

ECONOMIC ANALYSIS SUMMARY

Reid Gardner Unit 2

Boiler Design:

Foster Wheeler Wall-Fired PC

Parameter	Current Operation	NOx Control				
		LNB w/OFA	LNB w/OFA & SNCR	ROFA w/Rotamix	LNB w/OFA & SCR	ROFA w/SCR
Case	1	2	3	4	5	6
NOx Emission Control System	LNB	LNB w/OFA	LNB w/OFA & SNCR	ROFA w/Rotamix	LNB w/OFA & SCR	ROFA w/SCR
TOTAL INSTALLED CAPITAL COST (\$)	0	4,448,000	6,945,500	7,884,900	35,048,000	38,484,900
FIRST YEAR O&M COST (\$)						
Operating Labor (\$)	0	0	0	0	0	0
Maintenance Material (\$)	0	32,000	83,000	48,000	132,000	148,000
Maintenance Labor (\$)	0	48,000	124,500	72,000	198,000	222,000
Administrative Labor (\$)	0	0	0	0	0	0
TOTAL FIXED O&M COST	0	80,000	207,500	120,000	330,000	370,000
Makeup Water Cost	0	0	0	0	0	0
Reagent Cost	0	0	169,985	234,741	326,816	326,816
SCR Catalyst / FF Bag Cost	0	0	0	0	150,000	112,500
Electric Power Cost	0	0	41,172	307,020	271,735	578,755
TOTAL VARIABLE O&M COST	0	0	211,157	541,760	748,551	1,018,071
TOTAL FIRST YEAR O&M COST	0	80,000	418,657	661,760	1,078,551	1,388,071
FIRST YEAR DEBT SERVICE (\$)	0	471,737	736,612	836,241	3,717,051	4,081,555
TOTAL FIRST YEAR COST (\$)	0	551,737	1,155,269	1,498,001	4,795,602	5,469,625
Power Consumption (MW)	0.0	0.0	0.1	0.7	0.7	1.4
Annual Power Usage (Million kW-Hr/Yr)	0.0	0.0	0.8	6.1	5.4	11.6
CONTROL COST (\$/Ton Removed)						
NOx Removal Rate (%)	0.0%	23.7%	42.7%	59.0%	82.2%	82.2%
NOx Removed (Tons/Yr)	0	414	749	1,034	1,439	1,439
First Year Average Control Cost (\$/Ton NOx Rem.)	0	1,331	1,543	1,449	3,332	3,800
Incremental Control Cost (\$/Ton NOx Removed)	0	1,331	1,806	1,202	8,131	#DIV/0!

