

US EPA ARCHIVE DOCUMENT

TABLE C-16A. REQUIRED REDUCTION TO MEET OPTION 4 WITH 25% FEED REDUCTION

BER Site ID No.	Type	Hg Req. % Reduct.	Hg Adj. % Reduct.	PM Req. % Reduct.	PM Adj. % Reduct.	SVM Req. % Reduct.	SVM Adj. % Reduct.	LVM Req. % Reduct.	LVM Adj. % Reduct.	HCl Req. % Reduct.	HCl Adj. % Reduct.	Cl2 Req. % Reduct.	Cl2 Adj. % Reduct.	HC Req. % Reduct.	HC Adj. % Reduct.	CO Req. % Reduct.	CO Adj. % Reduct.	TEQ Req. % Reduct.	TEQ Adj. % Reduct.
Floor Levels																			
200	CK	5.00		0.015		60.00		80.00		60.00		1.00		5.00		50.00		0.20	
201	CK	33.76	34	-9.24	0	-11.18	0	75.85	76	-365.89	0	-12896.09	0	nr	50	nr	75	nr	25
202	CK	-151.33	0	-15.21	0	-50.56	0	73.25	73	-298.50	0	-24771.29	0	nr	75	nr	0	nr	75
203	CK	67.57	68	37.31	37	33.56	34	-215.07	0	-374.52	0	-385.88	0	nr	25	nr	75	nr	0
204	CK	-11.62	0	-9.76	0	86.27	86	-236.48	0	30.76	31	-70.10	0	73.68	74	83.97	84	96.43	96
205	CK	61.79	62	50.13	50	84.04	84	-1362.77	0	-13000.40	0	-12137.22	0	nr	75	nr	75	64.91	65
206	CK	77.43	77	67.61	68	94.73	95	-366.92	0	-397.63	0	-532.00	0	77.74	78	68.68	69	-103.05	0
207	CK	59.01	59	37.46	37	72.13	72	-984.03	0	3.33	3	-3047.41	0	58.59	59	65.82	66	82.61	83
208	CK	60.11	60	34.01	34	79.05	79	-381.13	0	-1689.68	0	-341.44	0	nr	75	-55.04	0	-1150.00	0
208	CK	67.65	68	-4.38	0	12.33	12	-677.54	0	-1861.54	0	-455.75	0	nr	2	2.44	2	-4238.39	0
228	CK	nr	75	nr	50	nr	75	nr	0	nr	0	nr	0	70.41	70	91.26	91	2.44	0
300	CK	nr	75	79.02	79	96.03	96	-6.02	0	-133.28	0	-342.19	0	73.86	74	86.56	87	98.33	98
301	CK	94.24	94	61.90	62	-730.24	0	-453.52	0	-35034.62	0	-630.73	0	58.57	59	92.67	93	nr	75
302	CK	nr	0	27.68	28	91.40	91	-355.66	0	-700.48	0	-176.54	0	nr	50	nr	50	nr	75
303	CK	77.10	77	34.78	35	-199.20	0	-682.96	0	-1955.87	0	-1210.34	0	91.67	92	97.30	97	nr	0
304	CK	85.26	85	74.45	74	87.73	88	-130.78	0	-22535.67	0	-30004.93	0	nr	75	nr	75	88.89	89
305	CK	37.94	38	79.40	79	92.98	93	-212.74	0	25.45	25	-430.90	0	77.61	78	98.79	99	99.65	99
306	CK	99.81	100	0.47	0	-367.57	0	-601.90	0	-3633.80	0	-669.23	0	nr	75	-6.16	0	-266.30	0
308	CK	nr	75	31.82	32	15.76	16	-1159.78	0	-1621.71	0	-68.87	0	nr	50	nr	75	nr	75
309	CK	82.73	83	37.11	37	87.03	87	-1843.95	0	-64.30	0	-1060.80	0	66.89	67	63.37	63	99.62	99
315	CK	nr	75	-1320.07	0	-413.88	0	-730.10	0	-3762.94	0	-5273.91	0	nr	50	nr	75	nr	75
316	CK	nr	50	-27.22	0	-1240.79	0	-1238.86	0	-196.56	0	-43.33	0	16.67	17	81.95	82	nr	75
317	CK	nr	75	-565.43	0	-162.65	0	-296.42	0	-1653.41	0	-2574.16	0	91.04	91	85.27	85	83.87	84
318	CK	nr	75	-62.51	0	41.59	42	-401.89	0	-63.11	0	-1460.26	0	23.08	23	83.10	83	nr	75
319	CK	87.95	88	60.00	60	87.88	88	-46.20	0	-30.38	0	87.33	87	92.23	92	81.21	81	96.42	96
320	CK	nr	50	-399.99	0	-3311.75	0	-2000.16	0	-2653.29	0	37.65	38	95.02	95	97.60	98	-136.97	0
321	CK	nr	50	85.71	86	-1038.05	0	-1518.62	0	-1645.51	0	49.40	49	nr	50	nr	50	nr	0
322	CK	nr	0	-15.38	0	49.25	49	-258.34	0	-260.41	0	-534.67	0	32.43	32	91.99	92	92.54	93
323	CK	nr	50	46.43	46	91.25	91	-15.59	0	6.12	6	-1427.98	0	52.38	52	91.95	92	94.44	94
335	CK	83.45	83	25.96	26	89.12	89	-767.16	0	29.91	30	-221.34	0	71.86	72	67.34	67	99.20	99
401	CK	89.00	89	71.20	71	91.62	92	6.01	6	-261.48	0	-128.90	0	90.33	90	94.75	95	48.72	49
402	CK	79.26	79	71.96	72	97.77	98	12.79	13	-451.10	0	62.93	63	83.26	83	95.67	96	nr	0
403	CK	99.23	99	56.69	57	-152.84	0	-182.29	0	-13145.69	0	-5893.12	0	71.70	72	91.80	92	81.31	81
404	CK	-56.76	0	-214.09	0	-36.09	0	27.44	27	-10.95	0	14.22	14	68.51	69	93.02	93	77.88	78
405	CK	66.98	67	31.72	32	92.04	92	67.60	68	-3224.52	0	-253.98	0	76.66	77	95.65	96	nr	50

TABLE C-16A. REQUIRED REDUCTION TO MEET OPTION 4 WITH 25% FEED REDUCTION

EER Site ID No.	Type	Hg		PM		SVM		LVM		HCl		Cl2		HC		CO		TEQ	
		Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.
Floor Levels																			
223	LWAK	5.00		0.015		60.00		80.00		60.00		1.00		5.00		50.00		0.20	
224	LWAK	82.09	82	-479.94	0	-1304.10	0	-124.69	0	96.31	96	-112.65	0	nr	nr	nr	0	nr	nr
225	LWAK	61.23	61	-427.20	0	-1893.38	0	-331.05	0	-8203.92	0	-207.91	0	nr	nr	nr	75	nr	nr
226	LWAK	-18.64	0	-4045.81	0	-8044.14	0	-692.88	0	86.75	87	-850.86	0	nr	nr	nr	0	nr	nr
227	LWAK	nr	50	-1385.13	0	nr	0	nr	0	nr	75	nr	0	nr	nr	96.25	75	nr	nr
307	LWAK	66.76	67	-926.73	0	-287.87	0	-297.03	0	94.74	95	-209.67	0	60.00	60	-10.30	96	nr	nr
310	LWAK	98.87	99	-38.09	0	-1282.19	0	-25.21	0	-263.59	0	-126.31	0	nr	50	nr	0	nr	nr
311	LWAK	59.85	60	6.25	6	76.47	6	-33.99	0	93.31	93	39.53	40	nr	50	nr	0	nr	nr
312	LWAK	63.26	63	-150.00	0	82.22	82	-121.23	0	93.47	93	81.94	82	nr	50	nr	75	nr	nr
313	LWAK	34.12	34	-114.28	0	81.33	81	-126.36	0	93.81	94	83.59	84	nr	50	nr	0	nr	nr
314	LWAK	-1397.52	0	-150.00	0	82.36	82	72.82	73	94.78	95	-115.46	0	nr	50	nr	75	nr	nr
336	LWAK	77.97	78	42.18	42	95.20	95	60.57	61	90.26	90	31.38	31	nr	50	nr	0	nr	nr
	LWAK	nr	75	-84.34	0	nr	75	nr	0	nr	75	nr	0	nr	50	nr	75	-418.13	0

TABLE C-16A. REQUIRED REDUCTION TO MEET OPTION 4 WITH 25% FEED REDUCTION

BEER Site ID No.	Floor Levels	Type	Hg Req. % Reduct.	Hg Adj. % Reduct.	PM Req. % Reduct.	PM Adj. % Reduct.	SVM Req. % Reduct.	SVM Adj. % Reduct.	LVM Req. % Reduct.	LVM Adj. % Reduct.	HCI Req. % Reduct.	HCI Adj. % Reduct.	CI2 Req. % Reduct.	CI2 Adj. % Reduct.	HC Req. % Reduct.	HC Adj. % Reduct.	CO Req. % Reduct.	CO Adj. % Reduct.	TEQ Req. % Reduct.	TEQ Adj. % Reduct.
209	INC		5.00	-108.04	0.015	-223.01	60.00	0	80.00	0	25.00	0	1.00	93.77	5.00	nr	50.00	81.58	0.20	75
210	INC		nr	-192.21	0	-192.21	-901.19	0	-254.98	0	-213.86	0	0	-323.19	nr	-28.98	0	81.58	nr	nr
211	INC		nr	-44.23	0	-44.23	nr	75	nr	75	0.74	1	0	-83.61	nr	-115.17	0	-951.02	nr	25
212	INC		nr	36.13	36	36.13	nr	0	nr	0	61.68	62	0	-689.04	nr	-44.54	0	-917.31	nr	0
214	INC		nr	96.64	35	35.45	89.14	89	47.30	47	-2225.59	0	nr	nr	-305.40	0	-230.99	0	-237.84	0
216	INC		nr	67.77	30	30.15	89.87	90	38.76	39	-254.00	0	nr	nr	-384.92	75	-384.92	0	nr	0
221	INC		nr	20.32	20	-5.42	-95.30	0	-31.44	0	-172.95	0	nr	nr	-41.03	0	-226.18	0	52.38	52
222	INC		nr	nr	0	-597.56	-2747.28	0	nr	0	-2256.19	0	nr	nr	-1425.98	0	-33.75	0	82.76	83
229	INC		nr	21.26	21	21.26	-76.35	0	-33.89	0	61.77	62	nr	nr	0	0	nr	nr	96.38	96
324	INC		nr	nr	0	-38.89	87.59	88	27.68	28	67.66	68	nr	nr	nr	0	-59.91	0	nr	75
325	INC		nr	76.94	0	-361.53	9.60	10	-152.27	0	-523.38	0	nr	nr	-490.98	0	-383.87	0	nr	75
327	INC		nr	99.23	0	-1094.70	-289.48	0	-200.94	0	-927.02	0	nr	nr	3.94	4	-498.03	0	98.75	99
329	INC		nr	50.74	51	50.74	64.37	75	nr	75	-374.75	0	nr	nr	-102.15	0	-417.79	0	nr	50
330	INC		nr	-27.88	0	64.37	76.47	76	-49.79	0	34.29	34	nr	nr	nr	50	0	0	99.25	99
331	INC		nr	85.31	85	-87.50	97.84	98	-43.68	0	nr	75	nr	nr	nr	0	nr	nr	-191.97	0
332	INC		nr	nr	87	87.30	nr	0	nr	0	13.13	13	nr	nr	nr	0	90.00	0	nr	75
333	INC		nr	nr	0	-1053.82	nr	0	nr	0	42.40	42	nr	nr	nr	0	-1018.45	0	nr	75
334	INC		nr	-11.44	73	72.94	98.24	98	84.07	84	-109.38	0	nr	nr	-146.46	0	32.52	33	89.47	89
337	INC		nr	95.93	0	-6247.01	2.90	3	64.19	64	-9471.38	0	nr	nr	-53.62	0	-6480.76	0	nr	0
338	INC		nr	88.99	0	-1099.99	-169.74	0	-5.63	0	-22288.80	0	nr	nr	-173.60	0	-2389.47	0	nr	0
339	INC		nr	75	0	-414.21	0	25	0	0	-91.67	0	nr	nr	-303.49	0	-2389.47	0	nr	0
340	INC		nr	35.30	35	-130.06	-817.42	0	-597.04	0	-99.81	0	nr	nr	-209.62	0	-69.02	0	nr	75
341	INC		nr	-614.53	0	-916.94	-478.44	0	-944.00	0	-2160.14	0	nr	nr	0	50	13.27	0	nr	50
342	INC		nr	0.56	1	-316.97	-313.76	0	-3408.50	0	-15877.71	0	nr	nr	nr	0	nr	nr	nr	0
344	INC		nr	nr	0	-826.62	-395.71	0	-16.98	0	-3569.67	0	nr	nr	-178.75	0	-209.81	0	nr	25
346	INC		nr	-2297.40	0	-1067.30	11.30	11	-553.14	0	-4344.22	0	nr	nr	nr	0	-77.84	0	-63.93	0
347	INC		nr	-29.07	0	-115.39	-658.24	0	-443.92	0	-2138.44	0	nr	nr	nr	0	nr	nr	-936.27	0
348	INC		nr	nr	0	-1399.99	-824.71	0	-2435.15	0	-59821.89	0	nr	nr	nr	0	-502.09	0	nr	75
349	INC		nr	nr	0	-690.51	-114.45	0	nr	75	nr	50	nr	nr	nr	0	-476.61	0	nr	0
350	INC		nr	nr	0	-633.69	nr	75	nr	50	nr	0	nr	nr	nr	0	-1385.22	0	nr	0
351	INC		nr	nr	0	-68.16	nr	0	-645.40	0	nr	0	nr	nr	nr	0	32.39	32	nr	50
353	INC		nr	-65.16	31	30.81	20.30	20	32.99	33	nr	0	nr	nr	nr	0	-214.55	0	-57.48	0
354	INC		nr	-697.91	0	-141.54	-3272.96	0	-684.78	0	-5572.48	0	nr	nr	nr	0	-1590.75	0	-2624.80	0
356	INC		nr	nr	52	51.61	nr	0	nr	0	nr	0	nr	nr	nr	25	-1250.82	0	nr	75
357	INC		nr	nr	39	38.53	nr	75	nr	0	-390.75	0	nr	nr	nr	75	-354.30	0	nr	0
358	INC		nr	nr	50	52.79	nr	50	nr	0	-1005.24	0	nr	nr	nr	0	-323.54	0	nr	0
359	INC		nr	nr	23	19.91	84.57	85	99.85	100	-315.01	0	nr	nr	nr	0	49.71	50	nr	0
400	INC		nr	58.48	58	-152.37	89.32	89	27.87	28	nr	0	nr	nr	nr	50	nr	nr	nr	50
500	INC		-123.65	-123.65	-167.27	-167.27	-2717.13	0	-2249.06	0	-140.75	0	nr	nr	nr	0	nr	nr	-430.50	0
502	INC		nr	57.14	57	57.14	93.67	94	-5.12	0	-59.17	0	nr	nr	nr	0	nr	nr	-796.86	0
503	INC		nr	43.40	43	43.40	89.61	90	81.34	81	-628.63	0	nr	nr	nr	0	nr	nr	nr	75
504	INC		nr	99.64	100	16.67	-106.12	0	46.56	47	-2746.99	0	nr	nr	nr	0	nr	nr	nr	0
600	INC		nr	nr	0	-100.00	nr	0	nr	50	-2746.99	0	nr	nr	nr	0	nr	nr	nr	0
700	INC		nr	-48.90	65	65.40	99.69	100	88.65	89	-152.96	0	nr	nr	-549.35	0	nr	nr	nr	0
701	INC		nr	nr	65	65.22	nr	75	nr	75	-209.72	0	nr	nr	nr	0	nr	nr	nr	50
702	INC		nr	nr	82	81.59	nr	75	nr	0	nr	0	nr	nr	nr	0	nr	nr	nr	75
703	INC		nr	nr	0	-400.00	nr	0	nr	0	89.70	90	nr	nr	-1233.93	0	-4240.46	0	nr	0
704	INC		nr	23.08	23	23.08	nr	0	nr	0	78.37	78	nr	nr	nr	0	-1042.24	0	nr	0
705	INC		nr	47.99	44	43.74	52.88	53	32.84	33	-238.87	0	nr	nr	nr	0	-1632.17	0	nr	75
706	INC		nr	64.87	65	64.87	nr	0	nr	0	-6211.60	0	nr	nr	3.55	4	-25.75	0	-895.02	0
707	INC		nr	62.86	63	62.86	nr	75	nr	0	-559.36	0	nr	nr	nr	0	99.28	99	nr	50
708	INC		nr	nr	40	39.80	nr	0	nr	50	-4479.16	0	nr	nr	nr	0	-473.71	0	nr	75
709	INC		nr	63.41	63	63.41	nr	0	nr	0	-291.04	0	nr	nr	nr	0	-544.33	0	nr	0
710	INC		nr	45.78	46	45.78	nr	75	nr	0	63.05	63	nr	nr	60.53	61	-70.45	0	nr	0
711	INC		nr	47.67	48	47.67	nr	0	nr	0	-3874.02	0	nr	nr	nr	50	-245.51	0	nr	75

