



Wyodak Plant Heat Rate Improvement Plan
Wyd_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 Wyodak unit 1. The decrease in Heat Rate for 2016 reflects the capital overhaul improvement projects. In 2011 the installation of a bag house will increase aux load for the plant causing a heat rate increase of 88 Btu/Kwh. In 2016 the major projects are air heater basket changeout and repairs and a turbine overhaul).

5. Performance against last year’s plan

5.1. Unit 1

Planned Net Heat Rate			11,704
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	117	114	(3)
Turbine Losses	570	646	76
Other Losses	(306)	(304)	3
Actual Net Heat Rate			11,780

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	11,326
Boiler Losses	120
Turbine Losses	301
Other Losses	(4)
Planned Net Heat Rate	11,743

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

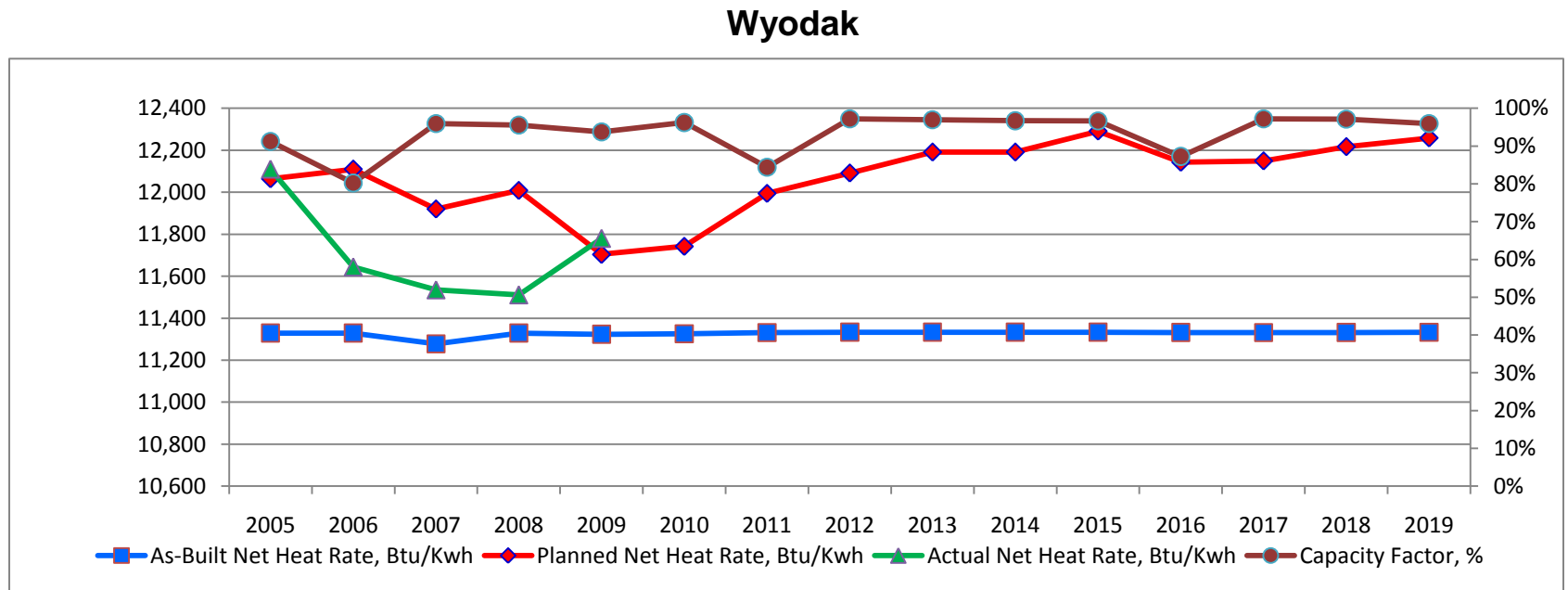
Table 1 shows the capital projects included in the 10-year plan that contribute to the recovery of lost heat rate. Numbers inside parentheses are negative impact on heat rate and represent improvement to the overall unit efficiency.

8. Annual Review and Update

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

9. Appendix

Figure 1
Wyodak 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	11,329	11,329	11,278	11,329	11,324	11,326	11,337	11,342	11,342	11,342	11,342	11,340	11,340	11,340	11,341
Planned Net Heat Rate, Btu/Kwh	12,064	12,110	11,921	12,009	11,704	11,743	12,000	12,100	12,200	12,200	12,300	12,152	12,158	12,226	12,268
Actual Net Heat Rate, Btu/Kwh	12,110	11,644	11,535	11,511	11,780										
Capacity Factor, %	91.3%	80.2%	96.0%	95.6%	93.7%	96.2%	84.4%	97.2%	96.9%	96.7%	96.6%	87.3%	97.2%	97.1%	96.0%

Table 1
Wyodak Unit 1
10-year Plan Heat Rate Improvement Projects

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Budgeted / Planned Heat Rate Changes, Net basis (Improvements are negative)											
Low NOx burners installation	Btu/kWh		50	75	75	75	75	75	75	75	75
Air Heater Basket Replacement (hot and cold end)	Btu/kWh							-15	-25	-15	-10
Major Pulverizer Overhauls	Btu/kWh	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30
CAI Upgrades DFGD, LNB, Baghouse	Btu/kWh		58.8	88.2	88.2	88.2	88.2	88.2	88.2	88.2	88.2
Total adjustments related to Capital Projects	Btu/kWh	-30	79	133	133	133	133	118	108	118	123
Budgeted / Planned Auxiliary Load Changes											
Reduced auxiliary load benefit of Budgeted / Planned Heat Rate Changes	KW	-96	64	145	145	145	145	96	64	96	113
Total Auxiliary Load Changes	KW	-96	64	145	145	145	145	96	64	96	113
Budgeted / Planned Net Dependable Rating Changes, (Net Basis)											
CAI Upgrades DFGD, LNB, Baghouse	MW		-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6
Total Capacity Changes	MW		-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6

10. Required Signatures

Performance Engineer – Wyodak Plant			
Signature:	(on file)	Date:	26Mar10

Manager, Engineering – Wyodak Plant		Cory Bryngelson	
Signature:	(on file)	Date:	26Mar10

Managing Director, Wyodak Plant		Gary Harris	
Signature:	(on file)	Date:	26Mar10