		2.3	2.6
Condenser Pressure LP	inHga		1.9		2.2	2.3
AIRHTR-A GAS OUTLET TEMP	degF		327.0		320.3	324.1
AIRHTR-B GAS OUTLET TEMP	degF		317.5		319.7	304.4
AMBIENT AIR TEMP	degF		33.8		32.5	35.4
CIRC WTR TEMP TO LP CONDB	degF		36.1		36.7	37.8
CIRC WTR TEMP TO LP CONDB	degF		37.6		37.2	39.9
CIRC WTR TEMP TO LP CONDB	degF		36.1		37.2	38.4
CIRC WTR TEMP TO LP CONDB	degF		35.4		37.3	37.7
Minimum River Temperature	degF		35.4		36.7	37.7
FWH 1 Temperature Rise	degF		49.3		49.1	49.1
Net Load	MW		587.7		587.9	617.3
Average Cond Press	inHga		2.0		2.2	2.4
Average Exit Gas Temperature	degF		322.3		320.0	314.3
Aux Power	%		4.8		4.9	4.5
Gross Unit Heat Rate	BTU/KW-HR		9579.0		9646.3	9508.2
Gross Turbine Heat Rate	BTU/KW-HR		8167.8		8220.9	8103.3

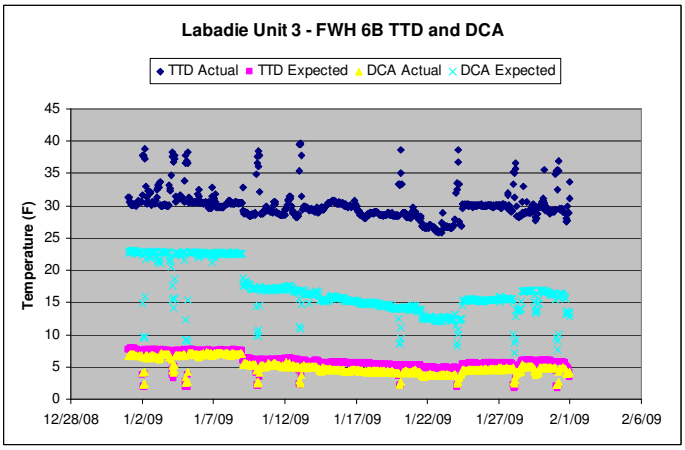


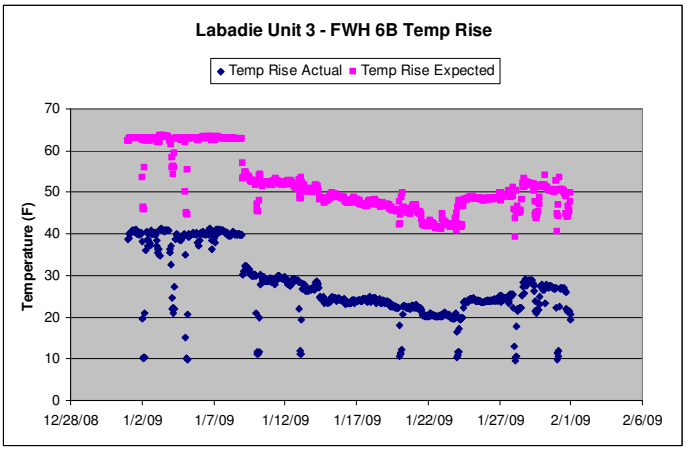
Note the decrease in load and turbine efficiencies followed by the step change up following the recent SBO

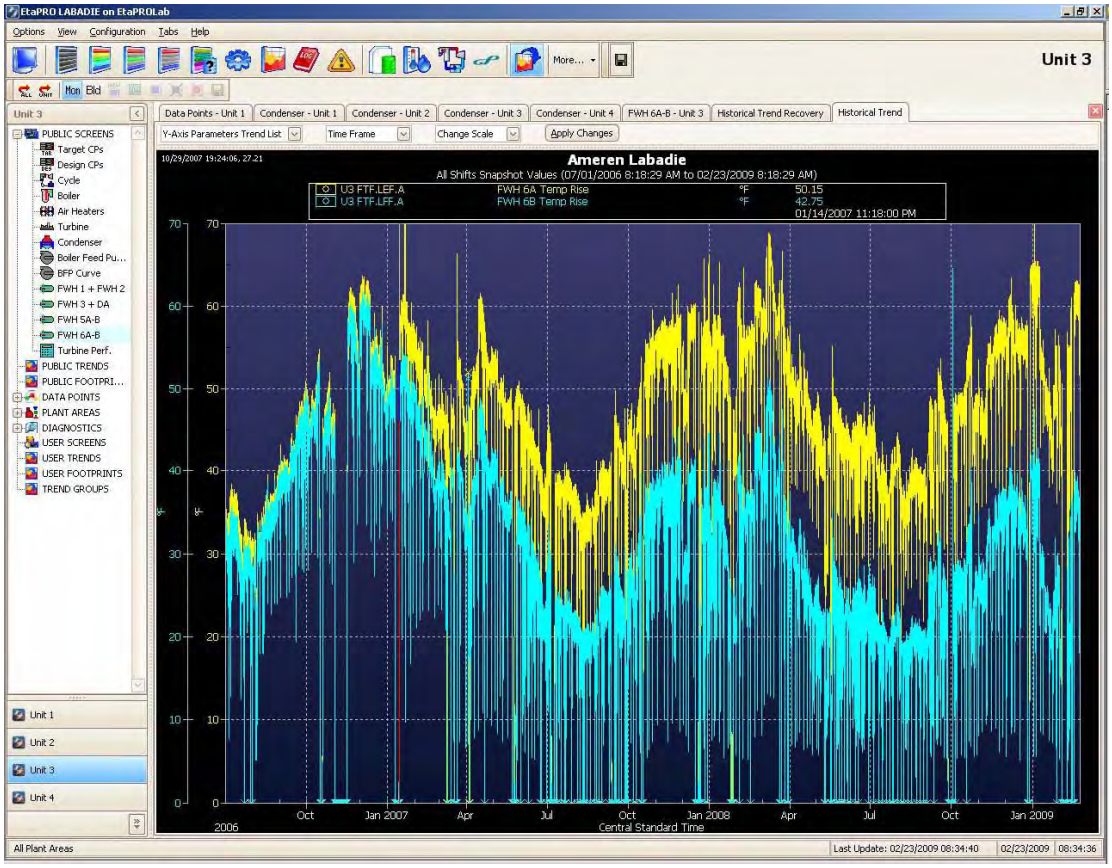


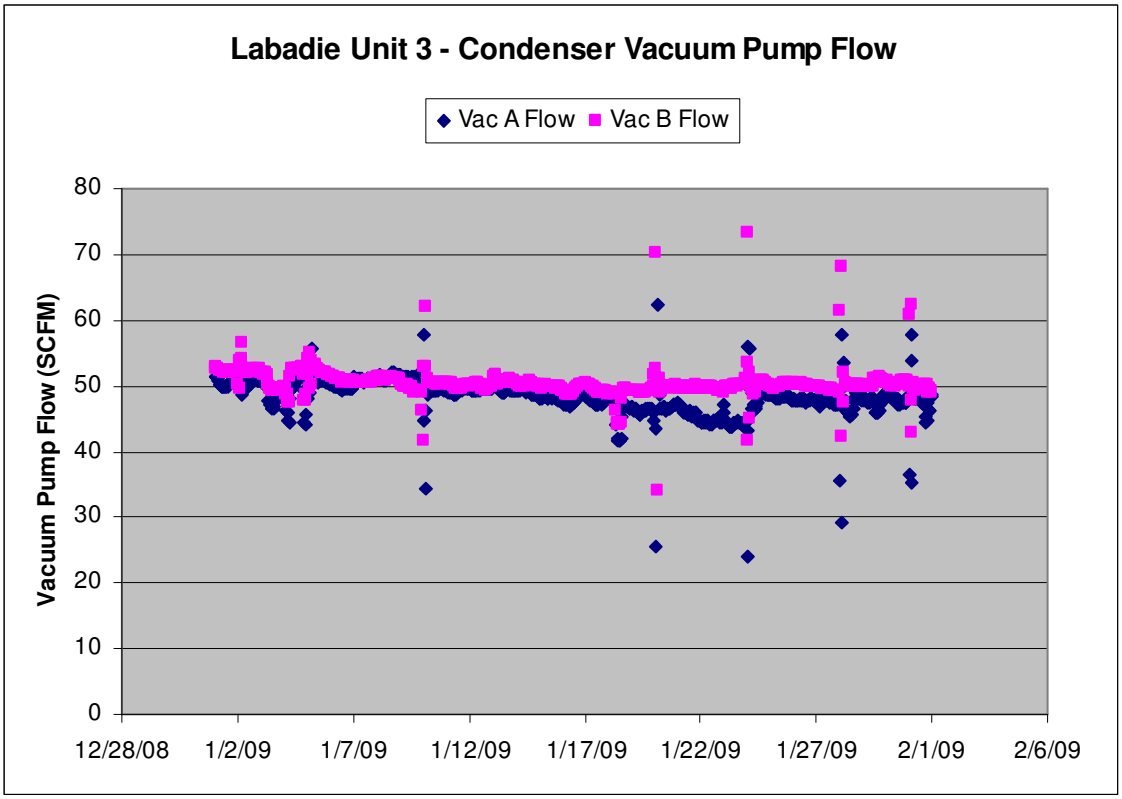

Labadie Unit 3 - FWH 6A TTD and DCA
TTD Actual
TTD Expected
DCA Actual
DCA Expected
Temperature (F)
0
5
10
15
20
25
30
35
40
45
12/28/08
1/2/09
1/7/09
1/12/09
1/17/09
1/22/09
1/27/09
2/1/09
2/6/09


Labadie Unit 3 - FWH 6A Temp Rise
Temp Rise Actual
Temp Rise Expected
Temperature (F)
0
10
20
30
40
50
60
70
12/28/08
1/2/09
1/7/09
1/12/09
1/17/09
1/22/09
1/27/09
2/1/09
2/6/09


Labadie Unit 3 - FWH 6B TTD and DCA
TTD Actual
TTD Expected
DCA Actual
DCA Expected
Temperature (F)
0
5
10
15
20
25
30
35
40
45
12/28/08
1/2/09
1/7/09
1/12/09
1/17/09
1/22/09
1/27/09
2/1/09
2/6/09


Labadie Unit 3 - FWH 6B Temp Rise
Temp Rise Actual
Temp Rise Expected
Temperature (F)
0
10
20
30
40
50
60
70
12/28/08
1/2/09
1/7/09
1/12/09
1/17/09
1/22/09
1/27/09
2/1/09
2/6/09


EtaPRO LABADIE on EtaPROLab
Options
View
Configuration
Tabs
Help
Unit 3
Data Points - Unit 1
Condenser - Unit 1
Condenser - Unit 2
Condenser - Unit 3
Condenser - Unit 4
FWH 6A-B - Unit 3
Historical Trend Recovery
Historical Trend
Y-Axis Parameters Trend List
Time Frame
Change Scale
Apply Changes
Ameren Labadie
All Shifts Snapshot Values (07/01/2006 8:18:29 AM to 02/23/2009 8:18:29 AM)
U3 FTF.LEF.A
FWH 6A Temp Rise
°F
50.15
U3 FTF.LFF.A
FWH 6B Temp Rise
°F
42.75
01/14/2007 11:18:00 PM
PUBLIC SCREENS
Target CPs
Design CPs
Cycle
Boiler
Air Heaters
Turbine
Condenser
Boiler Feed Pu...
BFP Curve
FWH 1 + FWH 2
FWH 3 + DA
FWH 5A-B
FWH 6A-B
Turbine Perf.
PUBLIC TRENDS
PUBLIC FOOTPRI...
DATA POINTS
PLANT AREAS
DIAGNOSTICS
USER SCREENS
USER TRENDS
USER FOOTPRINTS
TREND GROUPS
Unit 1
Unit 2
Unit 3
Unit 4
°F
0
10
20
30
40
50
60
70
2006
Oct
Jan 2007
Apr
Jul
Oct
Jan 2008
Apr
Jul
Oct
Jan 2009
Central Standard Time
All Plant Areas
Last Update: 02/23/2009 08:34:40
02/23/2009
08:34:36



Unit 3 has the highest condenser air inleakage of all the Units.

Unit 4 Observations

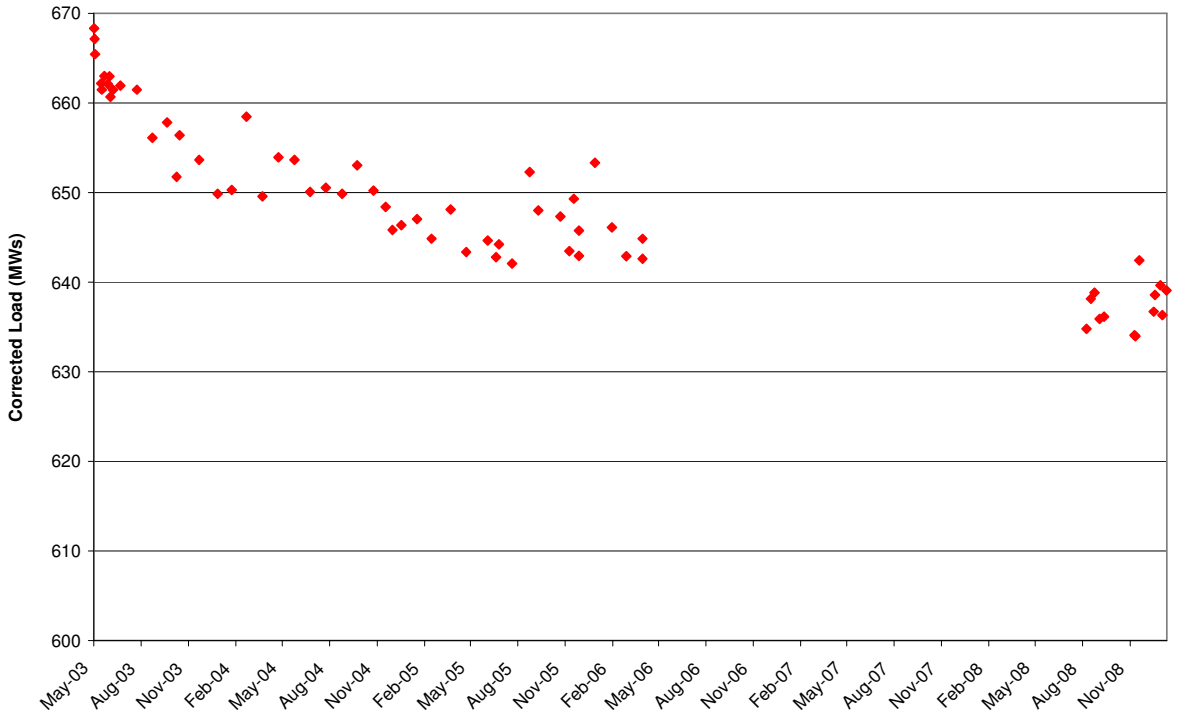
The following observations were made regarding Unit 4 operation and performance:

- Due to the lack of VWO data on the unit in December and January, this report has been based on times when the unit was operating within 5% of the monthly capability value. A switch to using all data for which gross load is greater than 90-95% of the monthly capability value will be used in future reports.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.

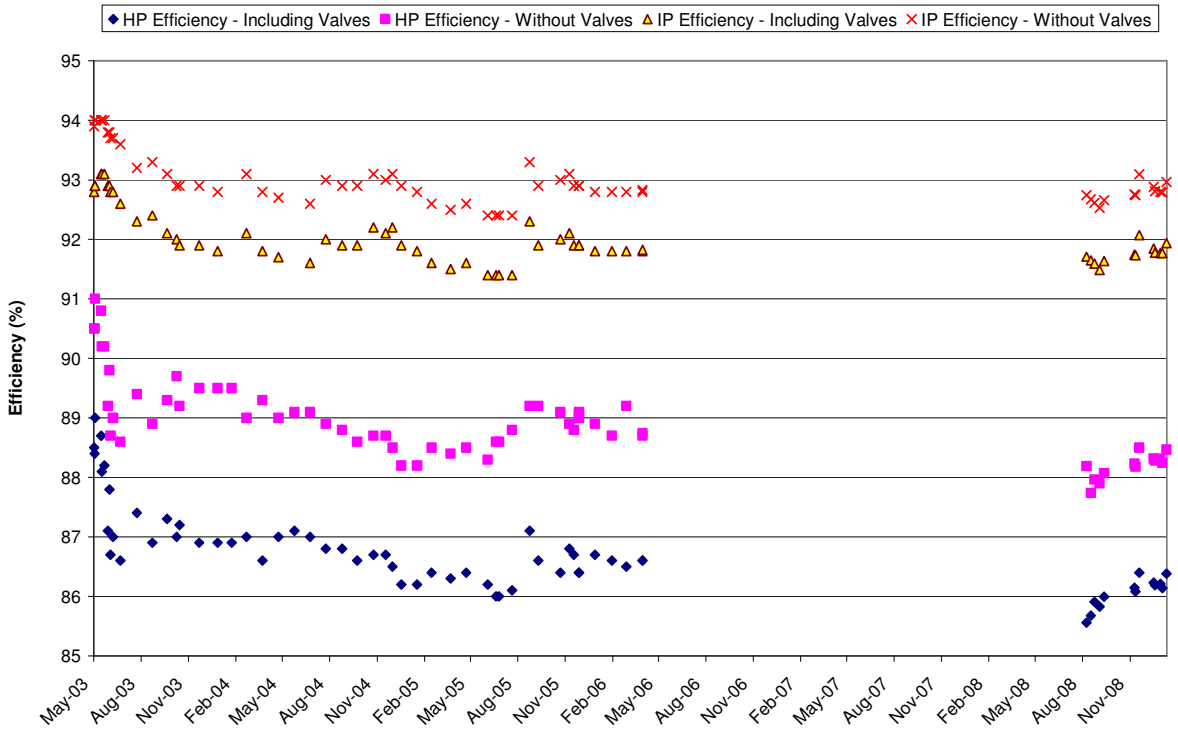
Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	1/1/09	to	2/1/09			
Full Load Performance			Jan-09		Dec-08	Jan-08
Hours of Data			633		332	479
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		621.3		621.2	646.0
AUX POWER	MW		27.9		28.1	30.4
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10279.0		10184.1	10139.7
Boiler Efficiency Actual	%		84.8		84.8	85.0
CONTROL VALVE POSITION LVDT	%		88.5		85.6	99.0
FEEDWATER TEMP TO ECON	degF		484.1		483.3	484.3
FEEDWATER TEMP TO HTR 1	degF		433.7		432.6	430.0
HP Turbine Efficiency Actual	%		86.6		86.5	87.9
IP Turbine Efficiency Corrected	%		93.6		93.6	93.7
Condenser Pressure HP	inHga		3.1		2.1	2.0
Condenser Pressure LP	inHga		2.1		1.9	2.1
AIRHTR-A GAS OUTLET TEMP	degF		349.8		333.8	328.2
AIRHTR-B GAS OUTLET TEMP	degF		311.2		319.1	311.6
AMBIENT AIR TEMP	degF		35.2		33.1	34.6
CIRC WTR TEMP TO LP CONDB	degF		36.1		36.9	38.1
CIRC WTR TEMP TO LP CONDB	degF		37.9		38.3	39.6
CIRC WTR TEMP TO LP CONDB	degF		37.3		37.7	38.7
CIRC WTR TEMP TO LP CONDB	degF		37.1		37.6	37.6
Minimum River Temperature	degF		36.1		36.9	37.6
FWH 1 Temperature Rise	degF		50.4		50.7	54.3
Net Load	MW		593.4		593.0	615.6
Average Cond Press	inHga		2.6		2.0	2.1
Average Exit Gas Temperature	degF		330.5		326.4	319.9
Aux Power	%		4.5		4.5	4.7
Gross Unit Heat Rate	BTU/KW-HR		9817.8		9722.7	9662.4
Gross Turbine Heat Rate	BTU/KW-HR		8321.1		8245.0	8213.4
Kept all data for which load was above 95% of the monthly capability						

Note the increase in heat rate from December to January with a corresponding increase in condenser pressure.

Labadie Unit 4 - Corrected Load



Labadie Unit 4 - HP and IP Efficiencies



December 30, 2008

To: David Fox
From: Jeff Shelton
Cc: Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Greg Gurnow, Tony Balestreri, Greg Bolte, Chris Hegger, Scott McCormack, Ken Stuckmeyer, Don Clayton, Joe Sind, Matt Wallace

Subject: Labadie November Performance Report

Executive Summary

The most notable items regarding Labadie unit performance were:

- Unit 2 reheat temperature issue appears to be due in part to reduced flow through the reheat spray valves over time.
- Unit 2, 3, and 4 all exhibit some form of turbine efficiency degradation over time that is recovered following SBOs.
- Units 3 and 4 5A FWH emergency dump valves open greater than 50%. Tubes were plugged on both feedwater heaters during SBOs in December and the normal drainers are now controlling level in both heaters.

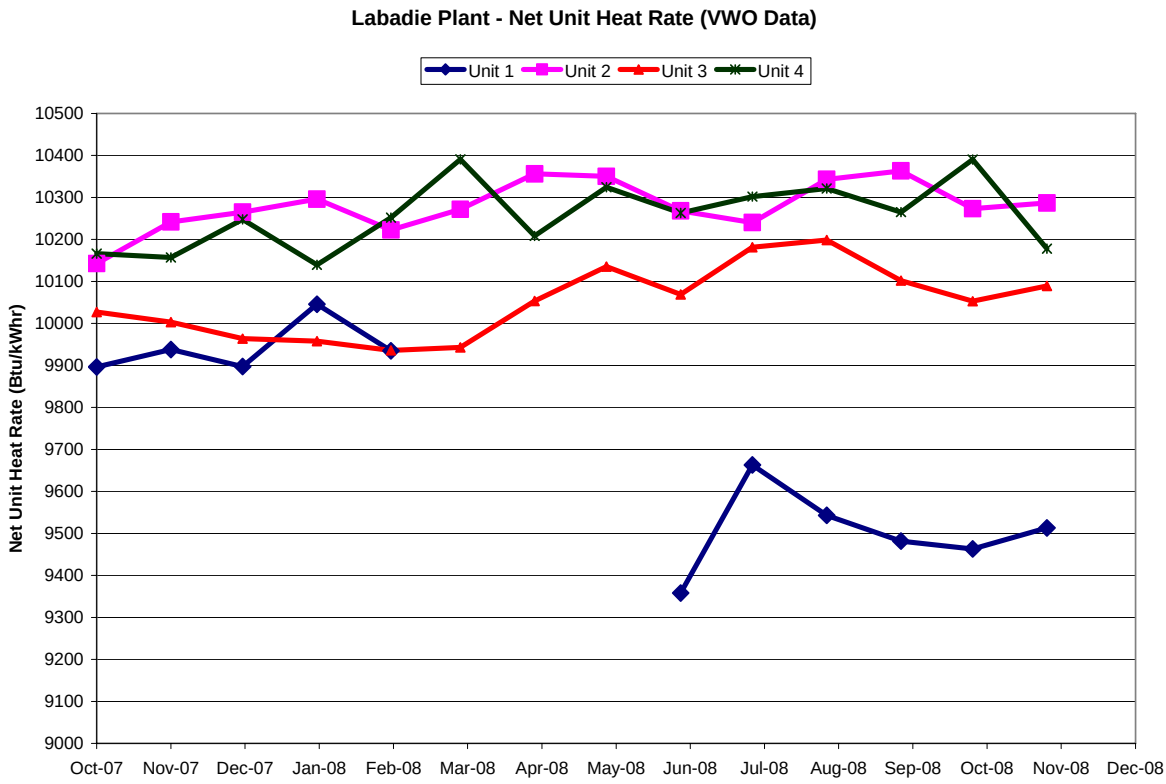
The following table shows the known instrument deficiencies for all four units:

Tag	Unit	Issue
1TURB-08084, COLD RHT TEMP A AT TURBINE	1	Went bad at about 9:00 pm on 12/23/08
3BFWSTM-08321, EXTRACT PRESS HTR 4B	3	Has only had valid data from Nov. 2003 to Jan. 2004
3AUXSTM-00849, 3PT-289B COLD RH PRESSURE	3	Did not come back up to normal range following SBO this weekend

A plot of monthly unit heat rates for all four units is included on the following page.