INPUT CALCULATIONS		Boiler Design: Foster Wheeler Wall-Fired PC				
Reid Gardner Unit 2						
Parameter	Current Operation	NOx Control				
		LNB w/OFA	LNB w/OFA & SNCR	ROFA w/Rotamix	LNB w/OFA & SCR	ROFA w/SCR
Case	1	2	3	4	5	6
NOx Emission Control System	LNB	LNB w/OFA	LNB w/OFA & SNCR	ROFA w/Rotamix	LNB w/OFA & SCR	ROFA w/SCR
Unit Design and Coal Characteristics						
Type of Unit	PC	PC	PC	PC	PC	PC
Net Power Output (kW)	100,000	100,000	100,000	100,000	100,000	100,000
Net Plant Heat Rate (Btu/kW-Hr)	10,824	10,824	10,824	10,824	10,824	10,824
Boiler Fuel	Bituminous Coal	Bituminous Coal	Bituminous Coal	Bituminous Coal	Bituminous Coal	Bituminous Coal
Coal Heating Value (Btu/Lb)	11,712	11,712	11,712	11,712	11,712	11,712
Coal Sulfur Content (wt.%)	0.570%	0.570%	0.570%	0.570%	0.570%	0.570%
Coal Ash Content (wt.%)	7.640%	7.640%	7.640%	7.640%	7.640%	7.640%
Boiler Heat Input, each (MMBtu/Hr)	1,082	1,082	1,082	1,082	1,082	1,082
Coal Flow Rate (Lb/Hr)	92,418	92,418	92,418	92,418	92,418	92,418
(Ton/Yr)	380,504	380,504	380,504	380,504	380,504	380,504
(MMBtu/Yr)	8,912,915	8,912,915	8,912,915	8,912,915	8,912,915	8,912,915
Emissions						
Uncontrolled NOx (Lb/Hr)	425	425	425	425	425	425
(Lb/MMBtu)	0.39	0.39	0.39	0.39	0.39	0.39
(Lb Moles/Hr)	14.17	14.17	14.17	14.17	14.17	14.17
(Tons/Yr)	1,751	1,751	1,751	1,751	1,751	1,751
NOx Removal Rate (%)	0.0%	23.7%	42.7%	59.0%	82.2%	82.2%
(Lb/Hr)	0	101	182	251	350	350
(Lb Moles/Hr)	0.00	3.35	6.06	8.37	11.65	11.65
(Ton/Yr)	0	414	749	1,034	1,439	1,439
NOx Emission Rate (Lb/Hr)	425	325	244	174	76	76
(Lb/MMBtu)	0.39	0.30	0.23	0.16	0.07	0.07
(Ton/Yr)	1,751	1,337	1,003	717	312	312
General Plant Data						
Annual Operation (Hours/Year)	8,234	8,234	8,234	8,234	8,234	8,234
Annual On-Site Power Plant Capacity Factor	94%	0.94	0.94	0.94	0.94	0.94
Economic Factors						
Interest Rate (%)	8.55%	8.55%	8.55%	8.55%	8.55%	8.55%
Discount Rate (%)	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Plant Economic Life (Years)	20	20	20	20	20	20
Installed Capital Costs						
NOx Emission Control System (\$2007)	0	4,448,000	6,945,500	7,884,900	35,048,000	38,484,900
Total Emission Control Systems (\$2007)	0	4,448,000	6,945,500	7,884,900	35,048,000	38,484,900
NOx Emission Control System (\$/kW)	0	44	69	79	350	385
Total Emission Control Systems (\$/kW)	0	44	69	79	350	385
Total Fixed Operating & Maintenance Costs						
Operating Labor (\$)	0	0	0	0	0	0
Maintenance Material (\$)	0	32,000	83,000	48,000	132,000	148,000
Maintenance Labor (\$)	0	48,000	124,500	72,000	198,000	222,000
Administrative Labor (\$)	0	0	0	0	0	0
Total Fixed O&M Cost (\$)	0	80,000	207,500	120,000	330,000	370,000
Annual Fixed O&M Cost Escalation Rate (%)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Reagent Cost						
Unit Cost (\$/Ton)	None	None	Anhydrous NH3	Anhydrous NH3	Anhydrous NH3	Anhydrous NH3
(\$/Lb)	0.00	0.00	400	400	400	400
Molar Stoichiometry	0.00	0.00	0.200	0.200	0.200	0.200
Reagent Purity (Wt.%)	100%	100%	100%	100%	100%	100%
Reagent Usage (Lb/Hr)	0	0	103	143	198	198
First Year Reagent Cost (\$)	0	0	169,985	234,741	326,816	326,816
Annual Reagent Cost Escalation Rate (%)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
SCR Catalyst / FF Bag Replacement Cost						
Annual SCR Catalyst (m3) / No. FF Bags	0	0	0	0	50	38
SCR Catalyst (\$/m3) / Bag Cost (\$/ea.)	3,000	3,000	3,000	3,000	3,000	3,000
First Year SCR Catalyst / Bag Replace. Cost (\$)	0	0	0	0	150,000	112,500
Annual SCR Catalyst / Bag Cost Esc. Rate (%)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%
Auxiliary Power Cost						
Auxiliary Power Requirement (% of Plant Output)	0.00%	0.00%	0.10%	0.75%	0.66%	1.41%
(MW)	0.00	0.00	0.10	0.75	0.66	1.41
Unit Cost (\$2007/MW-Hr)	50.00	50.00	50.00	50.00	50.00	50.00
First Year Auxiliary Power Cost (\$)	0	0	41,172	307,020	271,735	578,755
Annual Power Cost Escalation Rate (%)	2.00%	2.00%	2.00%	2.00%	2.00%	2.00%