TABLE C-16A. REQUIRED REDUCTION TO MEET OPTION 4 WITH 25% FEED REDUCTION

BER Site ID No.	Type	Hg		PM		SVM		LVM		HCI		CI2		HC		CO		TEQ	
		Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.	Req. % Reduct.	Adj. % Reduct.
712	INC	nr	0	30.97	31	-3458.83	0	-241.79	0	nr	0	nr	0	nr	0	nr	0	nr	0
713	INC	nr	75	77.78	78	nr	50	nr	0	-27.56	0	nr	75	nr	0	-2398.65	0	nr	75
714	INC	nr	0	18.48	18	nr	75	nr	0	33.34	33	nr	0	nr	0	-195.25	0	nr	50
725	INC	-313.63	0	24.62	25	-103.28	0	-69.64	0	-515.50	0	97.71	98	-185.71	0	-1110.45	0	3.85	4
726	INC	nr	75	-499.99	0	nr	75	nr	75	nr	0	nr	75	65.76	-147.16	0	nr	nr	0
727	INC	nr	0	81.71	82	nr	75	nr	50	nr	0	nr	0	97.29	97.74	98	nr	nr	0
728	INC	nr	0	65.04	65	nr	nr	nr	0	-8462.93	0	nr	75	nr	0	nr	0	nr	75
784	INC	nr	0	63.41	63	nr	75	nr	50	96.31	96	nr	0	nr	0	-1273.27	0	nr	0
805	INC	nr	0	73.50	73	nr	0	nr	0	nr	50	73.72	74	-4.12	85.39	85	nr	nr	75
806	INC	95.77	96	66.47	66	85.41	85	-1025.54	0	24.67	25	nr	75	67.16	74.58	75	nr	nr	0
807	INC	41.64	42	39.43	39	54.90	55	53.04	53	-1536.67	0	-349.69	0	-123.95	-831.18	0	42.53	43	0
808	INC	nr	0	-38.32	0	nr	75	nr	50	-7885.28	0	nr	0	nr	1.62	2	-29.87	0	0
809	INC	nr	50	nr	0	99.21	99	97.87	98	nr	0	nr	75	-13.61	95.94	96	nr	nr	75
810	INC	nr	75	nr	0	94.52	95	86.54	87	nr	0	nr	0	nr	-221.89	0	nr	0	0
824	INC	-837.46	0	-134.37	0	-67.55	0	29.62	30	-1320.46	0	nr	75	nr	-487.13	0	nr	nr	0
825	INC	nr	50	80.00	80	nr	0	nr	0	-1321.95	0	nr	0	nr	nr	75	nr	nr	50
902	INC	85.72	86	28.23	28	-231.54	0	-725.08	0	-634.89	0	nr	0	-13.70	-26.92	0	-3167.97	0	0
904	INC	nr	0	-68.54	0	nr	75	nr	0	nr	0	nr	0	35.02	-983.193	0	nr	nr	0
905	INC	nr	0	nr	0	99.70	100	56.79	57	nr	0	nr	0	nr	-36.48	0	nr	nr	25
906	INC	nr	75	77.68	78	nr	25	nr	75	75.64	76	nr	50	-147.78	-729.92	0	nr	nr	75
914	INC	nr	0	-257.14	0	nr	0	nr	50	nr	25	91.71	92	nr	-1288.89	0	95.44	95	0
915	INC	nr	50	73.45	73	93.48	93	88.18	88	nr	0	nr	0	76.74	92.24	92	52.94	53	0

TABLE C-16b. MODEL GROUP SELECTION FOR OPTION 4A WITH 25% FEED REDUCTION

EER Site ID No.	Type	Current APCD	% Emission Reduction Required to Meet Option 4 with 25% Feed Reduction										Model Group	Required Retrofit Flue Gas Control
			Hg	PM	SVM	LVM	HCl	CL2	THC	CO	D/F			
200	CK	FF	34	0	0	76	0	0	0	50	75	25	12	Add AB + WQ + Cl + FF
201	CK	FF	0	0	0	73	0	0	0	75	0	75	14	Moderate DOM on FF + Add AB + WQ
202	CK	FF	68	37	34	0	0	0	0	25	75	0	12	Add AB + WQ + Cl + FF
203	CK	ESP	0	0	86	0	31	0	0	74	84	96	13	Add AB + WQ + Cl + FF + PT
204	CK	ESP	62	50	84	0	0	0	0	75	75	65	12	Add AB + WQ + Cl + FF
205	CK	ESP	77	68	95	0	0	0	0	78	69	0	12	Add AB + WQ + Cl + FF
206	CK	ESP	59	37	72	0	3	0	0	59	66	83	13	Add AB + WQ + Cl + FF + PT
207	CK	MC/ESP	60	34	79	0	0	0	0	75	0	0	12	Add AB + WQ + Cl + FF
208	CK	ESP	68	0	12	0	0	0	0	50	2	0	12	Add AB + WQ + Cl + FF
228	CK	ESP	0	50	75	0	0	0	0	70	91	0	24	Add AB + WQ + FF
300	CK	ESP	75	79	96	0	0	0	0	74	87	98	12	Add AB + WQ + Cl + FF
301	CK	FF	94	62	0	0	0	0	0	59	93	75	12	Add AB + WQ + Cl + FF
302	CK	ESP	0	28	91	0	0	0	0	50	50	75	12	Add AB + WQ + Cl + FF
303	CK	QC/FF	77	35	0	0	0	0	0	92	97	0	12	Add AB + WQ + Cl + FF
304	CK	ESP	85	74	88	0	0	0	0	75	75	89	12	Add AB + WQ + Cl + FF
305	CK	ESP	38	79	93	0	25	0	0	78	99	99	13	Add AB + WQ + Cl + FF + PT
306	CK	MC/FF	100	0	0	0	0	0	0	75	0	0	12	Add AB + WQ + Cl + FF
308	CK	ESP	75	32	16	0	0	0	0	50	75	75	12	Add AB + WQ + Cl + FF
309	CK	MC/ESP	83	37	87	0	0	0	0	67	63	99	12	Add AB + WQ + Cl + FF
315	CK	FF	75	0	0	0	0	0	0	50	75	75	12	Add AB + WQ + Cl + FF
316	CK	FF	50	0	0	0	0	0	0	17	82	75	12	Add AB + WQ + Cl + FF
317	CK	FF	75	0	0	0	0	0	0	91	85	84	12	Add AB + Cl + FF
318	CK	ESP	75	0	42	0	0	0	0	23	83	75	12	Add AB + WQ + Cl + FF
319	CK	ESP	88	60	88	0	0	0	87	92	81	96	13	Add AB + WQ + Cl + FF + PT
320	CK	FF	50	0	0	0	0	0	38	95	98	0	13	Add AB + WQ + Cl + FF + PT
321	CK	ESP	50	86	0	0	0	0	49	50	50	0	13	Add AB + WQ + Cl + FF + PT
322	CK	ESP	0	0	49	0	0	0	0	32	92	93	27	Moderate DOM on ESP + Add AB + WQ
323	CK	ESP	50	46	91	0	6	0	0	52	92	94	13	Add AB + WQ + Cl + FF + PT
335	CK	ESP	83	26	89	0	30	0	0	72	67	99	13	Add AB + WQ + Cl + FF + PT
401	CK	ESP	89	71	92	6	0	0	0	90	95	49	12	Add AB + WQ + Cl + FF
402	CK	ESP	79	72	98	13	0	0	63	83	96	0	13	Add AB + WQ + Cl + FF + PT
403	CK	ESP	99	57	0	0	0	0	0	72	92	81	12	Add AB + WQ + Cl + FF
404	CK	ESP	0	0	0	27	0	0	14	69	93	78	26	Add AB + WQ + IWS
405	CK	ESP	67	32	92	68	0	0	0	77	96	50	12	Add AB + WQ + Cl + FF

TABLE C-16b. MODEL GROUP SELECTION FOR OPTION 4A WITH 25% FEED REDUCTION

EER Site ID No.	Type	Current APCD	% Emission Reduction Required to Meet Option 4 with 25% Feed Reduction										Model		Required Retrofit Flue Gas Control
			Hg	PM	SVM	LVM	HCl	CL2	THC	CO	DF	Group			
223	LWAK	FF	82	0	0	0	96	0	50	0	0	0	11	Add AB + WQ + CI + FF + ST	
224	LWAK	FF	61	0	0	0	0	0	50	0	75	0	9	Add AB + WQ + CI + FF	
225	LWAK	FF	0	0	0	0	87	0	60	0	96	0	14	Add AB + WQ + ST	
226	LWAK	FF	50	0	0	0	75	0	50	0	0	0	11	Add AB + WQ + CI + FF + ST	
227	LWAK	FF	67	0	0	0	95	0	50	0	75	0	11	Add AB + WQ + CI + FF + ST	
307	LWAK	FF/VS	99	0	0	0	0	0	50	0	0	0	9	Add AB + WQ + CI + FF	
310	LWAK	FF	60	6	76	0	93	40	50	0	0	0	11	Add AB + WQ + CI + FF + ST	
311	LWAK	FF	63	0	82	0	93	82	50	75	0	0	11	Add AB + WQ + CI + FF + ST	
312	LWAK	FF	34	0	81	0	94	84	50	75	0	0	11	Add AB + WQ + CI + FF + ST	
313	LWAK	FF	0	0	82	73	95	0	50	0	0	0	13	Add AB + WQ + IWS	
314	LWAK	FF	78	42	95	61	90	31	50	75	0	0	11	Add AB + WQ + CI + FF + ST	
336	LWAK	FF	75	0	75	0	75	0	50	0	0	0	11	Add AB + WQ + CI + FF + ST	

TABLE C-16b. MODEL GROUP SELECTION FOR OPTION 4A WITH 25% FEED REDUCTION

EIR Site ID No.	Type	Current APCD	% Emission Reduction Required to Meet Option 4 with 25% Feed Reduction										Model Group	Required Retrofit Flue Gas Control
			Hg	PM	SVM	LVM	HCl	CL2	THC	CO	D/F			
209	INC	WHB/FF/VQ/PT/DM	0	0	0	0	0	0	94	25	82	75	52	Add AB + WQ + PT
210	INC	FF/S	75	0	50	75	1	0	0	0	25	29	Small DOM on WS + Add RH + CI + FF	
211	INC	SS/PT/VS	25	0	75	50	0	84	0	0	0	13	Add RH + CI + FF + PT	
212	INC	FF/S	0	36	0	0	62	0	0	0	0	7	Moderate DOM on FF and WS	
214	INC	IWS	97	35	89	47	0	25	0	0	0	29	Small DOM on IWS + Add RH + CI + FF	
216	INC	HES/WS	68	50	90	39	0	75	0	0	0	25	Add AB + RH + CI + FF	
221	INC	PT	20	0	0	0	0	78	0	0	52	13	Add RH + CI + FF + PT	
222	INC	WHB/SD/ESP/Q/PBS	50	0	0	0	0	0	0	0	83	8	Add CI	
229	INC	WHB/ACS/HCS/CS	75	21	0	0	62	75	96	0	75	43	Add AB + RH + CB + IWS	
324	INC	?	50	0	88	28	68	0	0	0	75	13	Add RH + CI + FF + PT	
325	INC	SD/FF/WS/IWS	77	0	10	0	0	75	0	0	0	15	Moderate DOM on FF + Add CI + PT	
327	INC	SD/FF/WS/ESP	99	0	0	0	0	4	0	0	99	53	Moderate DOM on comb. + Add CI	
330	INC	PT/WS/DM	0	64	76	75	0	0	0	0	50	9	Add RH + CI + FF	
331	INC	PT/IWS	85	0	98	0	34	75	0	0	99	56	Moderate DOM on WS and comb. + Add RH + CI + FF	
332	INC	WS	25	87	0	0	75	0	0	0	75	39	Add AB + RH + CI + FF + PT	
333	INC	SD/FF	0	0	0	0	13	93	0	0	0	14	Moderate DOM on SD and FF	
334	INC	WS/ESP/PT	0	73	98	84	42	0	0	0	89	54	Moderate DOM on comb. + Add RH + CI + FF	
337	INC	WHB/DA/D/FF	96	0	3	64	0	73	0	0	0	58	Moderate DOM on FF and DI + Add CI	
338	INC	QC/FF/SS/C/HES/DM	89	0	0	0	0	0	0	0	0	8	Add CI	
339	INC	AT/PT/R/S/ESP	75	0	25	0	0	0	0	0	0	28	Moderate DOM on ESP + CB + RH	
340	INC	WHB/ESP/WS	35	0	0	0	0	50	0	0	75	59	Moderate DOM on WS + Add WQ + CI	
341	INC	DA/D/FF/HEPA/CA	0	0	0	0	0	0	0	13	50	53	Moderate DOM on comb. + Add CI	
342	INC	WHB/QC/VS/DM	1	0	0	0	0	75	0	0	0	40	Add RH + CB + PT	
344	INC	QC/VS/PT/DM	50	0	0	0	0	0	0	0	25	9	Add RH + CI + FF	
346	INC	C/QC/VS/PT/DM	0	0	11	0	0	75	0	0	0	60	Small DOM on VS + Add PT	
347	INC	C/QC/VS/S/DM	0	0	0	0	0	0	0	0	0	1	None	
348	INC	QC/AS/IWS	75	0	0	75	50	0	0	0	75	32	Add RH + CB	
349	INC	QC/FF/QC/PT	0	0	0	75	0	0	0	0	0	4	Add IWS	
350	INC	WHB/HE/FF	0	0	75	50	0	0	0	0	0	6	Add FF	
351	INC	GC/C/FF	50	0	0	0	0	50	0	32	50	46	Moderated DOM on comb. + Add CI + PT	
353	INC	QC/VS/DM/ESP	0	31	20	33	0	0	0	0	0	17	Moderate DOM on ESP	
354	INC	QC/AS/VS/DM/IWS	0	0	0	0	0	0	0	0	0	1	None	
356	INC	QC/AS/FN/DM	75	52	0	0	0	75	25	0	75	24	Moderate DOM on comb. + Add RH + CI + FF + PT	
357	INC	QC/VS/PT/IWS	75	39	75	0	0	0	0	0	0	54	Moderate DOM on comb. + Add RH + CI + FF	
358	INC	QC/VS/C/CT/S/DM	50	53	50	0	0	75	0	0	0	13	Add RH + CI + FF + PT	
359	INC	WHB/FF/S	75	20	85	100	0	0	0	50	0	54	Moderate DOM on comb. + Add RH + CI + FF	
400	INC	SD/FF	58	0	89	28	0	75	50	0	50	38	Moderate DOM on comb. + Add CI + IWS	
500	INC	QC/VS/KOV/DM	0	0	0	0	0	85	0	75	0	57	Add AB + PT	
502	INC	WHB/QC/PBC/VS/ES	50	57	94	0	0	0	0	50	0	54	Moderate DOM on comb. + Add RH + CI + FF	
503	INC	HTHE/LTHE/FF	57	43	90	81	0	75	0	0	75	38	Moderate DOM on comb. + Add CI + IWS	
504	INC	V/S/C	100	17	0	47	0	0	0	0	0	9	Add RH + CI + FF	
600	INC	WHB/QC/PT/IWS	0	0	0	50	0	75	0	0	0	4	Add IWS	
700	INC	SD/R/S/VS/WS	0	65	100	89	0	0	0	0	0	6	Add FF	
701	INC	VS/PT	75	65	0	75	0	0	0	0	50	9	Add RH + CI + FF	
702	INC	QT/S/C	0	82	75	0	0	75	0	0	75	13	Add RH + CI + FF + PT	
703	INC	WHB	75	0	0	0	90	0	0	0	0	20	Add WQ + CB + PT	
704	INC	NONE	0	23	0	0	78	50	0	0	0	4	Add IWS	