Action Items:

- Plant to determine action regarding reheat spray valve issue on Unit 2 (clean versus replace with larger size)


Labadie Plant - Net Unit Heat Rate (VWO Data)
Unit 1
Unit 2
Unit 3
Unit 4
Net Unit Heat Rate (Btu/kWhr)
10500
10400
10300
10200
10100
10000
9900
9800
9700
9600
9500
9400
9300
9200
9100
9000
Oct-07
Nov-07
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08

Unit 1 Observations

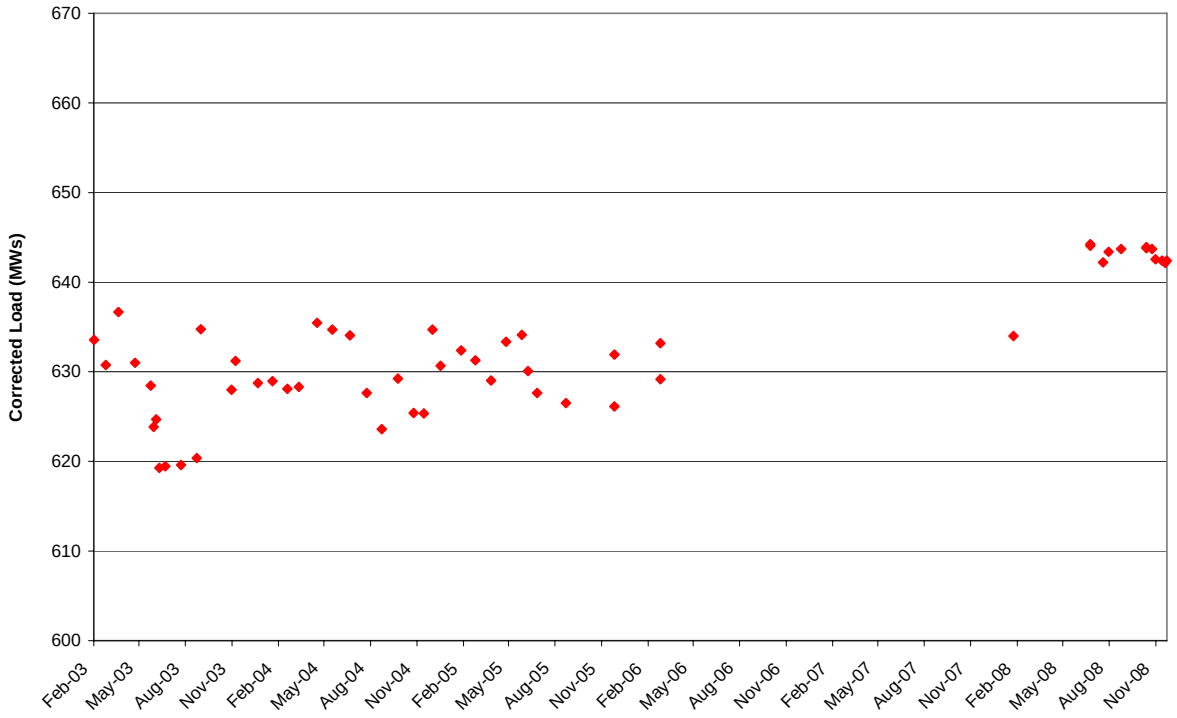
The following observations were made regarding Unit 1 operation and performance:

- The unit went from no VWO data in October to almost 300 hours of VWO operation in November.

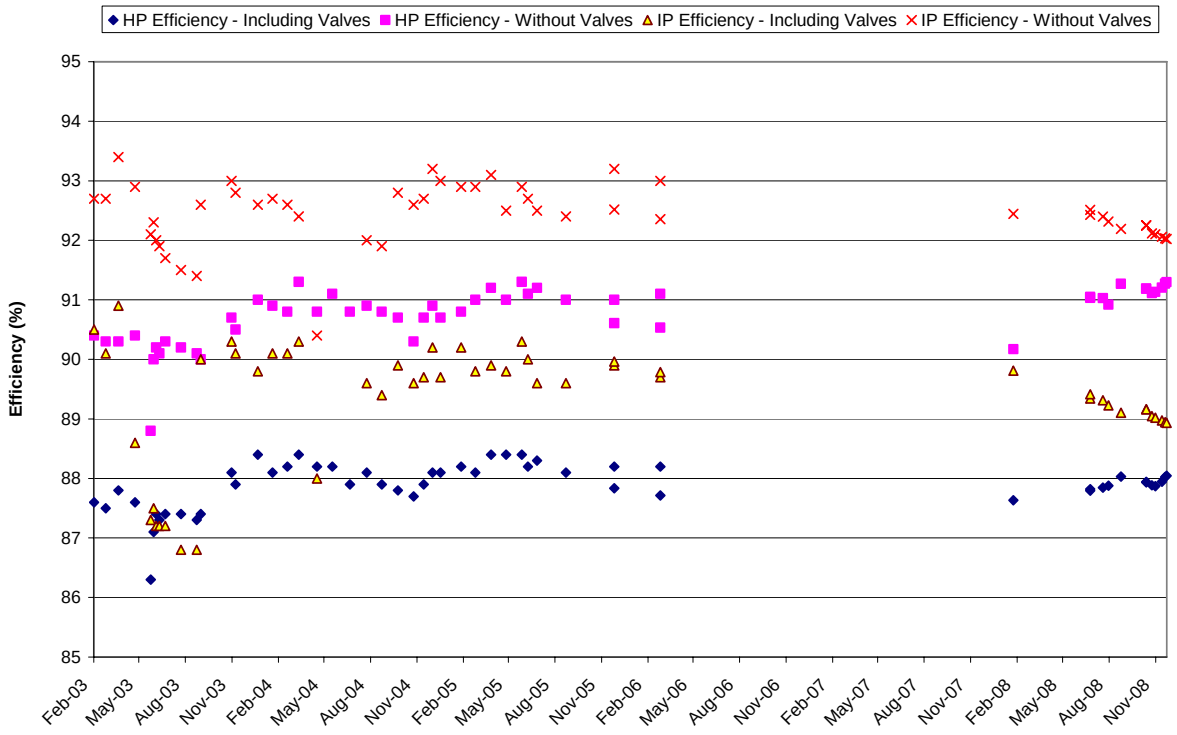
Summary of Performance Report for:						
Plant	Labadie					
Unit	1					
Period	11/1/08	to	12/1/08			
			Nov-08		Oct-08	Nov-07
Full Load Performance						
Hours of Data			292		45	252
			Averages		**Averages**	**Averages**
GENERATOR MEGAWATTS	MW		636.9		634.6	628.7
AUX POWER	MW		27.6		27.1	29.9
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9513.1		9463.0	9937.8
Boiler Efficiency Actual	%		85.4		85.3	85.3
CONTROL VALVE POSITION LVDT	%		99.5		54.1	100.5
FEEDWATER TEMP TO ECON	degF		492.2		491.8	491.5
FEEDWATER TEMP TO HTR 1	degF		437.0		436.6	439.6
HP Turbine Efficiency Actual	%		87.2		86.1	91.5
IP Turbine Efficiency Corrected	%		90.8		90.9	92.9
Condenser Pressure HP	inHga		1.7		1.6	2.3
Condenser Pressure LP	inHga		1.4		1.3	2.1
AIRHTR-A GAS OUTLET TEMP	degF		337.2		351.7	338.2
AIRHTR-B GAS OUTLET TEMP	degF		328.3		327.6	309.1
AMBIENT AIR TEMP	degF		42.1		61.3	45.8
CIRC WTR TEMP TO LP CONDB	degF		44.9		53.4	50.1
CIRC WTR TEMP TO LP CONDB	degF		45.9		54.8	50.9
CIRC WTR TEMP TO LP CONDB	degF		45.8		54.1	51.0
CIRC WTR TEMP TO LP CONDB	degF		47.2		53.7	50.4
Minimum River Temperature	degF		44.9		53.4	50.1
FWH 1 Temperature Rise	degF		55.2		55.2	51.9
Net Load	MW		609.2		607.6	598.7
Average Cond Press	inHga		1.5		1.4	2.2
Average Exit Gas Temperature	degF		332.8		339.7	323.7
Aux Power	%		4.3		4.3	4.8
Gross Unit Heat Rate	BTU/KW-HR		9100.4		9059.5	9464.6
Gross Turbine Heat Rate	BTU/KW-HR		7775.1		7725.8	8068.7
There was no VWO data in October 2008.						

The HP turbine efficiency is lower than the Nov. 2007 value due to an erroneous main steam temperature indication that was fixed during the 2008 MBO. The IP efficiency change is still being investigated but is due in part to installation of the fine mesh screens. Note that the efficiencies given in this table (calculated by EtaPro) differ from those shown on the following graphs. Performance Engineering plans to update EtaPro this year so that all efficiencies are calculated in a consistent manner.

Labadie Unit 1 - Corrected Load



Labadie Unit 1 - HP and IP Efficiencies



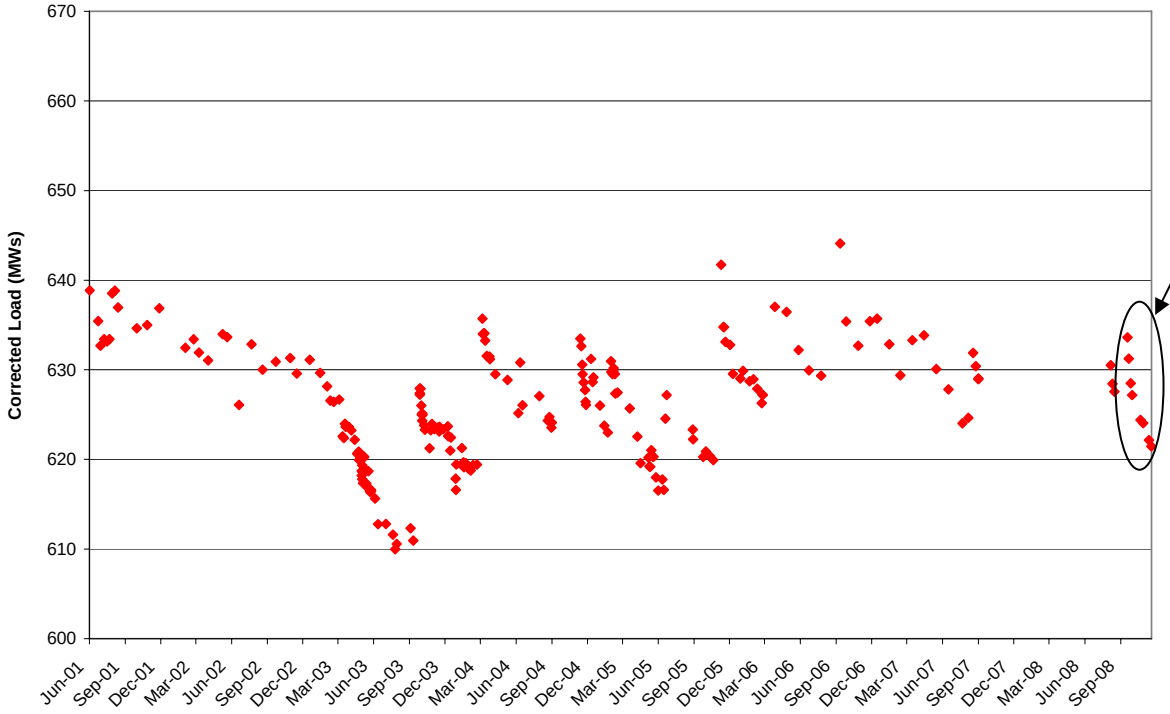
Unit 2 Observations

The following observations were made regarding Unit 2 operation and performance:

- The unit went from about 50 hours of VWO data in October to almost 200 hours of VWO operation in November.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored.
- A review of reheat spray data for the unit shows a steady decline in maximum spray flow over time which is a contributor to high reheat steam temperatures on the unit. The plant is considering options to address the issue (clean valves or replace with larger trim). This reduction in spray flow capacity is a contributor to high reheat temperatures on the unit.

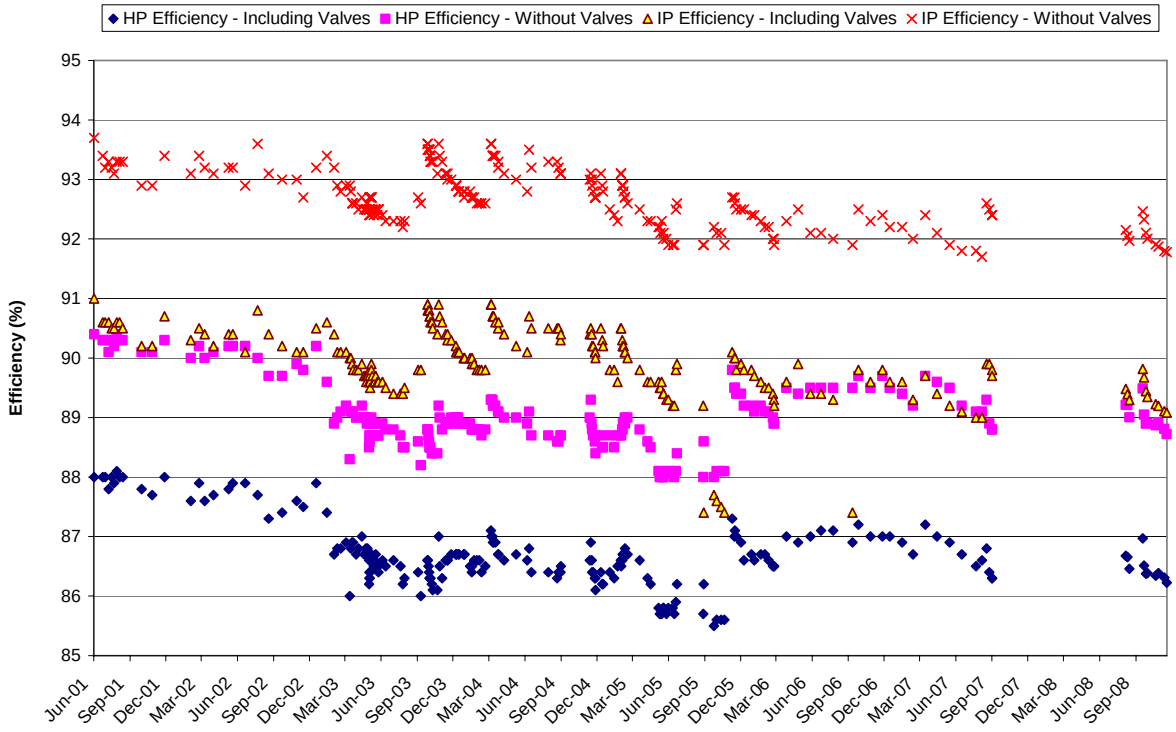
Summary of Performance Report for:						
Plant	Labadie					
Unit	2					
Period	11/1/08	to	12/1/08			
Full Load Performance			Nov-08		Oct-08	Nov-07
Hours of Data			191		53	376
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		617.8		625.4	627.9
AUX POWER	MW		29.1		29.6	27.8
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10286.7		10273.1	10241.6
Boiler Efficiency Actual	%		85.6		85.1	85.3
CONTROL VALVE POSITION LVDT	%		99.8		99.9	99.9
FEEDWATER TEMP TO ECON	degF		494.7		494.7	495.7
FEEDWATER TEMP TO HTR 1	degF		446.3		446.3	447.6
HP Turbine Efficiency Actual	%		86.1		86.3	86.4
IP Turbine Efficiency Corrected	%		90.3		90.7	89.6
Condenser Pressure HP	inHga		1.9		2.4	2.7
Condenser Pressure LP	inHga		1.6		2.0	1.9
AIRHTR-A GAS OUTLET TEMP	degF		331.9		336.7	323.0
AIRHTR-B GAS OUTLET TEMP	degF		337.3		339.1	338.7
AMBIENT AIR TEMP	degF		41.8		60.0	47.7
CIRC WTR TEMP TO LP CONDB	degF		46.2		62.0	49.1
CIRC WTR TEMP TO LP CONDB	degF		46.5		62.7	49.7
CIRC WTR TEMP TO LP CONDB	degF		46.8		63.0	49.9
CIRC WTR TEMP TO LP CONDB	degF		47.1		62.9	49.7
Minimum River Temperature	degF		46.2		62.0	49.1
FWH 1 Temperature Rise	degF		48.4		48.4	48.2
Net Load	MW		588.7		595.8	600.2
Average Cond Press	inHga		1.8		2.2	2.3
Average Exit Gas Temperature	degF		334.6		337.9	330.9
Aux Power	%		4.7		4.7	4.4
Gross Unit Heat Rate	BTU/KW-HR		9802.3		9787.2	9788.9
Gross Turbine Heat Rate	BTU/KW-HR		8395.1		8330.1	8351.6

Labadie Unit 2 - Corrected Load

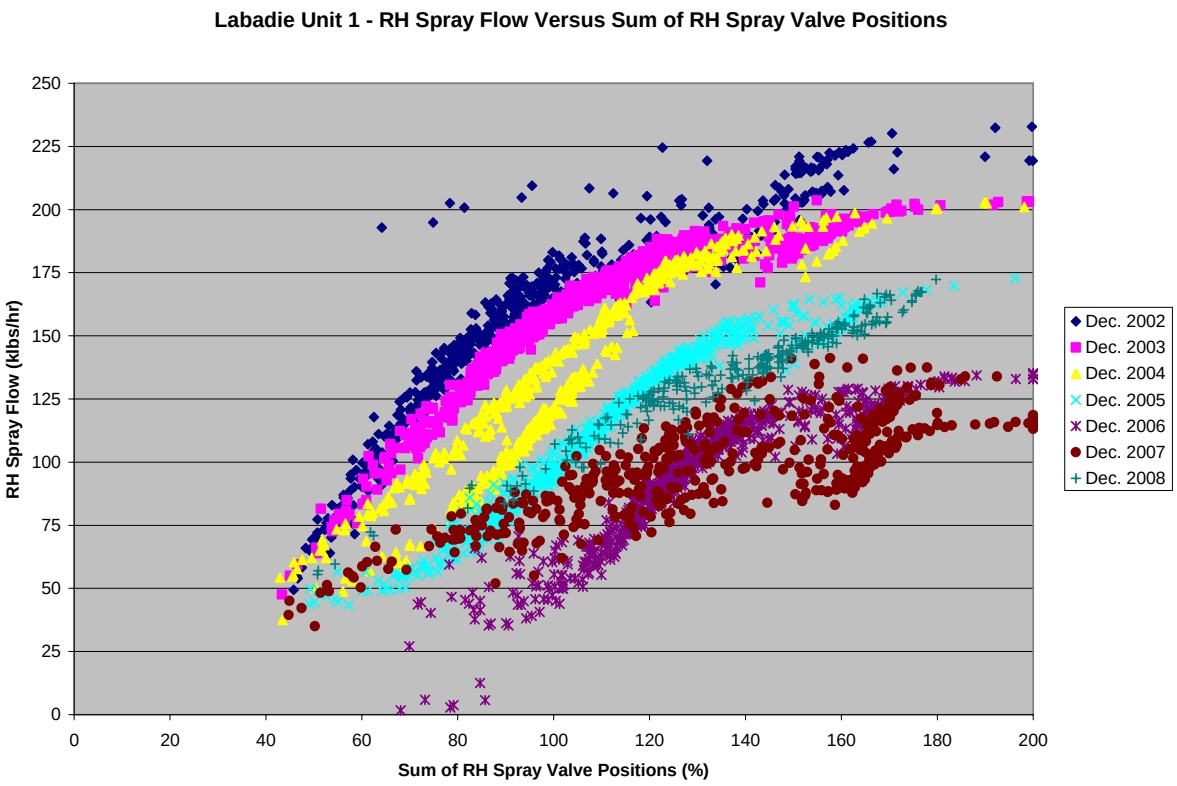


Note the decrease in load during the latest steady run on the Unit

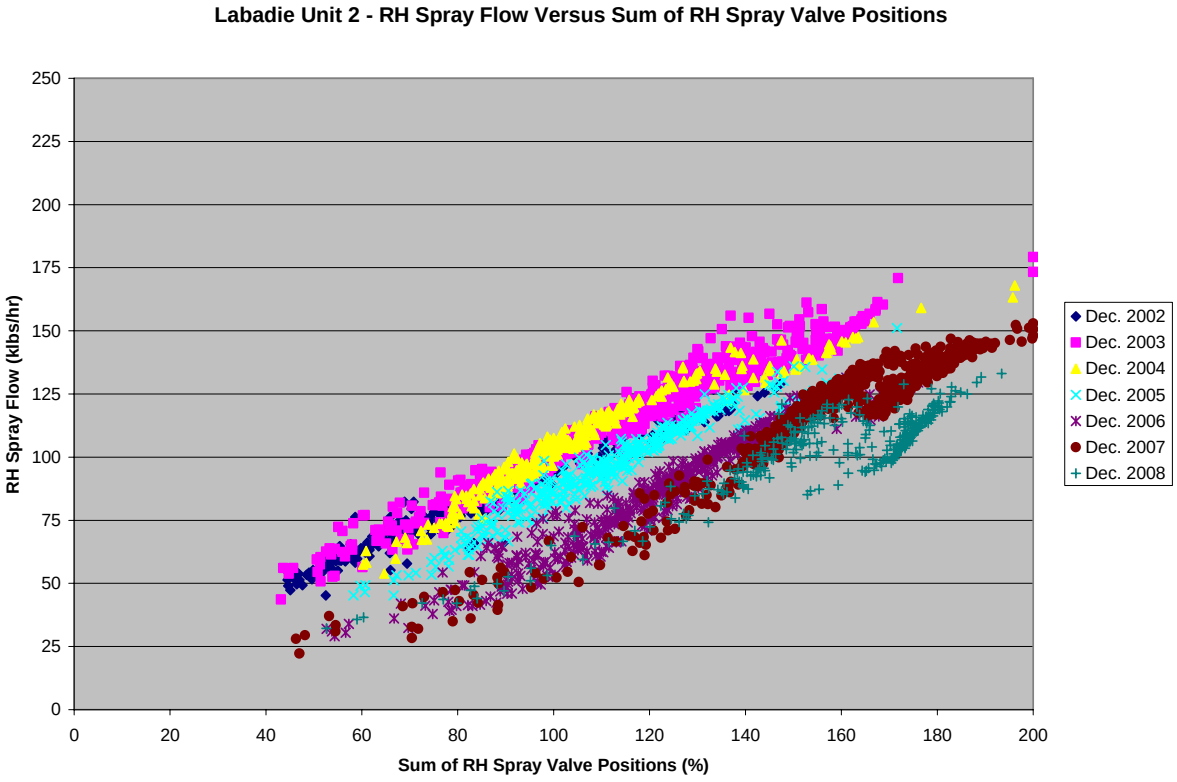
Labadie Unit 2 - HP and IP Efficiencies



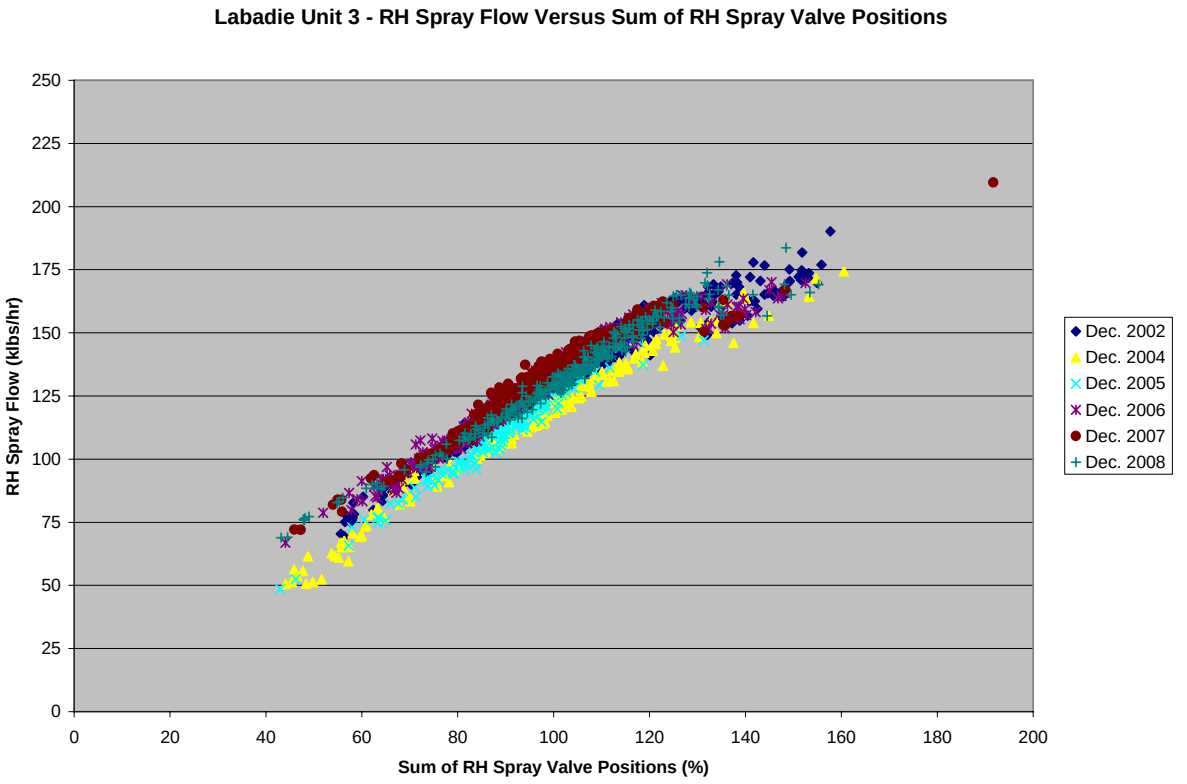
Note the decrease in turbine efficiency over the same time period