Economic factors as per Sierra Pacific 2008 planning guidelines

CAPITAL COST

Reid Gardner Unit 2

Parameter	NOx Control									
	LNB w/OFA		LNB w/OFA & SNCR		ROFA w/Rotamix		LNB w/OFA & SCR		ROFA w/SCR	
Case	2		3		4		5		6	
NOx Emission Control System	LNB w/OFA		LNB w/OFA & SNCR		ROFA w/Rotamix		LNB w/OFA & SCR		ROFA w/SCR	
SO2 Emission Control System	Soda Ash Wet FGD		Soda Ash Wet FGD		Soda Ash Wet FGD		Soda Ash Wet FGD		Soda Ash Wet FGD	
PM Emission Control System	Fabric Filter		Fabric Filter		Fabric Filter		Fabric Filter		Fabric Filter	
CAPITAL COST COMPONENT	Factor/Source	Cost	Factor/Source	Cost	Factor/Source	Cost	Factor/Source	Cost	Factor/Source	Cost
LNB w/OFA or ROFA	LNB w/OFA		LNB w/OFA		ROFA		LNB w/OFA		ROFA	
Major Materials Design and Supply	Vendor	\$1,600,000	Vendor	\$1,600,000	Vendor	\$2,880,000	Vendor	\$1,600,000	Vendor	\$2,880,000
Construction	70.0%	\$1,120,000	70.0%	\$1,120,000	Vendor	\$742,500	70.0%	\$1,120,000	Vendor	\$742,500
Balance of Plant	50.0%	\$800,000	50.0%	\$800,000	50.0%	\$1,440,000	50.0%	\$800,000	50.0%	\$1,440,000
Electrical (Allowance)	5.0%	\$80,000	5.0%	\$80,000	30.0%	\$864,000	5.0%	\$80,000	30.0%	\$864,000
Owner's Costs	10.0%	\$160,000	10.0%	\$160,000	10.0%	\$288,000	10.0%	\$160,000	10.0%	\$288,000
Surcharge	16.0%	\$256,000	16.0%	\$256,000	16.0%	\$460,800	16.0%	\$256,000	16.0%	\$460,800
AFUDC	12.0%	\$192,000	12.0%	\$192,000	12.0%	\$345,600	12.0%	\$192,000	12.0%	\$345,600
Subtotal		\$4,208,000		\$4,208,000		\$7,020,900		\$4,208,000		\$7,020,900
Contingency	15.0%	\$240,000	15.0%	\$240,000	30.0%	\$864,000	15.0%	\$240,000	30.0%	\$864,000
Total Capital Cost for LNB w/OFA, ROFA/Rotamix		\$4,448,000		\$4,448,000		\$7,884,900		\$4,448,000		\$7,884,900
SNCR or SCR or Rotamix	SNCR		SNCR		Rotamix		SCR		SCR	
Major Materials Design and Supply	Vendor	\$0	Vendor	\$1,350,000	Vendor	\$1,029,000	Vendor	\$20,000,000	Vendor	\$20,000,000
Construction	0.0%	\$0	15.0%	\$202,500	Vendor	\$247,500	0.0%	\$0	0.0%	\$0
Balance of Plant	0.0%	\$0	12.0%	\$162,000	12.0%	\$123,480	0.0%	\$0	0.0%	\$0
Electrical (Allowance)	0.0%	\$0	5.0%	\$67,500	0.0%	\$0	0.0%	\$0	0.0%	\$0
Owner's Costs	0.0%	\$0	10.0%	\$135,000	10.0%	\$102,900	10.0%	\$2,000,000	10.0%	\$2,000,000
Surcharge	0.0%	\$0	16.0%	\$216,000	16.0%	\$164,640	16.0%	\$3,200,000	16.0%	\$3,200,000
AFUDC	0.0%	\$0	12.0%	\$162,000	12.0%	\$123,480	12.0%	\$2,400,000	12.0%	\$2,400,000
Subtotal		\$0		\$2,295,000		\$1,791,000		\$27,600,000		\$27,600,000
Contingency	0.0%	\$0	15.0%	\$202,500	15.0%	\$154,350	15.0%	\$3,000,000	15.0%	\$3,000,000
Total Capital Cost for SNCR or SCR or Rotamix		\$0		\$2,497,500		\$1,945,350		\$30,600,000		\$30,600,000

Reid Gardner Unit 2		Current Operation								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	-	-	-	-	-	-	-	-	-
2	2015	-	-	-	-	-	-	-	-	-
3	2016	-	-	-	-	-	-	-	-	-
4	2017	-	-	-	-	-	-	-	-	-
5	2018	-	-	-	-	-	-	-	-	-
6	2019	-	-	-	-	-	-	-	-	-
7	2020	-	-	-	-	-	-	-	-	-
8	2021	-	-	-	-	-	-	-	-	-
9	2022	-	-	-	-	-	-	-	-	-
10	2023	-	-	-	-	-	-	-	-	-
11	2024	-	-	-	-	-	-	-	-	-
12	2025	-	-	-	-	-	-	-	-	-
13	2026	-	-	-	-	-	-	-	-	-
14	2027	-	-	-	-	-	-	-	-	-
15	2028	-	-	-	-	-	-	-	-	-
16	2029	-	-	-	-	-	-	-	-	-
17	2030	-	-	-	-	-	-	-	-	-
18	2031	-	-	-	-	-	-	-	-	-
19	2032	-	-	-	-	-	-	-	-	-
20	2033	-	-	-	-	-	-	-	-	-

