



**Hunter Plant Heat Rate Improvement Plan**  
**Htr\_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 Hunter 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 Hunter 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).

4.3. Unit 3 - Goals for 10-year Plan

Figure 3, in the appendix, shows the ten-year heat rate plan for Hunter unit 3. The dips in the Planned Net Heat Rate in the years 2013 and 2017 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				10,762
Reconciliation to Planned Net Heat Rate	Planned	Actual		
Boiler Losses	268	344	76	
Turbine Losses	554	599	45	
Other Losses	94	205	111	
Actual Net Heat Rate				10,993

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

5.2. Unit 2

Planned Net Heat Rate				10,607
Reconciliation to Planned Net Heat Rate	Planned	Actual		
Boiler Losses	242	140	(102)	
Turbine Losses	471	900	429	
Other Losses	55	238	183	
Actual Net Heat Rate				11,117

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

5.3. Unit 3

Planned Net Heat Rate				10,178
Reconciliation to Planned Net Heat Rate	Planned	Actual		
Boiler Losses	185	159	(26)	

Turbine Losses	428	418	(10)
Other Losses	(11)	182	193
Actual Net Heat Rate			10,335

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	9,845		
Boiler Losses	162		
Turbine Losses	288		
Other Losses	(170)		
Planned Net Heat Rate	10,125		

### 6.2. Unit 2

As-Built Net Heat Rate	9,839		
Boiler Losses	267		
Turbine Losses	519		
Other Losses	56		
Planned Net Heat Rate	10,681		

### 6.3. Unit 3

As-Built Net Heat Rate	9,576		
Boiler Losses	211		
Turbine Losses	402		
Other Losses	50		
Planned Net Heat Rate	10,238		