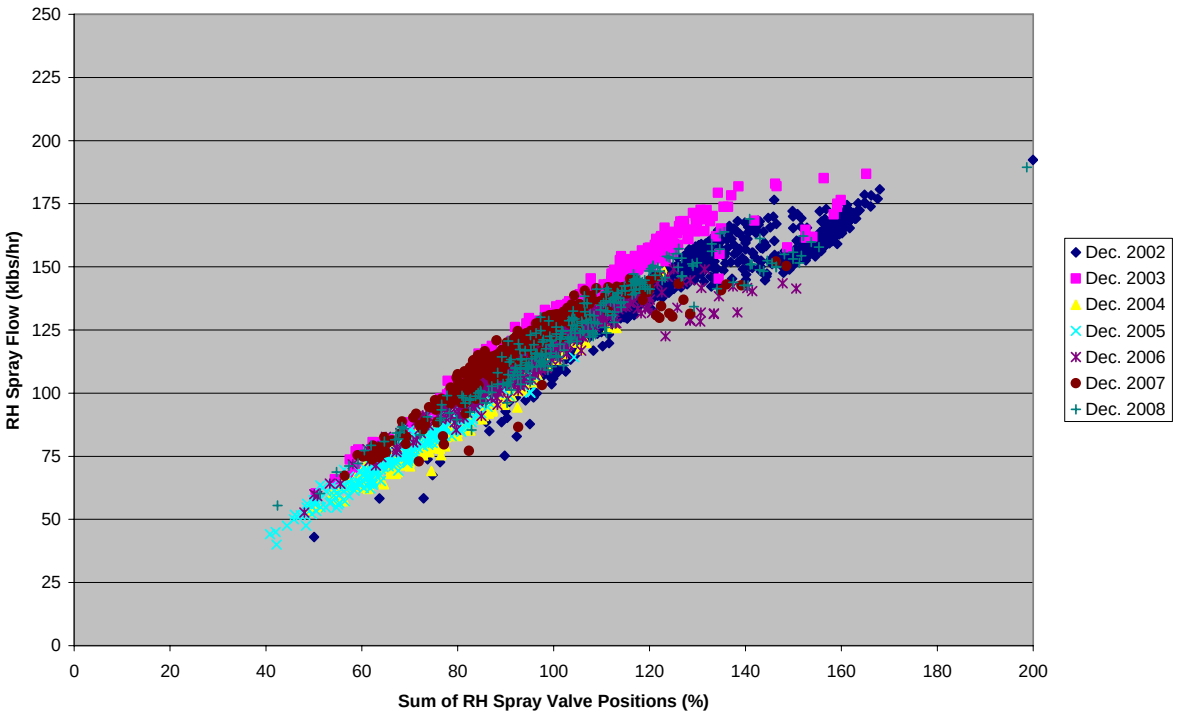


Note the decrease in total spray flow over time on Unit 1. Some flow was recovered in 2008 due to valve cleaning performed during the 2008 MBO. Also note that the total flow on Unit 1 is higher than the other units due to a larger valve trim installed in 2002.



As seen on Unit 1, total reheat spray flow has been decreasing over time on Unit 2.





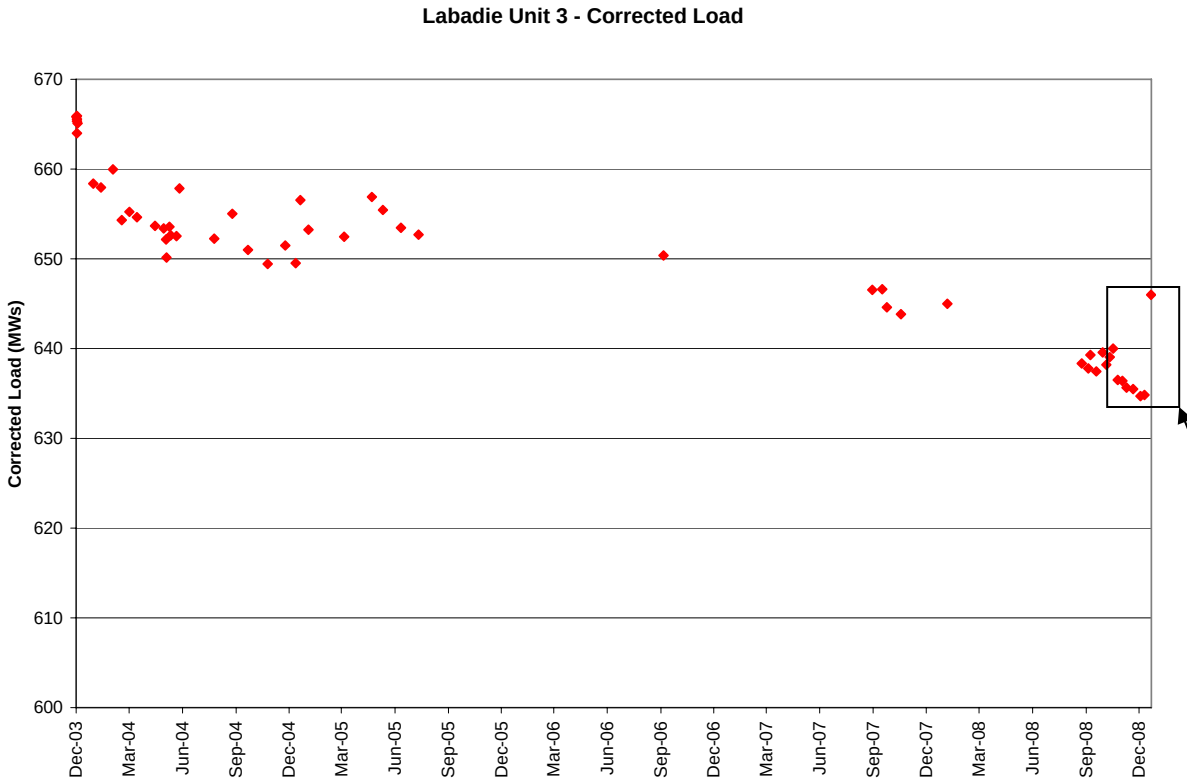
Units 3 and 4 have not seen a significant decrease in reheat spray flow over the same time period.

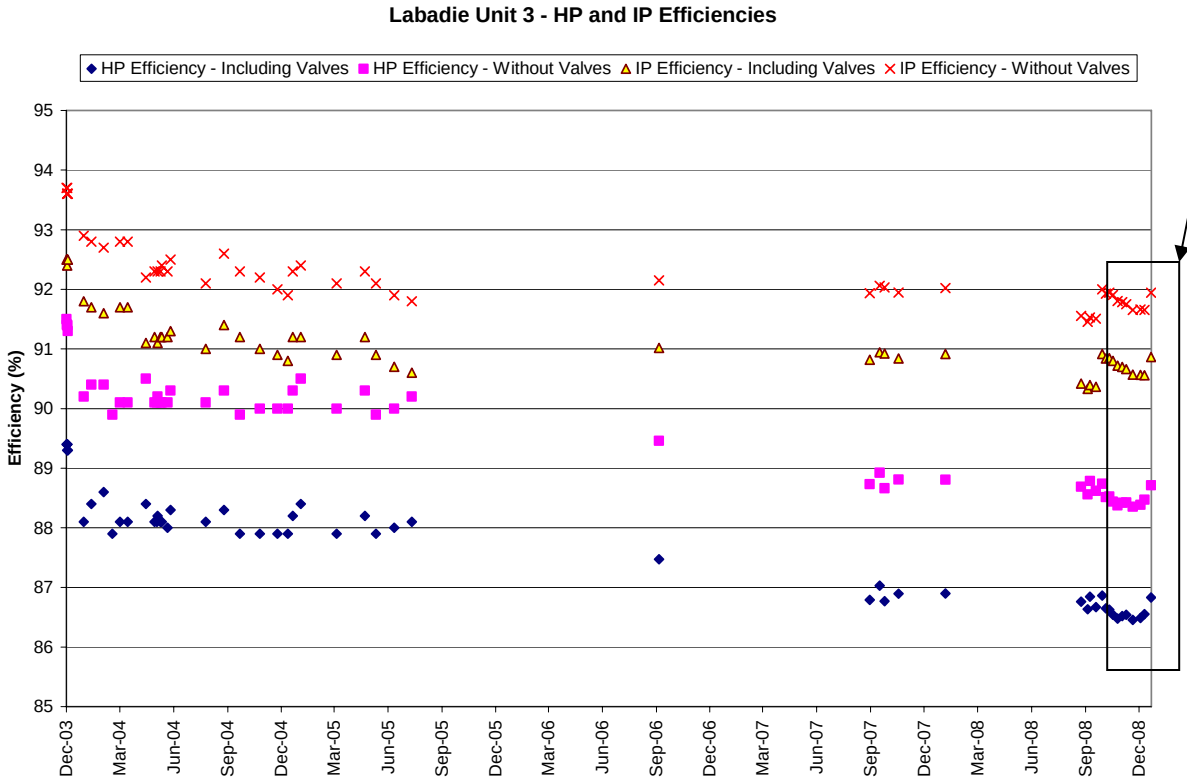
Unit 3 Observations

The following observations were made regarding Unit 3 operation and performance:

- Tube leaks in the 5A FWH were forcing the emergency dump valve open greater than 50%. These tube leaks were fixed on a recent SBO and the normal drainers are now controlling level.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored. This issue was specifically discussed at the last quarterly heat rate meeting but mainly with regards to Unit 2.

Summary of Performance Report for:						
Plant	Labadie					
Unit	3					
Period	11/1/08	to	12/1/08			
Full Load Performance			Nov-08		Oct-08	Nov-07
Hours of Data			269		418	560.0
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		623.1		630.0	644.8
AUX POWER	MW		28.2		30.0	29.3
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10089.2		10052.8	10003.3
Boiler Efficiency Actual	%		85.5		85.5	85.4
CONTROL VALVE POSITION LVDT	%		104.8		104.7	99.8
FEEDWATER TEMP TO ECON	degF		483.9		484.1	486.1
FEEDWATER TEMP TO HTR 1	degF		435.2		435.6	437.1
HP Turbine Efficiency Actual	%		87.0		87.2	87.4
IP Turbine Efficiency Corrected	%		94.2		94.4	94.2
Condenser Pressure HP	inHga		2.8		3.0	2.3
Condenser Pressure LP	inHga		2.3		2.4	2.3
AIRHTR-A GAS OUTLET TEMP	degF		327.8		335.2	334.1
AIRHTR-B GAS OUTLET TEMP	degF		317.8		320.4	315.8
AMBIENT AIR TEMP	degF		55.2		61.1	48.3
CIRC WTR TEMP TO LP CONDB	degF		52.0		63.1	50.0
CIRC WTR TEMP TO LP CONDB	degF		52.7		64.6	50.9
CIRC WTR TEMP TO LP CONDB	degF		52.5		63.6	50.6
CIRC WTR TEMP TO LP CONDB	degF		52.2		63.4	50.5
Minimum River Temperature	degF		52.0		63.1	50.0
FWH 1 Temperature Rise	degF		48.7		48.4	49.0
Net Load	MW		594.9		600.1	615.5
Average Cond Press	inHga		2.5		2.7	2.3
Average Exit Gas Temperature	degF		322.8		327.8	324.9
Aux Power	%		4.5		4.8	4.5
Gross Unit Heat Rate	BTU/KW-HR		9631.9		9574.5	9548.4
Gross Turbine Heat Rate	BTU/KW-HR		8236.2		8189.9	8155.0





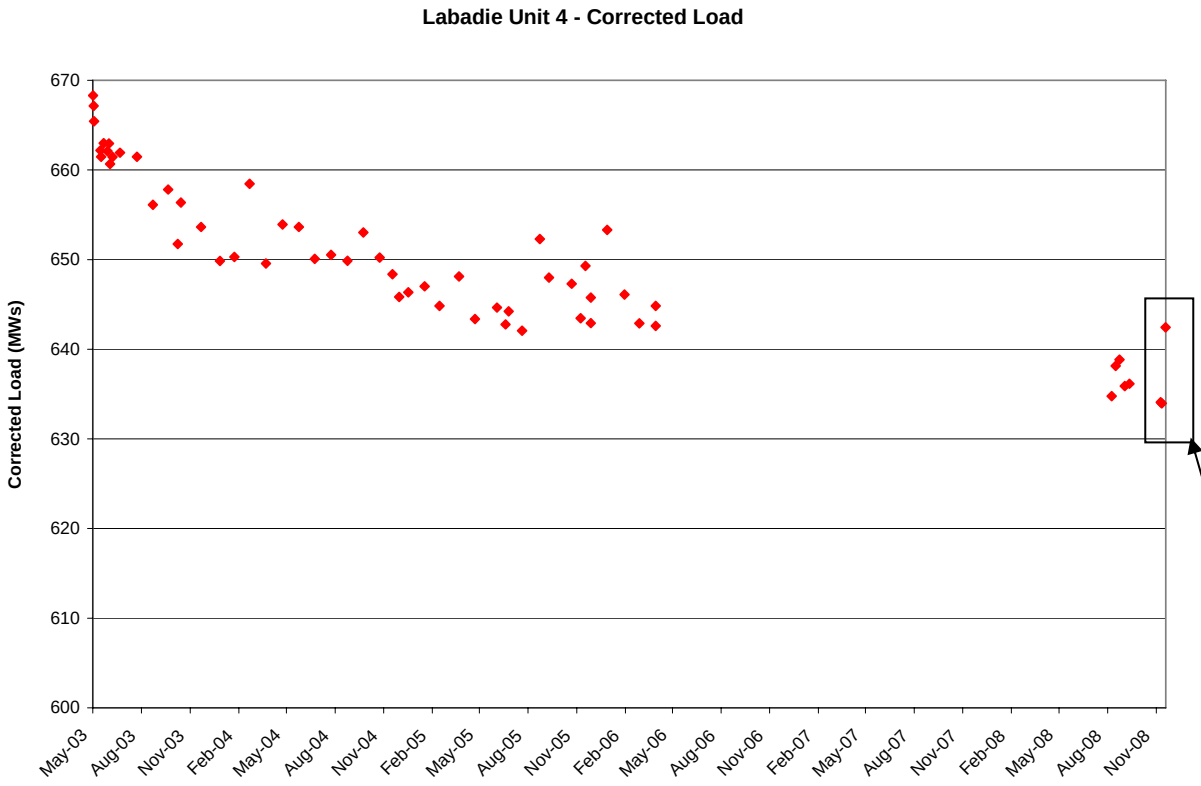
Note the decrease in load and turbine efficiencies followed by the step change up following the recent SBO

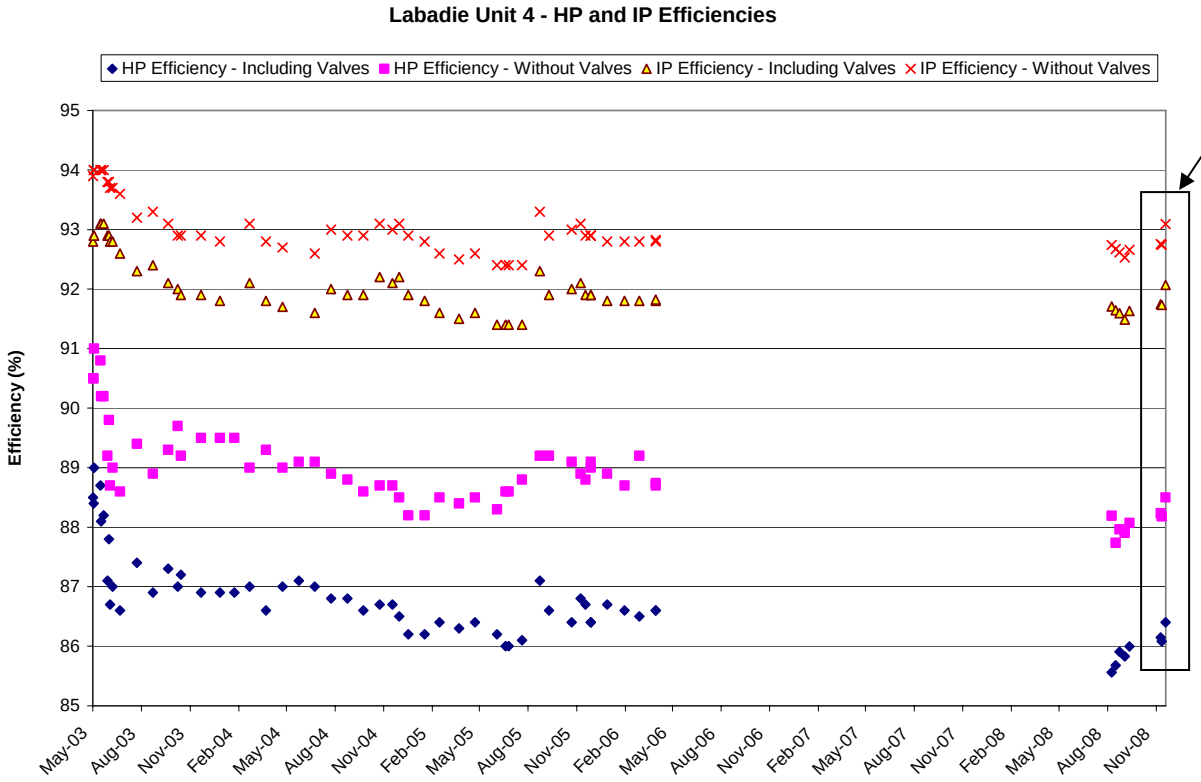
Unit 4 Observations

The following observations were made regarding Unit 4 operation and performance:

- No VWO data for the unit in November.
- Tube leaks in the 5A FWH were forcing the emergency dump valve open greater than 50%. These tube leaks were fixed on a recent SBO and the normal drainers are now controlling level.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This topic has been discussed before with regard to potential water soluble deposits with no known resolution. This will continue to be monitored. This issue was specifically discussed at the last quarterly heat rate meeting but mainly with regards to Unit 2.

Summary of Performance Report for:						
Plant	Labadie					
Unit	4					
Period	11/1/08	to	12/1/08			
Full Load Performance			Nov-08		Oct-08	Nov-07
Hours of Data			496		31	302
			Averages		Averages	Averages
GENERATOR MEGAWATTS	MW		619.3		627.0	646.2
AUX POWER	MW		29.0		30.2	29.2
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10177.8		10390.3	10156.9
Boiler Efficiency Actual	%		85.1		85.1	85.0
CONTROL VALVE POSITION LVDT	%		81.7		98.7	98.8
FEEDWATER TEMP TO ECON	degF		483.2		484.1	486.6
FEEDWATER TEMP TO HTR 1	degF		432.4		434.1	438.8
HP Turbine Efficiency Actual	%		86.0		87.2	87.7
IP Turbine Efficiency Corrected	%		93.6		93.4	93.6
Condenser Pressure HP	inHga		2.1		3.1	2.0
Condenser Pressure LP	inHga		2.0		2.5	2.0
AIRHTR-A GAS OUTLET TEMP	degF		327.6		342.3	327.9
AIRHTR-B GAS OUTLET TEMP	degF		319.0		328.7	318.6
AMBIENT AIR TEMP	degF		51.4		63.6	50.2
CIRC WTR TEMP TO LP CONDB	degF		49.9		69.9	49.9
CIRC WTR TEMP TO LP CONDB	degF		50.7		70.6	50.7
CIRC WTR TEMP TO LP CONDB	degF		50.6		70.5	50.4
CIRC WTR TEMP TO LP CONDB	degF		49.9		70.2	49.8
Minimum River Temperature	degF		49.9		69.9	49.8
FWH 1 Temperature Rise	degF		50.8		50.0	47.8
Net Load	MW		590.2		596.8	617.0
Average Cond Press	inHga		2.1		2.8	2.0
Average Exit Gas Temperature	degF		323.3		335.5	323.3
Aux Power	%		4.7		4.8	4.5
Gross Unit Heat Rate	BTU/KW-HR		9700.8		9889.9	9697.7
Gross Turbine Heat Rate	BTU/KW-HR		8256.8		8412.8	8239.4
No VWO data for Nov-08. Kept data with load above 95% of capability value.						





Trends are more difficult to see on this unit since there was no VWO data from early October until early December. However, following the SBO in early December, corrected load and turbine efficiencies show a marked improvement.

November 12, 2008

To: David Fox
From: Jeff Shelton
Cc: Mark Litzinger, Kevin Stumpe, Paul Piontek, Brian Griffen, Russ Hawkins, Scott McCormack, Ken Stuckmeyer, Joe Sind, Matt Wallace

Subject: Labadie October Performance Report

This is the first regular report following the initial demonstration in July's performance meeting. The report should not be considered in its final form for regular publication. Please advise on anything you think would be an improvement: presentation, content (additional content needed or content that is of little use), format, etc. Attempts will be made to improve the report until all recipients are satisfied.