Reid Gardner Unit 2		LNB w/OFA								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	80,000	-	-	-	-	-	471,737	551,737	1,331
2	2015	81,600	-	-	-	-	-	471,737	553,337	1,335
3	2016	83,232	-	-	-	-	-	471,737	554,969	1,339
4	2017	84,897	-	-	-	-	-	471,737	556,634	1,343
5	2018	86,595	-	-	-	-	-	471,737	558,332	1,347
6	2019	88,326	-	-	-	-	-	471,737	560,064	1,351
7	2020	90,093	-	-	-	-	-	471,737	561,830	1,356
8	2021	91,895	-	-	-	-	-	471,737	563,632	1,360
9	2022	93,733	-	-	-	-	-	471,737	565,470	1,364
10	2023	95,607	-	-	-	-	-	471,737	567,345	1,369
11	2024	97,520	-	-	-	-	-	471,737	569,257	1,374
12	2025	99,470	-	-	-	-	-	471,737	571,207	1,378
13	2026	101,459	-	-	-	-	-	471,737	573,196	1,383
14	2027	103,489	-	-	-	-	-	471,737	575,226	1,388
15	2028	105,558	-	-	-	-	-	471,737	577,295	1,393
16	2029	107,669	-	-	-	-	-	471,737	579,407	1,398
17	2030	109,823	-	-	-	-	-	471,737	581,560	1,403
18	2031	112,019	-	-	-	-	-	471,737	583,756	1,409
19	2032	114,260	-	-	-	-	-	471,737	585,997	1,414
20	2033	116,545	-	-	-	-	-	471,737	588,282	1,419

Reid Gardner Unit 2		ROFA w/Rotamix								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	120,000	-	234,741	-	307,020	541,760	836,241	1,498,001	1,449
2	2015	122,400	-	239,436	-	313,160	552,595	836,241	1,511,236	1,462
3	2016	124,848	-	244,224	-	319,423	563,647	836,241	1,524,736	1,475
4	2017	127,345	-	249,109	-	325,812	574,920	836,241	1,538,506	1,488
5	2018	129,892	-	254,091	-	332,328	586,419	836,241	1,552,552	1,502
6	2019	132,490	-	259,173	-	338,974	598,147	836,241	1,566,878	1,516
7	2020	135,139	-	264,356	-	345,754	610,110	836,241	1,581,491	1,530
8	2021	137,842	-	269,643	-	352,669	622,312	836,241	1,596,396	1,544
9	2022	140,599	-	275,036	-	359,722	634,759	836,241	1,611,599	1,559
10	2023	143,411	-	280,537	-	366,917	647,454	836,241	1,627,106	1,574
11	2024	146,279	-	286,148	-	374,255	660,403	836,241	1,642,923	1,589
12	2025	149,205	-	291,871	-	381,740	673,611	836,241	1,659,057	1,605
13	2026	152,189	-	297,708	-	389,375	687,083	836,241	1,675,513	1,621
14	2027	155,233	-	303,662	-	397,163	700,825	836,241	1,692,298	1,637
15	2028	158,337	-	309,735	-	405,106	714,841	836,241	1,709,420	1,653
16	2029	161,504	-	315,930	-	413,208	729,138	836,241	1,726,883	1,670
17	2030	164,734	-	322,249	-	421,472	743,721	836,241	1,744,696	1,687
18	2031	168,029	-	328,694	-	429,902	758,595	836,241	1,762,865	1,705
19	2032	171,390	-	335,268	-	438,500	773,767	836,241	1,781,398	1,723
20	2033	174,817	-	341,973	-	447,270	789,242	836,241	1,800,301	1,741