TABLE C-16b. MODEL GROUP SELECTION FOR OPTION 4A WITH 25% FEED REDUCTION

EER Site ID No.	Type	Current APCD	% Emission Reduction Required to Meet Option 4 with 25% Feed Reduction											Model		Required Retrofit Flue Gas Control
			Hg	PM	SVM	LVM	HCl	CL2	THC	CO	DF	Group				
705	INC	QT/VS/ESP/PT	48	44	53	33	0	0	0	0	0	0	75	9	Add RH + CI + FF	
706	INC	QT/HS/C	75	65	0	0	0	0	75	4	0	0	0	24	Moderate DOM on comb. + Add RH + CI + FF + PT	
707	INC	QT/VS	0	63	75	0	0	0	0	0	99	50	25	Add AB + RH + CI + FF		
708	INC	WS/ESP	0	40	0	50	0	0	75	0	0	75	13	Add RH + CI + FF + PT		
709	INC	NONE	50	63	0	0	0	0	0	0	0	0	10	Add WQ + CB + FF		
710	INC	QT/OS/C/S	50	46	75	0	0	63	99	61	0	0	24	Moderate DOM on comb. + Add RH + CI + FF + PT		
711	INC	CVS/AS	0	48	0	0	0	0	75	50	0	75	24	Moderate DOM on comb. + Add RH + CI + FF + PT		
712	INC	NONE	0	31	0	0	0	0	0	0	0	0	6	Add FF		
713	INC	VS/PT	75	78	50	0	0	0	75	0	0	75	13	Add RH + CI + FF + PT		
714	INC	WS	0	18	75	0	0	33	0	0	0	50	3	Moderate DOM on WS + Add RH + CI + FF		
725	INC	WS/QT	0	25	0	0	0	0	98	0	0	4	13	Add RH + CI + FF + PT		
726	INC	QC/CS/DM/VS	75	0	75	75	0	0	75	66	0	0	24	Moderate DOM on comb. + Add RH + CI + FF + PT		
727	INC	GC/FF	0	82	75	50	0	0	0	97	98	0	21	Add AB + FF		
728	INC	QT/PT/VS	0	65	0	0	0	0	75	0	0	75	37	Moderate DOM on VS + Add RH + CB + PT		
784	INC	NONE	0	63	75	50	0	96	0	0	0	0	4	Add IWS		
805	INC	QT/QS/VS/ES/PBS	96	73	0	0	0	50	74	0	85	75	39	Add AB + RH + CI + FF + PT		
806	INC	C/VS	0	66	85	0	0	25	75	67	75	0	24	Moderate DOM on comb. + Add RH + CI + FF + PT		
807	INC	C/WB/VQ/PT/HS/DM	42	39	55	53	0	0	0	0	0	43	9	Add RH + CI + FF		
808	INC	QT/PBS/ESP	0	0	75	50	0	0	0	0	2	0	55	Moderate DOM on comb. + Add FF		
809	INC	VS	50	0	99	98	0	0	75	0	96	75	39	Add AB + RH + CI + FF + PT		
810	INC	QVS/PBS	75	0	95	87	0	0	0	0	0	0	9	Add RH + CI + FF		
824	INC	QT/VS/PT/DM	0	0	0	30	0	0	75	0	0	0	16	Moderate DOM on VS + Add PT		
825	INC	CCS/QC/ESP	50	80	0	0	0	0	0	0	75	50	25	Add AB + RH + CI + FF		
902	INC	QT/VS/PT	86	28	0	0	0	0	0	0	0	0	9	Add RH + CI + FF		
904	INC	?	0	0	75	0	0	0	0	35	0	0	55	Moderate DOM on comb. + Add FF		
905	INC	QT/VS/AS/CS	0	0	100	57	0	0	0	0	0	25	9	Add RH + CI + FF		
906	INC	QT/PT	75	78	25	75	76	0	50	0	0	75	42	Add RH + CB + IWS		
914	INC	?	0	0	0	50	25	0	92	75	0	95	39	Add AB + RH + CI + FF + PT		
915	INC	QC/VS/C	50	73	93	88	0	0	0	77	92	53	25	Add AB + RH + CI + FF		

TABLE C-16c. CHARACTERIZATION OF ATF MODEL PLANTS, OPTION 4, 25%FEED CONTROL

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
CK	Group 12	Add AB + CI + FF + WQ	2	200 *	S	Giant	FF	123,584	147,000	
				207 *	S	Keystone	MC/ESP	90,681	147,000	
				300	S	Esroc	ESP	164,692	147,000	
				301	S	Esroc	FF	185,409	147,000	
				302 *	S	Lafarge	ESP	130,576	147,000	
				308 *	S	North Texas	ESP	162,599	147,000	
				315 *	S	Southdown	FF	102,042	147,000	
				318 *	S	Texas Industries	ESP	152,675	147,000	
				401	S	Ash Grove	ESP	172,481	147,000	
				403	S	Ash Grove	ESP	184,877	147,000	
	405	S	Ash Grove	ESP	194,905	147,000				
	Group 13	Add AB + CI + FF + PT + WQ	1	202 *	L	Heartland	FF	221,421	370,000	
				204 *	L	Holnam	ESP	693,613	370,000	
				205	L	Holnam	ESP	253,556	370,000	
				208	L	Keystone	ESP	307,644	370,000	
				303	L	Lone Star	MC/FF	408,681	370,000	
				304 *	L	Lone Star	ESP	300,367	370,000	
				306 *	L	National	MC/FF	280,868	370,000	
				309	L	River Cement	MC/ESP	665,839	370,000	
				316 *	L	Southdown	FF	nr	370,000	
317				L	Southdown	FF	422,190	370,000		
Group 14	Add AB + CI + FF + PT + WQ	2	305	S	Medusa	ESP	196,903	147,000	85	
			321 *	S	Lafarge	ESP	59,542	147,000	85	
			323	S	Lafarge	FF	185,409	147,000	85	
			335	S	Medusa	ESP	100,378	147,000	85	
			402	S	Ash Grove	ESP	187,605	147,000	85	
			203	L	Holnam	ESP	291,645	370,000	85	
			206	L	Holnam	ESP	348,510	370,000	85	
			319	L	Continental	ESP	344,250	370,000	85	
			320 *	L	Lafarge	FF	nr	370,000	85	
			201 *	S	Giant	FF	137,945	147,000		
Group 24	Add AB + FF + WQ	1	228 *	S	Ash Grove	ESP	148,537	147,000		
			404	L	Ash Grove	ESP	265,721	370,000	85	
			322	S	Lafarge	ESP	112,269	147,000		
			224	M	Solite	FF	39,049	40,500		
Group 9	Add AB + CI + FF + WQ	2	307	M	Norlite	FF/VS	49,050	40,500		
			223 *	M (hi HCl)	Solite	FF	29,092	40,500	1,570	
			311 *	M (hi HCl)	Solite	FF	51,627	40,500	1,570	
			312 *	M (hi HCl)	Solite	FF	47,698	40,500	1,570	
			226 *	M (lo HCl)	Solite	FF	nr	40,500	875	
			227 *	M (lo HCl)	Solite	FF	38,796	40,500	875	
			310 *	M (lo HCl)	Solite	FF	47,770	40,500	875	
			314 *	M (lo HCl)	Solite	FF	36,793	40,500	875	
			336 *	M (lo HCl)	Solite	FF	30,336	40,500	875	
			313 *	M (lo HCl)	Solite	FF	36,793	40,500	875	
Group 14	Add AB + ST + WQ	1	225	M (lo HCl)	Solite	FF	38,270	40,500	875	

TABLE C-16c. CHARACTERIZATION OF ATF MODEL PLANTS, OPTION 4, 25%FEED CONTROL

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
INC	Group 1	None	1	347	M	Department of Army Dow Chemical	C/QC/VS/SDM QC/AS/VS/DM/IWS	10,795 27,383	22,100 22,100	
	Group 3	Moderate DOM on WS + Add Cl + FF + RH	2	714 *	M	Olin Chemical	WS	19,185	22,100	
	Group 4	Add IWS	1	349 *	S	Radford Army Ammo Plant	QC/FF/QC/PT	5,653	3,900	92
			1	704	S	Ashland	NONE	5,011	3,900	92
	Group 6	Add FF	1	784	S	Cook Composites	NONE	nr	3,900	92
			1	600 *	L	Dow Chemical	WHB/QC/PT/IWS	43,839	60,800	92
	Group 7	Moderate DOM on FF and WS	1	350 *	M	Dupont	WHB/HE/FF	15,883	22,100	
			1	700	M	Dupont	SD/RS/VS/WS	30,185	22,100	
	Group 8	Add Cl	1	712	L	Nepera	NONE	65,256	60,800	
	Group 9	Add Cl + FF + RH	1	212	L	LWD	FF/S	44,610	60,800	
	Group 10	Add CB + FF + WQ	1	222	L	WTT	WHB/SD/ESP/Q/PBS	93,718	60,800	
			1	338	L	Dupont	QC/FF/SS/C/HES/DM	65,598	60,800	
	Group 13	Add Cl + FF + PT + RH	1	905 *	S	Veliscol Chemical	QT/VS/AS/CS	nr	3,900	
			1	344 *	M	Department of Army	QC/VS/PT/DM	13,886	22,100	
			1	504	M	Chevron Chemical	VS/C	32,804	22,100	
			1	701 *	M	Eli Lilly	VS/PT	9,208	22,100	
			1	705	M	Ciba-Geigy	QT/VS/ESP/PT	36,116	22,100	
			1	807	M	Bros Lagoon Site	C/WHB/VQ/PT/HS/DM	34,109	22,100	
			1	810 *	M	Tennessee Eastman	QV/S/PBS	28,434	22,100	
			1	902	M	Rocky Mountain Arsenal	QT/VS/PT	25,436	22,100	
			1	329 *	L	Dupont	PT/IWS	53,489	60,800	
1			709 *	S	Cargill Chemical	NONE	3,123	3,900		
1			708 *	S	Burroughs Wellcome	WS/ESP	3,687	3,900	92	
1			713 *	S	Pfizer	VS/PT	2,625	3,900	92	
1			725	S	Zeneca	WS/QT	1,489	3,900	92	
Group 14	Moderate DOM on SD and FF	1	324 *	M	Allied	?	12,120	22,100	92	
		1	358 *	M	Eli Lilly	QC/VS/C/CT/S/DM	14,406	22,100	92	
Group 15	Moderate DOM on FF + Add Cl + PT	1	702 *	M	Dupont	QT/S/C	nr	22,100	92	
		1	211 *	L	LWD	SS/PT/VS	43,596	60,800	92	
Group 16	Moderate DOM on VS + Add PT	1	221	L	Rollins	PT	51,114	60,800	92	
		1	331 *	L	Ross	PT/IWS	44,379	60,800	92	
Group 17	Moderate DOM on ESP	1	333 *	L	Trade Waste	SD/FF	42,042	60,800		
		1	325 *	M	Aptus	SD/FF/WS/IWS	23,127	22,100	92	
Group 20	Add CB + PT + WQ	1	824 *	S	Pennwalt	QT/VS/PT/DM	1,086	3,900	92	
		1	353	M	Dow Chemical	QC/VS/DM/ESP	nr	22,100		
Group 21	Add AB + FF	1	703 *	S	Aristech	WHB	1,873	3,900	92	
		1	727	S	Iowa Army Ammo Plant	GC/FF	3,043	3,900		

TABLE C-16c. CHARACTERIZATION OF ATF MODEL PLANTS, OPTION 4, 25%FEED CONTROL

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
	Group 24	Moderate DOM on comb. + Add CI + FF + PT + RH	1	356 *	S	Dupont Shell Oil	QC/AS/FN/DM	5,100	3,900	92
				726 *	S		QC/CS/DM/VS	3,669	3,900	92
				706 *	M	Ciba-Geigy	QT/HS/C	nr	22,100	92
				710 *	M	Dupont	QT/OS/C/S	nr	22,100	92
	Group 25	Add AB + CI + FF + RH	1	806 *	M	Amoco Oil	C/S	20,641	22,100	92
				711 *	L	Chevron Chemical	C/VS/AS	52,907	60,800	92
				825 *	M	General Electric	CCS/QC/ESP	21,363	22,100	
				915	M	Eastman Kodak	QC/VS/C	nr	22,100	
	Group 28	Moderate DOM on ESP + CB + RH	1	216 *	L	Rollins	HES/WS	40,002	60,800	
				707 *	L	Dupont	QT/WS	58,120	60,800	
	Group 29	Small DOM on IWS + Add CI + FF + RH	1	339 *	S	Dupont	AT/PT/RJ/ESP	6,263	3,900	
				214 *	M	Rollins	IWS	34,655	22,100	
	Group 32	Add CB + RH	1	210 *	L	LWD	FF/S	96,107	60,800	
				348 *	S	Occidental Chemical	QC/AS/IWS	nr	3,900	
	Group 37	Moderate DOM on VS + Add CB + PT + RH	1	728 *	S	Eli Lilly	QT/PT/VS	5,819	3,900	92
				503 *	S	Lake City Army Ammo Plant	HTHE/LTHE/FF	4,747	3,900	92
	Group 38	Moderate DOM on comb. + Add CI + IWS	1	400 *	L	Marine Shale	SD/FF	179,333	60,800	92
				332 *	M	Thermalchem	WS	20,208	22,100	92
				805 *	M	American Cyanamid	QT/QS/VS/ES/PBS	31,943	22,100	92
				914 *	M	Vertac Superfund	?	25,849	22,100	92
	Group 40	Add CB + PT + RH	1	809 *	L	Tennessee Eastman	VS	40,524	60,800	92
				342 *	S	Upjohn	WHB/QC/VS/DM	5,640	3,900	92
	Group 42	Add CB + IWS + RH	1	906 *	S	Monsanto	QT/PT	2,738	3,900	92
				229 *	S	Vulcan Materials	WHB/ACS/HCS/CS	1,171	3,900	92
	Group 43	Add AB + CB + IWS + RH	1	351 *	S	Iowa Army Ammo Plant	GC/C/FF	3,457	3,900	92
				209 *	M	Laidlaw	WHB/FF/VQ/PT/DM	21,716	22,100	92
	Group 46	Moderate DOM on comb. + Add CI + PT	1	341 *	M	Glaxo	DAV/DI/FF/HEPA/CA	nr	22,100	
				327	L	Aptus	SD/FF/WS/ESP	49,572	60,800	
	Group 54	Moderate DOM on comb. + Add CI + FF + RH	1	502 *	S	Pfizer	WHB/QC/PBC/VS/ES	6,647	3,900	
				357 *	M	Department of Energy	QC/VS/PT/IWS	20,778	22,100	
				359 *	M	Atochem	WHB/FF/S	13,802	22,100	
				334	L	3M	WS/ESP/PT	40,599	60,800	
	Group 55	Moderate DOM on comb. + Add FF	1	904 *	S	First Chemical	?	5,950	3,900	
				808 *	M	Dow Chemical	QT/PBS/ESP	35,720	22,100	
	Group 56	Moderate DOM on WS and comb. + Add CI + FF + RH	1	330 *	M	General Electric	QT/WS/DM	10,345	22,100	
				500 *	L	Chevron	QC/VS/KOV/DM	49,822	60,800	92
	Group 57	Add AB + PT	1	337	M	Olin Chemical	WHB/DA/DI/FF	13,807	22,100	92
				340 *	M	Miles	WHB/ESP/WS	16,003	22,100	92
	Group 58	Moderate DOM on FF and DI + Add CI	2							
	Group 59	Moderate DOM on WS + Add CI + WQ	1							

TABLE C-16c. CHARACTERIZATION OF ATF MODEL PLANTS, OPTION 4, 25%FEED CONTROL

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
	Group 60	Small DOM on VS + Add PT	1	346	M	Department of Army	C/QC/VS/PT/DM	21,812	22,100	92

* Facility has been assigned to model group based on assumed emission level. Facility did not report the necessary emission value, therefore one was assigned based on the distribution of reported values from other facilities.

** Reported Ratio is equal to the number of total units located at a site divided by the number of units for which information was reported.