## 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.

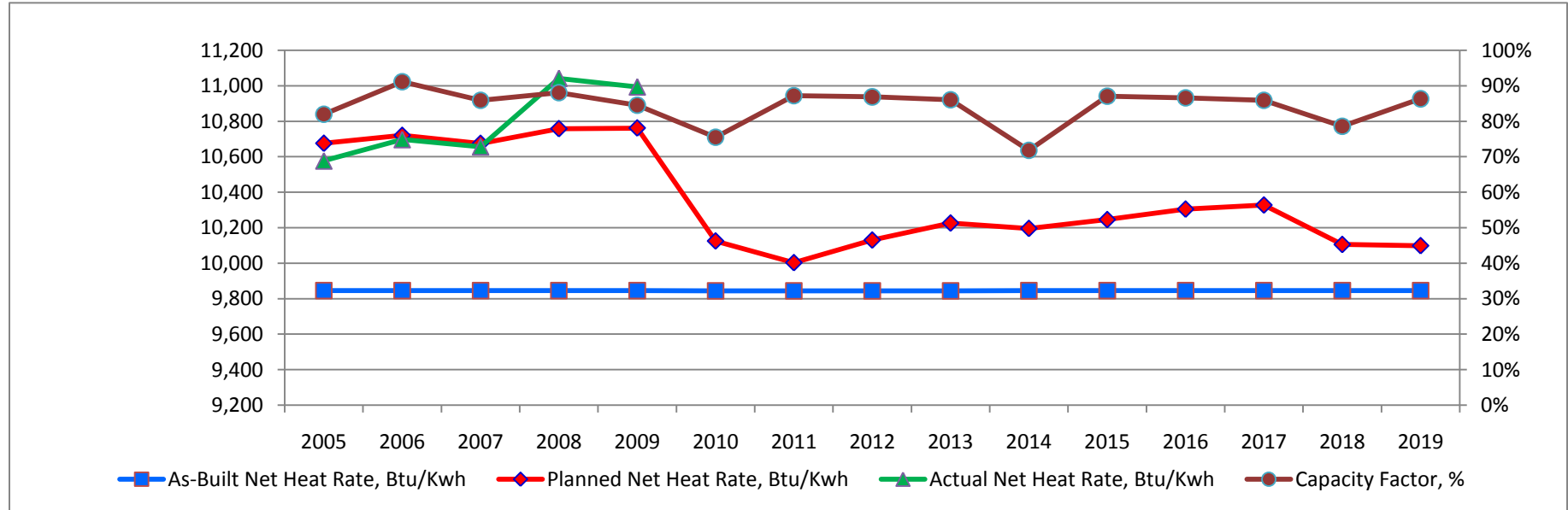
**8. Annual Review and Update**

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

**9. Appendix**

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

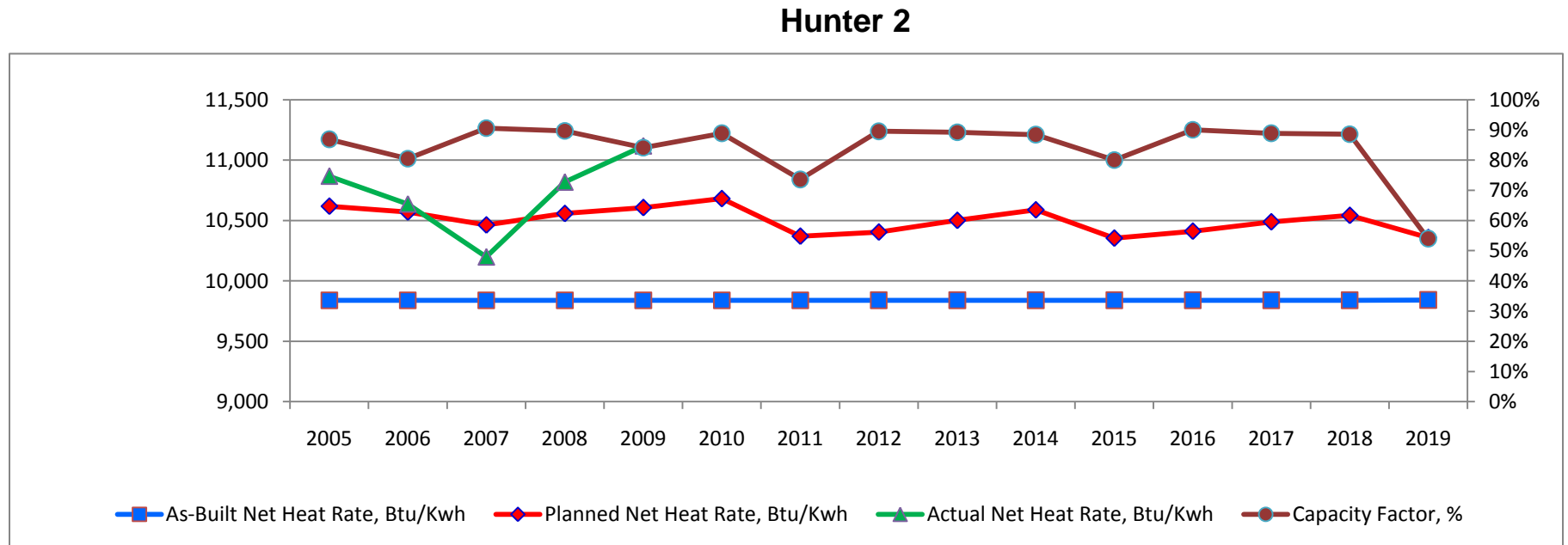
**Hunter 1**



Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As-Built Net Heat Rate, Btu/Kwh	9,846	9,846	9,846	9,846	9,846	9,845	9,844	9,844	9,844	9,845	9,846	9,846	9,846	9,846	9,846
Planned Net Heat Rate, Btu/Kwh	10,675	10,720	10,675	10,758	10,762	10,125	10,003	10,130	10,226	10,196	10,246	10,305	10,328	10,105	10,099
Actual Net Heat Rate, Btu/Kwh	10,577	10,697	10,656	11,042	10,993	-	-	-	-	-	-	-	-	-	-
Capacity Factor, %	82.0%	91.1%	85.9%	88.1%	84.5%	75.5%	87.2%	86.9%	86.1%	71.8%	87.1%	86.6%	85.9%	78.6%	86.3%
Annual Deviation from Plan, %	0.92%	0.21%	0.17%	2.64%	2.15%	-	-	-	-	-	-	-	-	-	-
Four-year Average Deviation from Plan, %	0.68%	0.38%	0.25%	0.33%	1.10%	-	-	-	-	-	-	-	-	-	-



