



**Huntington Plant Heat Rate Improvement Plan**  
**Htg\_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 Huntington unit 1. The dips in the Planned Net Heat Rate in the years 2011 and 2015 are due to the work that is scheduled to take place during the planned outages in 2010 and 2014 (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 Huntington unit 2. 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 2011 and 2015 (see section 7).

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

5.1. Unit 1

Planned Net Heat Rate			10,143
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	81	184	103
Turbine Losses	243	(32)	(275)
Other Losses	25	75	49
<u>Actual Net Heat Rate</u>			<u>10,020</u>

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

5.2. Unit 2

Planned Net Heat Rate			10,075
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	118	74	(44)
Turbine Losses	279	147	(132)
Other Losses	(24)	112	135
<u>Actual Net Heat Rate</u>			<u>10,034</u>

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	9,791
Boiler Losses	111
Turbine Losses	218
Other Losses	(10)
<u>Planned Net Heat Rate</u>	<u>10,110</u>

6.2. Unit 2

As-Built Net Heat Rate	9,702
Boiler Losses	124
Turbine Losses	241
Other Losses	35
<hr/>	<hr/>
Planned Net Heat Rate	10,101

**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

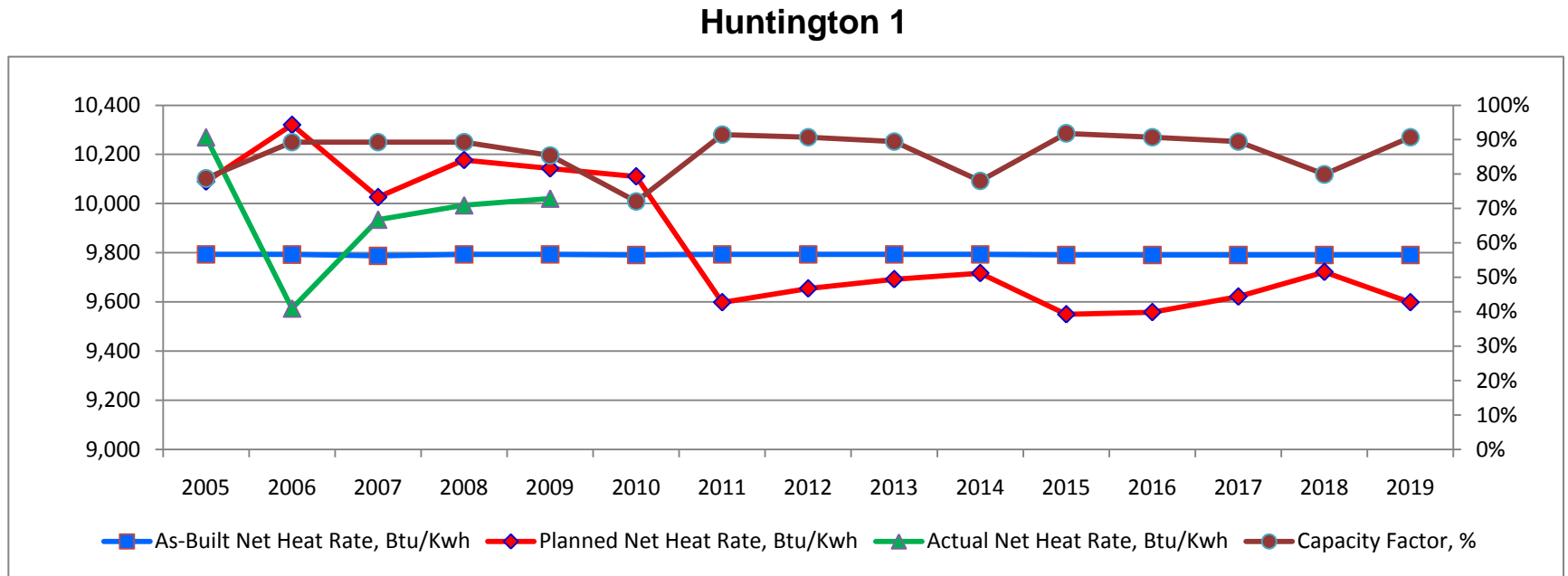
Table 2 shows the capital projects included in the 10-year plan that contribute to the recovery of lost heat rate. Numbers inside parentheses are negative impact on heat rate and represent improvement to the overall unit efficiency.