Executive Summary

The most notable items regarding Labadie unit performance were:

- Only Unit 3 spent a significant time at Valves Wide Open (VWO)
- Unit 2 turbine efficiencies gradually decline during continuous runs (possible water soluble deposit issue?)
- There is a notable difference in heat rate between Units 1&2 (pre-MBO) and Units 3&4 when similar heat rates are expected
- Units 2 and 4 both have a reheat temperature bias between the A and B side
- The turbine performance reports previously generated by Gary Blessing have been resurrected. VWO for each unit is needed each month to evaluate unit performance.

The following table shows the known instrument deficiencies for all four units:

Tag	Unit	Issue
1COND-HTR-08345 & 1COND-HTR-08348	Unit 1	FWH 5A&B shell pressures not reading since MBO
4BFW-HTR-16241	Unit 4	FWH 4 ext. temp west reading too high compared to east side temperature

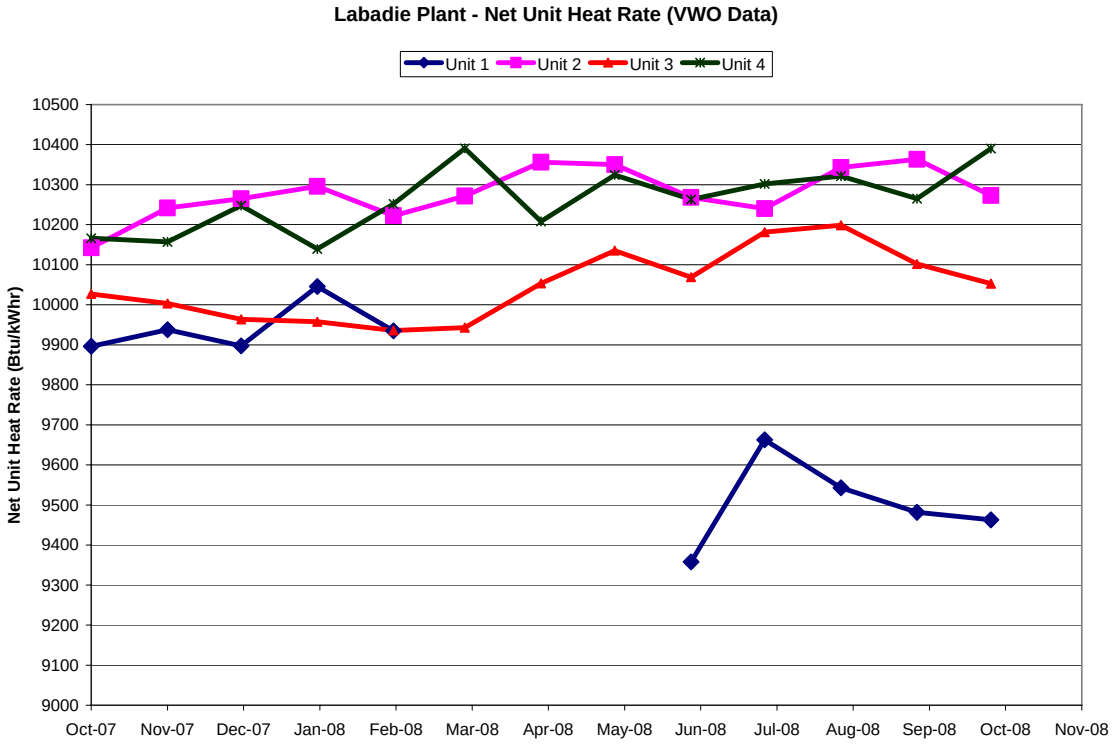
Action Items:

- JR the above instrument deficiencies
- Investigate the loss in turbine efficiencies on Unit 2
- Investigate the differences in heat rates between Units 1&2 (prior to the MBO) and Units 3&4

Detailed Observations

Actual data and graphs for the month's performance are at the end of this report. Observations concerning the data, the unit's operation and performance in general are as follows:

- The first observation is that Unit 4's heat rate is typically higher than Unit 3's heat rate by 100-200 Btu/kWhr. These units are expected to have similar heat rates due to their similarities. Further investigation will be done to determine if this is due to instrumentation/measurement issues or if the difference is real and what contributes to it.
- Prior to the 2008 MBO on Unit 1, Unit 1's heat rate was 100-250 Btu/kWhr better than Unit 2's heat rate. Again, prior to the spring 2008 outage, these units were expected to have similar heat rates. As with Units 3 & 4, further investigation will be done to determine the cause of the difference.
- Only Unit 3 spent a significant time at Valves Wide Open in October.
- Plots of corrected load (load corrected for initial and reheat temperature, initial pressure, backpressure, reheat spray flow, and hot water coil flow) as well as turbine efficiencies are presented at the back of the report for each unit.
- Summary data of unit performance is also given in the back of the report. This summary includes the current month's performance, the prior month's performance, and the performance from the same month in the prior year.



Unit 1

The following observations were made regarding Unit 1 operation and performance:

- The unit operated with one HPBFP and the top heaters OOS most of October.
- After restoration of the HPBFP, no valve wide open data in October (VWO data was obtained for the Unit on 11/5/08).
- Both vacuum pumps running with 80 SCFM total leakage.

Unit 2

The following observations were made regarding Unit 2 operation and performance:

- The unit is not being operated VWO.
- HP/IP/LP turbine efficiencies steadily decline during continuous runs. Following SBOs, a step increase in efficiency is seen. This phenomenon is seen on other units but to a much lesser extent. This topic has been discussed before with regard to potential water soluble deposits with no known resolution.
- There is a bias in reheat steam temperature between the A and B side. This bias is seen both at the boiler and at the turbine (i.e not an instrument issue). Using data from the elevated temperature tag, the unit is operating outside of the turbine instruction manual limits.
- Condenser cleanliness has decreased 10-15% since mid-October and condenser pressure has risen about 0.3 in HgA above the expected value in the same time period. However, this Unit has one of the lowest backpressures and the backpressure is consistent with the Oct 2007 value.

Unit 3

The following observations were made regarding Unit 3 operation and performance:

- Unit switched to one circ. pump on Oct. 24 with a corresponding increase in backpressure. The average backpressure is up to 1.0 in HgA greater than the other units.
- Air in-leakage is high with both pumps running at a total flowrate of up to 120 SCFM.
- FWH 5A tube leaks. Currently bypassing some flow around the LP heaters.
- FWH 6B has a large TTD. The 6B outlet temperature should be checked although it appears to not be achieving the temperature rise expected. This may be indicative of a partition plate leak.

Unit 4

The following observations were made regarding Unit 4 operation and performance:

- Unit not operated VWO since beginning of October

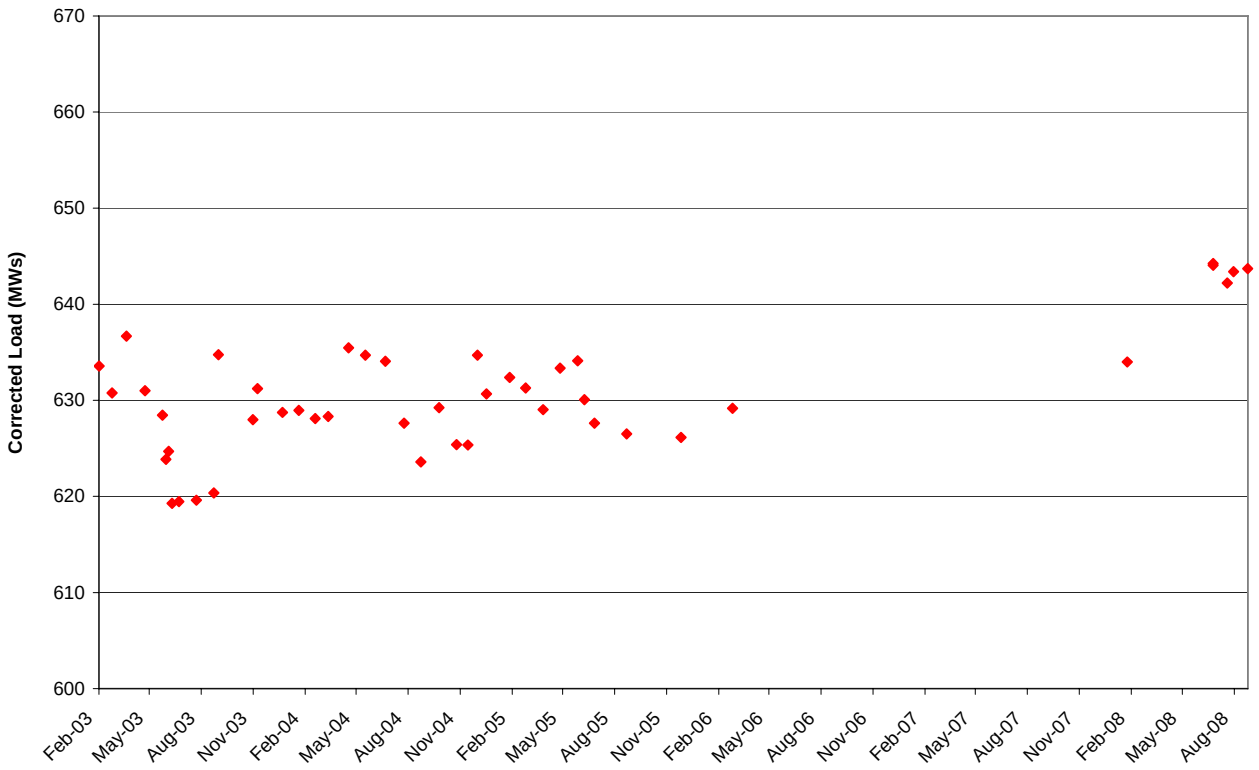
- Condenser air in-leakage decreased from 120-60 SCFM following a SBO in October. Slop drain repair?
- Tube leaks in FWH 5A (maybe 5B) causing emergency dumps controlling level. The LP heaters have been partially bypassed.
- There is a bias in reheat steam temperature between the A and B side. This bias is seen both at the boiler and at the turbine (i.e not an instrument issue).

Plant	Labadie				
Unit	1				
Period	10/1/08	to	11/1/08		
			Oct-08	Sep-08	Oct-07
Full Load Performance					
Hours of Data			45	224	394
			Averages	**Averages**	**Averages**
GENERATOR MEGAWATTS	MW		634.6	638.7	629.7
AUX POWER	MW		27.1	27.1	29.0
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		9463.0	9481.6	9896.2
Boiler Efficiency Actual	%		85.3	85.4	85.5
CONTROL VALVE POSITION LVDT	%		54.1	100.0	100.6
FEEDWATER TEMP TO ECON	degF		491.8	492.5	492.4
FEEDWATER TEMP TO HTR 1	degF		436.6	437.9	440.3
HP Turbine Efficiency Actual	%		86.1	87.2	91.8
IP Turbine Efficiency Corrected	%		90.9	90.8	92.6
Condenser Pressure HP	inHga		1.6	2.7	2.8
Condenser Pressure LP	inHga		1.3	2.1	2.3
AIRHTR-A GAS OUTLET TEMP	degF		351.7	343.1	335.6
AIRHTR-B GAS OUTLET TEMP	degF		327.6	325.3	311.4
AMBIENT AIR TEMP	degF		61.3	72.5	62.7
CIRC WTR TEMP TO LP CONDB	degF		53.4	73.4	65.2
CIRC WTR TEMP TO LP CONDB	degF		54.8	74.3	66.1
CIRC WTR TEMP TO LP CONDB	degF		54.1	74.2	66.0
CIRC WTR TEMP TO LP CONDB	degF		53.7	73.6	65.5
Minimum River Temperature	degF		53.4	73.4	65.2
FWH 1 Temperature Rise	degF		55.2	54.6	52.2
Net Load	MW		607.6	611.6	600.7
Average Cond Press	inHga		1.4	2.4	2.5
Average Exit Gas Temperature	degF		339.7	334.2	323.5
Aux Power	%		4.3	4.2	4.6
Gross Unit Heat Rate	BTU/KW-HR		9059.5	9079.4	9440.0
Gross Turbine Heat Rate	BTU/KW-HR		7725.8	7751.7	8069.6

The data for October was for gross loads greater than 600 MWs (no VWO data).

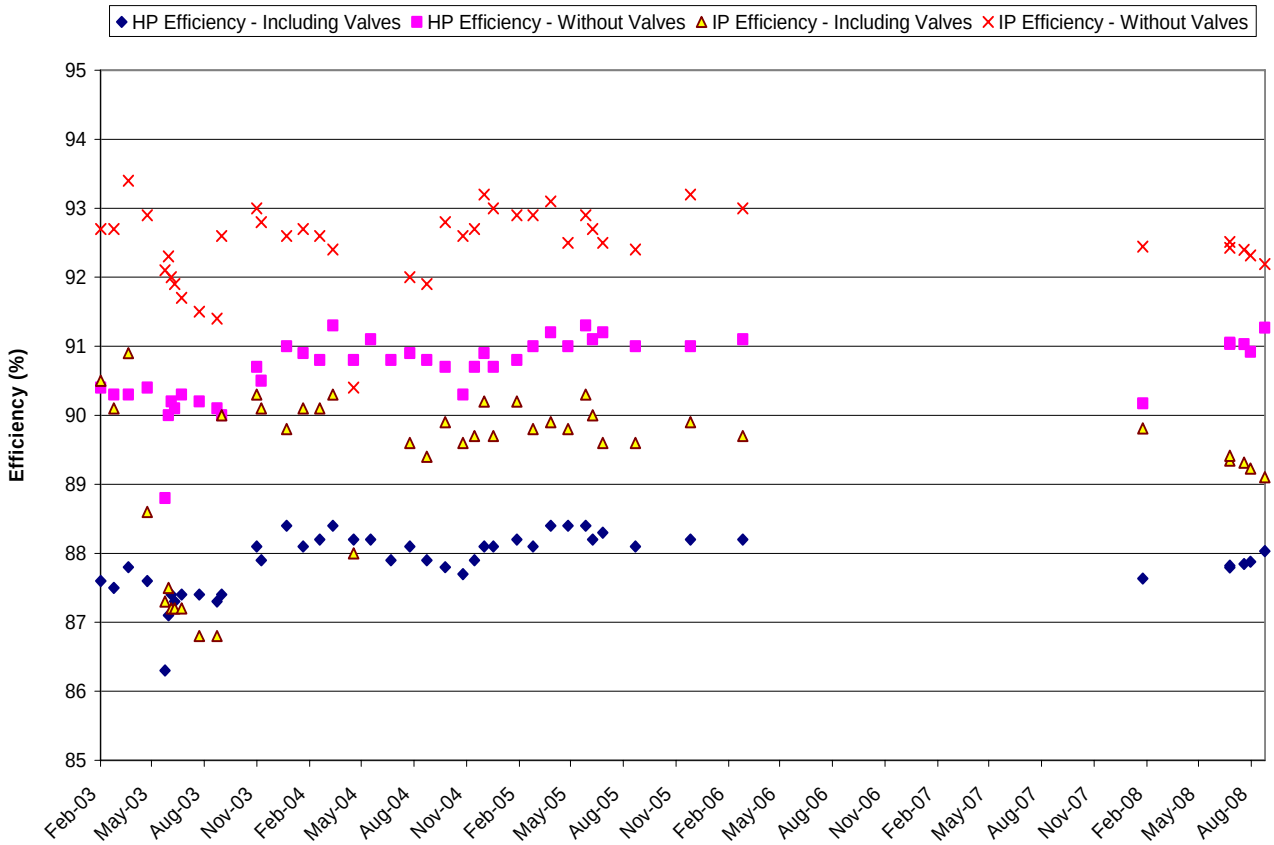
Plant	Labadie				
Unit	2				
Period	10/1/08	to	11/1/08		
			Oct-08	Sep-08	Oct-07
Full Load Performance					
Hours of Data			53	36	310
			Averages	Averages	Averages
GENERATOR MEGAWATTS	MW		625.4	620.5	627.3577
AUX POWER	MW		29.6	29.4	29.2
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR		10273.1	10363.4	10142.3
Boiler Efficiency Actual	%		85.1	85.7	85.7
CONTROL VALVE POSITION LVDT	%		99.9	99.7	100.1
FEEDWATER TEMP TO ECON	degF		494.7	495.5	494.9
FEEDWATER TEMP TO HTR 1	degF		446.3	447.4	447.2
HP Turbine Efficiency Actual	%		86.3	86.4	86.3
IP Turbine Efficiency Corrected	%		90.7	90.5	90.6
Condenser Pressure HP	inHga		2.4	3.3	2.6
Condenser Pressure LP	inHga		2.0	2.6	2.0
AIRHTR-A GAS OUTLET TEMP	degF		336.7	343.6	317.0
AIRHTR-B GAS OUTLET TEMP	degF		339.1	351.3	325.6
AMBIENT AIR TEMP	degF		60.0	75.6	64.3
CIRC WTR TEMP TO LP CONDB	degF		62.0	76.1	63.8
CIRC WTR TEMP TO LP CONDB	degF		62.7	76.8	64.5
CIRC WTR TEMP TO LP CONDB	degF		63.0	76.8	64.4
CIRC WTR TEMP TO LP CONDB	degF		62.9	76.3	64.0
Minimum River Temperature	degF		62.0	76.1	63.8
FWH 1 Temperature Rise	degF		48.4	48.1	47.7
Net Load	MW		595.8	591.1	598.2
Average Cond Press	inHga		2.2	2.9	2.3
Average Exit Gas Temperature	degF		337.9	347.4	321.3
Aux Power	%		4.7	4.7	4.7
Gross Unit Heat Rate	BTU/KW-HR		9787.2	9872.0	9670.5
Gross Turbine Heat Rate	BTU/KW-HR		8330.1	8455.8	8287.7

Labadie Unit 1 - Corrected Load



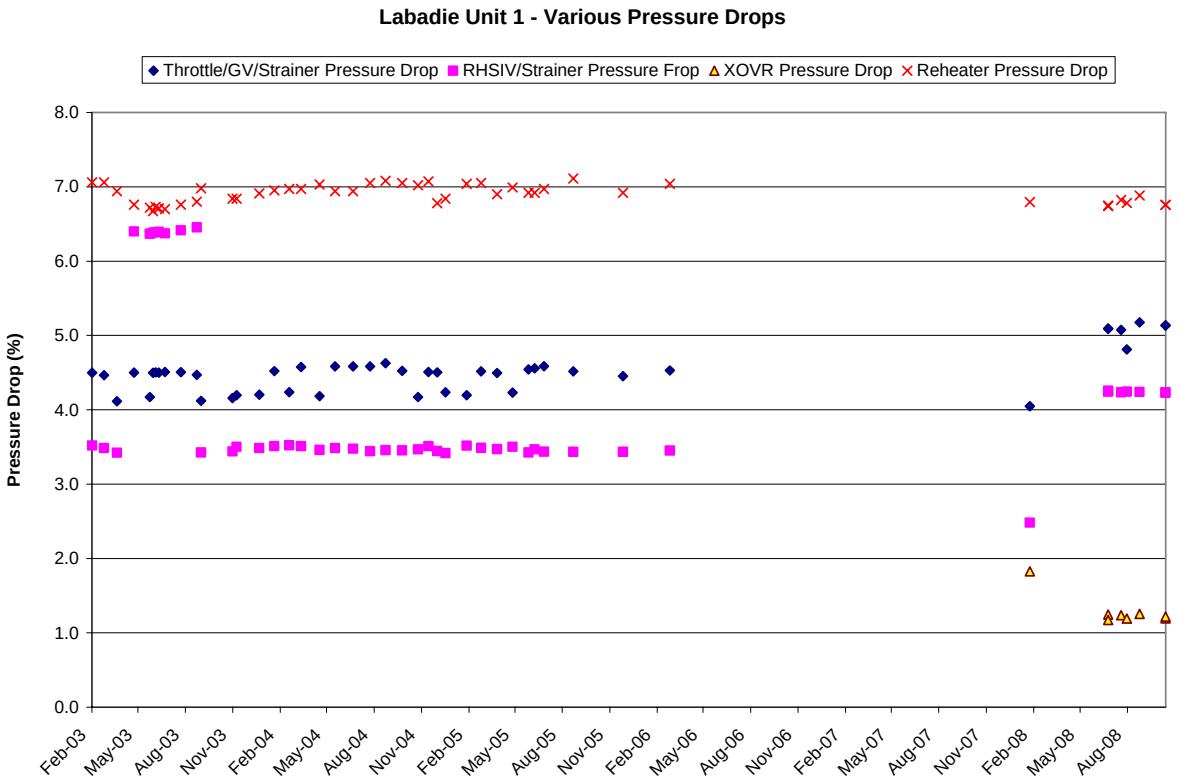
Corrected load up due to new LP turbines as expected

Labadie Unit 1 - HP and IP Efficiencies

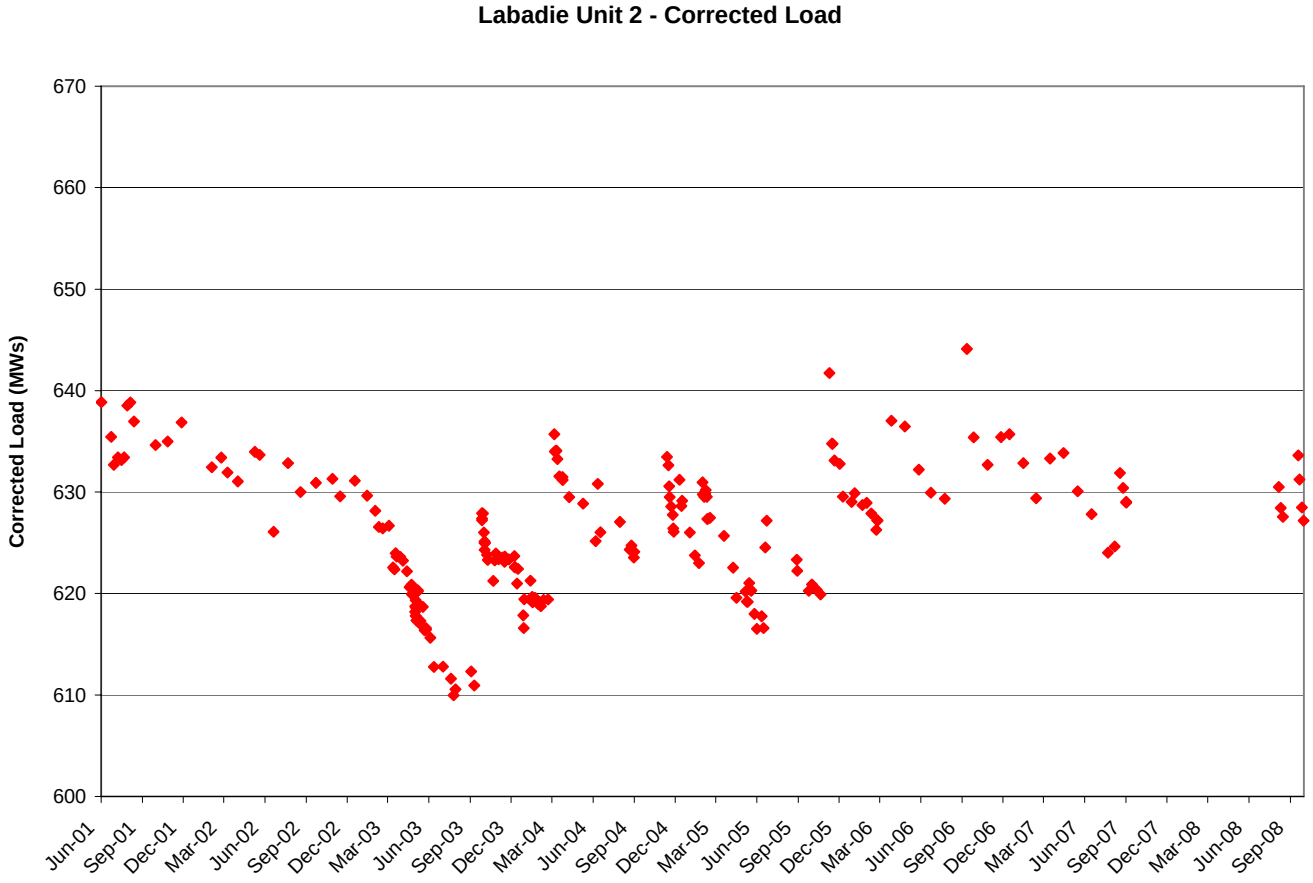


HP/IP Eff including valves has decreased after the MBO due to presence of screens