Often a facility will report data for only one unit even when the facility has two or three units at the particular site, since the single reported unit can be considered as representative of the other nonreported units.

nr = not reported

TABLE C-16d. COST ESTIMATES FOR MODEL PLANTS, OPTION 4, 25% FEED CONTROL

Source Group	Model Plant Number	Size Category	Required Equipment	Total Number of Units	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	Group 12	S	Add Q, CI, FF, AB	19	\$3,825K	\$4,318K	\$4,781K
		L		10	\$7,437K	\$10,098K	\$10,980K
	Group 13	S	Add Q, CI, FF, AB, PT	6	\$4,726K	\$4,648K	\$5,258K
		L		6	\$9,371K	\$10,782K	\$11,979K
	Group 14	S	Moderate DOM on existing FF, Add Q, AB	2	\$1,339K	\$3,641K	\$3,805K
	Group 24	S	Add AB, Q, FF	1	\$3,354K	\$3,954K	\$4,356K
	Group 26	L	Add AB, Q, IWS	1	\$6,189K	\$9,355K	\$10,306K
	Group 27	S	Moderate DOM on existing ESP, Add AB, Q	1	\$2,971K	\$3,749K	\$4,139K
LWAK	Group 9	M	Add AB, Q, CI, FF	3	\$1,883K	\$1,615K	\$1,850K
	Group 11	M (hi HCl)	Add AB, Q, CI, FF, ST	3	\$3,112K	\$1,944K	\$2,380K
		M (lo HCl)		5	\$3,112K	\$1,876K	\$2,311K
	Group 13	M (lo HCl)	Add AB, IWS	1	\$1,825K	\$1,713K	\$1,985K
	Group 14	M (lo HCl)	Add AB, Q, ST	1	\$2,038K	\$1,525K	\$1,832K
Incinerators	Group 1	M	None	2	\$0K	\$0K	\$0K
	Group 2	L	Add PT		\$445K	\$195K	\$267K
	Group 3	M	DOM WS mod, Add RH, CI/CB, FF	2	\$1,004K	\$405K	\$541K
	Group 4	S	Add IWS	4	\$215K	\$97K	\$132K
		L		1	\$1,331K	\$228K	\$445K
	Group 6	M	Add FF	2	\$295K	\$121K	\$154K
		L		1	\$943K	\$198K	\$305K
	Group 7	L	DOM FF mod, DOM WS mod	1	\$247K	\$58K	\$111K
	Group 8	L	Add CI/CB	2	\$425K	\$224K	\$280K
	Group 9	S	Add RH, CI/CB, FF	1	\$575K	\$241K	\$315K
		M		7	\$932K	\$391K	\$508K
		L		1	\$1,681K	\$672K	\$876K
	Group 10	S	Add Q, CI/CB, FF	1	\$643K	\$221K	\$304K
	Group 13	S	Add PT, RH, CI/CB, FF	3	\$632K	\$331K	\$414K
M			3	\$1,137K	\$515K	\$665K	
Incinerators		L		3	\$2,126K	\$866K	\$1,143K
(cont.)	Group 14	L	DOM SD mod, DOM FF mod	1	\$587K	\$74K	\$162K
	Group 15	M	DOM FF mod, Add CI/CB, PT	1	\$620K	\$278K	\$364K
	Group 16	S	DOM VS mod, Add PT	1	\$68K	\$96K	\$109K
	Group 17	M	DOM ESP mod	1	\$535K	\$50K	\$120K
	Group 20	S	Add Q, CI/CB, PT	1	\$619K	\$222K	\$305K
	Group 21	S	Add AB, FF	1	\$347K	\$282K	\$326K

TABLE C-16d. COST ESTIMATES FOR MODEL PLANTS, OPTION 4, 25% FEED CONTROL

Source Group	Model Plant Number	Size Category	Required Equipment	Total Number of Units	Capital Cost	Annualized O&M Cost	Annualized Total Cost
	Group 24	S	DOM combustor, Add PT,RH,CI/CB,FF	2	\$749K	\$331K	\$433K
		M		3	\$1,291K	\$515K	\$690K
		L		1	\$2,312K	\$866K	\$1,173K
	Group 25	M	Add AB,RH,CI/CB,FF	2	\$1,349K	\$924K	\$1,096K
		L		2	\$2,223K	\$1,947K	\$2,223K
	Group 28	S	DOM ESP mod, Add RH,CI/CB	1	\$673K	\$178K	\$267K
	Group 29	M	DOM IWS small, Add RH,CI/CB,FF	1	\$972K	\$403K	\$528K
		L		1	\$1,782K	\$702K	\$925K
	Group 32	S	Add RH, CB/CI	1	\$493K	\$152K	\$216K
	Group 33	S	DOM Combustor, Add IWS		\$331K	\$97K	\$151K
	Group 37	S	Moderate DOM on existng VS, Add RH, CI/CB, PT	1	\$561K	\$248K	\$326K
	Group 38	S	Moderate DOM on Combustor, Add CI/CB, IWS	1	\$672K	\$188K	\$287K
		L		1	\$1,941K	\$452K	\$755K
	Group 39	M	Add RH, CI/CB, FF, PT, AB	3	\$1,554K	\$1,048K	\$1,253K
		L		1	\$2,669K	\$2,142K	\$2,490K
	Group 40	S	Add RH, CI/CB, PT	1	\$550K	\$242K	\$316K
	Group 42	S	Add RH, CI/CB, IWS	1	\$708K	\$249K	\$348K
	Group 43	S	Add RH, CI/CB, IWS, AB	1	\$973K	\$441K	\$576K
	Group 44	M	Add AB, CI/CB		\$1,493K	\$825K	\$1,042K
	Group 46	S	Moderate DOM on Combustor, Add CI/CB, PT	1	\$514K	\$181K	\$254K
Group 52	M	Add AB, Q, PT	1	\$899K	\$706K	\$830K	
Incinerators (cont.)	Group 53	M	Moderate DOM on Combustor, Add CI/CB	1	\$551K	\$147K	\$225K
		L		1	\$610K	\$224K	\$310K
	Group 54	S	Moderate DOM on Combustor, Add RH, CI/CB, FF	1	\$691K	\$241K	\$334K
		M		2	\$1,087K	\$391K	\$533K
		L		1	\$1,866K	\$672K	\$906K
	Group 55	S	Moderate DOM on Combustor, Add FF	1	\$198K	\$89K	\$117K
		M		1	\$450K	\$121K	\$179K
	Group 56	M	Moderate DOM on WS, Combustor, Add RH, CI/CB, FF	1	\$1,158K	\$405K	\$566K
	Group 57	L	Add AB, PT	1	\$988K	\$1,470K	\$1,614K
	Group 58	M	Moderate DOM on existing FF and DI, Add CI/CB	2	\$778K	\$174K	\$286K
	Group 59	M	Moderate DOM on existing WS, Add CI/CB, Q	1	\$746K	\$210K	\$317K
	Group 60	M	Small DOM on existing VS, Add PT	1	\$244K	\$137K	\$178K

TABLE C-17. NATIONAL YEARLY (BASED ON 365 DAYS) EMISSIONS ESTIMATE FOR FLOOR 1 AND BTF OPTION 1-4

System Type	Substance	Baseline	Floor	BTF Opt. 1a	BTF Opt. 1b	BTF Opt. 1c	BTF Opt. 2a	BTF Opt. 2b	BTF Opt. 3	BTF Opt. 4
Cement Kiln	Chlorine	3.96E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05	1.80E+05
Cement Kiln	OO	1.46E+08	No Floor	No BTF - 1a	No BTF - 1b	No BTF - 1c	8.05E+06	No BTF - 2b	No BTF - 3	8.05E+06
Cement Kiln	CO(MHRA)	1.77E+08	No Floor	No BTF - 1a	No BTF - 1b	No BTF - 1c	8.19E+06	No BTF - 2c	No BTF - 3	8.19E+06
Cement Kiln	HCl	5.15E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06
Cement Kiln	LVM	7.00E+03	3.95E+03	3.95E+03	3.95E+03	3.95E+03	3.95E+03	3.95E+03	3.95E+03	3.95E+03
Cement Kiln	Mercury	2.79E+04	5.90E+03	5.90E+03	3.16E+03	7.10E+02	7.10E+02	7.10E+02	3.16E+03	3.16E+03
Cement Kiln	Particulate	8.74E+06	6.12E+06	6.12E+06	6.12E+06	6.12E+06	6.12E+06	6.12E+06	3.87E+06	3.87E+06
Cement Kiln	SVM	6.34E+04	6.15E+03	6.15E+03	6.15E+03	6.15E+03	6.15E+03	6.15E+03	6.15E+03	6.15E+03
Cement Kiln	TEQ	1.95E+00	No Floor	4.88E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
Cement Kiln	THC	9.77E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06	4.45E+06
Cement Kiln	THC(MHRA)	1.25E+07	4.26E+06	4.26E+06	4.26E+06	4.26E+06	4.26E+06	4.26E+06	4.26E+06	4.26E+06
Incinerator	Chlorine	2.02E+06	1.33E+05	1.33E+05	1.33E+05	1.33E+05	1.33E+05	1.33E+05	1.33E+05	1.33E+05
Incinerator	OO	3.22E+07	2.91E+06	2.91E+06	2.91E+06	2.91E+06	2.01E+06	2.01E+06	2.91E+06	2.01E+06
Incinerator	CO(MHRA)	1.32E+07	8.09E+06	8.09E+06	8.09E+06	8.09E+06	4.42E+06	4.42E+06	8.09E+06	4.42E+06
Incinerator	HCl	2.53E+06	1.21E+06	1.21E+06	1.21E+06	1.21E+06	1.21E+06	1.21E+06	1.21E+06	1.21E+06
Incinerator	LVM	6.25E+04	4.41E+03	4.41E+03	4.41E+03	4.41E+03	4.41E+03	4.41E+03	4.41E+03	4.41E+03
Incinerator	Mercury	1.05E+04	1.46E+03	1.46E+03	1.46E+03	3.51E+02	3.51E+02	3.51E+02	1.46E+03	1.46E+03
Incinerator	Particulate	4.55E+06	1.76E+06	1.76E+06	1.76E+06	1.76E+06	1.76E+06	1.76E+06	1.76E+06	1.76E+06
Incinerator	SVM	1.20E+05	3.02E+03	3.02E+03	3.02E+03	3.02E+03	3.02E+03	3.02E+03	3.02E+03	3.02E+03
Incinerator	TEQ	1.93E-01	No Floor	2.00E-02	9.72E-03	9.72E-03	9.72E-03	9.72E-03	9.72E-03	9.72E-03
Incinerator	THC	5.46E+05	5.00E+05	5.00E+05	5.00E+05	5.00E+05	4.18E+05	4.18E+05	5.00E+05	4.18E+05
Incinerator	THC(MHRA)	1.55E+06	1.55E+06	1.55E+06	1.55E+06	1.55E+06	7.11E+05	7.11E+05	1.55E+06	7.11E+05
LWA Kiln	Chlorine	5.08E+04	1.68E+04	1.68E+04	1.68E+04	1.68E+04	1.68E+04	1.68E+04	9.94E+03	9.94E+03
LWA Kiln	OO	1.40E+06	3.43E+05	3.43E+05	3.43E+05	3.43E+05	2.65E+05	2.65E+05	3.43E+05	2.65E+05
LWA Kiln	CO(MHRA)	7.29E+06	5.69E+05	5.69E+05	5.69E+05	5.69E+05	2.85E+05	2.85E+05	5.69E+05	2.85E+05
LWA Kiln	HCl	5.83E+06	5.28E+06	5.28E+06	5.28E+06	5.28E+06	5.28E+06	5.28E+06	5.28E+06	5.28E+06
LWA Kiln	LVM	4.16E+02	2.28E+02	2.28E+02	2.28E+02	2.28E+02	2.28E+02	2.28E+02	2.28E+02	2.28E+02
LWA Kiln	Mercury	6.03E+02	8.09E+01	8.09E+01	8.09E+01	2.23E+01	2.23E+01	2.23E+01	8.09E+01	8.09E+01
LWA Kiln	Particulate	8.83E+04	8.08E+04	8.08E+04	8.08E+04	8.08E+04	8.08E+04	8.08E+04	8.08E+04	8.08E+04
LWA Kiln	SVM	1.29E+03	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02	1.23E+02
LWA Kiln	TEQ	1.95E-04	No Floor	1.95E-04	1.95E-04	1.95E-04	1.95E-04	1.95E-04	1.95E-04	1.95E-04
LWA Kiln	THC	8.44E+04	8.44E+04	8.44E+04	8.44E+04	8.44E+04	4.47E+04	4.47E+04	8.44E+04	4.47E+04
LWA Kiln	THC(MHRA)	1.14E+05	1.14E+05	1.14E+05	1.14E+05	1.14E+05	4.47E+04	4.47E+04	1.14E+05	4.47E+04

APPENDIX C-A

Mact Options: 2/15/95

MACT Option 1a: Basic Option (Includes Common Hg STND)

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators	ATF	0.015	30	60	80	25	1	100	20
Cement Kilns		0.03	105	60	80	60	1	NA	20
LWA Kilns		0.015	30	60	80	1300	2.5	100	20
Boilers		0.015	30	60	80	25	1	100	20

MACT Option 1b: Basic Option (Includes Common Hg STND)

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators (I-1)	ATF 0.20	0.015	30	60	80	25	1	100	20
Cement Kilns (C-1)	ATF 0.20	0.03	ATF 30	60	80	60	1	NA	20
LWA Kilns (L-1)	ATF 0.20	0.015	30	60	80	1300	2.5	100	20
Boilers (B-1)	ATF 0.20	0.015	30	60	80	25	1	100	20

MACT Option 1c: Basic Option (Includes Common Hg STND)

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators (I-2)	ATF 0.20	0.015	ATF 5	60	80	25	1	100	20
Cement Kilns (C-2)	ATF 0.20	0.03	ATF 5	60	80	60	1	NA	20
LWA Kilns (L-2)	ATF 0.20	0.015	ATF 5	60	80	1300	2.5	100	20
Boilers (B-2)	ATF 0.20	0.015	ATF 5	60	80	25	1	100	20

C1-260

TABLE C-18. NATIONAL ENGINEERING COSTS PER HAP FOR FLOOR 1 AND BTF OPTIONS 1-4

MACT Option	Source Category	Total Cost for Each HAP (\$M)									
		Hg	PM	SVM	LVM	HCl	Cl2	THC	CO	D/F	
1a	CK	\$5.9	\$2.2	\$14.1	\$3.5	\$3.3	\$5.3	\$0.0	\$0.0	\$19.2	\$
1a	IC	\$20.8	\$6.3	\$8.5	\$5.0	\$3.8	\$13.5	\$2.6	\$15.3	\$16.7	\$
1a	LWK	\$1.5	\$0.1	\$1.9	\$0.4	\$1.1	\$0.7	\$0.0	\$0.0	\$0.0	\$
1a	Total	\$28.1	\$8.6	\$24.5	\$8.9	\$8.3	\$19.6	\$2.6	\$15.3	\$35.9	\$
1b	CK	\$11.4	\$2.0	\$12.3	\$3.5	\$3.4	\$5.8	\$0.0	\$0.0	\$20.7	\$
1b	IC	\$18.9	\$6.3	\$8.4	\$4.5	\$4.0	\$13.9	\$2.1	\$13.7	\$35.2	\$
1b	LWK	\$1.5	\$0.1	\$1.8	\$0.4	\$1.1	\$0.7	\$0.0	\$0.0	\$0.0	\$
1b	Total	\$31.8	\$8.4	\$22.5	\$8.4	\$8.5	\$20.4	\$2.1	\$13.7	\$55.9	\$
1c	CK	\$35.7	\$1.7	\$6.6	\$3.0	\$3.2	\$6.4	\$0.0	\$0.0	\$20.8	\$
1c	IC	\$36.0	\$6.3	\$7.1	\$5.1	\$3.4	\$14.6	\$2.2	\$13.6	\$34.2	\$
1c	LWK	\$4.6	\$0.1	\$1.1	\$0.5	\$0.5	\$1.6	\$0.0	\$0.0	\$0.0	\$
1c	Total	\$76.3	\$8.0	\$14.8	\$8.6	\$7.1	\$22.6	\$2.2	\$13.6	\$54.8	\$
2a	CK	\$32.6	\$1.8	\$10.0	\$2.6	\$4.4	\$8.3	\$130.1	\$130.4	\$21.0	\$
2a	IC	\$41.4	\$6.3	\$7.6	\$4.3	\$4.4	\$14.1	\$11.1	\$20.0	\$28.2	\$
2a	LWK	\$4.6	\$0.1	\$1.2	\$0.4	\$0.8	\$1.2	\$10.4	\$7.1	\$0.0	\$
2a	Total	\$78.6	\$8.1	\$18.7	\$7.3	\$9.5	\$23.6	\$151.6	\$157.5	\$49.2	\$
2b	CK	\$36.7	\$1.8	\$8.8	\$2.7	\$3.8	\$8.0	\$0.0	\$0.0	\$19.5	\$
2b	IC	\$40.8	\$6.2	\$8.1	\$5.0	\$4.3	\$14.2	\$10.9	\$20.0	\$27.8	\$
2b	LWK	\$4.6	\$0.1	\$1.2	\$0.4	\$0.8	\$1.2	\$10.4	\$7.1	\$0.0	\$
2b	Total	\$82.2	\$7.9	\$18.0	\$8.1	\$8.9	\$23.5	\$21.4	\$27.1	\$47.3	\$
3	CK	\$35.0	\$4.9	\$7.8	\$2.7	\$3.9	\$6.0	\$0.0	\$0.0	\$18.8	\$
3	IC	\$40.7	\$6.0	\$7.7	\$5.0	\$4.1	\$14.1	\$2.1	\$13.6	\$29.3	\$
3	LWK	\$4.4	\$0.2	\$2.0	\$0.3	\$2.8	\$0.9	\$0.0	\$0.0	\$0.0	\$
3	Total	\$80.1	\$11.1	\$17.5	\$8.0	\$10.8	\$20.9	\$2.1	\$13.6	\$48.2	\$
4	CK	\$31.3	\$5.3	\$9.1	\$2.7	\$3.8	\$6.3	\$130.3	\$130.2	\$20.1	\$
4	IC	\$40.8	\$6.0	\$7.7	\$4.9	\$4.1	\$14.1	\$9.1	\$21.8	\$29.4	\$
4	LWK	\$4.9	\$0.1	\$1.0	\$0.3	\$3.8	\$1.1	\$10.3	\$7.1	\$0.0	\$
4	Total	\$77.0	\$11.3	\$17.8	\$7.9	\$11.3	\$21.5	\$149.7	\$158.9	\$49.5	\$
Floor	CK	\$5.5	\$3.1	\$17.3	\$3.1	\$2.2	\$5.1	\$0.0	\$0.0	\$0.0	\$
Floor	IC	\$23.2	\$6.3	\$8.9	\$5.0	\$3.7	\$13.0	\$2.1	\$13.7	\$0.0	\$
Floor	LWK	\$1.5	\$0.1	\$1.9	\$0.4	\$1.1	\$0.7	\$0.0	\$0.0	\$0.0	\$
Floor	Total	\$30.2	\$9.5	\$28.2	\$8.5	\$7.0	\$18.8	\$2.1	\$13.7	\$0.0	\$