**8. Annual Review and Update**

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

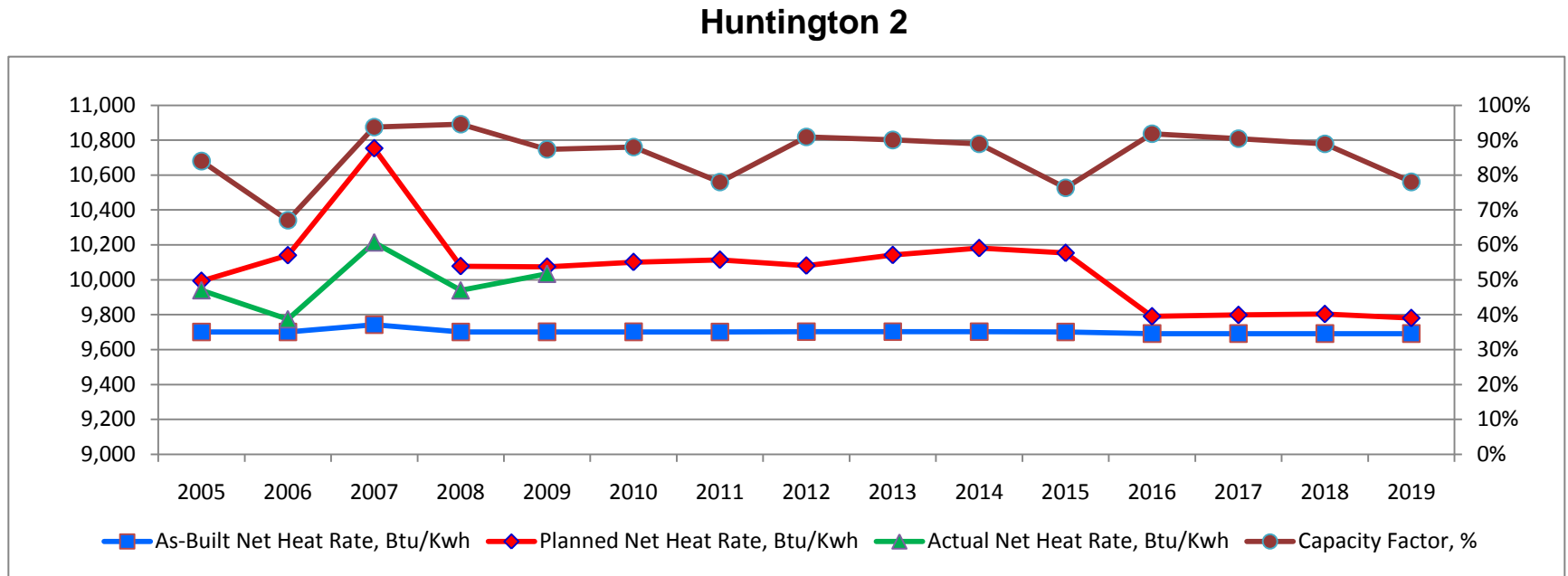
**9. Appendix**

**Figure 1**  
**Huntington Unit 1**  
**10-year Plan Heat Rate Goals**



Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As-Built Net Heat Rate, Btu/Kwh	9,794	9,793	9,787	9,794	9,794	9,791	9,793	9,793	9,793	9,793	9,791	9,791	9,791	9,791	9,791
Planned Net Heat Rate, Btu/Kwh	10,089	10,320	10,026	10,177	10,143	10,110	9,598	9,655	9,692	9,717	9,550	9,558	9,622	9,722	9,598
Actual Net Heat Rate, Btu/Kwh	10,270	9,573	9,935	9,993	10,020										
Capacity Factor, %	78.7%	89.3%	89.3%	89.3%	85.4%	72.1%	91.5%	90.7%	89.4%	78.0%	91.8%	90.7%	89.4%	79.9%	90.7%