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

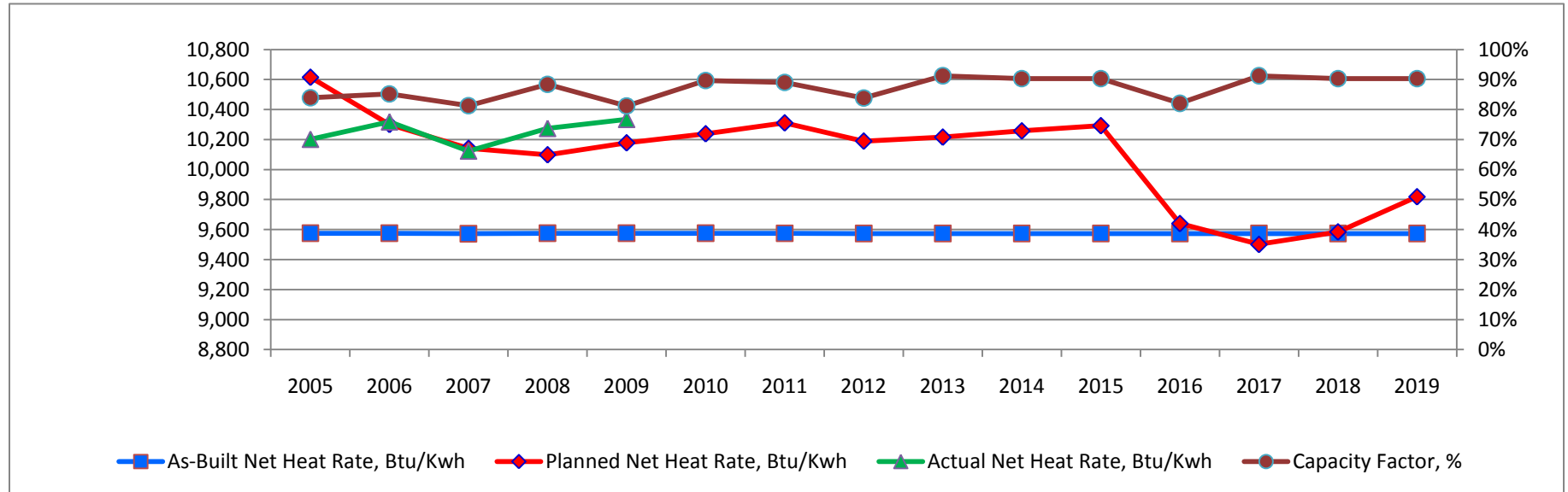


Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As-Built Net Heat Rate, Btu/Kwh	9,839	9,839	9,839	9,839	9,839	9,839	9,839	9,840	9,840	9,840	9,840	9,840	9,840	9,840	9,842
Planned Net Heat Rate, Btu/Kwh	10,618	10,570	10,463	10,558	10,607	10,681	10,370	10,404	10,501	10,588	10,354	10,411	10,489	10,542	10,358
Actual Net Heat Rate, Btu/Kwh	10,867	10,636	10,198	10,817	11,117										
Capacity Factor, %	86.9%	80.4%	90.6%	89.7%	84.1%	88.9%	73.6%	89.5%	89.2%	88.4%	80.0%	90.0%	88.9%	88.5%	54.0%
Annual Deviation from Plan, %	2.34%	0.63%	2.53%	2.46%	4.81%										
Four-year Average Deviation from Plan, %	2.97%	2.19%	1.01%	0.72%	1.34%										

Figure 3

**Hunter Unit 3  
10-year Plan Heat Rate Goals**

**Hunter 3**



Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As-Built Net Heat Rate, Btu/Kwh	9,576	9,576	9,572	9,576	9,576	9,576	9,575	9,574	9,574	9,574	9,574	9,574	9,574	9,574	9,574
Planned Net Heat Rate, Btu/Kwh	10,614	10,300	10,141	10,098	10,178	10,238	10,311	10,189	10,216	10,257	10,292	9,641	9,502	9,585	9,819
Actual Net Heat Rate, Btu/Kwh	10,202	10,318	10,123	10,275	10,335										
Capacity Factor, %	84.0%	85.2%	81.3%	88.4%	81.2%	89.6%	89.1%	83.8%	91.2%	90.3%	90.3%	82.1%	91.2%	90.3%	90.3%
Annual Deviation from Plan, %	3.88%	0.18%	0.17%	1.75%	1.54%										
Four-year Average Deviation from Plan, %	2.71%	1.74%	1.35%	0.53%	0.82%										