APPENDIX C-A

MACT Option 2a: Basic Option 1b + Improved Combustion

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators (I-2)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	ATF 5
Cement Kilns (C-2)	ATF 0.20	0.03	ATF 5	60	80	60	1	ATF 50	ATF 5
LWA Kilns (L-2)	ATF 0.20	0.015	ATF 5	60	80	1300	2.5	ATF 50	ATF 5
Boilers (B-3)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	ATF 5

MACT Option 2b: Basic Option 1b + Improved Combustion (W/Ck Exemption)

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators (I-3)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	ATF 5
Cement Kilns (C-3)	ATF 0.20	0.03	ATF 5	60	80	60	1	NA	20
LWA Kilns (L-3)	ATF 0.20	0.015	ATF 5	60	80	1300	2.5	ATF 50	ATF 5
Boilers (B-3)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	ATF 5

MACT Option 3: Basic Option 1b + Common Standards

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators (I-2)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	20
Cement Kilns (C-4)	ATF 0.20	ATF 0.015	ATF 5	60	80	60	1	NA	20
LWA Kilns (L-4)	ATF 0.20	0.015	ATF 5	60	80	ATF 60	ATF 1	100	20
Boilers (B-2)	ATF 0.20	0.015	ATF 5	60	80	25	1	100	20

MACT Option 4: Basic Option 1b + Common Standards + Improved Combustion

Source Category	D/F	PM	Hg	SVM	LVM	HCl	Cl2	CO	HC
Incinerators (I-3)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	ATF 5
Cement Kilns (C-5)	ATF 0.20	ATF 0.015	ATF 5	60	80	60	1	ATF 50	ATF 5
LWA Kilns (L-5)	ATF 0.20	0.015	ATF 5	60	80	ATF 60	ATF 1	ATF 50	ATF 5
Boilers (B-3)	ATF 0.20	0.015	ATF 5	60	80	25	1	ATF 50	ATF 5

APPENDIX C-B
Partitioning Factors

HAP Emission Reduction as a Consequence of Waste Feed Reduction									
Syst Subst	HAP redct @25% Wat Redct			HAP redct @50% Wat Redct			HAP redct @75% Wat Redct		
	Median	Max	Min	Median	Max	Min	Median	Max	Min
<i>Boiler_Chlorine</i>	25.00%	25.00%	0.02%	50.00%	50.00%	0.04%	75.00%	75.00%	0.05%
<i>Boiler_LVM</i>	25.00%	25.00%	0.10%	50.00%	50.00%	0.21%	75.00%	75.00%	0.31%
<i>Boiler_Mercury</i>	25.00%	25.00%	1.13%	50.00%	50.00%	2.26%	75.00%	75.00%	3.39%
<i>Boiler_SVM</i>	25.00%	25.00%	7.96%	50.00%	50.00%	15.73%	75.00%	75.00%	23.59%
<i>Cem Kiln_Chlorine</i>	22.75%	25.00%	0.81%	45.50%	50.00%	1.62%	68.25%	75.00%	2.43%
<i>Cem Kiln_LVM</i>	13.85%	24.39%	0.03%	27.71%	48.78%	0.05%	41.56%	73.16%	0.08%
<i>Cem Kiln_Mercury</i>	25.00%	25.00%	0.95%	50.00%	50.00%	1.90%	75.00%	75.00%	2.85%
<i>Cem Kiln_SVM</i>	20.66%	24.83%	0.25%	41.33%	49.66%	0.50%	61.99%	74.78%	0.74%
<i>Incinerator_Chlorine</i>	25.00%	25.00%	0.07%	50.00%	50.00%	0.14%	75.00%	75.00%	0.21%
<i>Incinerator_LVM</i>	25.00%	25.00%	0.42%	50.00%	50.00%	0.84%	75.00%	75.00%	1.26%
<i>Incinerator_Mercury</i>	25.00%	25.00%	0.00%	50.00%	50.00%	0.01%	75.00%	75.00%	0.01%
<i>Incinerator_SVM</i>	25.00%	25.00%	0.42%	50.00%	50.00%	0.85%	75.00%	75.00%	1.27%
<i>LWA Kiln_Chlorine</i>	24.88%	25.00%	14.92%	49.76%	50.00%	29.85%	74.63%	75.00%	44.77%
<i>LWA Kiln_LVM</i>	11.40%	26.00%	0.47%	22.79%	50.00%	0.94%	34.19%	75.00%	1.42%
<i>LWA Kiln_Mercury</i>	8.95%	25.00%	0.22%	19.91%	50.00%	0.44%	29.85%	75.00%	0.66%
<i>LWA Kiln_SVM</i>	24.31%	25.00%	0.50%	48.62%	50.00%	1.20%	72.83%	75.00%	1.81%

Cat	Model Group	APCD Requirements
CK		None Moderate DOM on existng ESP 3 Add FF 4 Add CI + FF 5 Add WQ + CI + FF 6 Add fWS 7 Moderate DOM on existing FF 8 Add CI + FF + PT 9 Add PIT 10 Small DOM on existing ESP 11 Small DOM on existing FF 12 Add AB + WQ + CI + FF 13 Add AB + WQ + CI + FF + PT 14 Moderate DOM on FF + Add AB + WQ 15 Not Assigned 16 Add WQ + CI + FF + PT 17 Add WQ 18 Add WQ + FF 19 Add WQ + IWS 20 Moderate DOM on existing ESP + Add WQ 21 Moderate DOM on FF + Add WQ 22 Small DOM on ESP + Add WQ 23 Not Assigned 24 Add AB + WQ + FF 25 Not Assigned 26 Add AB + WQ + IWS 27 Moderate DOM on ESP + Add AB + WQ
LWAK		1 None 2 Add FF 3 Add CI + FF 4 Add CI + FF + ST 5 Add ST 6 Add IWS 7 Moderate DOM on existing FF 8 Not Assigned 9 Add AB + WQ + CI + FF 10 Not Assigned 11 Add AB + WQ + CI + FF + ST 12 AB + WQ 13 Add IWS + AB + WQ
		14 Add AB + WQ + ST 15 Not Assigned 16 Add AB + WQ + FF
INCIN	1	None

- 2 Add PT
- 3 Moderate DOM on existing WS + Add RH + CI/CB + FF
- 4 Add IWS
- 5 Add AB + rWS
- 6 Add FF
- 7 Moderate DOM on existing FF and WS
- 8 Add CI/CB
- 9 Add RH + CI/CB + FF
- 10 Add WQ + CI/CB + FF
- 11 Moderate DOM on existing FF + Add PT
- 12 Moderate DOM on existing WS + Add FF
- 13 Add RH + CI/CB + FF + PT
- 14 Moderate DOM on existing FF and SD
- 15 Moderate DOM on existing FF + Add CI/CB + PT
- 16 Moderate DOM on existing VS + Add PT
- 17 Moderate DOM on existing ESP
- 18 Small DOM on existing WS
- 19 Moderate DOM on existing VS
- 20 Add WQ + CI/CB + PT
- 21 Add AB + FF
- 22 Moderate DOM on existing ESP + Add PT
- 23 Moderate DOM on existing VS and combustor + Add PT
- 24 Moderate DOM on combustor + Add RH + CI/CB + FF + PIT
- 25 Add AB + RH + CI/CB + FF
- 26 Moderate DOM on existing VS + Add AB + RH + CI/CB + FF
- 27 Moderate DOM on combustor + Add PT
- 28 Moderate DOM on existing ESP + Add RH + CB/CI
- 29 Small DOM on existing IWS + Add RH + CI/CB + FF
- 30 Moderate DOM on existing WS
- 31 Moderate DOM on existing VS, WS and combustor
- 32 Add RH + CB/CI
- 33 Moderate DOM on combustor + Add IWS
- 34 Add CI/CB + PT
- 35 Moderate DOM on combustor + Add WQ + PT
- 36 Add IWS + CI/CB
- 37 Moderate DOM on existing VS + Add RH + CI/CB + PT
- 38 Moderate DOM on combustor + Add CI/CB + IWS
- 39 Add AB + RH + CI/CB + FF + PT
- 40 Add RH + CI/CB + PT
- 41 Add WQ + CI/CB + FF + PT
- 42 Add RH + CI/CB + IWS

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- 43 Add AB + RH + CI/CB + fWS
- 44 Add AB + CI/CB + IWS
- 45 Add CI/CB + FF + PT
- 46 Moderate DOM on combustor + Add PIT + CI/CB
- 47 Moderate DOM on VS and combustor + RH + CI/CB + PT
- 48 Add AB + WQ + CI/CB + FF + PT
- 49 Add CI/CB + FF
- 50 Not Assigned
- 51 Moderate DOM on VS and PIT and combustor + Add RH + CB/CI

- 52 Add AB + WQ + PIT
- 53 Moderate DOM on combustor + Add CI/CB
- 54 Moderate DOM on combustor + Add RH + CI/CB + FF
- 55 Moderate DOM on combustor + Add FF
- 56 Moderate DOM on combustor and WS + Add RH + CI + FF
- 57 Add AB + PT
- 58 Moderate DOM on FF and DI + Add CI/CB
- 59 Moderate DOM on WS + Add WQ + CI/CB
- 60 Small DOM on VS + Add PT

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APPENDIX C2

Engineering Cost Analysis, National Emissions Estimate and Engineering Cost By HAP Tables for Floors 2, 3 and 4 and BTF Option 5

LIST OF TABLES

C2-1a	Required Reduction to Meet Floor 2
C2-1b	Model Group Selection for Floor 2
C2-1c	Characterization of Model Plants for Floor 2
C2-1d	Cost Estimates for Model Plants for Floor 2
C2-2a	Required Reduction to Meet Option 5
C2-2b	Model Group Selection for Option 5
C2-2c	Characterization of Model Plants for Option 5
C2-2d	Cost Estimates for Model Plants for Option 5
C2-3a	Required Reduction to Meet Floor 3
C2-3b	Model Group Selection for Floor 3
C2-3c	Characterization of Model Plants for Floor 3
C2-3d	Cost Estimates for Model Plants for Floor 3
C2-4a	Required Reduction to Meet Floor 4
C2-4b	Model Group Selection for Floor 4
C2-4c	Characterization of Model Plants for Floor 4
C2-4d	Cost Estimates for Model Plants for Floor 4
C2-5	National Emissions Estimate(for 330 days/yr) For Floor 2 and BTF Option 5
C2-6	National Emissions Estimate (for 330 days/yr) For Floors 3 and 4
C2-7	National Engineering Cost Breakdown Per HAP for Floor 2 and BTF Option 5
C2-8	National Engineering Cost Breakdown Per HAP for Floors 3 and 4

TABLE C2-1a. REQUIRED REDUCTION TO MEET FLOOR 2

EER Site ID No.	Type	Hg		PM		SVM		LVM		HCl/Cl2		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ Adj. Reduct.
		Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	
Floor Levels		40.00		0.03		60.00		80.00		60.00		20.00		na		6.00		100.00		0.20		
200	CK	-297.44	0	-118.49	0	11.79	12	79.20	79	-259.68	0	nr	0	na	na	na	na	na	na	nr	na	550
201	CK	-1407.99	0	-130.41	0	-19.45	0	76.95	77	-207.76	0	nr	0	na	na	na	na	na	na	nr	na	550
202	CK	-94.60	0	-25.37	0	47.29	47	-171.43	0	-260.69	0	nr	0	na	na	na	na	na	na	nr	na	440
203	CK	-569.70	0	-119.51	0	89.11	89	-189.88	0	46.87	47	-5.26	0	na	na	na	na	na	na	96.43	na	500
204	CK	-129.25	0	0.26	0	87.34	87	-1160.17	0	-85274.81	0	nr	0	na	na	na	na	na	na	64.91	na	600
205	CK	-35.43	0	35.22	35	87.34	96	-302.25	0	-279.44	0	10.95	0	na	na	na	na	na	na	-103.05	na	500
206	CK	-145.96	0	-25.08	0	77.89	78	-833.89	0	25.36	25	-65.62	0	na	na	na	na	na	na	82.61	na	500
207	CK	-139.37	0	-31.99	0	83.38	83	-314.49	0	-1195.03	0	nr	0	na	na	na	na	na	na	-1150.00	na	400
208	CK	-94.07	0	-108.75	0	30.45	30	-569.85	0	-1331.11	0	nr	0	na	na	na	na	na	na	-4238.39	na	420
228	CK	nr	25	nr	0	nr	75	nr	nr	-103.74	0	-18.34	0	na	na	na	na	na	na	2.44	na	500
300	CK	nr	0	58.04	58	96.85	97	8.66	9	-78.64	0	-4.58	0	na	na	na	na	na	na	98.33	na	600
301	CK	65.46	65	23.80	24	-558.71	0	-376.85	0	-14967.21	0	-65.70	0	na	na	na	na	na	na	nr	na	400
302	CK	nr	50	-44.64	0	93.18	93	-292.55	0	-489.91	0	nr	0	na	na	na	na	na	na	13.60	na	600
303	CK	-37.41	0	-30.43	0	-137.38	0	-574.52	0	-1447.69	0	66.67	0	na	na	na	na	na	na	nr	na	420
304	CK	11.56	12	48.89	49	90.27	90	-98.82	0	-17169.64	0	nr	0	na	na	na	na	na	na	nr	na	75
305	CK	-272.38	0	58.80	59	94.43	94	-169.43	0	42.54	43	10.42	0	na	na	na	na	na	na	nr	na	250
306	CK	98.85	99	-99.06	0	-270.97	0	-504.69	0	-2568.48	0	nr	0	na	na	na	na	na	na	-266.30	na	89
308	CK	nr	0	-36.36	0	33.16	33	-968.07	0	-1036.85	0	-32.45	0	na	na	na	na	na	na	nr	na	100
309	CK	-3.62	0	-25.78	0	89.71	90	-1574.72	0	-26.62	0	nr	0	na	na	na	na	na	na	nr	na	440
315	CK	nr	0	-2740.15	0	-307.71	0	-615.13	0	-2848.80	0	nr	0	na	na	na	na	na	na	nr	na	640
316	CK	nr	0	-154.44	0	-963.78	0	-1053.42	0	-121.45	0	-233.33	0	na	na	na	na	na	na	nr	na	450
317	CK	nr	0	-1230.87	0	-108.38	0	-241.51	0	-1239.86	0	64.17	0	na	na	na	na	na	na	nr	na	500
318	CK	nr	0	-225.02	0	53.66	54	-332.38	0	-25.78	0	-207.69	0	na	na	na	na	na	na	nr	na	420
319	CK	27.68	28	20.00	20	90.38	90	-25.95	0	14.03	14	68.94	0	na	na	na	na	na	na	nr	na	540
320	CK	nr	0	-899.98	0	-2606.88	0	-1709.29	0	-1125.21	0	80.10	0	na	na	na	na	na	na	nr	na	480
321	CK	nr	50	71.43	71	-802.93	0	-1294.44	0	-756.14	0	nr	0	na	na	na	na	na	na	nr	na	240
322	CK	nr	75	-130.76	0	59.73	60	-208.71	0	-175.80	0	-170.27	0	na	na	na	na	na	na	nr	na	550
323	CK	nr	0	-7.14	0	93.06	93	0.42	0	27.55	28	-90.48	0	na	na	na	na	na	na	nr	na	93
335	CK	0.72	1	-48.08	0	91.37	91	-647.06	0	46.05	46	-12.55	0	na	na	na	na	na	na	nr	na	500
401	CK	33.99	34	42.41	42	93.35	93	19.03	19	-172.08	0	61.33	0	na	na	na	na	na	na	nr	na	94
402	CK	-24.45	0	43.93	44	98.23	98	24.87	25	-241.19	0	33.05	0	na	na	na	na	na	na	nr	na	718
403	CK	95.40	95	13.39	13	-100.61	0	-143.20	0	-9768.77	0	-13.19	0	na	na	na	na	na	na	nr	na	400
404	CK	-840.56	0	-528.18	0	-7.97	0	37.49	37	16.10	16	-25.96	0	na	na	na	na	na	na	nr	na	500
405	CK	-98.12	0	-36.56	0	93.69	94	72.09	72	-2120.60	0	6.65	0	na	na	na	na	na	na	nr	na	250
Floor Levels		30.00		0.015		60.00		80.00		1300.00		6.00		100.00		na		na		0.20		
223	LWAK	3.22	3	-479.94	0	-62.76	0	-124.69	0	39.88	40	nr	0	-986.96	0	na	na	na	na	nr	na	0
224	LWAK	-109.49	0	-427.20	0	-1408.79	0	-331.05	0	-93143.69	0	nr	0	-1215.79	0	na	na	na	na	nr	na	0
225	LWAK	-541.04	0	-4045.81	0	-6064.30	0	-692.88	0	-115.56	0	nr	0	-1182.05	0	na	na	na	na	nr	na	0
226	LWAK	nr	0	-1385.13	0	nr	0	nr	0	-146.05	0	nr	0	-387.80	0	na	na	na	na	nr	na	0
227	LWAK	-79.59	94	-38.09	0	-193.58	0	-297.03	0	14.42	14	52.00	0	92.51	93	na	na	na	na	nr	na	0
307	LWAK	93.89	0	6.25	6	-946.18	0	-25.21	0	-5663.39	0	-71.43	0	-120.61	0	na	na	na	na	nr	na	0
310	LWAK	-116.91	0	82.19	82	82.19	82	-33.99	0	-8.71	0	-15.47	0	-15.47	0	na	na	na	na	nr	na	0
311	LWAK	-98.51	0	-150.00	0	86.54	87	-121.23	0	-5.65	0	-22.45	0	-49.70	0	na	na	na	na	nr	na	0
312	LWAK	-255.93	0	-114.28	0	85.87	86	-126.36	0	-0.11	0	-71.43	0	-15.47	0	na	na	na	na	nr	na	0
313	LWAK	-7991.07	0	-150.00	0	86.65	87	72.82	73	15.08	15	-39.53	0	-426.32	0	na	na	na	na	nr	na	0
314	LWAK	-19.05	0	42.18	42	96.37	96	60.57	61	-58.15	0	-33.33	0	-2677.78	0	na	na	na	na	nr	na	0

