



**Dave Johnston Plant Heat Rate Improvement Plan**  
DJ\_2010\_HRIP

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**1. Revision History**

Version	Status	Author	Reason for Issue	Date
1			2010 Plan Issue	March 31, 2010

**2. Revision Control**

This document is maintained by the PacifiCorp Energy Asset Management group.

**3. Glossary of Terms**

3.1. Actual Net Heat Rate (Btu/kWh)

Total actual heat input in Btu's divided by actual net generation.

3.2. As-built Net Heat Rate (Btu/kWh)

Total guaranteed heat input, from the design heat balances in Btu's divided by the guaranteed net generation, corrected for changes in equipment from design. This is the baseline number for the plant personnel when they make their annual reconciliation.

3.3. British thermal unit (Btu)

British thermal unit is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

3.4. Gross Heat Rate (Btu/kWh)

Total actual heat input in Btu's divided by actual gross generation.

3.5. Net Generation (kWh)

Gross generation minus auxiliary or station usage

3.6. Planned Net Heat Rate (Btu/kWh)

Total budgeted heat input in Btu's divided by the budgeted net generation. This number is the annual goal for the plant personnel to achieve.

**4. Overall Plan and Objectives**

4.1. Unit 1- Goals for 10-year plan

Figure 1, in the appendix, shows the ten-year heat rate plan for Dave Johnston unit 1. The dips in the Planned Net Heat Rate in the years 2013 and 2018 are due to the work that is scheduled to take place during the planned outages in 2013 and 2018 (see section 7).

4.2. Unit 2 - Goals for 10-year Plan

Figure 2, in the appendix, shows the ten-year heat rate plan for Dave Johnston unit 2. The dips in the Planned Net Heat Rate in the years 2012 and 2017 are due to the work that is scheduled to take place during the planned outages in 2012 and 2017 (see section 7).

4.3. Unit 3 - Goals for 10-year Plan

Figure 3, in the appendix, shows the ten-year heat rate plan for Dave Johnston unit 3. The dips in the Planned Net Heat Rate in the years 2010, 2014, and 2018 are due to the work that is scheduled to take place during the planned outages in 2010, 2014 and 2018 (see section 7).

4.4. Unit 4 - Goals for 10-year Plan

Figure 4, in the appendix, shows the ten-year heat rate plan for Dave Johnston unit 4. The dips in the Planned Net Heat Rate in the years 2012 and 2016 are due to the work that is scheduled to take place during the planned outages in 2012 and 2016 (see section 7).

**5. Performance against last year's plan**

5.1. Unit 1

Planned Net Heat Rate				10,971
Reconciliation to Planned Net Heat Rate	Planned	Actual		
Boiler Losses	(13)	68		81
Turbine Losses	518	886		368
Other Losses	77	112		34
Actual Net Heat Rate				11,454

Negative numbers in the table above are improvements to heat rate.

5.2. Unit 2

Planned Net Heat Rate				10,987
Reconciliation to Planned Net Heat Rate	Planned	Actual		
Boiler Losses	10	99		89
Turbine Losses	635	952		317
Other Losses	(42)	93		135
Actual Net Heat Rate				11,528

Negative numbers in the table above are improvements to heat rate.

5.3. Unit 3

Planned Net Heat Rate			11,476
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	31	137	106
Turbine Losses	608	594	(14)
Other Losses	347	251	(96)
Actual Net Heat Rate			11,472

Negative numbers in the table above are improvements to heat rate.

5.4. Unit 4

Planned Net Heat Rate			10,563
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	(65)	13	78
Turbine Losses	424	855	431
Other Losses	(41)	205	246
Actual Net Heat Rate			11,318

Negative numbers in the table above are improvements to heat rate.

**6. Major Losses for Current Planned Net Heat Rate**

This section of the heat rate plan identifies the reconciliation of the items that have the most impact between the As-built Net Heat Rate and the Planned Net Heat Rate.