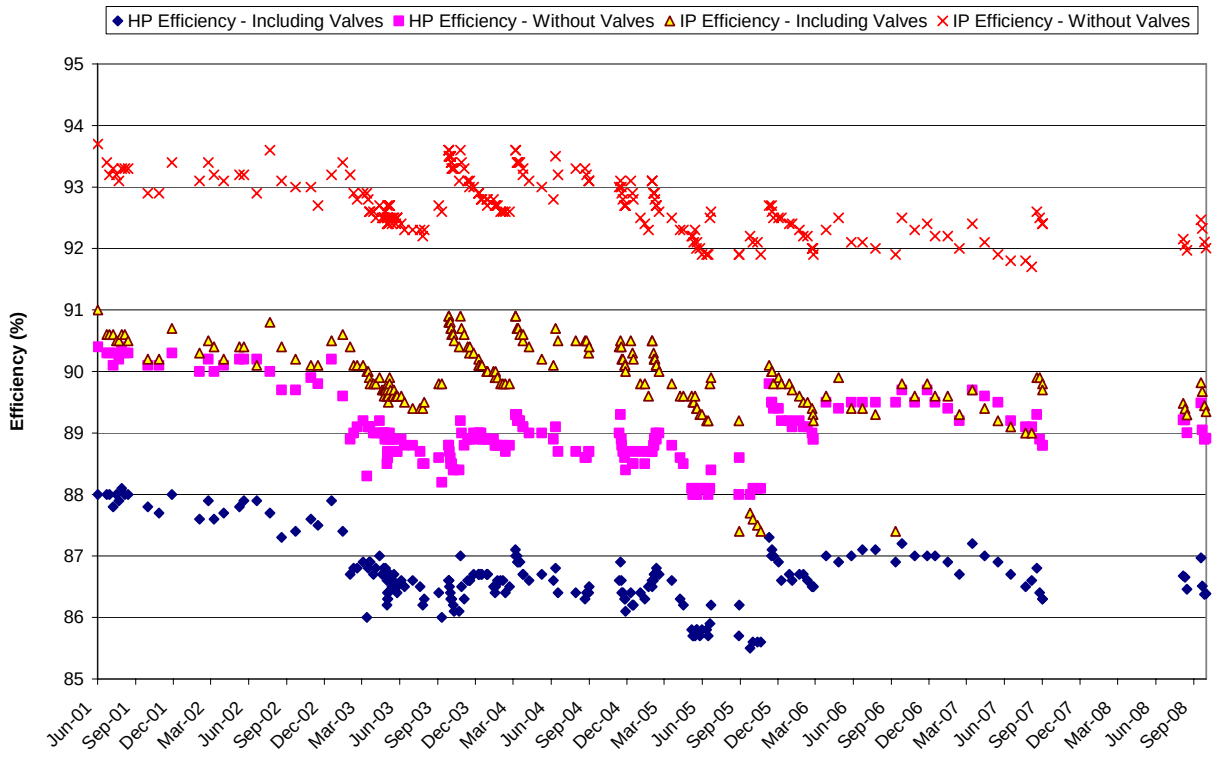
Feb. 08 HP Eff. data skewed due to MS thermocouple issue

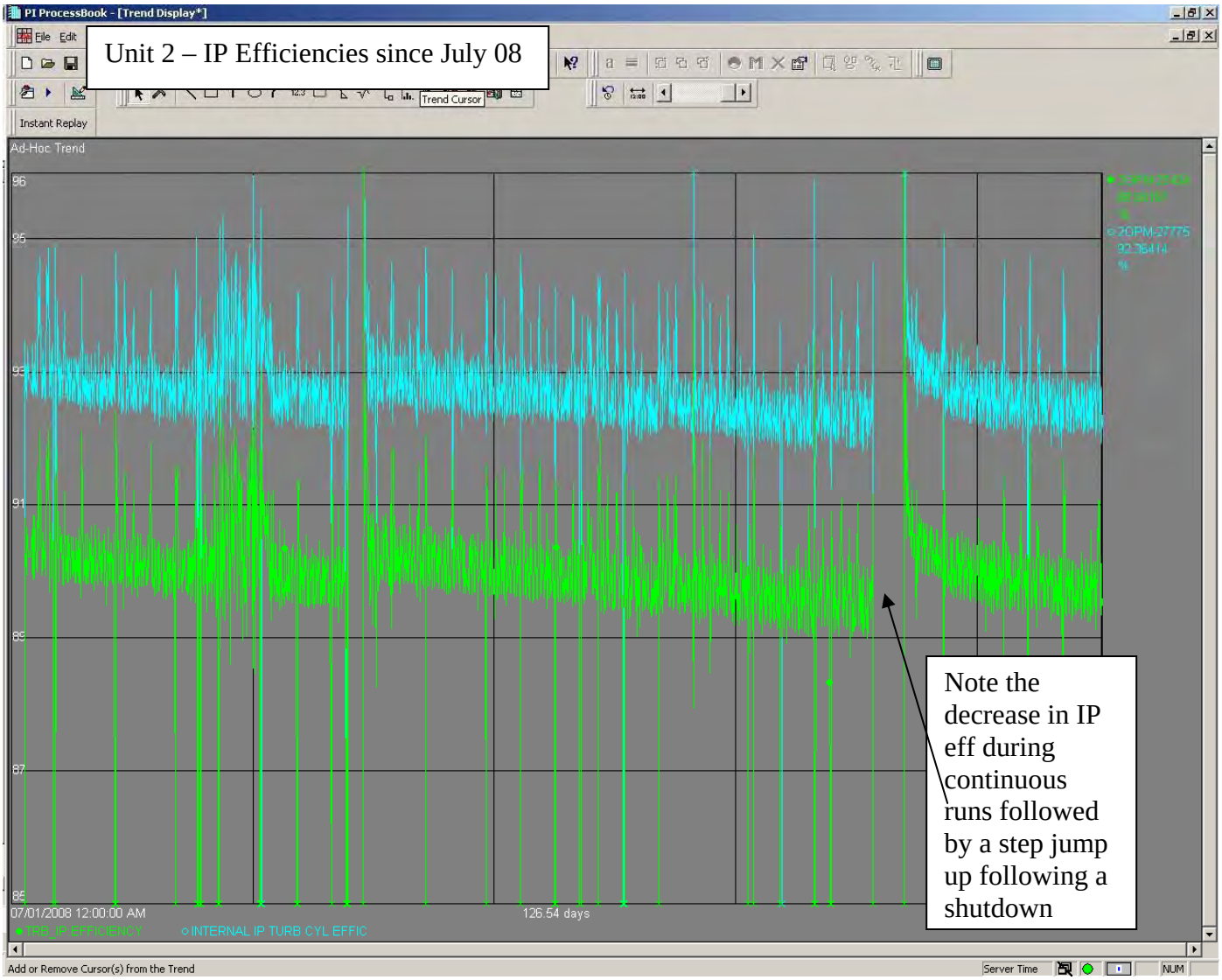


Note the increase in pressure drop following the MBO (0.5% for HP valves and 1.7% for IP valves). Note that the RHSIV Pressure drop was artificially high prior to Feb-08 due to double accounting of a water leg



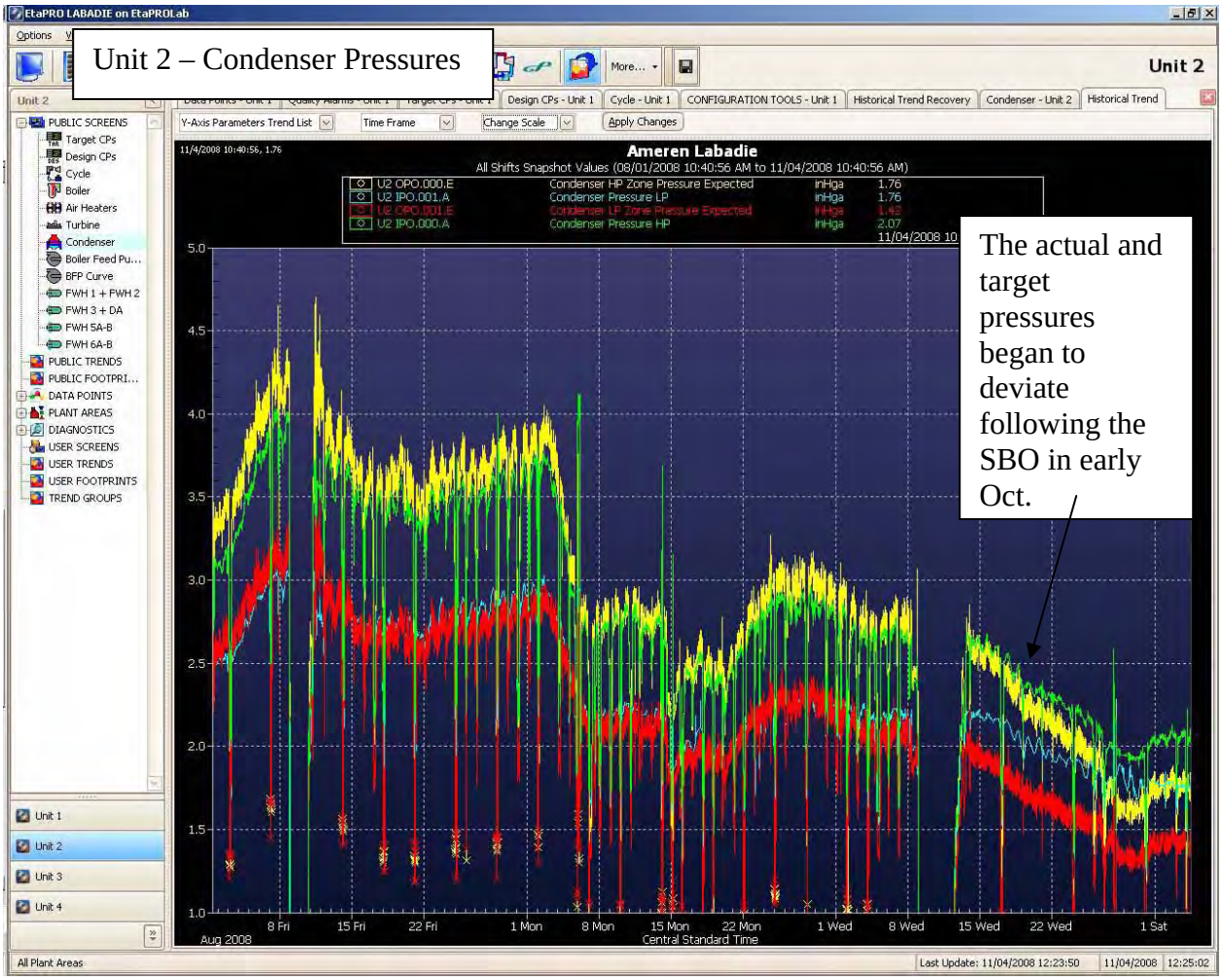
Labadie Unit 2 - HP and IP Efficiencies

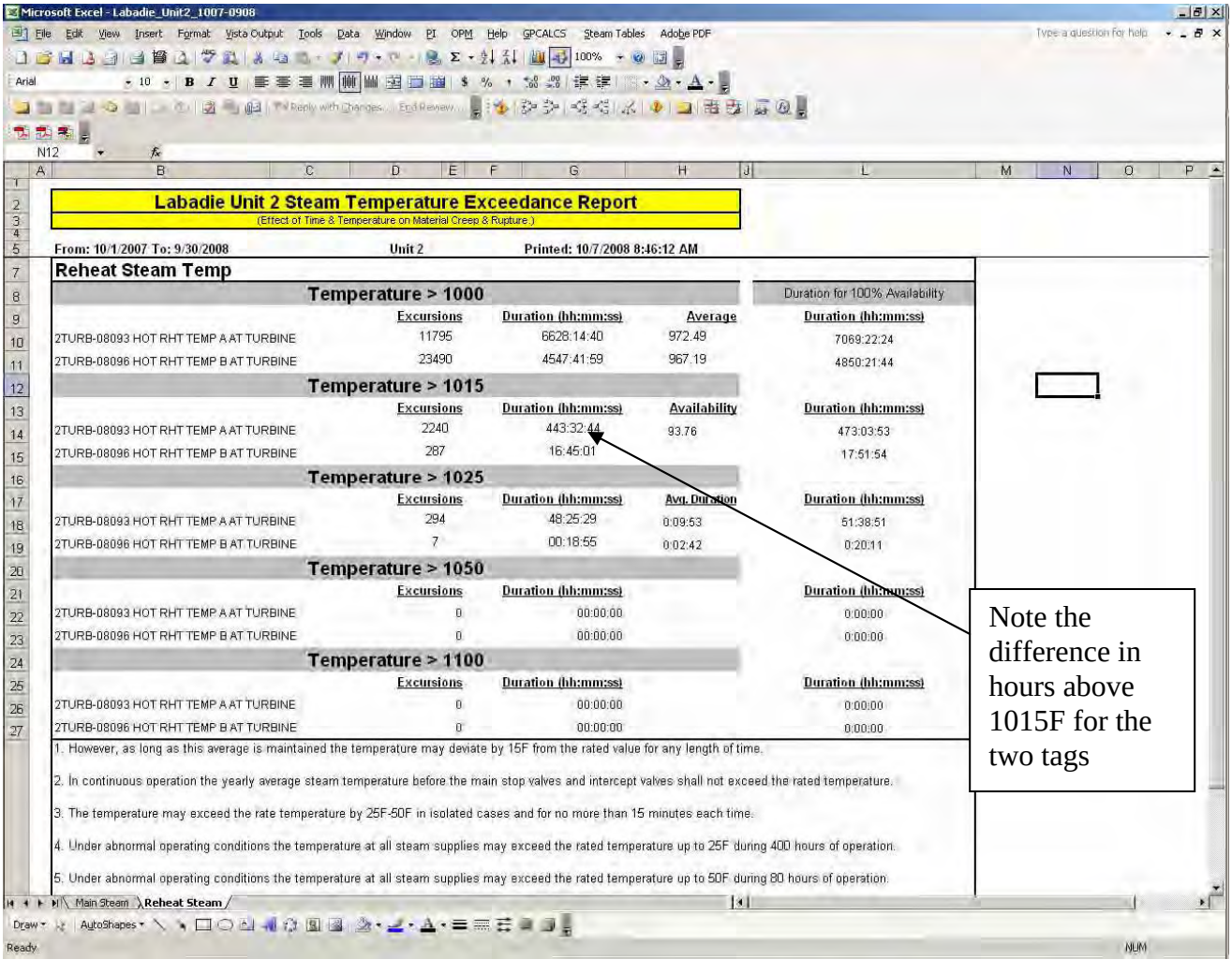




Unit 2 – IP Efficiencies since July 08

Note the decrease in IP eff during continuous runs followed by a step jump up following a shutdown


Unit 2 – Condenser Pressures
EtaPRO LABADIE on EtaPROLab
Unit 2
Ameren Labadie
All Shifts Snapshot Values (08/01/2008 10:40:56 AM to 11/04/2008 10:40:56 AM)
U2 OPO.000.E Condenser HP Zone Pressure Expected inHga 1.76
U2 IPO.001.A Condenser Pressure LP inHga 1.76
U2 OPO.001.E Condenser LP Zone Pressure Expected inHga 1.42
U2 IPO.000.A Condenser Pressure HP inHga 2.07
The actual and target pressures began to deviate following the SBO in early Oct.
Aug 2008
Central Standard Time

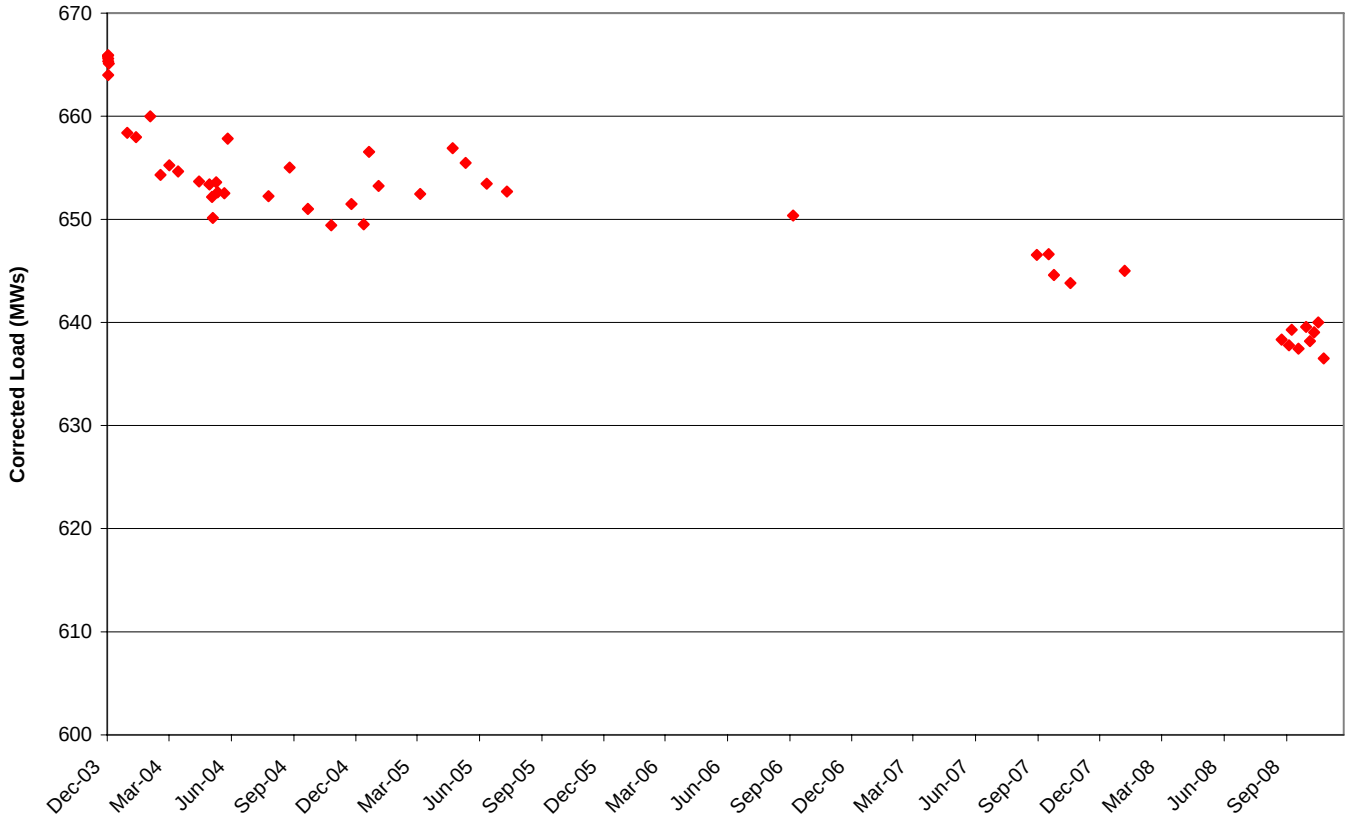

Microsoft Excel - Labadie_Unit2_1007-0908
Labadie Unit 2 Steam Temperature Exceedance Report
(Effect of Time & Temperature on Material Creep & Rupture.)
From: 10/1/2007 To: 9/30/2008
Unit 2
Printed: 10/7/2008 8:46:12 AM
Reheat Steam Temp
Temperature > 1000
Duration for 100% Availability
Excursions
Duration (hh:mm:ss)
Average
2TURB-08093 HOT RHT TEMP A AT TURBINE 11795 6628:14:40 972.49 7069:22:24
2TURB-08096 HOT RHT TEMP B AT TURBINE 23490 4547:41:59 967.19 4850:21:44
Temperature > 1015
Availability
2TURB-08093 HOT RHT TEMP A AT TURBINE 2240 443:32:44 93.76 473:03:53
2TURB-08096 HOT RHT TEMP B AT TURBINE 287 16:45:01 17:51:54
Temperature > 1025
Avg. Duration
2TURB-08093 HOT RHT TEMP A AT TURBINE 294 48:25:29 0:09:53 51:38:51
2TURB-08096 HOT RHT TEMP B AT TURBINE 7 00:18:55 0:02:42 0:20:11
Temperature > 1050
2TURB-08093 HOT RHT TEMP A AT TURBINE 0 00:00:00 0:00:00
2TURB-08096 HOT RHT TEMP B AT TURBINE 0 00:00:00 0:00:00
Temperature > 1100
2TURB-08093 HOT RHT TEMP A AT TURBINE 0 00:00:00 0:00:00
2TURB-08096 HOT RHT TEMP B AT TURBINE 0 00:00:00 0:00:00
1. However, as long as this average is maintained the temperature may deviate by 15F from the rated value for any length of time.
2. In continuous operation the yearly average steam temperature before the main stop valves and intercept valves shall not exceed the rated temperature.
3. The temperature may exceed the rate temperature by 25F-50F in isolated cases and for no more than 15 minutes each time.
4. Under abnormal operating conditions the temperature at all steam supplies may exceed the rated temperature up to 25F during 400 hours of operation.
5. Under abnormal operating conditions the temperature at all steam supplies may exceed the rated temperature up to 50F during 80 hours of operation.
Note the difference in hours above 1015F for the two tags

Plant	Labadie			
Unit	3			
Period	10/1/08 to	11/1/08		
Full Load Performance		Oct-08	Sep-08	Oct-07
Hours of Data		418	277.0	471.0
		Averages	Averages	Averages
GENERATOR MEGAWATTS	MW	630.0	616.8	642.9
AUX POWER	MW	30.0	29.9	29.9
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR	10052.8	10102.0	10026.9
Boiler Efficiency Actual	%	85.5	85.7	85.5
CONTROL VALVE POSITION LVDT	%	104.7	103.9	100.0
FEEDWATER TEMP TO ECON	degF	484.1	484.6	486.0
FEEDWATER TEMP TO HTR 1	degF	435.6	436.5	437.0
HP Turbine Efficiency Actual	%	87.2	87.0	87.2
IP Turbine Efficiency Corrected	%	94.4	93.9	94.1
Condenser Pressure HP	inHga	3.0	3.2	2.9
Condenser Pressure LP	inHga	2.4	2.7	2.5
AIRHTR-A GAS OUTLET TEMP	degF	335.2	338.7	332.9
AIRHTR-B GAS OUTLET TEMP	degF	320.4	330.4	317.1
AMBIENT AIR TEMP	degF	61.1	73.7	65.2
CIRC WTR TEMP TO LP CONDB	degF	63.1	73.3	66.2
CIRC WTR TEMP TO LP CONDB	degF	64.6	74.3	66.8
CIRC WTR TEMP TO LP CONDB	degF	63.6	73.9	66.6
CIRC WTR TEMP TO LP CONDB	degF	63.4	73.5	66.5
Minimum River Temperature	degF	63.1	73.3	66.2
FWH 1 Temperature Rise	degF	48.4	48.1	49.0
Net Load	MW	600.1	587.0	612.9
Average Cond Press	inHga	2.7	3.0	2.7
Average Exit Gas Temperature	degF	327.8	334.6	325.0
Aux Power	%	4.8	4.8	4.7
Gross Unit Heat Rate	BTU/KW-HR	9574.5	9612.9	9559.9
Gross Turbine Heat Rate	BTU/KW-HR	8189.9	8238.0	8175.6