Reid Gardner Unit 2		ROFA w/SCR								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	370,000	-	326,816	112,500	578,755	1,018,071	4,081,555	5,469,625	3,800
2	2015	377,400	-	333,352	114,750	590,330	1,038,432	4,081,555	5,497,387	3,819
3	2016	384,948	-	340,019	117,045	602,136	1,059,201	4,081,555	5,525,703	3,839
4	2017	392,647	-	346,819	119,386	614,179	1,080,385	4,081,555	5,554,586	3,859
5	2018	400,500	-	353,756	121,774	626,463	1,101,992	4,081,555	5,584,047	3,879
6	2019	408,510	-	360,831	124,209	638,992	1,124,032	4,081,555	5,614,097	3,900
7	2020	416,680	-	368,048	126,693	651,772	1,146,513	4,081,555	5,644,748	3,922
8	2021	425,014	-	375,409	129,227	664,807	1,169,443	4,081,555	5,676,011	3,943
9	2022	433,514	-	382,917	131,812	678,103	1,192,832	4,081,555	5,707,901	3,965
10	2023	442,184	-	390,575	134,448	691,666	1,216,688	4,081,555	5,740,427	3,988
11	2024	451,028	-	398,387	137,137	705,499	1,241,022	4,081,555	5,773,605	4,011
12	2025	460,048	-	406,354	139,880	719,609	1,265,843	4,081,555	5,807,446	4,035
13	2026	469,249	-	414,481	142,677	734,001	1,291,160	4,081,555	5,841,964	4,059
14	2027	478,634	-	422,771	145,531	748,681	1,316,983	4,081,555	5,877,172	4,083
15	2028	488,207	-	431,226	148,441	763,655	1,343,322	4,081,555	5,913,084	4,108
16	2029	497,971	-	439,851	151,410	778,928	1,370,189	4,081,555	5,949,715	4,133
17	2030	507,931	-	448,648	154,438	794,506	1,397,593	4,081,555	5,987,078	4,159
18	2031	518,089	-	457,621	157,527	810,396	1,425,544	4,081,555	6,025,189	4,186
19	2032	528,451	-	466,773	160,678	826,604	1,454,055	4,081,555	6,064,061	4,213
20	2033	539,020	-	476,109	163,891	843,136	1,483,136	4,081,555	6,103,711	4,240

Reid Gardner Unit 2		LNB w/OFA & SNCR								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	207,500	-	169,985	-	41,172	211,157	736,612	1,155,269	1,543
2	2015	211,650	-	173,384	-	41,995	215,380	736,612	1,163,642	1,554
3	2016	215,883	-	176,852	-	42,835	219,687	736,612	1,172,182	1,566
4	2017	220,201	-	180,389	-	43,692	224,081	736,612	1,180,894	1,577
5	2018	224,605	-	183,997	-	44,566	228,563	736,612	1,189,779	1,589
6	2019	229,097	-	187,677	-	45,457	233,134	736,612	1,198,843	1,601
7	2020	233,679	-	191,430	-	46,366	237,797	736,612	1,208,087	1,614
8	2021	238,352	-	195,259	-	47,294	242,553	736,612	1,217,517	1,626
9	2022	243,119	-	199,164	-	48,240	247,404	736,612	1,227,135	1,639
10	2023	247,982	-	203,147	-	49,204	252,352	736,612	1,236,945	1,652
11	2024	252,941	-	207,210	-	50,188	257,399	736,612	1,246,952	1,666
12	2025	258,000	-	211,355	-	51,192	262,547	736,612	1,257,159	1,679
13	2026	263,160	-	215,582	-	52,216	267,798	736,612	1,267,570	1,693
14	2027	268,423	-	219,893	-	53,260	273,154	736,612	1,278,189	1,707
15	2028	273,792	-	224,291	-	54,326	278,617	736,612	1,289,021	1,722
16	2029	279,268	-	228,777	-	55,412	284,189	736,612	1,300,069	1,736
17	2030	284,853	-	233,352	-	56,520	289,873	736,612	1,311,338	1,752
18	2031	290,550	-	238,020	-	57,651	295,670	736,612	1,322,832	1,767
19	2032	296,361	-	242,780	-	58,804	301,584	736,612	1,334,557	1,783
20	2033	302,288	-	247,636	-	59,980	307,615	736,612	1,346,516	1,799