6.1. Unit 1

As-Built Net Heat Rate	10,390
Boiler Losses	(9)
Turbine Losses	619
Other Losses	106
Planned Net Heat Rate	11,106

6.2. Unit 2

As-Built Net Heat Rate	10,389
Boiler Losses	14
Turbine Losses	598
Other Losses	37
Planned Net Heat Rate	11,038

6.3. Unit 3

As-Built Net Heat Rate	10,506
Boiler Losses	31
Turbine Losses	580
Other Losses	355
Planned Net Heat Rate	11,473

6.4. Unit 4

As-Built Net Heat Rate	10,242
Boiler Losses	(64)
Turbine Losses	416
Other Losses	(135)
Planned Net Heat Rate	10,459

**7. Major Unit Specific Initiatives**

This section identifies the major planned capital and operational activities to improve or regain lost heat rate for the current 10-year plan.

7.1. Unit 1

Table 1 shows the capital projects included in the 10-year plan that contribute to the recovery of lost heat rate. Numbers inside parentheses are negative impact on heat rate and represent improvement to the overall unit efficiency.

7.2. Unit 2

Table 2 shows the capital projects included in the 10-year plan that contribute to the recovery of lost heat rate. Numbers inside parentheses are negative impact on heat rate and represent improvement to the overall unit efficiency.

7.3. Unit 3

Table 3 shows the capital projects included in the 10-year plan that contribute to the recovery of lost heat rate. Numbers inside parentheses are negative impact on heat rate and represent improvement to the overall unit efficiency.

7.4. Unit 4

Table 4 shows the capital projects included in the 10-year plan that contribute to the recovery of lost heat rate. Numbers inside parentheses are negative impact on heat rate and represent improvement to the overall unit efficiency.

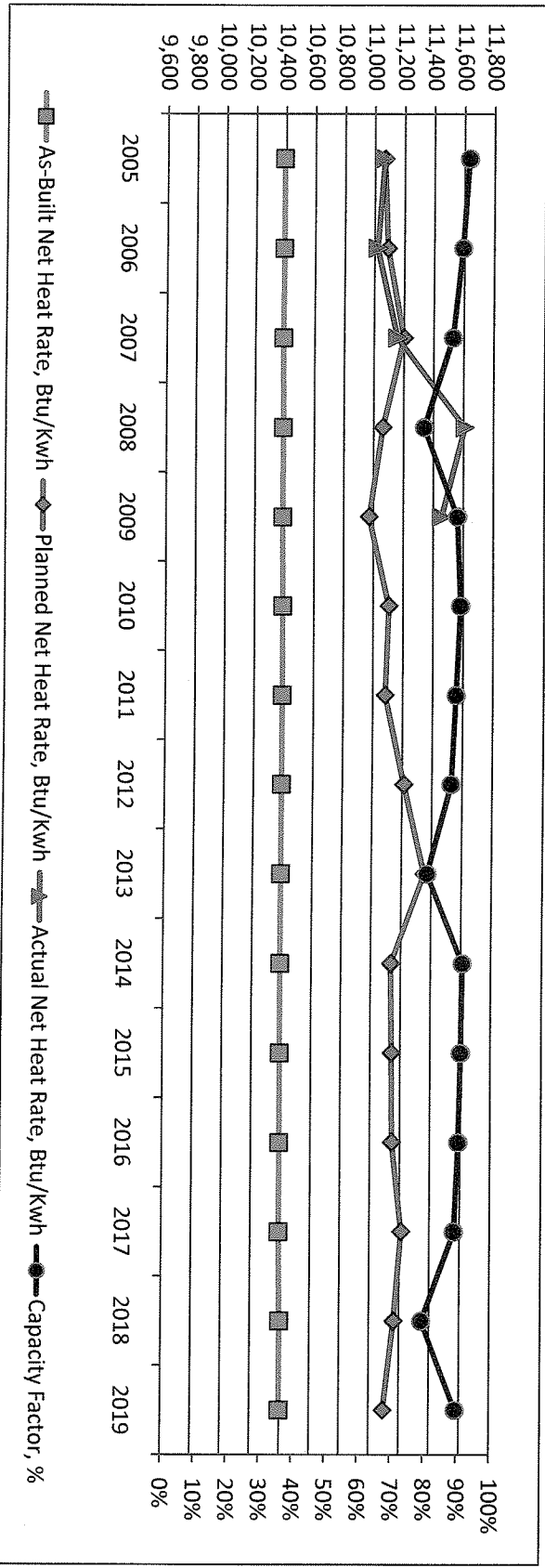
**8. Annual Review and Update**

This plan will be reviewed and updated annually by the Dave Johnston plant management team by March 31.