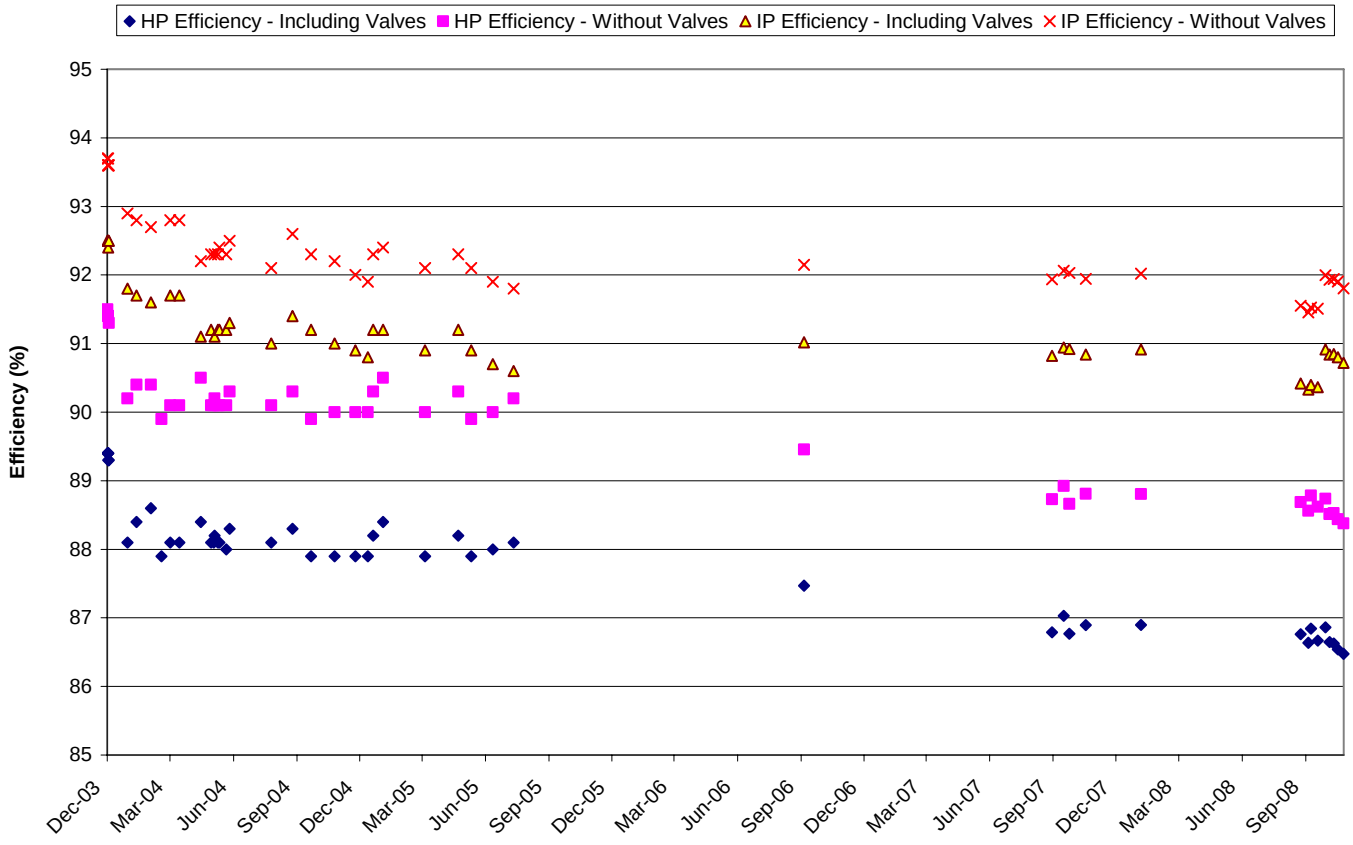
Plant	Labadie			
Unit	4			
Period	10/1/08 to	11/1/08		
Full Load Performance		Oct-08	Sep-08	Oct-07
Hours of Data		31	437	211
		Averages	Averages	Averages
GENERATOR MEGAWATTS	MW	627.0	633.6	642.8
AUX POWER	MW	30.2	30.5	29.7
Net Unit Heat Rate Actual (GPHI)	BTU/KW-HR	10390.3	10265.1	10166.4
Boiler Efficiency Actual	%	85.1	85.3	85.2
CONTROL VALVE POSITION LVDT	%	98.7	98.7	99.1
FEEDWATER TEMP TO ECON	degF	484.1	485.7	482.8
FEEDWATER TEMP TO HTR 1	degF	434.1	435.7	431.3
HP Turbine Efficiency Actual	%	87.2	87.1	87.7
IP Turbine Efficiency Corrected	%	93.4	93.5	93.8
Condenser Pressure HP	inHga	3.1	3.2	2.7
Condenser Pressure LP	inHga	2.5	2.6	2.3
AIRHTR-A GAS OUTLET TEMP	degF	342.3	345.2	330.7
AIRHTR-B GAS OUTLET TEMP	degF	328.7	332.1	324.7
AMBIENT AIR TEMP	degF	63.6	72.2	69.0
CIRC WTR TEMP TO LP CONDB	degF	69.9	72.2	66.6
CIRC WTR TEMP TO LP CONDB	degF	70.6	73.1	67.6
CIRC WTR TEMP TO LP CONDB	degF	70.5	72.9	67.3
CIRC WTR TEMP TO LP CONDB	degF	70.2	72.4	66.7
Minimum River Temperature	degF	69.9	72.2	66.6
FWH 1 Temperature Rise	degF	50.0	50.0	51.5
Net Load	MW	596.8	603.1	613.2
Average Cond Press	inHga	2.8	2.9	2.5
Average Exit Gas Temperature	degF	335.5	338.6	327.7
Aux Power	%	4.8	4.8	4.6
Gross Unit Heat Rate	BTU/KW-HR	9889.9	9770.8	9697.2
Gross Turbine Heat Rate	BTU/KW-HR	8412.8	8332.2	8264.8

Unit 4 heat rate 300 Btu/kWhr greater than Unit 3 in October and 200 Btu/kWhr higher than last October

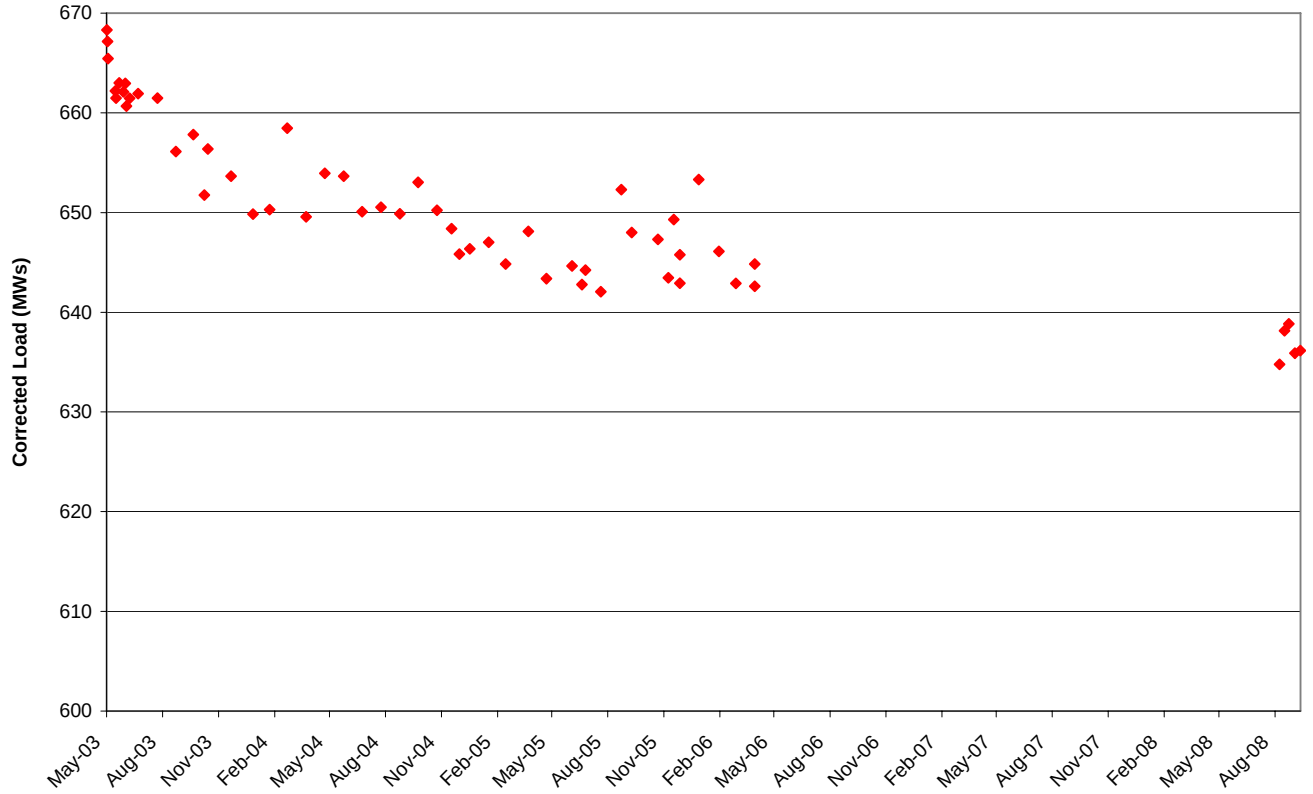
Labadie Unit 3 - Corrected Load



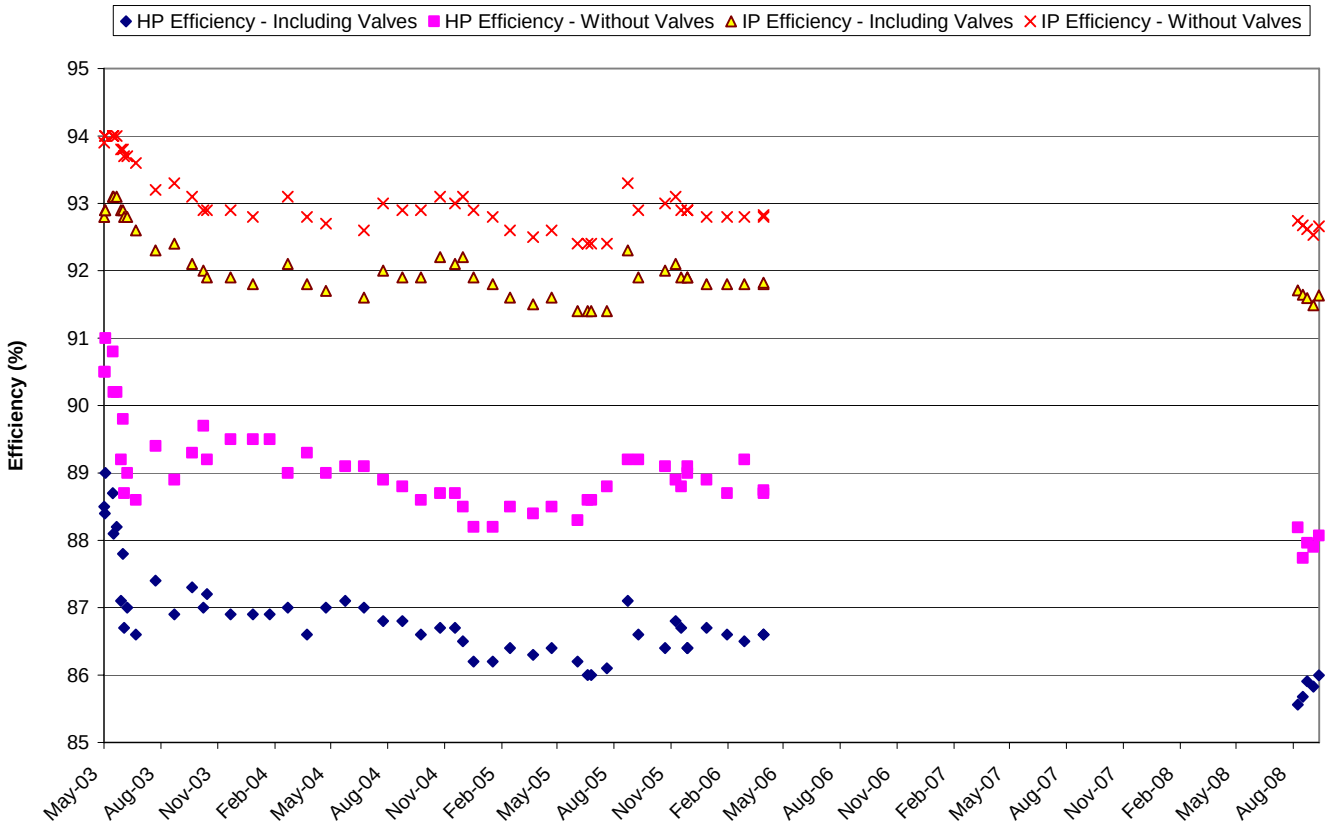
Labadie Unit 3 - HP and IP Efficiencies



Labadie Unit 4 - Corrected Load



Labadie Unit 4 - HP and IP Efficiencies

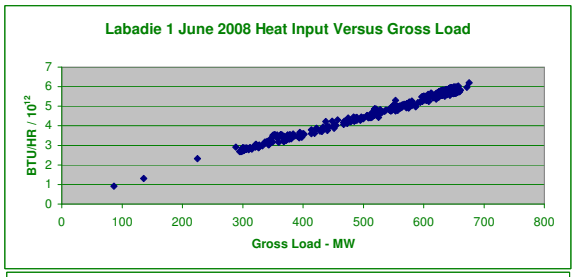


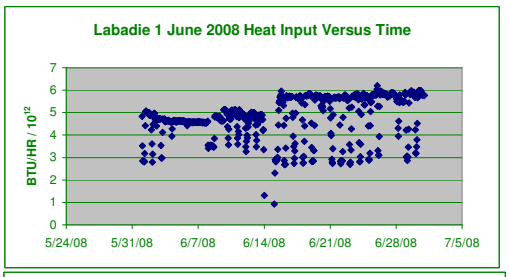
Summary of Performance Report for:

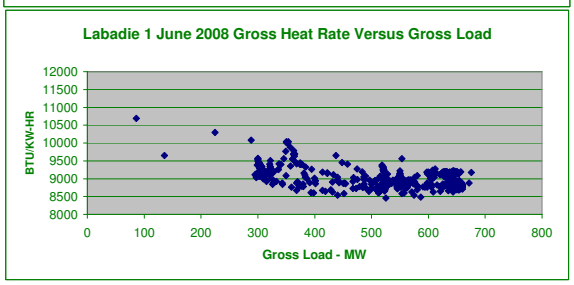
Plant Labadie
Unit 1
Period 6/1/08 to 7/1/08

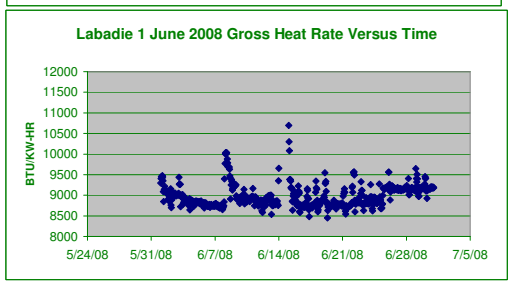
Full Load Performance
Hours of Data 39

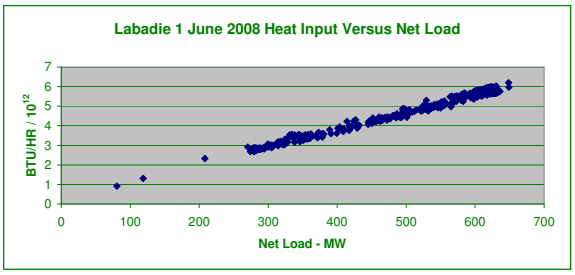
	Averages	
GENERATOR MEGAWATTS	650.1	MW
AUX POWER	26.1	MW
Net Unit Heat Rate Actual (GPHI)	9357.9	BTU/KW-HR
Boiler Efficiency Actual	85.3	%
CONTROL VALVE POSITION LVDT	99.9	%
FEEDWATER TEMP TO ECON	492.8	degF
FEEDWATER TEMP TO HTR 1	437.8	degF
HP Turbine Efficiency Actual	87.2	%
IP Turbine Efficiency Corrected	90.8	%
Condenser Pressure HP	2.6	inHga
Condenser Pressure LP	2.1	inHga
AIRHTR-A GAS OUTLET TEMP	339.3	degF
AIRHTR-B GAS OUTLET TEMP	324.3	degF
AMBIENT AIR TEMP	75.2	degF
CIRC WTR TEMP TO LP CONDB	74.5	degF
CIRC WTR TEMP TO LP CONDB	75.5	degF
CIRC WTR TEMP TO LP CONDB	75.2	degF
CIRC WTR TEMP TO LP CONDB	74.7	degF
Minimum River Temperature	74.5	degF
FWH 1 Temperature Rise	55.0	degF
Net Load	624.1	MW
Average Cond Press	2.3	inHga
Average Exit Gas Temperature	331.8	degF
Aux Power	4.0	%
Gross Unit Heat Rate	8982.8	BTU/KW-HR
Gross Turbine Heat Rate	7666.7	BTU/KW-HR

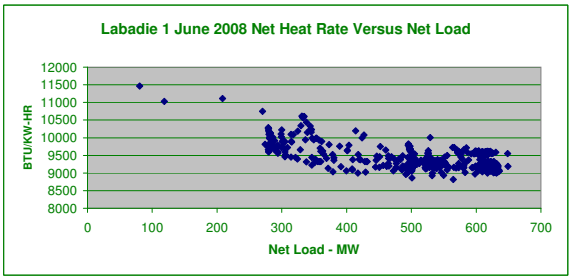


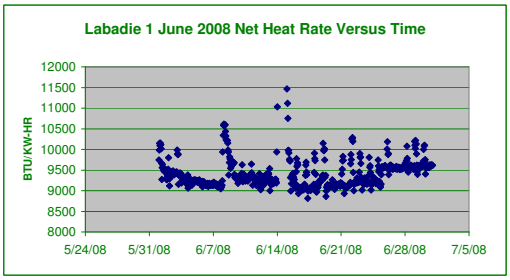












Labadie Unit 1 Rollup, June 2008

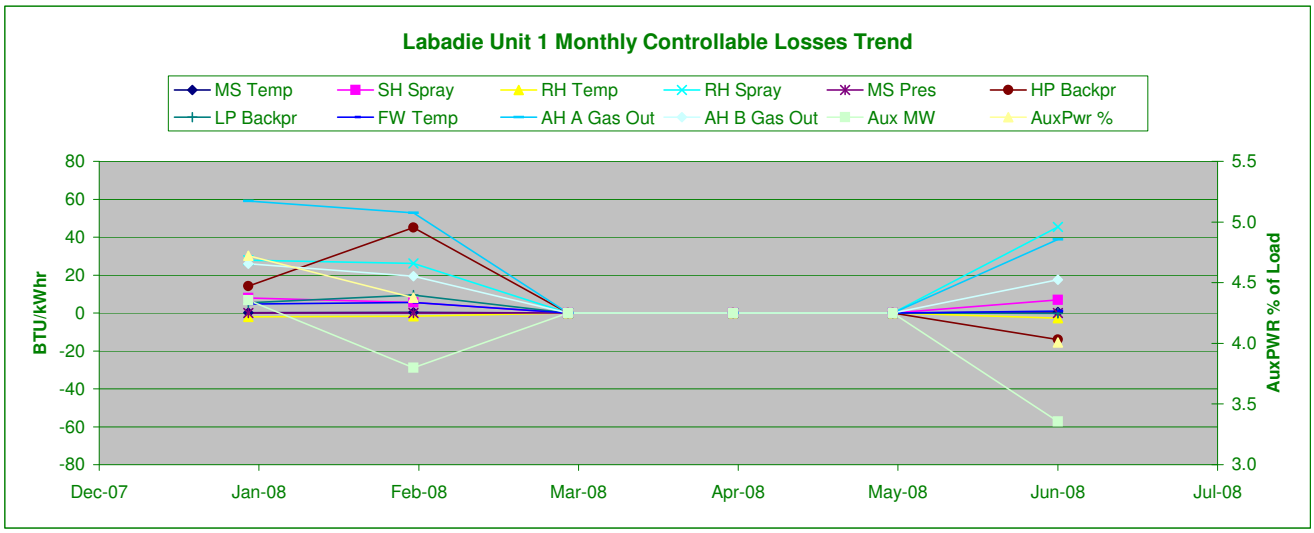
Notable Deviations in Plant Performance Data / Discussion Topics, etc.

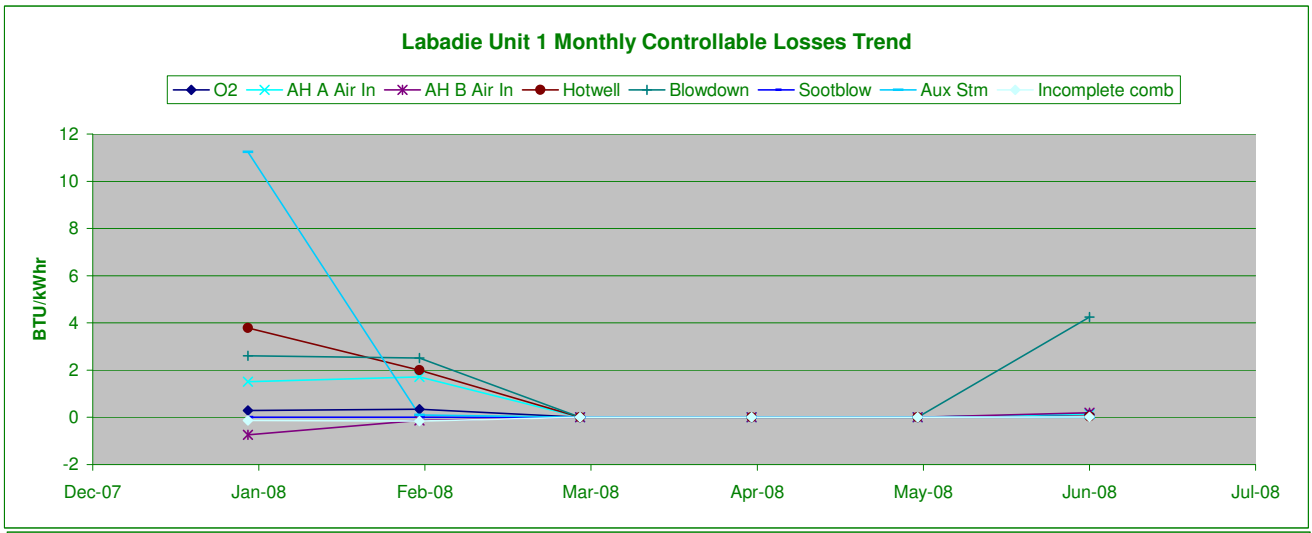
1. The controllable loss parameter target values need to be updated to reflect current plant operation. The target values for all controllable loss parameters have been reviewed using actual 2007 unit data.
2. Reheat Spray loss is about double the value from prior to the outage.
3. Net Unit Heat Rate did decrease following the outage as expected.