**Table 1**  
**Hunter 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>											
Plant controls replacement/Optimization systems in place	Btu/kWh	-6	-10	-10	-10	-10	-10	-10	-10	-10	-10
Feedwater Heater Replacement--HP FWH's	Btu/kWh	-9	-16	-16	-16	-16	-16	-16	-16	-16	-16
Air Preheater basket and seal replacement	Btu/kWh	-5	-8	-8	-8	-8	-8	-8	-8	-8	-8
HP/IP Turbine Upgrade	Btu/kWh	-218	-374	-374	-374	-374	-374	-374	-374	-374	-374
Clean air initiative: Baghouse installation, wet stack	Btu/kWh					21	32	32	32	32	32
Total adjustments related to Capital Projects	Btu/kWh	-238	-408	-408	-408	-387	-376	-376	-376	-376	-376
<b>Budgeted / Planned Auxiliary Load Changes</b>											
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	-58	-100	-100	-100	-37	-6	-6	-6	-6	-6
Total Auxiliary Load Changes	KW	-58	-100	-100	-100	-37	-6	-6	-6	-6	-6
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>											
Clean air initiative: wet stack & baghouse	MW	0	0	0	0	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5
HP/IP/LP Turbine Upgrade	MW	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0
Total Capacity Changes	MW	17	17	17	17	16	16	16	16	16	16

**Table 2  
Hunter 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>											
Plant controls replacement/Optimization system in place	Btu/kWh		-10	-10	-10	-10	-10	-10	-10	-10	-10
Air Preheater Basket Replacement	Btu/kWh		-8	-8	-8	-8	-8	-8	-8	-8	-8
Turbine Upgrade DensePack	Btu/kWh						-249	-374	-374	-374	-374
Clean air initiative - Baghouse installation, wet stack	Btu/kWh		23	33.8	33.8	33.8	33.8	33.8	33.8	33.8	33.8
Clean air initiative - SCR	Btu/kWh										36
Total adjustments related to Capital Projects	Btu/kWh	0	5	16	16	16	-234	-358	-358	-358	-322
<b>Budgeted / Planned Auxiliary Load Changes</b>											
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	0	12	43	43	43	43	43	43	43	143
Total Auxiliary Load Changes	KW	0	12	43	43	43	43	43	43	43	143
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>											
Clean air initiative: Baghouse, wet stack	MW		-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48	-1.48
Turbine Upgrade DensePack	MW						17.0	17.0	17.0	17.0	17.0
Clean air initiative - SCR	MW										-2.4
Total Capacity Changes	MW	0	-1.48	-1.48	-1.48	-1.48	15.52	15.52	15.52	15.52	13.16

**Table 3  
Hunter 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>											
Cooling tower replacement	Btu/kWh			-20	-20	-20	-20	-20	-20	-20	-20
Feedwater Htr replacement - HP	Btu/kWh		-10	-10	-10	-10	-10	-10	-10	-10	-10
Turbine Upgrade DensePack	Btu/kWh							-284	-378	-378	-378
CAI work (SCR)	Btu/kWh							0	0	0	0
Total adjustments related to Capital Projects	Btu/kWh	0	-10	-30	-30	-30	-30	-314	-408	-408	-408
<b>Budgeted / Planned Auxiliary Load Changes</b>											
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	0	-29	-86	-86	-86	-86	-86	-86	-86	-86
Total Auxiliary Load Changes	KW	0	-29	-86	-86	-86	-86	-86	-86	-86	-86
<b>Budgeted / Planned Net Dependable Rating Changes, (Net Basis)</b>											
Turbine Upgrade DensePack	MW							19	19	19	19
CAI work (SCR)	MW							0	0	0	0
Total Capacity Changes	MW	0	0	0	0	0	0	18.9	18.9	18.9	18.9

**10. Required Signatures**

Performance Engineer – Hunter Plant		Kent Gilbert	
Signature:	( on file )	Date:	30Mar10

Manager, Engineering – Hunter Plant		Larry Bruno	
Signature:	( on file )	Date:	30Mar10

Managing Director – Hunter Plant		Laren Huntsman	
Signature:	( on file )	Date:	31Mar10