TABLE C2-1a. REQUIRED REDUCTION TO MEET FLOOR 2

EER Site ID No.	Type	Hg		PM		SVM		LVM		HC/C12		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ
		Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	Req. %	Adj. Reduct	
336	LWAK	nr	0	-84.34	0	nr	75	nr	0	16.07	16	-22.45	0	-49.70	0	na	na	na	na	-418.13	0	0
Floor Levels																						
209	INC	30.00	0	0.015	0	60.00	0	80.00	0	25.00	22	6.00	25	100.00	63	na	na	na	na	0.30	0	0
210	INC	-836.18	75	-223.01	0	-650.89	50	-254.98	75	21.97	26	nr	nr	63.16	0	na	na	na	na	nr	0	0
211	INC	nr	0	-44.23	0	nr	75	nr	50	26.25	20	-54.77	0	-27385.21	0	na	na	na	na	nr	0	0
212	INC	nr	0	36.13	36	nr	0	nr	0	20.17	71	-158.20	0	-2002.04	0	na	na	na	na	nr	0	0
214	INC	84.88	85	35.45	35	91.85	92	47.30	47	71.32	0	-73.45	0	-1934.62	0	na	na	na	na	nr	0	0
216	INC	-45.02	0	50.15	50	92.40	92	38.76	39	-1345.23	0	-386.48	0	-561.99	0	na	na	na	na	nr	0	0
221	INC	-258.57	0	-5.42	0	-46.48	0	-31.44	0	-36.47	0	-69.24	0	-869.84	0	na	na	na	na	nr	0	0
222	INC	nr	50	-597.56	0	-2035.46	0	nr	0	-1297.25	0	-1731.17	0	-552.36	0	na	na	na	na	nr	0	0
229	INC	nr	0	21.26	21	-32.26	0	nr	0	71.33	71	nr	0	-167.49	0	na	na	na	na	nr	0	0
324	INC	nr	0	-38.89	0	90.69	91	27.68	28	79.02	79	nr	0	-219.83	0	na	na	na	na	nr	0	0
325	INC	-3.78	0	-361.53	0	32.20	32	-152.27	0	-338.37	0	-609.18	0	-867.74	0	na	na	na	na	nr	0	0
327	INC	96.53	97	-1094.70	0	-192.11	0	-200.94	0	-629.65	0	-15.27	0	-1096.05	0	na	na	na	na	nr	0	0
329	INC	nr	75	50.74	51	nr	75	nr	75	-238.89	0	-142.58	0	-935.58	0	na	na	na	na	nr	0	0
330	INC	-475.48	0	64.37	64	82.35	82	-49.79	0	64.22	64	nr	0	nr	0	na	na	na	na	nr	0	0
331	INC	33.89	34	-87.50	87	98.38	98	-43.68	0	-300.33	0	nr	50	80.00	80	na	na	na	na	nr	0	0
332	INC	nr	nr	87.30	87	nr	nr	nr	nr	56.54	57	nr	nr	nr	nr	na	na	na	na	nr	0	0
333	INC	nr	nr	-1053.82	0	nr	0	nr	50	57.22	57	nr	nr	-2136.89	0	na	na	na	na	nr	0	0
334	INC	-401.49	0	72.94	73	98.68	99	84.07	84	-51.95	0	-195.75	0	-34.96	0	na	na	na	na	nr	0	0
337	INC	81.67	82	-6247.01	0	27.17	27	64.19	64	-366.30	0	-84.35	0	-13061.51	0	na	na	na	na	nr	413	25
338	INC	50.46	50	-1099.99	0	-102.30	0	-5.63	0	-12529.53	0	-228.32	0	-4878.93	0	na	na	na	na	nr	415	0
339	INC	nr	75	-414.21	0	nr	50	nr	0	-43.64	0	-384.19	0	nr	0	na	na	na	na	nr	0	0
340	INC	-191.15	0	-130.06	0	-588.07	0	-597.04	0	-40.06	0	-271.54	0	-238.04	0	na	na	na	na	nr	0	0
341	INC	-3115.38	0	-916.94	0	-333.83	0	-944.00	0	-1540.53	0	nr	0	-73.46	0	na	na	na	na	nr	0	0
342	INC	-347.50	0	-316.97	0	-210.32	0	-3408.50	0	-4187.10	0	nr	0	nr	nr	na	na	na	na	nr	0	0
344	INC	nr	50	-826.62	0	-271.78	0	-16.98	0	-2328.80	0	-234.50	0	-519.62	0	na	na	na	na	nr	0	0
346	INC	-10688.31	0	-1067.30	0	33.47	33	-553.14	0	-3175.32	0	nr	0	-255.68	0	na	na	na	na	nr	0	0
347	INC	-480.81	0	-115.39	0	-468.68	0	-443.92	0	-284.48	0	nr	0	nr	nr	na	na	na	na	nr	0	0
348	INC	nr	75	-1399.99	0	-593.53	0	-2435.15	0	-4410.34	0	nr	0	-1104.17	0	na	na	na	na	nr	0	0
349	INC	nr	nr	-690.51	0	-60.84	0	nr	75	-4412.86	0	nr	0	-1053.22	0	na	na	na	na	nr	0	0
350	INC	nr	0	-633.69	0	nr	75	nr	50	-3043.84	0	nr	50	-2870.43	0	na	na	na	na	nr	0	0
351	INC	nr	0	-68.16	0	nr	0	-645.40	0	-152.92	0	nr	0	-35.23	0	na	na	na	na	nr	0	0
353	INC	-643.20	0	30.81	31	40.23	40	32.99	33	-1557.16	0	nr	0	-529.10	0	na	na	na	na	nr	0	0
354	INC	-3490.59	0	-141.54	0	-2429.72	0	-684.78	0	-1325.07	0	nr	0	-3281.50	0	na	na	na	na	nr	0	0
356	INC	nr	0	51.61	52	nr	0	nr	0	-274.25	0	nr	0	-2601.64	0	na	na	na	na	nr	0	0
357	INC	nr	0	38.53	39	nr	75	nr	0	-251.75	0	nr	0	-808.60	0	na	na	na	na	nr	0	0
358	INC	nr	0	52.79	53	nr	50	nr	0	-209.04	0	nr	0	-6563.08	0	na	na	na	na	nr	0	0
359	INC	nr	75	19.91	20	88.43	88	99.85	100	84.03	84	nr	0	-0.58	0	na	na	na	na	nr	0	0
400	INC	-86.85	0	-152.37	0	91.99	92	27.87	28	-714.97	0	nr	0	nr	nr	na	na	na	na	nr	0	0
500	INC	-906.41	0	-767.27	0	-2012.85	0	-2249.06	0	-9.18	0	nr	0	nr	nr	na	na	na	na	nr	0	0
502	INC	nr	50	57.14	57	95.25	95	-5.12	0	7.58	8	nr	0	nr	nr	na	na	na	na	nr	0	0
503	INC	-93.40	0	43.40	43	92.20	92	81.34	81	-456.38	0	nr	50	nr	50	na	na	na	na	nr	0	0
504	INC	98.38	98	16.67	17	-54.59	0	46.56	47	3.82	4	nr	0	nr	0	na	na	na	na	nr	0	0
600	INC	nr	0	-100.00	0	nr	0	nr	50	-300.35	0	nr	0	nr	nr	na	na	na	na	nr	0	0
700	INC	-570.04	0	65.40	65	99.77	100	88.65	89	-88.00	0	nr	0	nr	nr	na	na	na	na	nr	0	0
701	INC	nr	nr	65.22	65	nr	0	nr	75	84.30	84	-679.22	0	nr	0	na	na	na	na	nr	0	0

TABLE C2-1a. REQUIRED REDUCTION TO MEET FLOOR 2

EER Site ID No.	Type	Hg		PM		SVM		LVM		HCI/CI2		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ Adj. Reduct
		Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	Req. % Reduct	Adj. Reduct	
702	INC	nr	0	81.59	82	nr	75	0	0	-364.03	0	nr	0	nr	-8580.92	0	na	na	na	na	nr	0
703	INC	nr	75	-400.00	0	nr	0	0	0	92.29	92	-1500.72	0	na	na	na	na	na	na	na	na	0
704	INC	nr	0	23.08	23	nr	0	0	0	83.78	84	nr	0	na	na	-2184.48	na	na	na	na	nr	25
705	INC	-134.03	0	43.74	44	64.66	65	32.84	33	-141.89	0	nr	0	na	na	-3364.34	na	na	na	na	nr	0
706	INC	nr	0	64.87	65	nr	0	nr	0	-13.91	0	-15.74	0	na	na	-151.49	na	na	na	na	nr	0
707	INC	nr	0	62.86	63	nr	75	nr	0	-89.52	0	nr	0	na	na	98.57	na	na	na	na	nr	0
708	INC	nr	0	39.80	40	nr	0	nr	50	-2206.92	0	nr	0	na	na	-1047.43	na	na	na	na	nr	0
709	INC	nr	50	63.41	63	nr	0	nr	0	-7.02	0	-369.24	0	na	na	-1188.66	na	na	na	na	nr	0
710	INC	nr	0	45.78	46	nr	75	nr	0	89.53	90	52.63	53	na	na	-240.91	na	na	na	na	nr	0
711	INC	nr	0	47.67	48	nr	0	nr	0	-1679.54	0	nr	0	na	na	-591.02	na	na	na	na	nr	0
712	INC	nr	0	30.97	31	-2569.12	0	-241.79	0	-146.58	0	nr	0	na	na	nr	na	na	na	na	nr	0
713	INC	nr	0	77.78	78	nr	50	nr	0	13.24	13	nr	50	na	na	-4897.31	na	na	na	na	nr	0
714	INC	nr	0	18.48	18	nr	75	nr	0	76.91	77	nr	0	na	na	-490.50	na	na	na	na	nr	0
725	INC	-1761.35	0	24.62	25	-52.46	0	-69.64	0	60.76	61	-242.86	0	na	na	-2320.90	na	na	na	na	nr	0
726	INC	nr	75	-499.99	82	nr	75	nr	75	72.15	72	96.75	97	na	na	-394.32	na	na	na	na	nr	0
727	INC	nr	0	81.71	82	nr	75	nr	50	57.39	57	nr	0	na	na	95.49	na	na	na	na	nr	0
728	INC	nr	0	65.04	65	nr	0	nr	50	97.26	97	nr	0	na	na	-2646.55	na	na	na	na	nr	0
784	INC	nr	0	63.41	63	nr	75	nr	0	97.26	97	nr	0	na	na	nr	na	na	na	na	nr	0
805	INC	nr	0	73.50	73	nr	0	nr	0	2.26	2	-24.94	0	na	na	70.78	na	na	na	na	nr	0
806	INC	80.98	81	66.47	66	89.06	89	-1025.54	0	69.30	69	60.59	61	na	na	49.17	na	na	na	na	nr	0
807	INC	-162.61	0	39.43	39	66.18	66	53.04	53	-971.51	0	-168.74	0	na	na	-1762.35	na	na	na	na	nr	0
808	INC	nr	0	-38.32	0	nr	75	nr	50	-27.78	0	nr	0	na	na	-96.76	na	na	na	na	nr	0
809	INC	nr	0	nr	0	99.41	99	97.87	98	42.51	43	-36.33	0	na	na	91.87	na	na	na	na	nr	0
810	INC	nr	0	nr	0	95.89	96	86.54	87	62.95	63	nr	0	na	na	-543.78	na	na	na	na	nr	0
824	INC	-4118.58	0	-134.37	0	-25.66	0	29.62	30	-758.30	0	nr	0	na	na	-1074.27	na	na	na	na	nr	0
825	INC	nr	50	80.00	80	nr	0	nr	0	36.75	37	nr	50	na	na	nr	na	na	na	na	nr	0
902	INC	35.72	36	28.23	28	-148.65	0	-725.08	0	-436.85	0	-36.44	0	na	na	-153.83	na	na	na	na	nr	0
904	INC	nr	0	-68.54	0	99.77	100	56.79	57	70.76	71	22.02	22	na	na	-19763.85	na	na	na	na	nr	0
905	INC	nr	0	nr	0	nr	75	nr	75	85.58	86	nr	0	na	na	-172.96	na	na	na	na	nr	0
906	INC	nr	0	77.68	78	nr	50	nr	75	88.30	88	-197.34	0	na	na	-1559.85	na	na	na	na	nr	0
914	INC	nr	0	-257.14	0	nr	0	nr	50	84.53	85	nr	75	na	na	-2677.78	na	na	na	na	nr	0
915	INC	nr	75	73.45	73	95.11	95	88.18	88	95.93	96	72.09	72	na	na	84.49	na	na	na	na	nr	0

TABLE C2-1b. MODEL GROUP SELECTION FOR FLOOR 2

EER ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Floor-2										Model Group No.	Required Add-on Flue Gas Control		
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	D/F				
200	CK	FF	0	0	12	79	0	0	0	na	na	na	na	0	3	Add FF
201	CK	FF	0	0	47	77	0	0	0	na	na	na	na	75	18	Add WQ + FF
202	CK	FF	0	0	89	0	0	0	0	na	na	na	na	75	21	Moderate DOM on existing FF + Add WQ
203	CK	ESP	0	0	87	0	47	0	0	na	na	na	na	96	19	Add WQ + IWS
204	CK	ESP	0	0	87	0	0	0	0	na	na	na	na	65	18	Add WQ + FF
205	CK	ESP	0	35	96	0	0	0	0	na	na	na	na	0	3	Add FF
206	CK	ESP	0	0	78	0	25	0	0	na	na	na	na	83	19	Add WQ + IWS
207	CK	MC/ESP	0	0	83	0	0	0	0	na	na	na	na	0	3	Add FF
208	CK	ESP	0	0	30	0	0	0	0	na	na	na	na	0	2	Moderate DOM on existing ESP
228	CK	ESP	25	0	75	0	0	0	0	na	na	na	na	2	5	Add WQ + CI + FF
300	CK	ESP	0	58	97	9	0	0	0	na	na	na	na	98	18	Add WQ + FF
301	CK	FF	65	24	0	0	0	0	0	na	71	na	na	0	28	Add CI + FF + Moderate DOM Combustor
302	CK	ESP	50	0	93	0	0	0	0	na	na	na	na	75	4	Add CI + FF
303	CK	QC/FF	0	0	0	0	0	0	0	na	0	0	0	0	1	None
304	CK	ESP	12	49	90	0	0	0	0	na	na	na	na	89	5	Add WQ + CI + FF
305	CK	ESP	0	59	94	0	0	43	0	na	na	na	na	100	19	Add WQ + IWS
306	CK	MC/FF	99	0	0	0	0	0	0	na	na	na	na	0	29	Add WQ + CB
308	CK	ESP	0	0	33	0	0	0	0	na	na	na	na	0	2	Moderate DOM on existing ESP
309	CK	MC/ESP	0	0	90	0	0	0	0	na	na	na	na	100	18	Add WQ + FF
315	CK	FF	0	0	0	0	0	0	0	na	0	0	0	75	17	Add WQ
316	CK	FF	0	0	0	0	0	0	0	na	0	0	0	75	17	Add WQ
317	CK	FF	0	0	0	0	0	0	0	na	0	0	0	84	17	Add WQ
318	CK	ESP	0	0	54	0	0	0	0	na	na	na	na	0	2	Moderate DOM on existing ESP
319	CK	ESP	28	20	90	0	14	0	0	na	na	na	na	96	16	Add WQ + CI + FF + PT
320	CK	FF	0	0	0	0	0	0	0	na	na	na	na	0	1	None
321	CK	ESP	50	71	0	0	0	0	0	na	nr	0	0	0	4	Add CI + FF
322	CK	ESP	0	0	60	0	0	0	0	na	na	na	na	93	20	Moderate DOM on ESP + Add WQ
323	CK	ESP	75	0	93	0	28	0	0	na	na	na	na	94	16	Add WQ + CI + FF + PT
335	CK	ESP	1	0	91	0	46	0	0	na	na	na	na	99	16	Add WQ + CI + FF + PT
401	CK	ESP	34	42	93	19	0	0	0	na	na	na	na	4	4	Add CI + FF
402	CK	ESP	0	44	98	25	0	0	0	na	0	0	0	0	3	Add FF
403	CK	ESP	95	13	0	0	0	0	0	na	na	na	na	81	30	Add WQ + CB + Small DOM on ESP
404	CK	ESP	0	0	0	37	16	0	0	na	na	na	na	78	19	Add WQ + IWS
405	CK	ESP	0	0	94	72	0	0	0	na	na	na	na	0	3	Add FF

223	LWAK	FF	3	0	0	0	0	40	0	0	na	na	na	0	4	Add CI + FF + ST
224	LWAK	FF	0	0	0	0	0	0	0	0	na	na	na	0	1	None
225	LWAK	FF	0	0	0	0	0	0	50	0	na	na	na	0	12	Add AB + WQ
226	LWAK	FF	0	0	0	0	0	0	0	0	na	na	na	0	1	None
227	LWAK	FF	0	0	0	0	14	52	0	93	na	na	na	0	14	Add AB + WQ + ST
307	LWAK	FF/VS	94	0	0	0	0	0	0	0	na	na	na	0	3	Add CI + FF
310	LWAK	FF	6	6	82	0	0	0	0	0	na	na	na	0	2	Add FF
311	LWAK	FF	0	0	87	0	0	0	0	0	na	na	na	0	2	Add FF
312	LWAK	FF	0	0	86	0	0	0	0	0	na	na	na	0	2	Add FF
313	LWAK	FF	0	0	87	73	15	0	0	0	na	na	na	0	6	Add IWS
314	LWAK	FF	0	42	96	61	0	0	0	0	na	na	na	0	2	Add FF
336	LWAK	FF	0	0	75	0	16	0	0	0	na	na	na	0	6	Add IWS

209	INC	WHB/FF/VQ/PT/DM	0	0	0	0	0	22	25	63	na	na	na	0	74	Moderate DOM Combustor + Small DOM WS
210	INC	FF/S	75	0	50	75	26	0	0	0	na	na	na	0	3	Moderate DOM on existing WS + Add RH + CI + FF
211	INC	SS/PT/VS	0	0	75	50	20	0	0	0	na	na	na	0	62	Small DOM on existing WS + Add FF

TABLE C2-1b. MODEL GROUP SELECTION FOR FLOOR 2

EER ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Floor-2			LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	D/F	Model Group No.	Required Add-on Flue Gas Control
			Hg	PM	SVM									
212	INC	FF/S	0	36	0	0	0	0	na	na	0	7	Moderate DOM on existing FF & WS	
214	INC	IWS	85	35	92	47	0	0	na	na	0	9	Add RH + CI + FF	
216	INC	HES/WS	0	50	92	39	0	0	na	na	0	6	Add FF	
221	INC	PT	0	0	0	0	0	0	na	na	0	1	None	
222	INC	WHB/SD/ESP/Q/PBS	50	0	0	0	0	0	na	na	0	8	Add CI	
229	INC	WHB/ACS/HGS/CS	0	21	0	0	0	75	na	na	0	78	Moderate DOM on existing WS + Add AB + FF	
324	INC	?	0	0	91	28	0	0	na	na	0	4	Add IWS	
325	INC	SD/FF/WS/IWS	0	0	32	0	0	0	na	na	0	66	Moderate DOM on existing FF	
327	INC	SD/FF/WS/ESP	97	0	0	0	0	0	na	na	0	61	Add RH + CB	
329	INC	PT/IWS	75	51	75	75	0	0	na	na	0	9	Add RH + CI + FF	
330	INC	QT/WS/DM	0	64	82	0	64	0	na	na	0	12	Moderate DOM on existing WS + Add FF	
331	INC	PT/IWS	34	0	98	0	50	0	na	na	0	54	Moderate DOM on Combustor + Add RH + CI + FF	
332	INC	WS	0	87	0	0	57	80	na	na	0	78	Moderate DOM on existing WS + Add AB + FF	
333	INC	SD/FF	0	0	0	50	57	0	na	na	0	14	Moderate DOM on existing SD & FF	
334	INC	WS/ESP/PT	0	73	99	84	0	0	na	na	0	6	Add FF	
337	INC	WHB/DA/DI/FF	82	0	27	64	0	0	na	na	25	67	Moderate DOM on existing FF + Add CI	
338	INC	QC/FF/SS/C/HES/DM	0	0	0	0	0	0	na	na	0	8	Add CI	
339	INC	AT/PT/RIS/ESP	75	0	50	0	0	0	na	na	0	28	Moderate DOM on ESP + Add RH + CB	
340	INC	WHB/ESP/WS	0	0	0	0	0	0	na	na	0	1	None	
341	INC	DA/DI/FF/HEPA/CA	0	0	0	0	0	0	na	na	25	72	Add WQ	
342	INC	WHB/QC/S/SD/DM	0	0	0	0	0	0	na	na	0	1	None	
344	INC	QC/VS/PT/DM	50	0	0	0	0	0	na	na	0	9	Add RH + CI + FF	
346	INC	C/QC/VS/PT/DM	0	0	33	0	0	0	na	na	0	19	Moderate DOM on existing VS	
347	INC	C/QC/VS/SD/DM	0	0	0	0	0	0	na	na	0	1	None	
348	INC	QC/AS/IWS	75	0	0	0	0	0	na	na	0	32	Add RH + CB	
349	INC	QC/FF/QC/PT	0	0	0	75	0	0	na	na	0	6	Add FF	
350	INC	WHB/HE/FF	0	0	75	50	50	0	na	na	0	55	Moderate DOM on Combustor + Add FF	
351	INC	GC/FF	0	0	0	0	0	0	na	na	0	1	None	
353	INC	QC/VS/DM/ESP	0	31	40	33	0	0	na	na	0	17	Moderate DOM on existing ESP	
354	INC	QC/AS/VS/DM/IWS	0	0	0	0	0	0	na	na	0	1	None	
356	INC	QC/AS/FN/DM	0	52	0	0	50	0	na	na	0	75	Moderate DOM on Combustor & FF	
357	INC	QC/VS/PT/IWS	0	39	75	0	0	0	na	na	0	6	Add FF	
358	INC	QC/VS/C/CT/SD/DM	0	53	50	0	0	0	na	na	0	19	Moderate DOM on existing VS	
359	INC	WHB/FF/S	75	20	88	100	84	0	na	na	0	13	Add RH + CI + FF + PT	
400	INC	SD/FF	0	0	92	28	0	0	na	na	0	6	Add FF	
500	INC	QC/VS/KOV/DM	0	0	0	0	0	0	na	na	0	1	None	
502	INC	WHB/QC/PBC/VS/ES	50	57	95	0	8	0	na	na	0	29	Small DOM on existing WS + Add RH + CB + FF	
503	INC	HTHE/LTHE/FF	0	43	92	81	0	50	na	na	0	55	Moderate DOM on Combustor + Add FF	
504	INC	V/S/C	98	17	0	47	4	0	na	na	0	63	Moderate DOM on existing VS + Add RH + CB + PT	
600	INC	WHB/QC/PT/IWS	0	0	0	50	0	0	na	na	0	6	Add FF	
700	INC	SD/RIS/VS/WS	0	65	100	89	0	0	na	na	0	6	Add FF	
701	INC	VS/PT	0	65	0	75	84	0	na	na	0	4	Add IWS	
702	INC	QT/S/C	0	82	75	0	0	0	na	na	0	6	Add FF	
703	INC	WHB	75	0	0	0	92	0	na	na	0	20	Add WQ + CB + PT	
704	INC	NONE	0	23	0	0	84	0	na	na	25	4	Add IWS	
705	INC	QT/VS/ESP/PT	0	44	65	33	0	0	na	na	0	17	Moderate DOM on existing ESP	
706	INC	QT/HS/C	0	65	0	0	0	0	na	na	0	19	Moderate DOM on existing VS	
707	INC	QT/WS	0	63	75	0	0	99	na	na	0	21	Add AB + FF	
708	INC	WS/ESP	0	40	0	50	0	0	na	na	0	17	Moderate DOM on existing ESP	
709	INC	NONE	50	63	0	0	0	0	na	na	0	10	Add WQ + CB + FF	
710	INC	QT/OS/CS	0	46	75	0	50	0	na	na	0	33	Moderate DOM on Combustor + Add IWS	
711	INC	C/VS/AS	0	48	0	0	0	0	na	na	0	6	Add FF	
712	INC	NONE	0	31	0	0	0	0	na	na	0	6	Add FF	

TABLE C2-1b. MODEL GROUP SELECTION FOR FLOOR 2

EER ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Floor-2				LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	D/F	Model Group No.	Required Add-on Flue Gas Control
			Hg	PM	SVM	PM									
713	INC	VS/PT	0	78	50	0	13	50	0	na	na	0	73	Moderate DOM Comb + Small DOM on WS + Add FF	
714	INC	WS	0	18	75	0	77	0	0	na	na	0	4	Add IWS	
725	INC	WS/QT	0	25	0	0	61	0	0	na	na	0	12	Moderate DOM on existing WS + Add FF	
726	INC	QC/CS/DM/VS	75	0	75	75	0	59	0	na	na	0	54	Moderate DOM on combustor + Add RH + CB + FF	
727	INC	GC/C/FF	0	82	75	50	72	97	95	na	na	0	5	Add AB + IWS	
728	INC	QT/PT/VS	0	65	0	0	57	0	0	na	na	0	77	Moderate DOM on existing VS & WS	
784	INC	NONE	0	63	75	50	97	0	0	na	na	0	4	Add IWS	
805	INC	QT/QS/VS/ES/PBS	0	73	0	0	2	0	71	na	na	0	76	Moderate DOM on Combustor & VS + Small DOM on WS	
806	INC	C/VS	81	66	89	0	69	61	49	na	na	0	24	Moderate DOM Combustor + Add RH + CI + FF + PT	
807	INC	C/WHB/VQ/PT/HS/DM	0	39	66	53	0	0	0	na	na	0	6	Add FF	
808	INC	QT/PBS/ESP	0	0	75	50	0	0	0	na	na	0	6	Add FF	
809	INC	VS	0	0	99	98	43	0	92	na	na	0	71	Add AB + FF + PT	
810	INC	Q/VS/PBS	0	0	96	87	63	0	0	na	na	0	12	Moderate DOM on existing WS + Add FF	
824	INC	QT/VS/PT/DM	0	0	0	30	0	0	0	na	na	0	19	Moderate DOM on existing VS	
825	INC	CCS/QC/ESP	50	80	0	0	37	50	75	na	na	0	39	Add AB + RH + CI + FF + PT	
902	INC	QT/VS/PT	36	28	0	0	0	0	0	na	na	0	9	Add RH + CI + FF	
904	INC	?	0	0	75	0	71	22	0	na	na	0	33	Moderate DOM on Combustor + Add IWS	
905	INC	QT/VS/AS/CS	0	0	100	57	86	0	0	na	na	0	4	Add IWS	
906	INC	QT/PT	0	78	50	75	88	0	0	na	na	0	4	Add IWS	
914	INC	?	0	0	0	50	85	75	0	na	na	0	5	Add AB + IWS	
915	INC	QC/VS/C	75	73	95	88	96	72	84	na	na	0	39	Add AB + RH + CI + FF + PT	

TABLE C2-1c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 2

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
CK	Group 1	None	1	303	L	Lone Star	MC/FF	408,681	370,000	
			3	320 *	L	Lafarge	FF	nr	370,000	
	Group 2	Moderate DOM on existing ESP	3	308 *	S	North Texas	ESP	162,599	147,000	
			4	318 *	S	Texas Industries	ESP	152,675	147,000	
	Group 3	Add FF	1	208 *	L	Keystone	ESP	307,644	370,000	
			2	200 *	S	Giant	FF	123,584	147,000	
			1	207 *	S	Keystone	MC/ESP	90,681	147,000	
			1	402 *	S	Ash Grove	ESP	187,605	147,000	
			1	405 *	S	Ash Grove	ESP	194,905	147,000	
	Group 4	Add Cl + FF	1	205	L	Holnam	ESP	253,556	370,000	
			2	302 *	S	Lafarge	ESP	130,576	147,000	
			1	321 *	S	Lafarge	ESP	59,542	147,000	
			1	401	S	Ash Grove	ESP	172,481	147,000	
	Group 5	Add WQ + Cl + FF	1	228 *	S	Ash Grove	ESP	148,537	147,000	
			1	304 *	L	Lone Star	ESP	300,367	370,000	
	Group 16	Add WQ + Cl + FF + PT	1	323 *	S	Lafarge	FF	185,409	147,000	85
			1	335	S	Medusa	ESP	100,378	147,000	85
	Group 17	Add WQ	1	319	L	Continental	ESP	344,250	370,000	85
			1	315 *	S	Southdown	FF	102,042	147,000	
			1	316 *	L	Southdown	FF	nr	370,000	
		1	317 *	L	Southdown	FF	422,190	370,000		
Group 18	Add WQ + FF	2	201 *	S	Giant	FF	137,945	147,000		
		2	300 *	S	Essroc	ESP	164,692	147,000		
		1	204 *	L	Holnam	ESP	693,613	370,000		
		1	309	L	River Cement	MC/ESP	665,839	370,000		
Group 19	Add WQ + IWS	2	305	S	Medusa	ESP	196,903	147,000	85	
		1	203	L	Holnam	ESP	291,645	370,000	85	
		1	206	L	Holnam	ESP	348,510	370,000	85	
		1	404	L	Ash Grove	ESP	265,721	370,000	85	
Group 20	Moderate DOM on ESP + Add WQ	1	322 *	S	Lafarge	ESP	112,269	147,000		
Group 21	Moderate DOM on existing FF + Add WQ	1	202 *	L	Heartland	FF	221,421	370,000		
Group 28	Add Cl + FF + Moderate DOM Combustor	1	301	S	Essroc	FF	185,409	147,000		
Group 29	Add WQ + CB	1	306 *	L	National	MC/FF	280,868	370,000		
Group 30	Add WQ + CB + Small DOM on ESP	1	403	S	Ash Grove	ESP	184,877	147,000		
LWAK	Group 1	None	1	224 *	M	Solite	FF	39,049	40,500	
			1	226 *	M	Solite	FF	nr	40,500	
	Group 2	Add FF	1	310 *	M	Solite	FF	47,770	40,500	
			1	311 *	M	Solite	FF	51,627	40,500	
		1	312 *	M	Solite	FF	47,698	40,500		
		1	314 *	M	Solite	FF	36,793	40,500		
Group 3	Add Cl + FF	2	307 *	M	Norlite	FF/VS	49,050	40,500		
Group 4	Add Cl + FF + ST	1	223 *	M (hi HCl)	Solite	FF	29,092	40,500	1,570	