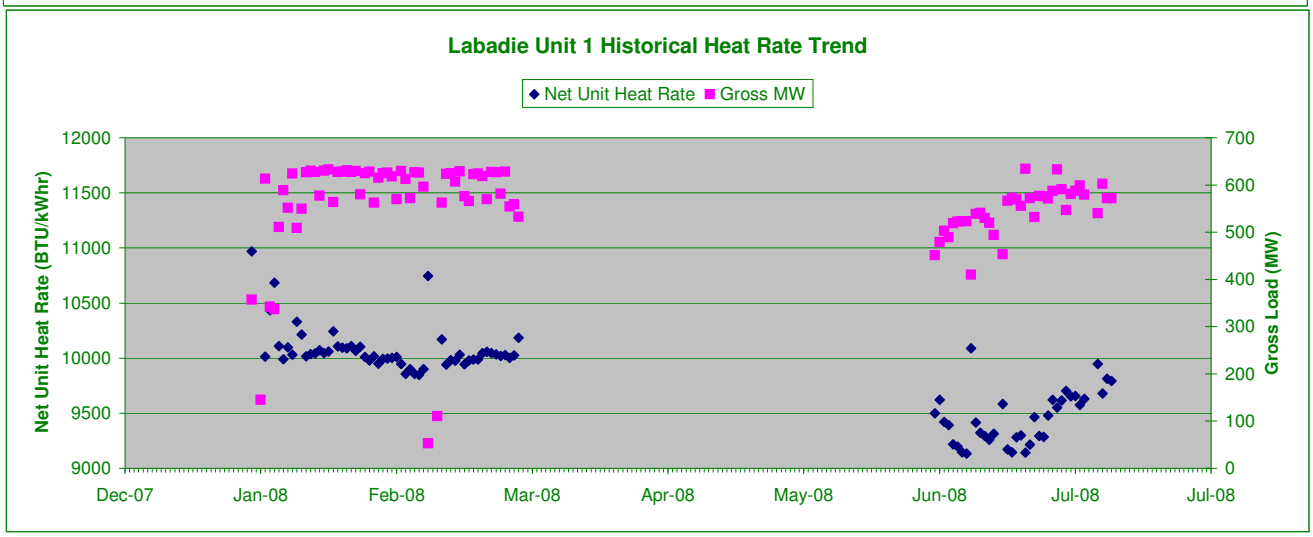
Top Priority Engineering Action Items	JR#	Priority	Resp Pty

Top Instrumentation Deficiencies	Point ID	Actual	Expected	JR#	Priority	Resp Pty

Top Priority EtaPro/OPM Action Items	Priority	Resp Pty
Update target values with agreed upon target values/curves	1	JDS


Labadie Unit 1 Monthly Controllable Losses Trend
MS Temp
SH Spray
RH Temp
RH Spray
MS Pres
HP Backpr
LP Backpr
FW Temp
AH A Gas Out
AH B Gas Out
Aux MW
AuxPwr %
BTU/kWhr
AuxPWR % of Load
80
60
40
20
0
-20
-40
-60
-80
5.5
5.0
4.5
4.0
3.5
3.0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 1 Monthly Controllable Losses Trend
O2
AH A Air In
AH B Air In
Hotwell
Blowdown
Sootblow
Aux Stm
Incomplete comb
BTU/kWhr
12
10
8
6
4
2
0
-2
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 1 Historical Heat Rate Trend
Net Unit Heat Rate
Gross MW
Net Unit Heat Rate (BTU/kWhr)
Gross Load (MW)
12000
11500
11000
10500
10000
9500
9000
700
600
500
400
300
200
100
0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Jul-08

Unit 1 Performance Analysis
June-08

Overall Heat Rate & Losses Summary

1. The controllable loss parameter target values need to be updated to reflect current plant operation.

Steam Generator Performance Summary:

1. AH A Efficiency And Effectiveness much lower than AH B
2. RH Temperature and Spray up in late June

Steam Turbine Performance Summary:

Separate evaluation performed for LP turbine acceptance

Condenser Performance Summary:

No items noted

Feedwater Heater Performance Summary:

No items noted

Recommended Actions:

Instrumentation or calculation related issues:

The EtaPro target values need to be updated to reflect current plant operation.

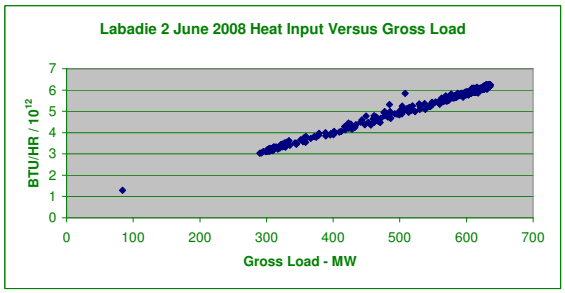
Changes made to the system that affects this month's report:

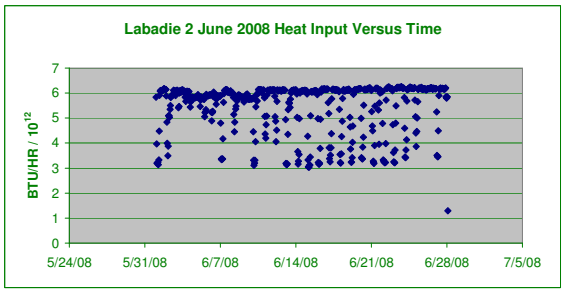
Summary of Performance Report for:

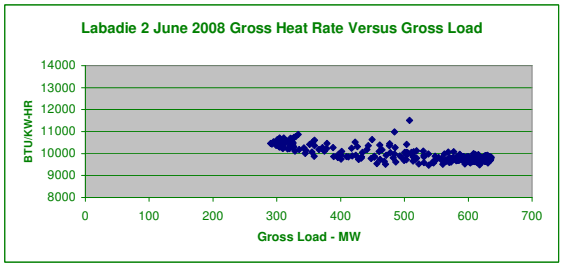
Plant Labadie
Unit 2
Period 6/1/08 to 7/1/08

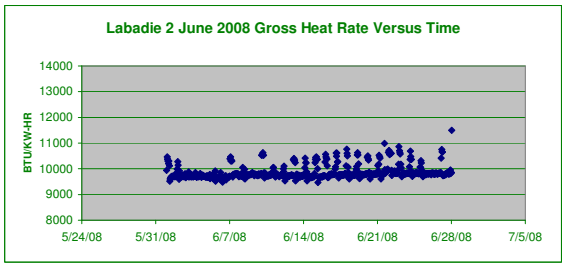
Full Load Performance
Hours of Data 266

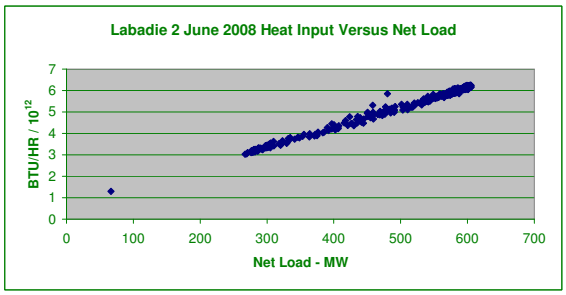
	Averages	
GENERATOR MEGAWATTS	629.3	MW
AUX POWER	30.6	MW
Net Unit Heat Rate Actual (GPHI)	10268.0	BTU/KW-HR
Boiler Efficiency Actual	85.3	%
CONTROL VALVE POSITION LVDT	99.9	%
FEEDWATER TEMP TO ECON	495.8	degF
FEEDWATER TEMP TO HTR 1	447.6	degF
HP Turbine Efficiency Actual	86.8	%
IP Turbine Efficiency Corrected	90.5	%
Condenser Pressure HP	3.0	inHga
Condenser Pressure LP	2.4	inHga
AIRHTR-A GAS OUTLET TEMP	342.0	degF
AIRHTR-B GAS OUTLET TEMP	347.9	degF
AMBIENT AIR TEMP	79.1	degF
CIRC WTR TEMP TO LP CONDB	74.5	degF
CIRC WTR TEMP TO LP CONDB	75.3	degF
CIRC WTR TEMP TO LP CONDB	75.2	degF
CIRC WTR TEMP TO LP CONDB	74.6	degF
Minimum River Temperature	74.5	degF
FWH 1 Temperature Rise	48.1	degF
Net Load	598.6	MW
Average Cond Press	2.7	inHga
Average Exit Gas Temperature	345.0	degF
Aux Power	4.9	%
Gross Unit Heat Rate	9767.9	BTU/KW-HR
Gross Turbine Heat Rate	8335.0	BTU/KW-HR

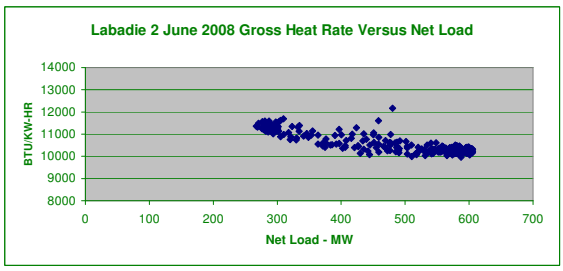


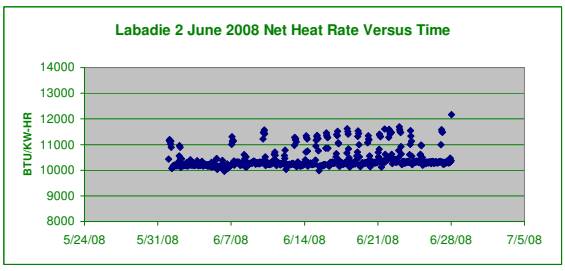












Labadie Unit 2 Rollup, June 2008

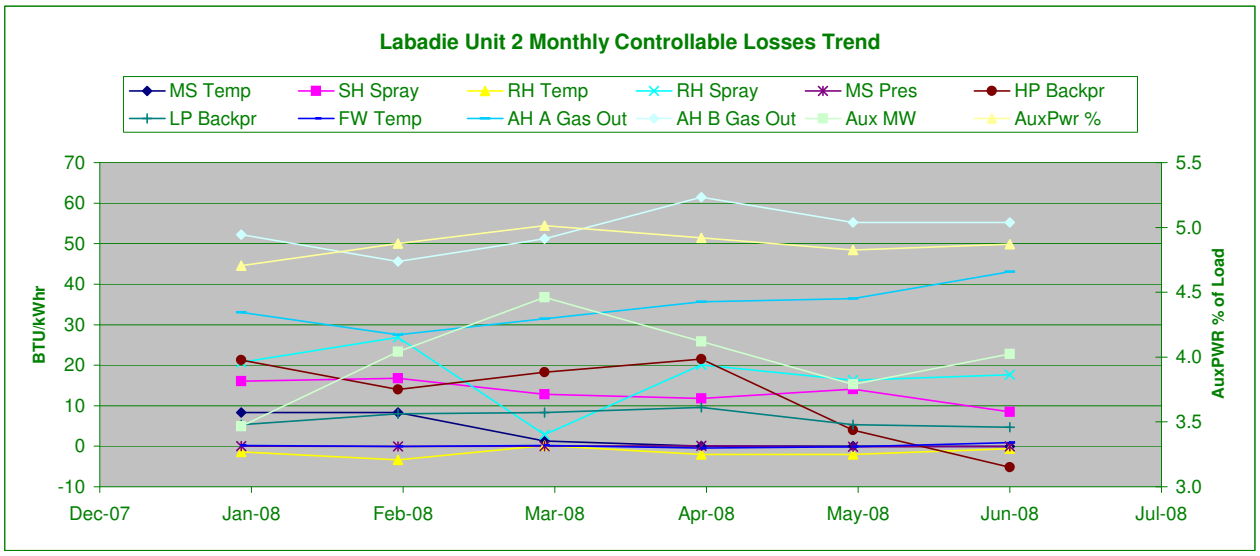
Notable Deviations in Plant Performance Data / Discussion Topics, etc.

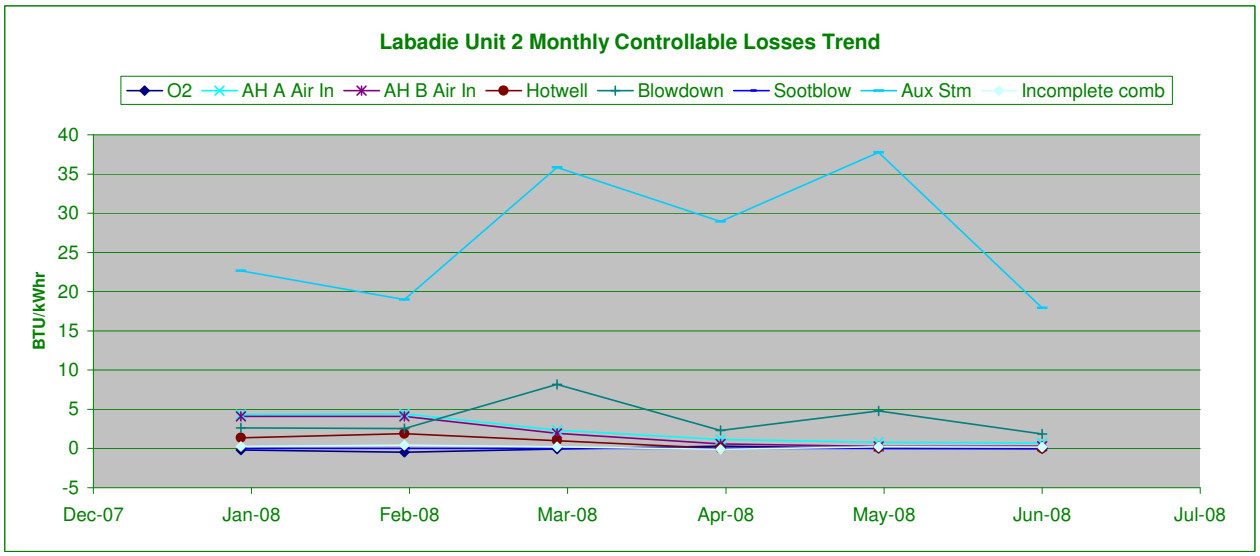
1. The controllable loss parameter target values need to be updated to reflect current plant operation. The target values for all controllable loss parameters have been reviewed using actual 2007 unit data.

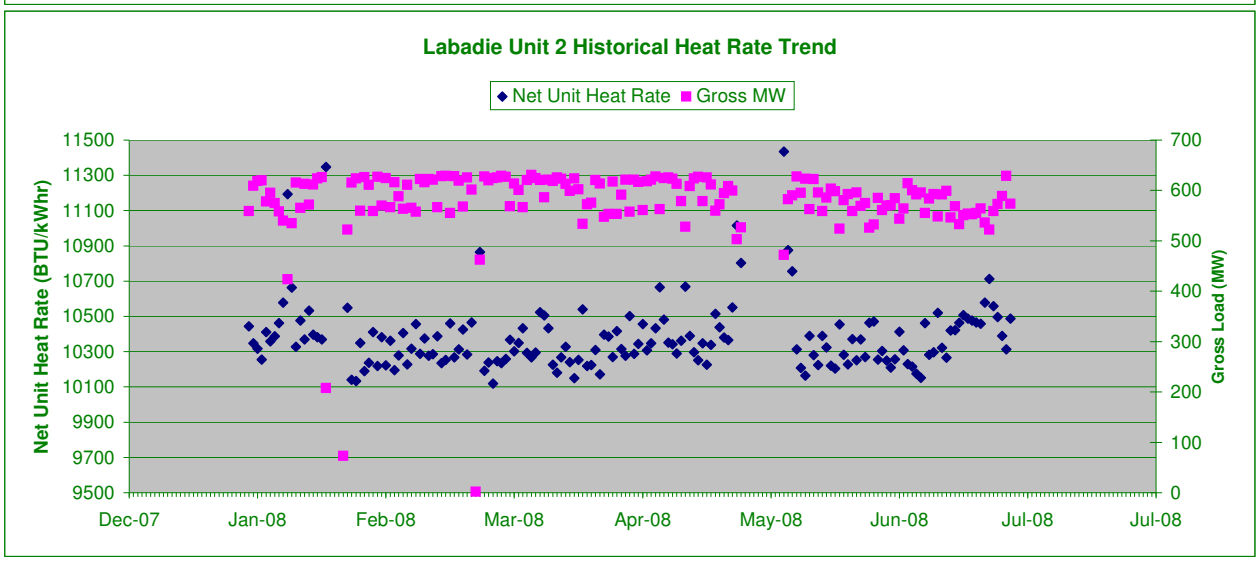
Top Priority Engineering Action Items	JR#	Priority	Resp Pty

Top Instrumentation Deficiencies	Point ID	Actual	Expected	JR#	Priority	Resp Pty

Top Priority EtaPro/OPM Action Items	Priority	Resp Pty
Update target values with agreed upon target values/curves	1	JDS


Labadie Unit 2 Monthly Controllable Losses Trend
MS Temp
SH Spray
RH Temp
RH Spray
MS Pres
HP Backpr
LP Backpr
FW Temp
AH A Gas Out
AH B Gas Out
Aux MW
AuxPwr %
BTU/kWhr
AuxPWR % of Load
70
60
50
40
30
20
10
0
-10
5.5
5.0
4.5
4.0
3.5
3.0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 2 Monthly Controllable Losses Trend
O2
AH A Air In
AH B Air In
Hotwell
Blowdown
Sootblow
Aux Stm
Incomplete comb
BTU/kWhr
40
35
30
25
20
15
10
5
0
-5
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 2 Historical Heat Rate Trend
Net Unit Heat Rate
Gross MW
Net Unit Heat Rate (BTU/kWhr)
Gross Load (MW)
11500
11300
11100
10900
10700
10500
10300
10100
9900
9700
9500
700
600
500
400
300
200
100
0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Jul-08

Unit 2 Performance Analysis
June-08

Overall Heat Rate & Losses Summary

1. The controllable loss parameter target values need to be updated to reflect current plant operation.

Steam Generator Performance Summary:

1. AH Gas Side Differential Pressure increased by over an inch in June.

Steam Turbine Performance Summary:

1. Internal IP Efficiency decreased 0.5% over the month

Condenser Performance Summary:

No items noted

Feedwater Heater Performance Summary:

No items noted

Recommended Actions:

Instrumentation or calculation related issues:

The EtaPro target values need to be updated to reflect current plant operation.

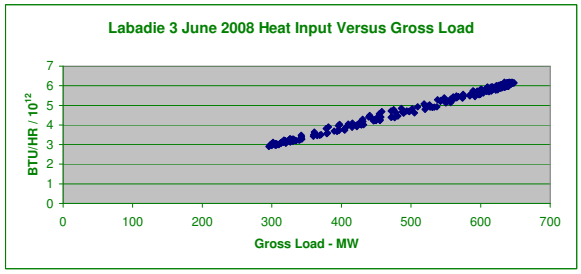
Changes made to the system that affects this month's report:

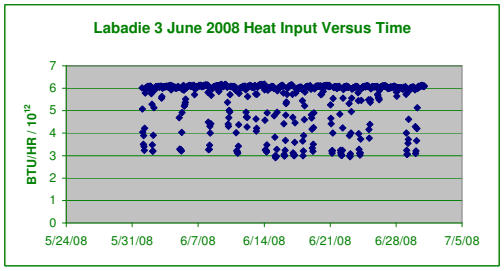
Summary of Performance Report for:

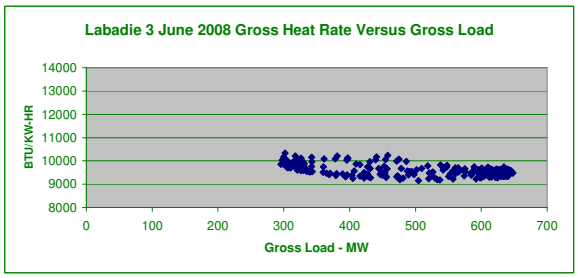
Plant Labadie
Unit 3
Period 6/1/08 to 7/1/08

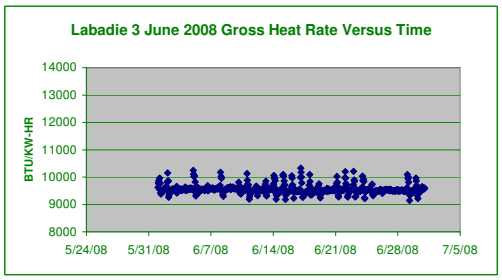
Full Load Performance
Hours of Data 546

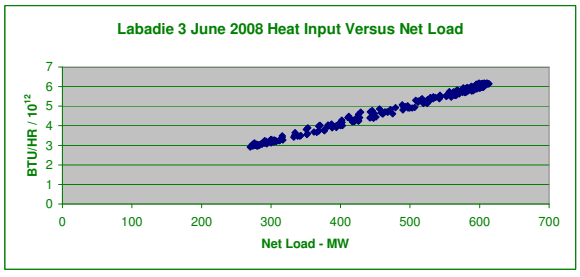
	Averages	
GENERATOR MEGAWATTS	636.7	MW
AUX POWER	30.8	MW
Net Unit Heat Rate Actual (GPHI)	10068.8	BTU/KW-HR
Boiler Efficiency Actual	85.5	%
CONTROL VALVE POSITION LVDT	104.8	%
FEEDWATER TEMP TO ECON	486.7	degF
FEEDWATER TEMP TO HTR 1	438.7	degF
HP Turbine Efficiency Actual	87.3	%
IP Turbine Efficiency Corrected	93.8	%
Condenser Pressure HP	3.4	inHga
Condenser Pressure LP	2.7	inHga
AIRHTR-A GAS OUTLET TEMP	340.6	degF
AIRHTR-B GAS OUTLET TEMP	336.0	degF
AMBIENT AIR TEMP	78.4	degF
CIRC WTR TEMP TO LP CONDB	74.0	degF
CIRC WTR TEMP TO LP CONDB	75.0	degF
CIRC WTR TEMP TO LP CONDB	74.7	degF
CIRC WTR TEMP TO LP CONDB	74.3	degF
Minimum River Temperature	74.0	degF
FWH 1 Temperature Rise	48.0	degF
Net Load	605.8	MW
Average Cond Press	3.0	inHga
Average Exit Gas Temperature	338.3	degF
Aux Power	4.8	%
Gross Unit Heat Rate	9581.0	BTU/KW-HR
Gross Turbine Heat Rate	8190.6	BTU/KW-HR

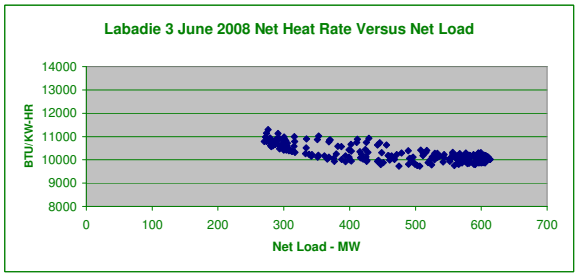


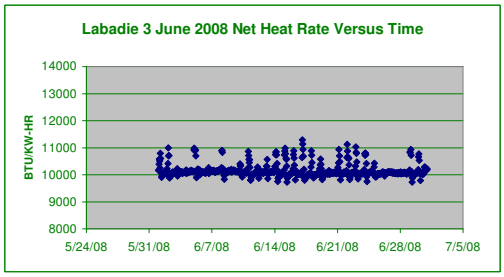












Labadie Unit 3 Rollup, June 2008

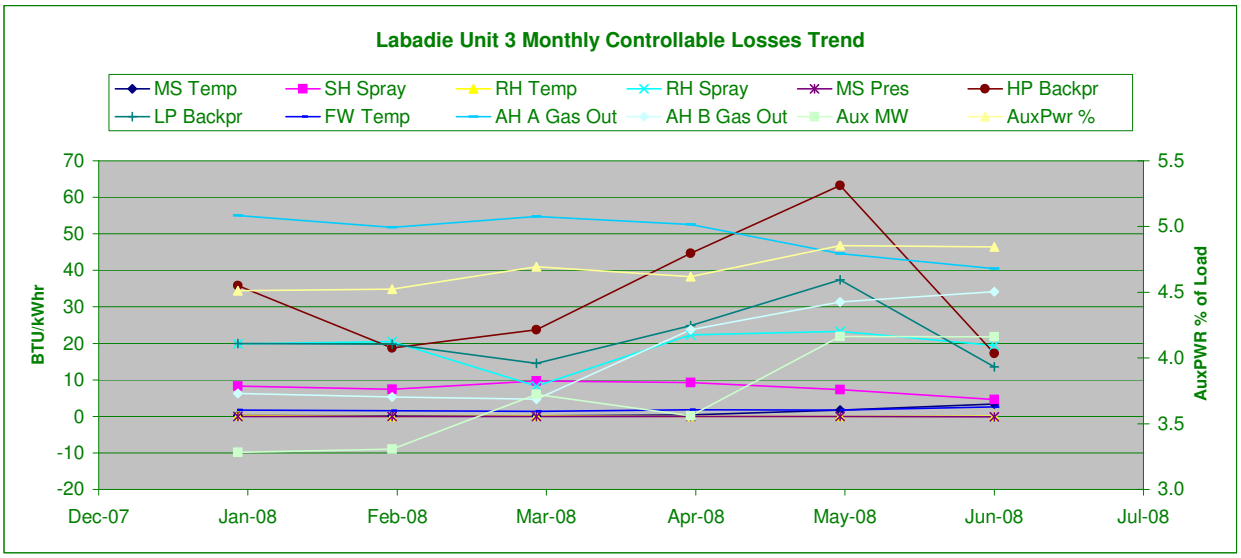
Notable Deviations in Plant Performance Data / Discussion Topics, etc.