**Figure 2**  
**Huntington Unit 2**  
**10-year Plan Heat Rate Goals**



Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As-Built Net Heat Rate, Btu/Kwh	9,701	9,701	9,742	9,701	9,702	9,702	9,701	9,702	9,702	9,702	9,701	9,692	9,692	9,692	9,692
Planned Net Heat Rate, Btu/Kwh	9,993	10,140	10,753	10,078	10,075	10,101	10,114	10,081	10,141	10,181	10,153	9,790	9,798	9,803	9,780
Actual Net Heat Rate, Btu/Kwh	9,940	9,774	10,214	9,940	10,034										
Capacity Factor, %	84.0%	67.1%	93.7%	94.6%	87.4%	88.0%	78.0%	90.9%	90.1%	88.9%	76.3%	91.8%	90.4%	88.9%	78.0%



Huntington Plant Heat Rate Improvement Plan

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**Table 1**  
**Huntington 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>											
3 Feedwater Heater Replacement (2011)	Btu/kWh		-10	-10	-10	-10	-10	-10	-10	-10	-10
Cooling Tower Fill (2010)	Btu/kWh	-2	-10	-10	-10	-10	-10	-10	-10	-10	-10
Air Heater Basket Replacements (2010)	Btu/kWh		-80	-80	-80	-80	-80	-80	-80	-80	-80
Boiler Optimization (2014)	Btu/kWh					0	-40	-40	-40	-40	-40
Scrubber Wet Stack Conversion (Aux steam reheat)(2010)	Btu/kWh	-13	-75	-75	-75	-75	-75	-75	-75	-75	-75
Steam Air Heaters (est)(2011)	Btu/kWh		120	120	120	120	120	120	120	120	120
Dense Pack Turbine	Btu/kWh	-29	-350	-350	-350	-350	-350	-350	-350	-350	-350
Low NOX Burners (LOI effect)	Btu/kWh		50	50	50	50	50	50	50	50	50
Total adjustments related to Capital Projects	Btu/kWh	-44	-355	-355	-355	-355	-395	-395	-395	-395	-395
<b>Budgeted / Planned Auxiliary Load Changes</b>											
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	-124	-14	-14	-14	-14	-126	-126	-126	-126	-126
Total Auxiliary Load Changes	KW	-124	-14	-14	-14	-14	-126	-126	-126	-126	-126
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>											
Clean Air Initiative Additions (1.48MW 2010)	MW	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48
Turbine upgrade Dense Pack (18nMW 2010)	MW	18	18	18	18	18	18	18	18	18	18
Total Capacity Changes	MW	17	17	17	17	17	17	17	17	17	17

Huntington Plant Heat Rate Improvement Plan

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**Table 2**  
**Huntington 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>											
Cooling Tower Fill	Btu/kWh	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Air Heater Basket Replacements (2011)	Btu/kWh			-80	-80	-80	-80	-80	-80	-80	-80
Boiler Optimization (2015)	Btu/kWh						0	-40	-40	-40	-40
Steam Air Heaters (2008)	Btu/kWh	0	0	120	120	120	120	120	120	120	120
2 LP FWHeaters (2012)	Btu/kWh			-5	-5	-5	-5	-5	-5	-5	-5
Dense Pack Turbine	Btu/kWh						-62	-373	-373	-373	-373
Total adjustments related to Capital Projects	Btu/kWh	-10	-10	25	25	25	-37	-388	-388	-388	-388
<b>Budgeted / Planned Auxiliary Load Changes</b>											
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	-25	-25	62	62	62	62	-37	-37	-37	-37
Complete Unit 1 & 2 BA Drag Chain Conveyor (eliminate ash water pumps)(2011)	KW						-73	-440	-440	-440	-440
Total Auxiliary Load Changes	KW	-25	-25	62	62	62	-11	-477	-477	-477	-477
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>											
Turbine upgrade Dense Pack (18nMW 2019)	MW						18	18	18	18	18
Total Capacity Changes	MW	0	0	0	0	0	18	18	18	18	18

**10. Required Signatures**

Performance Engineer – Huntington Plant		Ron Hall	
Signature:	(on file)	Date:	24Mar10

Manager, Engineering – Huntington Plant		Glenn Pinterich	
Signature:	(on file)	Date:	24Mar10

Managing Director – Huntington Plant		DJ Cunningham	
Signature:	(on file)	Date:	25Mar10