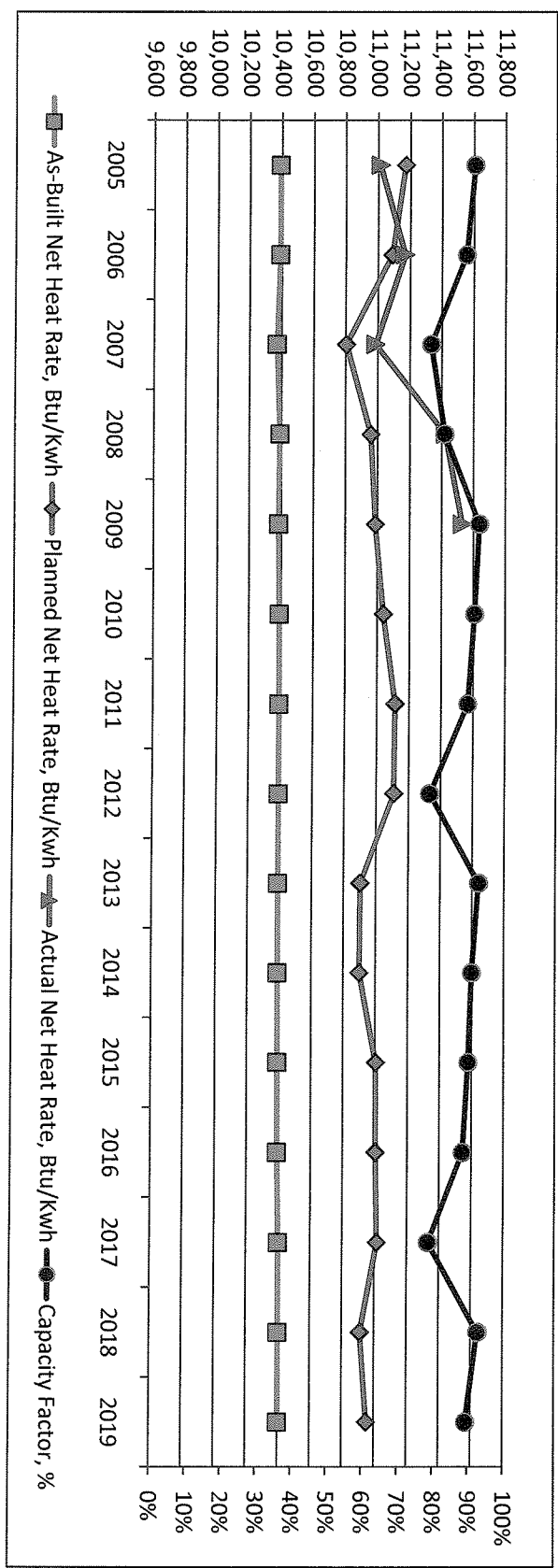
**9. Appendix**



**Figure 1**  
**Dave Johnston Unit 1**  
**10-year Plan Heat Rate Goals**



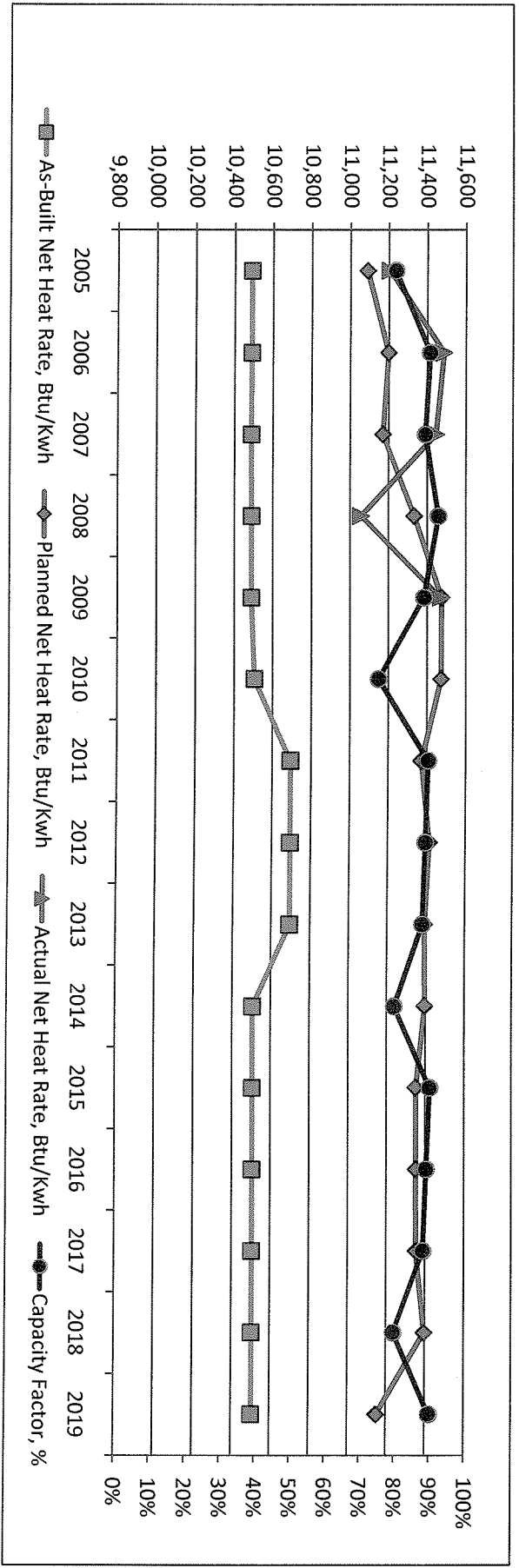
**Figure 2**  
**Dave Johnston Unit 2**  
**10-year Plan Heat Rate Goals**



**Dave Johnston 2**

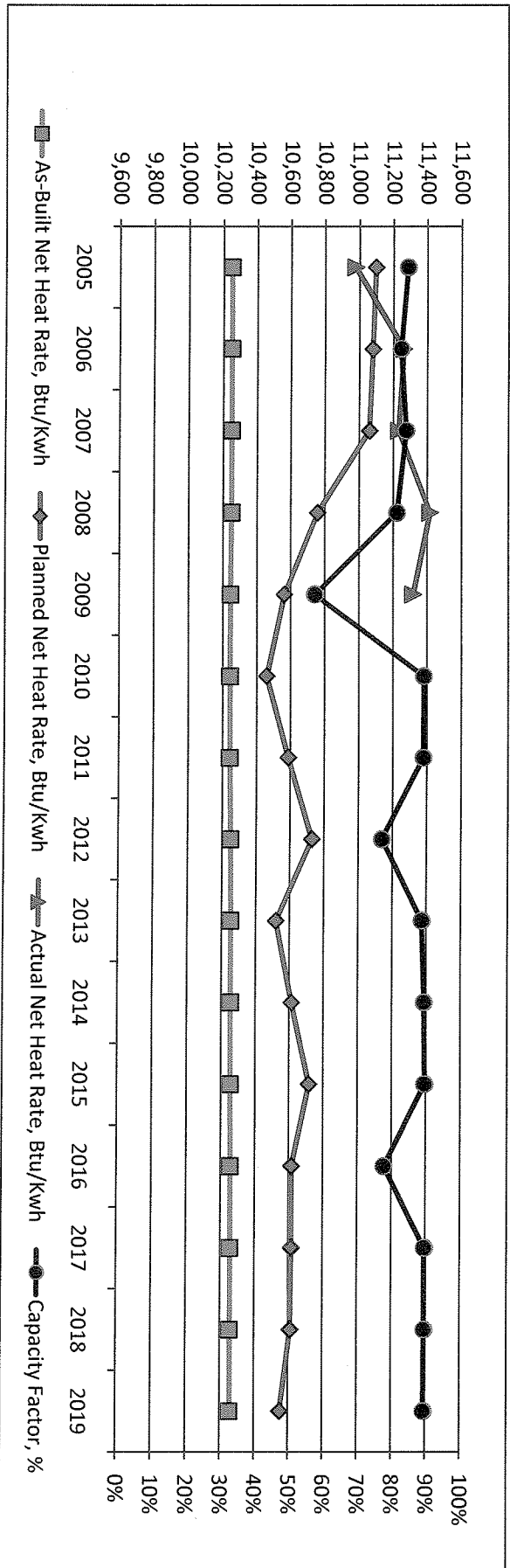
Year	As-Built Net Heat Rate, Btu/kWh	Planned Net Heat Rate, Btu/kWh	Actual Net Heat Rate, Btu/kWh	Capacity Factor, %
2005	10,390	10,390	10,390	91.2%
2006	10,390	10,390	10,390	88.9%
2007	10,371	10,371	10,371	78.9%
2008	10,390	10,390	10,390	82.7%
2009	10,384	10,384	10,384	92.6%
2010	10,389	10,389	10,389	91.3%
2011	10,389	10,389	10,389	89.4%
2012	10,389	10,389	10,389	78.7%
2013	10,389	10,389	10,389	92.8%
2014	10,389	10,389	10,389	90.8%
2015	10,389	10,389	10,389	89.9%
2016	10,389	10,389	10,389	88.4%
2017	10,398	10,398	10,398	78.6%
2018	10,398	10,398	10,398	92.8%
2019	10,398	10,398	10,398	89.4%