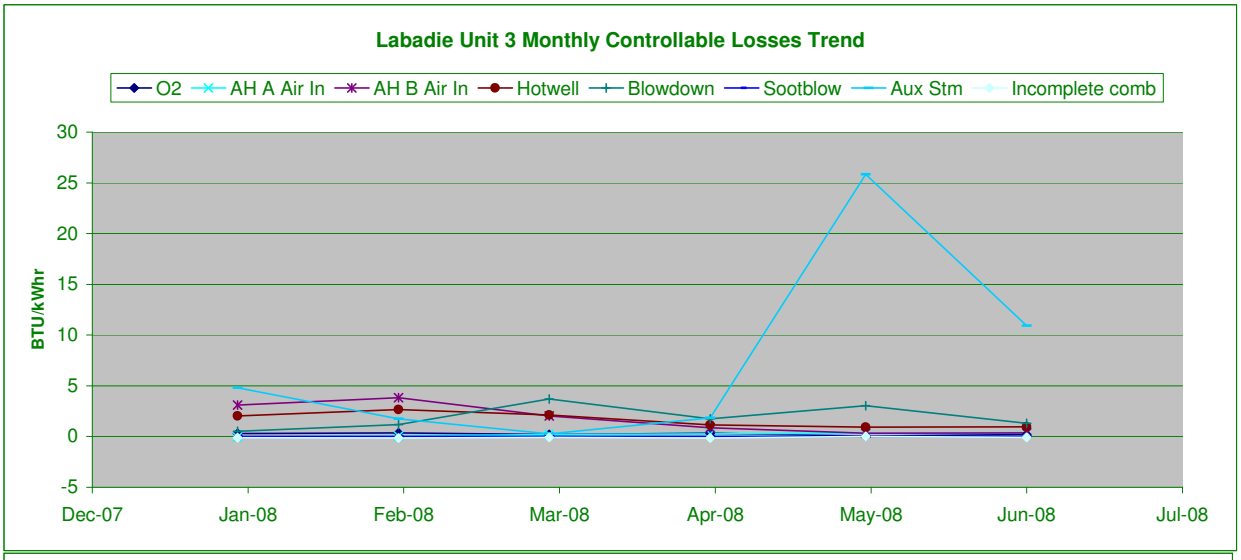
1. The controllable loss parameter target values need to be updated to reflect current plant operation. The target values for all controllable loss parameters have been reviewed using actual 2007 unit data.
2. HP and LP backpressure loss was increasing through May. Both losses decreased significantly in June.

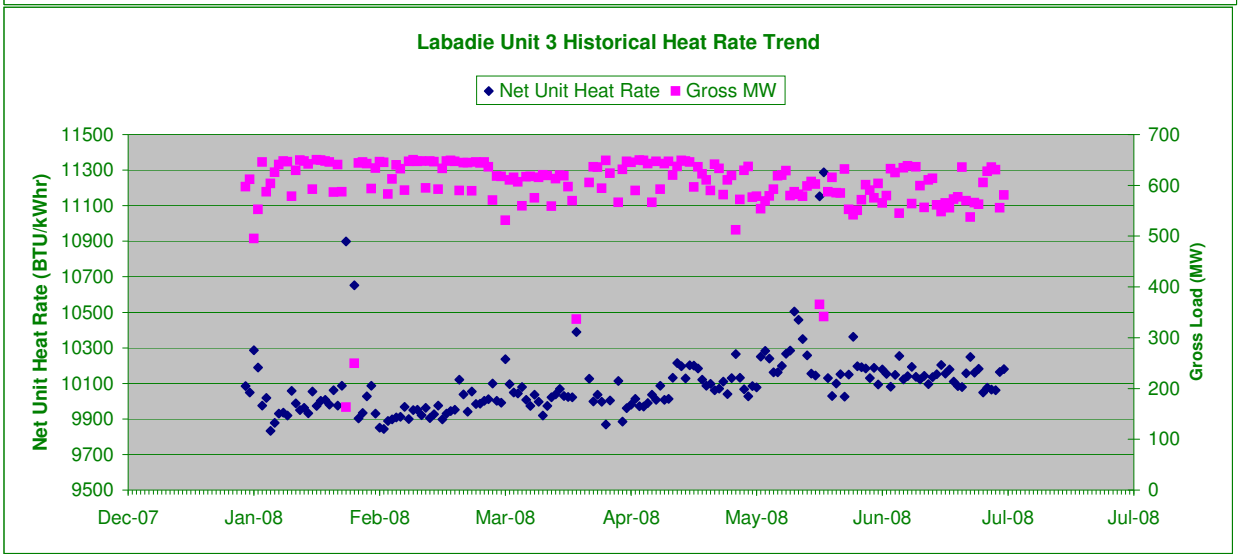
Top Priority Engineering Action Items	JR#	Priority	Resp Pty

Top Instrumentation Deficiencies	Point ID	Actual	Expected	JR#	Priority	Resp Pty

Top Priority EtaPro/OPM Action Items	Priority	Resp Pty
Update target values with agreed upon target values/curves	1	JDS


Labadie Unit 3 Monthly Controllable Losses Trend
MS Temp
SH Spray
RH Temp
RH Spray
MS Pres
HP Backpr
LP Backpr
FW Temp
AH A Gas Out
AH B Gas Out
Aux MW
AuxPwr %
BTU/kWhr
AuxPWR % of Load
70
60
50
40
30
20
10
0
-10
-20
5.5
5.0
4.5
4.0
3.5
3.0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 3 Monthly Controllable Losses Trend
O2
AH A Air In
AH B Air In
Hotwell
Blowdown
Sootblow
Aux Stm
Incomplete comb
BTU/kWhr
30
25
20
15
10
5
0
-5
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 3 Historical Heat Rate Trend
Net Unit Heat Rate
Gross MW
Net Unit Heat Rate (BTU/kWhr)
Gross Load (MW)
11500
11300
11100
10900
10700
10500
10300
10100
9900
9700
9500
700
600
500
400
300
200
100
0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Jul-08

Unit 3 Performance Analysis
June-08

Overall Heat Rate & Losses Summary

1. The controllable loss parameter target values need to be updated to reflect current plant operation.

Steam Generator Performance Summary:

No items noted

Steam Turbine Performance Summary:

No items noted

Condenser Performance Summary:

1. Cleanliness factor up by 10-15% since beginning on the month

Feedwater Heater Performance Summary:

1. FWH 6A Drain Inlet Flow 30 klbs/hr less than FWH 6B. FWH 6A Extraction Flow 30 klbs/hr higher than FWH 6B. FWH 6A outlet temp is 20F higher than FWH 6B outlet temperature.
2. FWH 5A Extraction flow 30 klbs/hr less than FWH 5B.
3. FWH 2 temperature rise is 7F lower than expected.

Recommended Actions:

Instrumentation or calculation related issues:

The EtaPro target values need to be updated to reflect current plant operation.

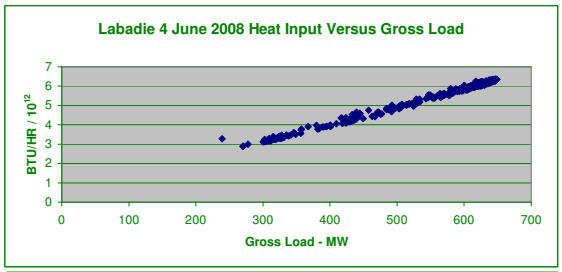
Changes made to the system that affects this month's report:

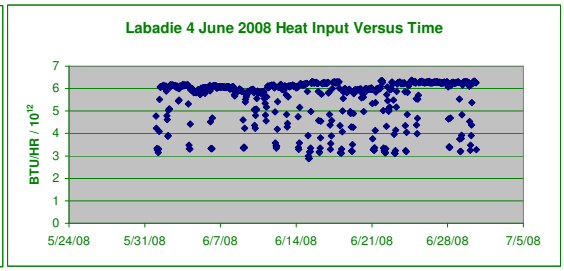
Summary of Performance Report for:

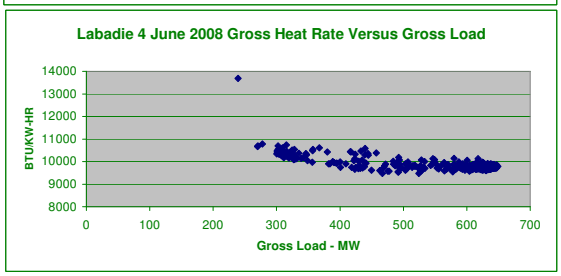
Plant Labadie
Unit 4
Period 6/1/08 to 7/1/08

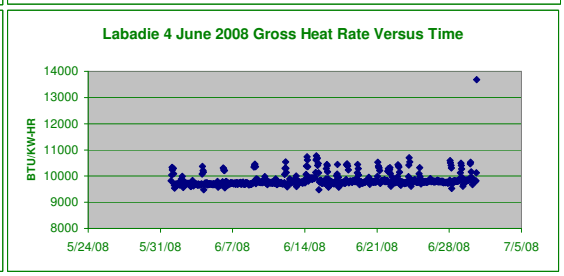
Full Load Performance
Hours of Data 157

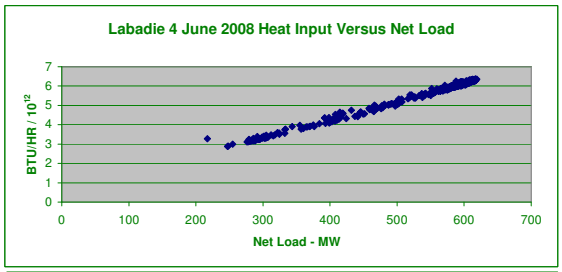
	Averages	
GENERATOR MEGAWATTS	641.0	MW
AUX POWER	29.9	MW
Net Unit Heat Rate Actual (GPHI)	10263.0	BTU/KW-HR
Boiler Efficiency Actual	85.3	%
CONTROL VALVE POSITION LVDT	98.7	%
FEEDWATER TEMP TO ECON	484.5	degF
FEEDWATER TEMP TO HTR 1	423.3	degF
HP Turbine Efficiency Actual	87.3	%
IP Turbine Efficiency Corrected	93.7	%
Condenser Pressure HP	3.4	inHga
Condenser Pressure LP	2.6	inHga
AIRHTR-A GAS OUTLET TEMP	339.5	degF
AIRHTR-B GAS OUTLET TEMP	332.9	degF
AMBIENT AIR TEMP	78.3	degF
CIRC WTR TEMP TO LP CONDB	75.4	degF
CIRC WTR TEMP TO LP CONDB	76.3	degF
CIRC WTR TEMP TO LP CONDB	76.0	degF
CIRC WTR TEMP TO LP CONDB	75.5	degF
Minimum River Temperature	75.4	degF
FWH 1 Temperature Rise	61.2	degF
Net Load	611.1	MW
Average Cond Press	3.0	inHga
Average Exit Gas Temperature	336.2	degF
Aux Power	4.7	%
Gross Unit Heat Rate	9783.7	BTU/KW-HR
Gross Turbine Heat Rate	8344.3	BTU/KW-HR

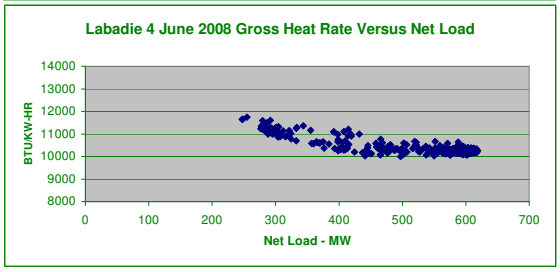


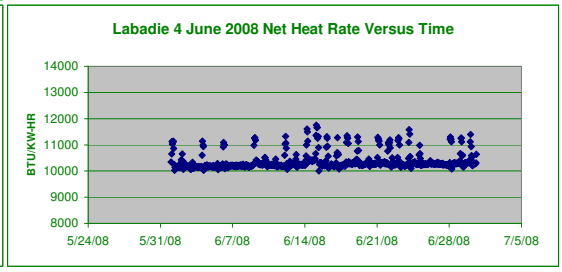












Labadie Unit 4 Scorecard, June 2008

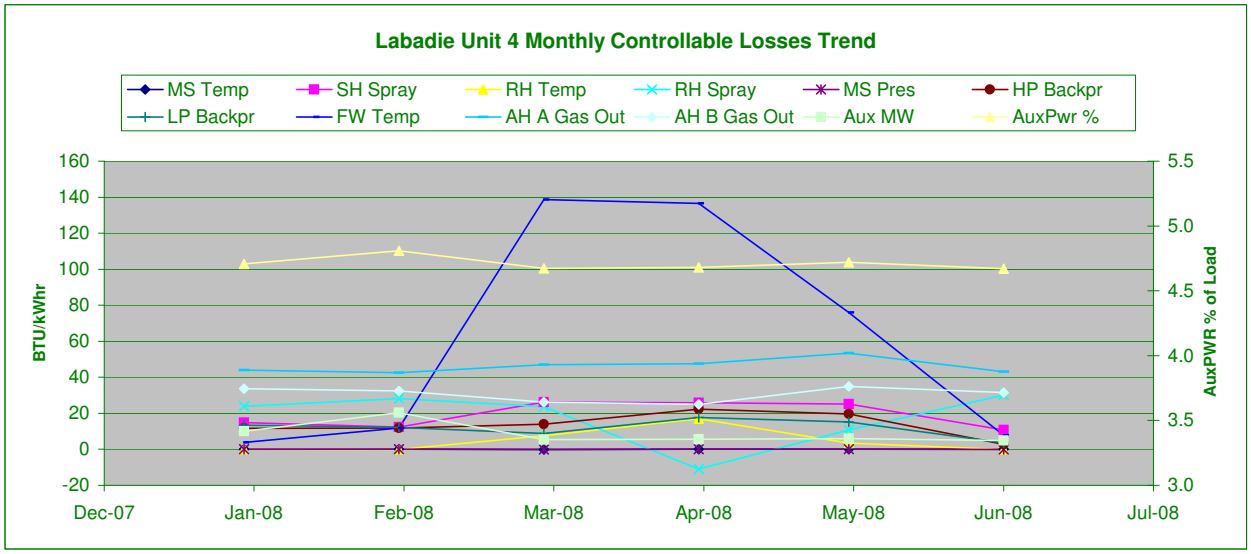
Notable Deviations in Plant Performance Data / Discussion Topics, etc.

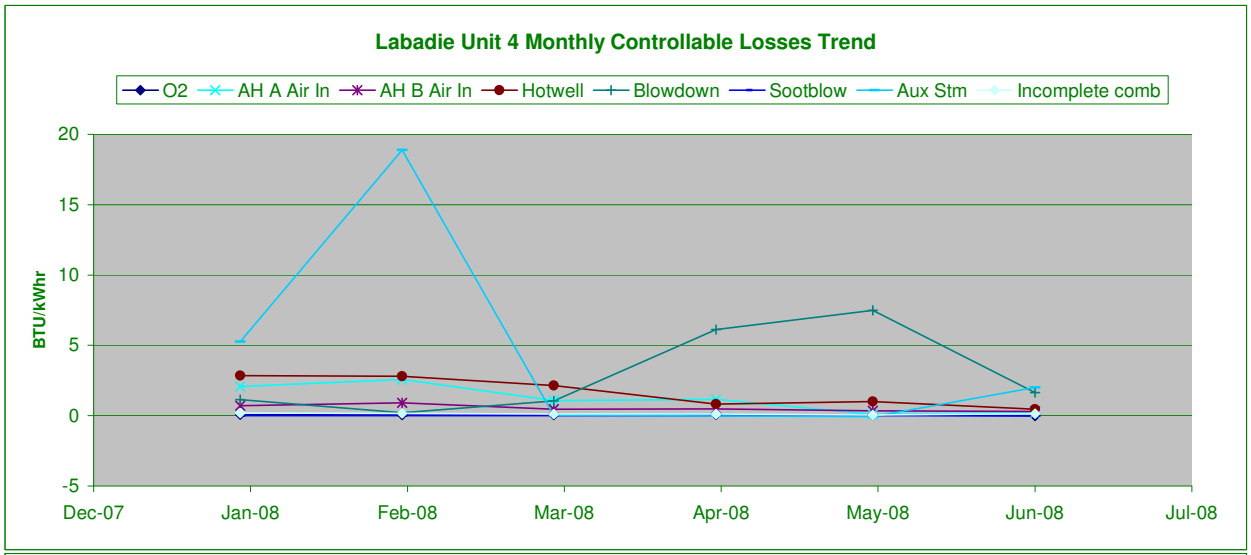
1. The controllable loss parameter target values need to be updated to reflect current plant operation. The target values for all controllable loss parameters have been reviewed using actual 2007 unit data.
2. FW Temp was the largest controllable loss for the unit during March, April, and May.

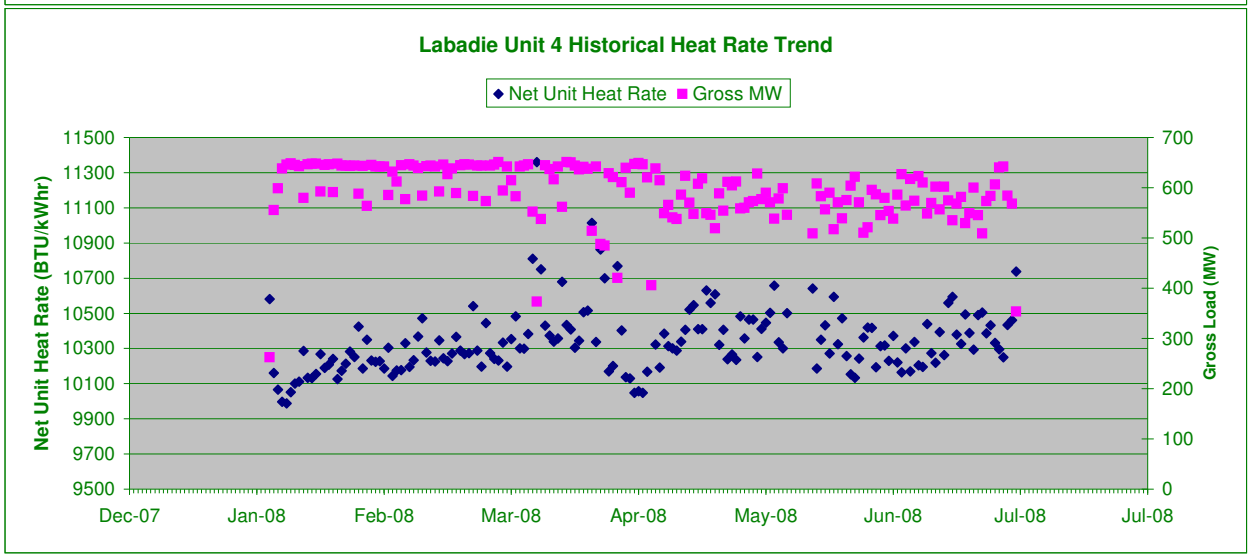
Top Priority Engineering Action Items	JR#	Priority	Resp Pty

Top Instrumentation Deficiencies	Point ID	Actual	Expected	JR#	Priority	Resp Pty

Top Priority EtaPro/OPM Action Items	Priority	Resp Pty
Update target values with agreed upon target values/curves	1	JDS
6A normal drainer between 30 and 60% open. 6B normal drainer 100% open with emergency drain 20-30% open		
3. DA Extraction temp dropped by 100F in the middle of June - instrumentation issue corrected?		


Labadie Unit 4 Monthly Controllable Losses Trend
MS Temp
SH Spray
RH Temp
RH Spray
MS Pres
HP Backpr
LP Backpr
FW Temp
AH A Gas Out
AH B Gas Out
Aux MW
AuxPwr %
BTU/kWhr
AuxPWR % of Load
160
140
120
100
80
60
40
20
0
-20
5.5
5.0
4.5
4.0
3.5
3.0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 4 Monthly Controllable Losses Trend
O2
AH A Air In
AH B Air In
Hotwell
Blowdown
Sootblow
Aux Stm
Incomplete comb
BTU/kWhr
20
15
10
5
0
-5
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08


Labadie Unit 4 Historical Heat Rate Trend
Net Unit Heat Rate
Gross MW
Net Unit Heat Rate (BTU/kWhr)
Gross Load (MW)
11500
11300
11100
10900
10700
10500
10300
10100
9900
9700
9500
700
600
500
400
300
200
100
0
Dec-07
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Jul-08

Unit 4 Performance Analysis
June-08

Overall Heat Rate & Losses Summary

1. The controllable loss parameter target values need to be updated to reflect current plant operation.

Steam Generator Performance Summary:

No items noted

Steam Turbine Performance Summary:

No items noted

Condenser Performance Summary:

1. Both vacuum pumps running with a total removal rate of 140 SCFM.

Feedwater Heater Performance Summary:

1. 6A extraction temp and drain temp reading the same
   6A TTD and DCA showing unusual trends - venting issue
   6A normal drainer between 30 and 60% open. 6B normal drainer 100% open with emergency drain 20-30% open
2. 5A DCA 5F higher than expected
3. DA Extraction temp dropped by 100F in the middle of June - instrumentation issue corrected?

Recommended Actions:

Instrumentation or calculation related issues:

The EtaPro target values need to be updated to reflect current plant operation.

Changes made to the system that affects this month's report: