



Carbon Plan Heat Rate Improvement Plan
Car_2009_HRIP

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1. Revision History

Version	Status	Author	Reason for Issue	Date
1			2009 Plan Issue	March 31, 2009

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 Carbon unit 1. The dips in the Planned Net Heat Rate in the years 2009, 2014 and 2018 are due to the work that is scheduled to take place during the planned outages in 2009, 2013 and 2017 (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 Carbon unit 2. The dip in the Planned Net Heat Rate in the year 2008 is due to the work that occurred during the planned outages in 2008. There are only

small fluctuations in the unit heat rate in other years that will be the result of smaller overhaul projects (see section 7).

5. Performance against last year’s plan

5.1. Unit 1

Planned Net Heat Rate			12,189
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	118	161	43
Turbine Losses	783	414	(370)
Other Losses	(66)	(104)	(38)
Actual Net Heat Rate			11,825

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

5.2. Unit 2

Planned Net Heat Rate			10,776
Reconciliation to Planned Net Heat Rate	Planned	Actual	
Boiler Losses	29	159	131
Turbine Losses	535	1,573	1,038
Other Losses	271	(110)	(382)
Actual Net Heat Rate			11,563

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	11,354
Boiler Losses	-6
Turbine Losses	581
Other Losses	-76
Planned Net Heat Rate	11,852

6.2. Unit 2

As-Built Net Heat Rate	9,941
Boiler Losses	72
Turbine Losses	1154
Other Losses	-29
<hr/>	<hr/>
Planned Net Heat Rate	11,138

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 Carbon plant management team by March 31.

9. Appendix

Figure 1
Carbon Unit 1
10-year Plan Heat Rate Goals

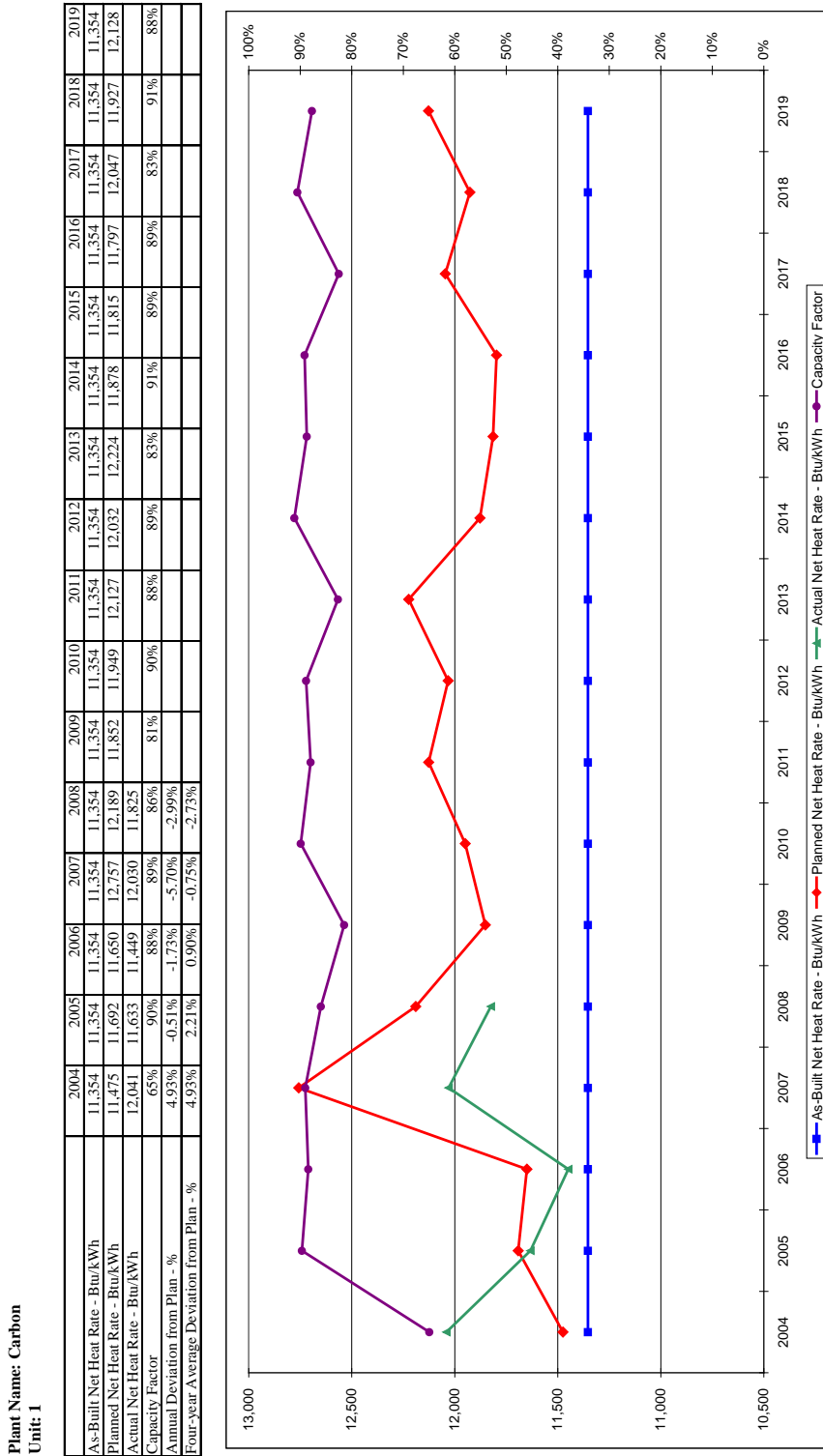
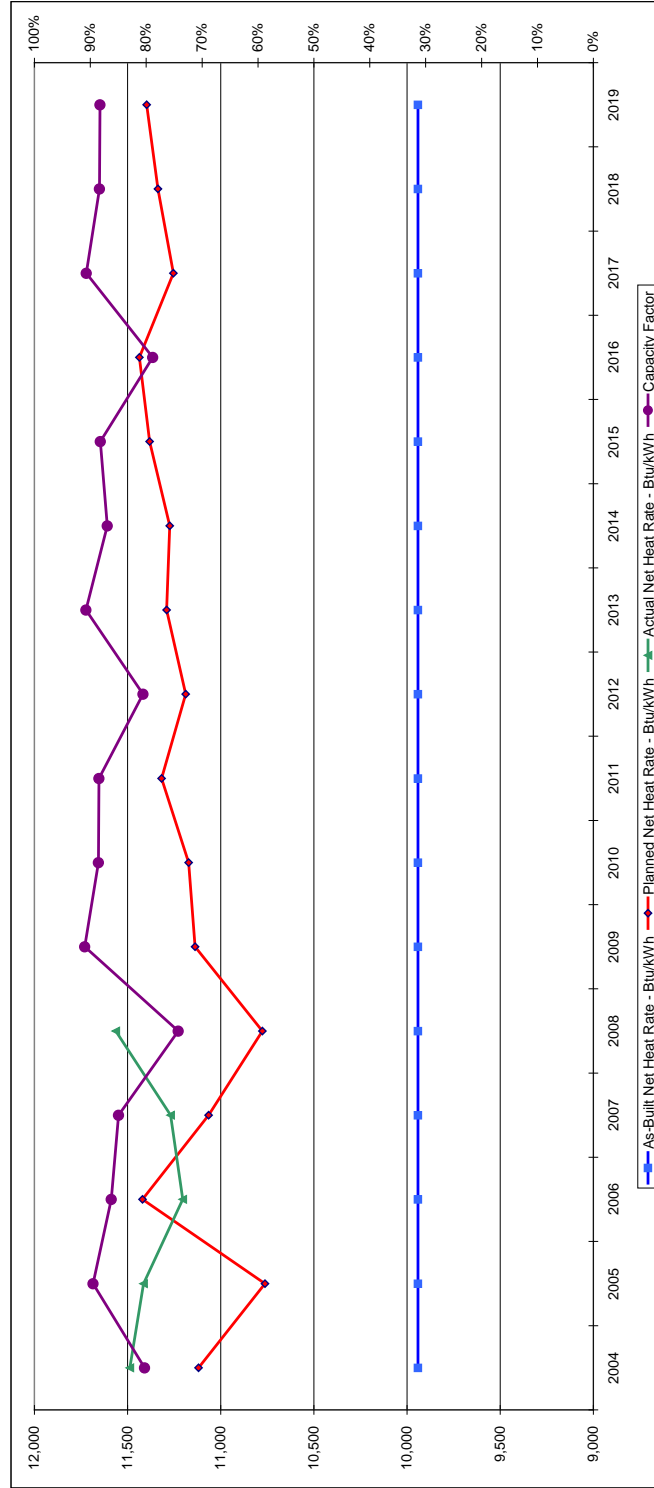


Figure 2
Carbon Unit 2
10-year Plan Heat Rate Goals

Plant Name: Carbon
 Unit: 2

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As-Built Net Heat Rate - Btu/kWh	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941	9,941
Planned Net Heat Rate - Btu/kWh	11,119	10,763	11,420	11,065	10,776	11,138	11,172	11,317	11,188	11,290	11,273	11,382	11,437	11,254	11,337	11,398
Actual Net Heat Rate - Btu/kWh	11,488	11,414	11,204	11,269	11,563											
Capacity Factor	80%	90%	86%	85%	74%	91%	89%	88%	81%	91%	87%	88%	79%	91%	88%	88%
Annual Deviation from Plan - %	3.32%	6.05%	-1.89%	1.84%	7.31%											
Four-year Average Deviation from Plan - %	3.32%	4.69%	-2.49%	2.33%	3.33%											



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

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Budgeted / Planned Heat Rate Changes, Net Basis (Improvements are negative)											
CY2009 Air Heater Partial Basket Rd	-34	-31	-28	-25	-22	-19	-16	-13	-10	-7	-4
Retube Condenser CY2009	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
Total adjustments related to Capital	-84	-81	-78	-75	-72	-69	-66	-63	-60	-57	-54
Budgeted / Planned Auxiliary Load Changes											
Reduced auxiliary load benefit of Bu	-57	-38	-36	-34	-32	-31	-30	-28	-27	-26	-24
Replacement Plan for Air Heater Set	21	42	62	83	21	42	62	83	83	83	83
Total Auxiliary Load Changes	-36	-17	5	49	-12	10	33	55	56	57	59
Budgeted / Planned Net Dependable Rating Changes, (Net Basis)											
Total Capacity Changes	0	0	0	0	0	0	0	0	0	0	0

Table 2
Carbon Unit 2
10-year Plan Heat Rate Improvement Projects

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Budgeted / Planned Heat Rate Changes, Net basis (Improvements are negative)											
CY2008 overhaul Air Heater Basket	-24	-21	-18	-15	-12	-9	-6	-30	-30	-30	-30
Total adjustments related to Capital	-24	-21	-18	-15	-12	-9	-6	-30	-30	-30	-30
Budgeted / Planned Auxiliary Load Changes											
Reduced auxiliary load benefit of Bu	-15	-13	-11	-9	-8	-6	-4	-19	-19	-19	-19
Replacement Plan for Air Heater Sec	0	21	41	-21	0	21	41	-21	-21	-21	-21
Total Auxiliary Load Changes	-15	7	30	-30	-8	15	37	-40	-40	-40	-40
Budgeted / Planned Net Dependable Rating Changes, (Net Basis)											
MW	0	0	0	0	0	0	0	0	0	0	0
MW	0	0	0	0	0	0	0	0	0	0	0
Total Capacity Changes	0	0	0	0	0	0	0	0	0	0	0

10. Required Signatures

Performance Engineer – Carbon Plant		April Haynes	
Signature:	{ on file }	Date:	3/11/09

Manager, Engineering – Carbon Plant			
Signature:		Date:	

Managing Director, Carbon Plant		Vaughn Judi	
Signature:	{ on file }	Date:	3/11/09