Reid Gardner Unit 2		LNB w/OFA & SCR								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	330,000	-	326,816	150,000	271,735	748,551	3,717,051	4,795,602	3,332
2	2015	336,600	-	333,352	153,000	277,170	763,522	3,717,051	4,817,173	3,347
3	2016	343,332	-	340,019	156,060	282,713	778,792	3,717,051	4,839,175	3,362
4	2017	350,199	-	346,819	159,181	288,368	794,368	3,717,051	4,861,618	3,377
5	2018	357,203	-	353,756	162,365	294,135	810,256	3,717,051	4,884,509	3,393
6	2019	364,347	-	360,831	165,612	300,018	826,461	3,717,051	4,907,858	3,410
7	2020	371,634	-	368,048	168,924	306,018	842,990	3,717,051	4,931,674	3,426
8	2021	379,066	-	375,409	172,303	312,138	859,850	3,717,051	4,955,967	3,443
9	2022	386,648	-	382,917	175,749	318,381	877,047	3,717,051	4,980,745	3,460
10	2023	394,381	-	390,575	179,264	324,749	894,588	3,717,051	5,006,019	3,478
11	2024	402,268	-	398,387	182,849	331,244	912,479	3,717,051	5,031,798	3,496
12	2025	410,314	-	406,354	186,506	337,869	930,729	3,717,051	5,058,093	3,514
13	2026	418,520	-	414,481	190,236	344,626	949,344	3,717,051	5,084,914	3,533
14	2027	426,890	-	422,771	194,041	351,518	968,330	3,717,051	5,112,271	3,552
15	2028	435,428	-	431,226	197,922	358,549	987,697	3,717,051	5,140,176	3,571
16	2029	444,137	-	439,851	201,880	365,720	1,007,451	3,717,051	5,168,638	3,591
17	2030	453,019	-	448,648	205,918	373,034	1,027,600	3,717,051	5,197,670	3,611
18	2031	462,080	-	457,621	210,036	380,495	1,048,152	3,717,051	5,227,282	3,631
19	2032	471,321	-	466,773	214,237	388,105	1,069,115	3,717,051	5,257,487	3,652
20	2033	480,748	-	476,109	218,522	395,867	1,090,497	3,717,051	5,288,296	3,674

Reid Gardner Unit 2		ROFA								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	80,000	-	-	-	307,020	307,020	836,241	1,223,261	1,634
2	2015	81,600	-	-	-	313,160	313,160	836,241	1,231,001	1,644
3	2016	83,232	-	-	-	319,423	319,423	836,241	1,238,896	1,655
4	2017	84,897	-	-	-	325,812	325,812	836,241	1,246,949	1,666
5	2018	86,595	-	-	-	332,328	332,328	836,241	1,255,163	1,676
6	2019	88,326	-	-	-	338,974	338,974	836,241	1,263,542	1,688
7	2020	90,093	-	-	-	345,754	345,754	836,241	1,272,088	1,699
8	2021	91,895	-	-	-	352,669	352,669	836,241	1,280,805	1,711
9	2022	93,733	-	-	-	359,722	359,722	836,241	1,289,696	1,723
10	2023	95,607	-	-	-	366,917	366,917	836,241	1,298,765	1,735
11	2024	97,520	-	-	-	374,255	374,255	836,241	1,308,016	1,747
12	2025	99,470	-	-	-	381,740	381,740	836,241	1,317,451	1,760
13	2026	101,459	-	-	-	389,375	389,375	836,241	1,327,075	1,773
14	2027	103,489	-	-	-	397,163	397,163	836,241	1,336,892	1,786
15	2028	105,558	-	-	-	405,106	405,106	836,241	1,346,905	1,799
16	2029	107,669	-	-	-	413,208	413,208	836,241	1,357,118	1,813
17	2030	109,823	-	-	-	421,472	421,472	836,241	1,367,536	1,827
18	2031	112,019	-	-	-	429,902	429,902	836,241	1,378,162	1,841
19	2032	114,260	-	-	-	438,500	438,500	836,241	1,389,000	1,855
20	2033	116,545	-	-	-	447,270	447,270	836,241	1,400,055	1,870

ECONOMIC ANALYSIS SUMMARY

Reid Gardner Unit 2

Boiler Design:

Parameter	Current Operation	PM Control
		Fabric Filter
Case	1	7
PM Emission Control System	Fabric Filter	Fabric Filter
TOTAL INSTALLED CAPITAL COST (\$)	0	23,520,000
FIRST YEAR O&M COST (\$)		
Operating Labor (\$)	0	0
Maintenance Material (\$)	0	128,000
Maintenance Labor (\$)	0	216,000
Administrative Labor (\$)	0	0
TOTAL FIXED O&M COST	0	344,000
Makeup Water Cost	0	0
Reagent Cost	0	0
SCR Catalyst / FF Bag Cost	0	54,080
Electric Power Cost	0	164,688
TOTAL VARIABLE O&M COST	0	218,768
TOTAL FIRST YEAR O&M COST	0	562,768
FIRST YEAR DEBT SERVICE (\$)	0	2,494,437
TOTAL FIRST YEAR COST (\$)	0	3,057,205
Power Consumption (MW)	0.0	0.4
Annual Power Usage (Million kW-Hr/Yr)	0.0	3.3
CONTROL COST (\$/Ton Removed)		
PM Removal Rate (%)	0.00%	0.0%
PM Removed (Tons/Yr)	0	0
First Year Average Control Cost (\$/Ton PM Rem.)	0	#DIV/0!
Incremental Control Cost (\$/Ton PM Removed)	Base	#DIV/0!
		7-1

INPUT CALCULATIONS			
Reid Gardner Unit 2		Boiler Design:	
Parameter	Current Operation	PM Control	Comments
		Fabric Filter	
Case	1	7	
PM Emission Control System	Fabric Filter	Fabric Filter	
Unit Design and Coal Characteristics			
Type of Unit	PC	PC	
Net Power Output (kW)	100,000	100,000	
Net Plant Heat Rate (Btu/kW-Hr)	10,824	10,824	
Boiler Fuel	Bituminous	Bituminous Coal	
Coal Heating Value (Btu/Lb)	11,712	11,712	
Coal Sulfur Content (wt.%)	0.570%	0.570%	
Coal Ash Content (wt.%)	7.640%	7.640%	
Boiler Heat Input, each (MMBtu/Hr)	1,082	1,082	
Coal Flow Rate (Lb/Hr)	92,418	92,418	
(Ton/Yr)	380,504	380,504	
(MMBtu/Yr)	8,912,915	8,912,915	
Emissions			
Uncontrolled Fly Ash (Lb/Hr)	5,649	16	
(Lb/MMBtu)	5.219	0.015	
(Lb Moles/Hr)	188.2	0.5	
(Tons/Yr)	23,256	67	
Fly Ash Removal Rate (%)	99.71%	0.00%	
(Lb/Hr)	5,632	0	
(Ton/Yr)	23,190	0	
Fly Ash Emission Rate (Lb/Hr)	16	16	
(Lb/MMBtu)	0.015	0.015	
(Ton/Yr)	67	67	
General Plant Data			
Annual Operation (Hours/Year)	8,234	8,234	
Annual On-Site Power Plant Capacity Factor	94%	0.94	
Economic Factors			
Interest Rate (%)	8.55%	8.55%	
Discount Rate (%)	9.00%	9.00%	
Plant Economic Life (Years)	20	20	
Installed Capital Costs			
PM Emission Control System (\$2007)	0	23,520,000	
Total Emission Control Systems (\$2007)	0	23,520,000	
PM Emission Control System (\$/kW)	0	235	
Total Emission Control Systems (\$/kW)	0	235	
Total Fixed Operating & Maintenance Costs			
Operating Labor (\$)	0	0	
Maintenance Material (\$)	0	128,000	
Maintenance Labor (\$)	0	216,000	
Administrative Labor (\$)	0	0	
Total Fixed O&M Cost (\$)	0	344,000	
Annual Fixed O&M Cost Escalation Rate (%)	2.00%	2.00%	
Reagent Cost			
Unit Cost (\$/Ton)	None	None	
(\$/Lb)	0.00	0.00	
Molar Stoichiometry	0.00	0.00	
Reagent Purity (Wt.%)	100%	200%	
Reagent Usage (Lb/Hr)	0	0	
First Year Reagent Cost (\$)	0	0	
Annual Reagent Cost Escalation Rate (%)	2.00%	2.00%	
SCR Catalyst / FF Bag Replacement Cost			
Annual SCR Catalyst (m3) / No. FF Bags	0	520	
SCR Catalyst (\$/m3) / Bag Cost (\$/ea.)	3,000	104	
First Year SCR Catalyst / Bag Replace. Cost (\$)	0	54,080	
Annual SCR Catalyst / Bag Cost Esc. Rate (%)	2.00%	2.00%	
Auxiliary Power Cost			
Auxiliary Power Requirement (% of Plant Output)	0.00%	0.40%	
(MW)	0.00	0.40	
Unit Cost (\$2007/MW-Hr)	50.00	50.00	
First Year Auxiliary Power Cost (\$)	0	164,688	
Annual Power Cost Escalation Rate (%)	2.00%	2.00%	

Economic factors as per Sierra Pacific 2008 planning guidelines

CAPITAL COST

Reid Gardner Unit 2

Parameter	PM Control	
	Fabric Filter	
Case NOx Emission Control System SO2 Emission Control System PM Emission Control System	7 LNB Soda Ash Wet FGD Fabric Filter	
CAPITAL COST COMPONENT	Factor/Source	Cost
Fabric Filter		
Major Materials Design and Supply	Vendor	\$21,000,000
Construction	0.0%	\$0
Balance of Plant	0.0%	\$0
Electrical (Allowance)	0.0%	\$0
Owner's Costs	0.0%	\$0
Surcharge	0.0%	\$0
AFUDC	12.0%	\$2,520,000
Subtotal		\$23,520,000
Contingency	0.0%	\$0
Total Capital Cost for Fabric Filter		\$23,520,000

Reid Gardner Unit 2		Current Operation								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton NOx Removed)
0	2013									
1	2014	-	-	-	-	-	-	-	-	-
2	2015	-	-	-	-	-	-	-	-	-
3	2016	-	-	-	-	-	-	-	-	-
4	2017	-	-	-	-	-	-	-	-	-
5	2018	-	-	-	-	-	-	-	-	-
6	2019	-	-	-	-	-	-	-	-	-
7	2020	-	-	-	-	-	-	-	-	-
8	2021	-	-	-	-	-	-	-	-	-
9	2022	-	-	-	-	-	-	-	-	-
10	2023	-	-	-	-	-	-	-	-	-
11	2024	-	-	-	-	-	-	-	-	-
12	2025	-	-	-	-	-	-	-	-	-
13	2026	-	-	-	-	-	-	-	-	-
14	2027	-	-	-	-	-	-	-	-	-
15	2028	-	-	-	-	-	-	-	-	-
16	2029	-	-	-	-	-	-	-	-	-
17	2030	-	-	-	-	-	-	-	-	-
18	2031	-	-	-	-	-	-	-	-	-
19	2032	-	-	-	-	-	-	-	-	-
20	2033	-	-	-	-	-	-	-	-	-

Reid Gardner Unit 2		Fabric Filter								
Year	Date	TOTAL FIXED O&M COST	Makeup Water Cost	Reagent Cost	SCR Catalyst / FF Bag Cost	Electric Power Cost	TOTAL VARIABLE O&M COST	DEBT SERVICE	TOTAL ANNUAL COST	Control Cost (\$/Ton PM Removed)
0	2013									
1	2014	344,000	-	-	54,080	164,688	218,768	2,494,437	3,057,205	#DIV/0!
2	2015	350,880	-	-	55,162	167,982	223,143	2,494,437	3,068,461	#DIV/0!
3	2016	357,898	-	-	56,265	171,341	227,606	2,494,437	3,079,941	#DIV/0!
4	2017	365,056	-	-	57,390	174,768	232,158	2,494,437	3,091,651	#DIV/0!
5	2018	372,357	-	-	58,538	178,264	236,802	2,494,437	3,103,595	#DIV/0!
6	2019	379,804	-	-	59,709	181,829	241,538	2,494,437	3,115,779	#DIV/0!
7	2020	387,400	-	-	60,903	185,465	246,368	2,494,437	3,128,205	#DIV/0!
8	2021	395,148	-	-	62,121	189,175	251,296	2,494,437	3,140,881	#DIV/0!
9	2022	403,051	-	-	63,363	192,958	256,322	2,494,437	3,153,810	#DIV/0!
10	2023	411,112	-	-	64,631	196,817	261,448	2,494,437	3,166,997	#DIV/0!
11	2024	419,334	-	-	65,923	200,754	266,677	2,494,437	3,180,448	#DIV/0!
12	2025	427,721	-	-	67,242	204,769	272,011	2,494,437	3,194,169	#DIV/0!
13	2026	436,275	-	-	68,587	208,864	277,451	2,494,437	3,208,163	#DIV/0!
14	2027	445,001	-	-	69,958	213,041	283,000	2,494,437	3,222,438	#DIV/0!
15	2028	453,901	-	-	71,357	217,302	288,660	2,494,437	3,236,998	#DIV/0!
16	2029	462,979	-	-	72,785	221,648	294,433	2,494,437	3,251,849	#DIV/0!
17	2030	472,238	-	-	74,240	226,081	300,322	2,494,437	3,266,997	#DIV/0!
18	2031	481,683	-	-	75,725	230,603	306,328	2,494,437	3,282,448	#DIV/0!
19	2032	491,317	-	-	77,240	235,215	312,455	2,494,437	3,298,209	#DIV/0!
20	2033	501,143	-	-	78,784	239,919	318,704	2,494,437	3,314,284	#DIV/0!