**Figure 3**  
**Dave Johnston Unit 3**  
**10-year Plan Heat Rate Goals**



**Dave Johnston 3**

**Figure 4**  
**Dave Johnston Unit 4**  
**10-year Plan Heat Rate Goals**



**Table 1**  
**Dave Johnston Unit 1**  
**10-year Plan Heat Rate Improvement Projects**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Budgeted / Planned Heat Rate Changes, Net basis (Improvements are negative)</b>										
	Btu/KWh									
Total adjustments related to Capital Projects	Btu/KWh	0	0	0	0	0	0	0	0	0
<b>Budgeted / Planned Auxiliary Load Changes</b>										
Hg Capture (100 kw in 2018)	KW								100	100
Total Auxiliary Load Changes	KW	0	0	0	0	0	0	0	0	100
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>										
	MW									
Total Capacity Changes	MW	0	0	0	0	0	0	0	0	0

**Table 2**  
**Dave Johnston Unit 2**  
**10-year Plan Heat Rate Improvement Projects**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Budgeted / Planned Heat Rate Changes, Net basis (Improvements are negative)</b>										
Pulverizer/PA Fan Controls Replace (2008)	Btu/kWh	-20	-20	-20	-20	-20	-20	-20	-20	-20
Total adjustments related to Capital Projects	Btu/kWh	-20	-20	-20	-20	-20	-20	-20	-20	-20
<b>Budgeted / Planned Auxiliary Load Changes</b>										
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	-13	-13	-13	-13	-13	-13	-13	-13	-13
Hg Capture (100 kw in 2017)	KW							100	100	100
Total Auxiliary Load Changes	KW	-13	-13	-13	-13	-13	-13	-13	87	87
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>										
	MW									
Total Capacity Changes	MW	0	0	0	0	0	0	0	0	0

**Table 3**  
**Dave Johnston Unit 3**  
**10-year Plan Heat Rate Improvement Projects**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Budgeted / Planned Heat Rate Changes, Net basis. (Improvements are negative)</b>										
3C Mill PA Flow indication 2010	Btu/kWh	-5	-10	-10	-10	-10	-10	-10	-10	-10
Clean Air Initiative - DFGD (85%) LNB	Btu/kWh	204.6	204.6	204.6	204.6	204.6	204.6	204.6	204.6	204.6
Total adjustments related to Capital Projects	Btu/kWh	199.6	194.6	194.6	194.6	194.6	194.6	194.6	194.6	194.6
<b>Budgeted / Planned Auxiliary Load Changes</b>										
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	377	367	367	367	367	367	367	367	367
Total Auxiliary Load Changes	KW	377	367	367	367	367	367	367	367	367
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>										
Clean Air Initiative - DFGD (85%) LNB	MW	-4.21	-4.21	-4.21	-4.21	-4.21	-4.21	-4.21	-4.21	-4.21
Unit Rerated after Environmental Projects (2014 +10MWn)	MW					10	10	10	10	10
Total Capacity Changes	MW	-4.2	-4.21	-4.21	-4.21	5.79	5.79	5.79	5.79	5.79