TABLE C2-1c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 2

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
INC	Group 6	Add IWS	1	313 *	M (hi HCl)	Solite	FF	36,793	40,500	1,570
	Group 12	Add AB + WQ	1	336 *	M (lo HCl)	Solite	FF	30,336	40,500	875
	Group 14	Add AB + WQ + ST	1	225 *	M	Solite	FF	38,270	40,500	
	Group 1	None	1	227 *	M (hi HCl)	Solite	FF	38,796	40,500	1,570
			1	342 *	S	Upjohn	WHB/QC/VS/DM	5,640	3,900	
			1	351 *	S	Iowa Army Ammo Plant	GC/C/FF	3,457	3,900	
			1	340 *	M	Miles	WHB/ESP/WS	16,003	22,100	
			1	347 *	M	Department of Army	C/QC/VS/S/DM	10,795	22,100	
			1	354 *	M	Dow Chemical	QC/AS/VS/DM/IWS	27,383	22,100	
			1	221	L	Rollins	PT	51,114	60,800	
			1	500 *	L	Chevron	QC/VS/KOV/DM	49,822	60,800	
	Group 3	Moderate DOM on existing WS + Add RH + CI + FF	1	210 *	L	LWD	FF/S	96,107	60,800	
	Group 4	Add IWS	1	704 *	S	Ashland	NONE	5,011	3,900	92
			1	784 *	S	Cook Composites	NONE	nr	3,900	92
		1	905 *	S	Velsicol Chemical	QTVS/AS/CS	nr	3,900	92	
		1	906 *	S	Monsanto	QT/PT	2,738	3,900	92	
		1	324 *	M	Allied	?	12,120	22,100	92	
		1	701 *	M	Eli Lilly	VS/PT	9,208	22,100	92	
		2	714 *	M	Olin Chemical	WS	19,185	22,100	92	
Group 5	Add AB + IWS	1	727 *	S	Iowa Army Ammo Plant	GC/C/FF	3,043	3,900	92	
		1	914 *	M	Vertac Superfund	?	25,849	22,100	92	
Group 6	Add FF	2	349 *	S	Radford Army Ammo Plant	QC/FF/QC/PT	5,653	3,900		
		1	357 *	M	Department of Energy	QC/VS/PT/IWS	20,778	22,100		
		1	700 *	M	Dupont	SD/R/S/VS/WS	30,185	22,100		
		1	702 *	M	Dupont	QT/S/C	nr	22,100		
		1	807	M	Bros Lagoon Site	C/WHB/VQ/PT/HS/DM	34,109	22,100		
		1	808 *	M	Dow Chemical	QT/PBS/ESP	35,720	22,100		
		1	216 *	L	Rollins	HES/WS	40,002	60,800		
		1	334 *	L	3M	WS/ESP/PT	40,599	60,800		
		1	400 *	L	Marine Shale	SD/FF	179,333	60,800		
		1	600 *	L	Dow Chemical	WHB/QC/PT/IWS	43,839	60,800		
		1	711 *	L	Chevron Chemical	C/VS/AS	52,907	60,800		
		1	712 *	L	Nepera	NONE	65,256	60,800		
Group 7	Moderate DOM on existing FF & WS	1	212 *	L	LWD	FF/S	44,610	60,800		
Group 8	Add CI	1	222 *	L	WTI	WHB/SD/ESP/Q/PBS	93,718	60,800		
		1	338 *	L	Dupont	QC/FF/SS/C/HES/DM	65,598	60,800		
Group 9	Add RH + CI + FF	1	214 *	M	Rollins	IWS	34,655	22,100		
		1	344 *	M	Department of Army	QC/VS/PT/DM	13,886	22,100		
		1	902 *	M	Rocky Mountain Arsenal	QTVS/PT	25,436	22,100		
Group 10	Add WQ + CB + FF	1	329 *	L	Dupont	PT/IWS	53,489	60,800		
Group 12	Moderate DOM on existing WS + Add FF	1	709 *	S	Cargill Chemical	NONE	3,123	3,900		
		1	725	S	Zeneca	WS/QT	1,489	3,900		
		1	330 *	M	General Electric	QT/WS/DM	10,345	22,100		
		1	810 *	M	Tennessee Eastman	Q/VS/PBS	28,434	22,100		

TABLE C2-1c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 2

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
	Group 13	Add RH + CI + FF + PT	1	359 *	M	Atochem	WHB/FF/S	13,802	22,100	
	Group 14	Moderate DOM on existing SD & FF	1	333 *	L	Trade Waste	SD/FF	42,042	60,800	
	Group 17	Moderate DOM on existing ESP	1	708 *	S	Burroughs Wellcome	WS/ESP	3,687	3,900	
			1	353 *	M	Dow Chemical	QC/VS/DM/ESP	nr	22,100	
			1	705 *	M	Ciba-Geigy	QT/VS/ESP/PT	36,116	22,100	
	Group 19	Moderate DOM on existing VS	1	824 *	S	Fenwall	QT/VS/PT/DM	1,086	3,900	
			1	346 *	M	Department of Army	C/QC/VS/PT/DM	21,812	22,100	
			1	358 *	M	Eli Lilly	QC/VS/C/CT/S/DM	14,406	22,100	
			1	706 *	M	Ciba-Geigy	QT/HS/C	nr	22,100	
	Group 20	Add WQ + CB + PT	1	703 *	S	Aristech	WHB	1,873	3,900	92
	Group 21	Add AB + FF	1	707 *	L	Dupont	QT/WS	58,120	60,800	
	Group 24	Moderate DOM Combustor + Add RH + CI + FF + PT	1	806 *	M	Amoco Oli	C/VS	20,641	22,100	92
	Group 28	Moderate DOM on ESP + Add RH + CB	1	339 *	S	Dupont	AT/PT/RJS/ESP	6,263	3,900	
	Group 29	Small DOM on existing WS + Add RH + CB + FF	1	502 *	S	Pfizer	WHB/QC/PBC/VS/ES	6,647	3,900	
	Group 32	Add RH + CB	1	348 *	S	Occidental Chemical	QC/AS/IWS	nr	3,900	
	Group 33	Moderate DOM on Combustor + Add IWS	1	904 *	S	First Chemical	?	5,950	3,900	92
			1	710 *	M	Dupont	QT/OS/C/S	nr	22,100	92
	Group 39	Add AB + RH + CI + FF + PT	1	825 *	M	General Electric	CCS/QC/ESP	21,363	22,100	92
			1	915 *	M	Eastman Kodak	QC/VS/C	nr	22,100	92
	Group 54	Moderate DOM on combustor + Add RH + CB + FF	1	726 *	S	Shell Oil	QC/CS/DM/VS	3,669	3,900	
			1	331 *	L	Ross	PT/IWS	44,379	60,800	
	Group 55	Moderate DOM on Combustor + Add FF	1	503 *	S	Lake City Army Ammo Plat	HTHE/LTHE/FF	4,747	3,900	
			1	350 *	M	Dupont	WHB/HE/FF	15,883	22,100	
	Group 61	Add RH + CB	1	327	L	Aptus	SD/FF/WS/ESP	49,572	60,800	
	Group 62	Small DOM on existing WS + Add FF	1	211 *	L	LWD	SS/PT/VS	43,596	60,800	
	Group 63	Moderate DOM on existing VS + Add RH + CB + PT	1	504 *	M	Chevron Chemical	VS/C	32,804	22,100	92
	Group 66	Moderate DOM on existing FF	1	325 *	M	Aptus	SD/FF/WS/IWS	23,127	22,100	
	Group 67	Moderate DOM on existing FF + Add CI	2	337 *	M	Olin Chemical	WHB/DA/DI/FF	13,807	22,100	
	Group 71	Add AB + FF + PT	1	809 *	L	Tennessee Eastman	VS	40,524	60,800	92
	Group 72	Add WQ	1	341 *	M	Glaxo	DA/DI/FF/HEPA/CA	nr	22,100	
	Group 73	Moderate DOM Comb + Small DOM on WS + Add FF	1	713 *	S	Pfizer	VS/PT	2,625	3,900	
	Group 74	Moderate DOM Combustor + Small DOM WS	1	209 *	M	Latdlaw	WHB/FF/VQ/PT/DM	21,716	22,100	
	Group 75	Moderate DOM on Combustor & FF	1	356 *	S	Dupont	QC/AS/EN/DM	5,100	3,900	
	Group 76	Moderate DOM on Combustor & VS + Small DOM on WS	1	805 *	M	American Cyanamid	QT/QS/VS/ES/PBS	31,943	22,100	
	Group 77	Moderate DOM on existing VS & WS	1	728 *	S	Eli Lilly	QT/PT/VS	5,819	3,900	
	Group 78	Moderate DOM on existing WS + Add AB + FF	1	229 *	S	Vulcan Materials	WHB/ACS/HCS/CS	1,171	3,900	
			1	332 *	M	Thermalkem	WS	20,208	22,100	

TABLE C2-1c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 2

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)

* Facility has been assigned to model group based on assumed emission level. Facility did not report the necessary emission value, therefore one was assigned based on the distribution of reported values from other facilities.

** Reported Ratio is equal to the number of total units located at a site divided by the number of units for which information was reported.

Often a facility will report data for only one unit even when the facility has two or three units at the particular site, since the single reported unit can be considered as representative of the other nonreported units.

nr = not reported

Source Type	Model Group	Size Category	Model Group Description	Number of Sources	Capital Cost	Annual Operating Cost	Total Annual Cost
CK	1	L	None	4	\$0K	\$0K	\$0K
CK	2	S	DOM ESP mod	7	\$1,757K	\$149K	\$380K
CK	2	L		1	\$3,136K	\$287K	\$699K
CK	3	S	Add FF	5	\$2,141K	\$355K	\$596K
CK	3	L		1	\$5,072K	\$754K	\$1,325K
CK	4	S	Add CI,FF	4	\$2,611K	\$718K	\$1,022K
CK	5	S	Add Q,CI,FF	1	\$3,144K	\$806K	\$1,180K
CK	5	L		1	\$6,570K	\$1,645K	\$2,414K
CK	16	S	Add Q, CI, FF, PT	2	\$4,045K	\$1,136K	\$1,656K
CK	16	L		1	\$8,505K	\$2,329K	\$3,413K
CK	17	S	Add Q	1	\$533K	\$88K	\$158K
CK	17	L		2	\$912K	\$155K	\$275K
CK	18	S	Add Q, FF	4	\$2,673K	\$443K	\$754K
CK	18	L		2	\$5,984K	\$909K	\$1,601K
CK	19	S	Add Q, IWS	2	\$2,923K	\$467K	\$926K
CK	19	L		3	\$5,322K	\$902K	\$1,740K
CK	20	S	Moderate DOM on existing ESP, Add Q	1	\$2,290K	\$237K	\$538K
CK	21	L	Moderate DOM on existing FF, Add Q	1	\$1,226K	\$259K	\$390K
CK	28	S	Moderate DOM on Combustor, Add CI,	1	\$2,832K	\$718K	\$1,058K
CK	29	L	Add WQ, CB	1	\$16,598K	\$1,696K	\$3,878K
CK	30	S	Small DOM on existing ESP, Add WQ,	1	\$7,938K	\$863K	\$1,907K
INC	1	S	None	2	\$0K	\$0K	\$0K
INC	1	M		3	\$0K	\$0K	\$0K
INC	1	L		2	\$0K	\$0K	\$0K
INC	3	L	DOM WS mod, Add RH,CI/CB,FF	1	\$1,876K	\$712K	\$968K
INC	4	S	Add IWS	4	\$215K	\$97K	\$132K
INC	4	M		4	\$680K	\$144K	\$254K
INC	5	S	Add AB,IWS	1	\$480K	\$289K	\$359K
INC	5	M		1	\$1,097K	\$677K	\$843K
INC	6	S	Add FF	2	\$82K	\$89K	\$98K
INC	6	M		5	\$295K	\$121K	\$154K
INC	6	L		6	\$943K	\$198K	\$305K
INC	7	L	DOM FF mod, DOM WS mod	1	\$247K	\$58K	\$111K
INC	8	L	Add CI/CB	2	\$425K	\$224K	\$280K
INC	9	M	Add RH, CI/CB, FF	3	\$932K	\$391K	\$508K
INC	9	L		1	\$1,681K	\$672K	\$876K
INC	10	S	Add Q,CI/CB,FF	1	\$643K	\$221K	\$304K
INC	12	S	DOM WS mod, Add FF	1	\$95K	\$92K	\$104K
INC	12	M		2	\$367K	\$136K	\$188K
INC	13	M	Add PT, RH, CI/CB, FF	1	\$1,137K	\$515K	\$665K
INC	14	L	DOM SD mod, DOM FF mod	1	\$587K	\$74K	\$162K
INC	17	S	DOM ESP mod	1	\$180K	\$27K	\$50K
INC	17	M		2	\$535K	\$50K	\$120K
INC	19	S	DOM VS mod	1	\$11K	\$6K	\$10K
INC	19	M		3	\$46K	\$35K	\$47K
INC	20	S	Add Q,CI/CB,PT	1	\$619K	\$222K	\$305K

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Source Type	Model Group	Size Category	Model Group Description	Number of Sources	Capital Cost	Annual Operating Cost	Total Annual Cost
INC	21	L	Add AB, FF	1	\$1,486K	\$1,473K	\$1,651K
INC	24	M	DOM combustor, Add PT,RH,CI/CB,FF	1	\$1,291K	\$515K	\$690K
INC	28	S	DOM ESP mod, Add RH,CI/CB	1	\$673K	\$178K	\$267K
INC	29	S	DOM IWS small, Add RH,CI/CB,FF	1	\$586K	\$246K	\$322K
INC	32	S	Add RH, CB/CI	1	\$493K	\$152K	\$216K
INC	33	S	DOM Combustor, Add IWS	1	\$331K	\$97K	\$151K
INC	33	M		1	\$834K	\$144K	\$280K
INC	39	M	Add RH, CI/CB, FF, PT, AB	2	\$1,554K	\$1,048K	\$1,253K
INC	54	S	Moderate DOM on Combustor, Add RH,	1	\$691K	\$241K	\$334K
INC	54	L		1	\$1,866K	\$672K	\$906K
INC	55	S	Moderate DOM on Combustor, Add FF	1	\$198K	\$89K	\$117K
INC	55	M		1	\$450K	\$121K	\$179K
INC	61	L	Add RH, CB	1	\$3,687K	\$603K	\$1,088K
INC	62	L	Small DOM on existing WS, Add FF	1	\$1,044K	\$227K	\$354K
INC	63	M	Moderate DOM on existing VS, Add RH,	1	\$1,830K	\$458K	\$711K
INC	66	M	Moderate DOM on existing FF	1	\$19K	\$6K	\$7K
INC	67	M	Moderate DOM on existing FF, Add CI/C	2	\$415K	\$153K	\$206K
INC	71	L	Add AB, FF	1	\$1,486K	\$1,473K	\$1,651K
INC	72	M	Add WQ	1	\$278K	\$48K	\$84K
INC	73	S	Moderate DOM Combustor, Small DOM	1	\$209K	\$94K	\$124K
INC	74	M	Moderate DOM Combustor, Small DOM	1	\$194K	\$13K	\$46K
INC	75	S	Moderate DOM Combustor, Moderate D	1	\$120K	\$1K	\$20K
INC	76	M	Moderate DOM Combustor, Moderate D	1	\$240K	\$48K	\$93K
INC	77	S	Moderate DOM on existing VS & WS	1	\$24K	\$9K	\$16K
INC	78	S	Moderate DOM on existing WS, Add AB	1	\$360K	\$284K	\$332K
INC	78	M		1	\$783K	\$669K	\$776K
LWAK	1	M	None	2	\$0K	\$0K	\$0K
LWAK	2	M	Add FF	4	\$661K	\$161K	\$236K
LWAK	3	M	Add CI, FF	2	\$1,074K	\$350K	\$480K
LWAK	4	M (hi	Add CI, FF, ST	1	\$2,302K	\$680K	\$1,009K
LWAK	6	M (lo		1	\$1,016K	\$449K	\$615K
LWAK	6	M (hi	Add IWS	1	\$1,016K	\$682K	\$847K
LWAK	12	M	Add AB, Q	1	\$809K	\$1,264K	\$1,371K
LWAK	14	M (hi	Add AB, Q, ST	1	\$2,038K	\$1,594K	\$1,900K

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TABLE C2-2a. REQUIRED REDUCTION TO MEET OPTION 5

EER Site ID No.	Type	Hg		PM		SVM		LVM		HCl/C12		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ Adj. Reduct.
		Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	
Floor Levels		30.00		0.03		60.00		80.00		60.00		20.00		na		6.00		100.00		0.20		
200	CK	-198.08	0	-118.49	0	11.79	12	79.20	79	-259.68	0	nr	0	na	na	na	na	na	na	nr	550	25
201	CK	-1030.99	0	-130.41	0	-19.45	0	76.95	77	-207.76	0	nr	0	na	na	na	na	na	na	nr	550	75
202	CK	-45.95	0	-25.37	0	47.29	47	-171.43	0	-260.69	0	nr	0	na	na	na	na	na	na	nr	440	75
203	CK	-402.27	0	-119.51	0	89.11	89	-189.88	0	46.87	47	-5.26	0	na	na	na	na	na	na	96.43	500	96
204	CK	-71.94	0	0.26	0	87.34	87	-1160.17	0	-85274.81	0	nr	0	na	na	na	na	na	na	64.91	600	65
205	CK	-1.57	0	35.22	35	95.82	96	-302.25	0	-279.44	0	10.95	0	na	na	na	na	na	na	-103.05	500	0
206	CK	-84.47	0	-25.08	0	77.89	78	-833.89	0	25.36	25	-65.62	0	na	na	na	na	na	na	82.61	500	83
207	CK	-79.53	0	-31.99	0	83.38	83	-314.49	0	-1195.03	0	nr	0	na	na	na	na	na	na	-1150.00	400	0
208	CK	-45.55	0	-108.75	0	30.45	30	-569.85	0	-1331.11	0	nr	0	na	na	na	na	na	na	-4238.39	420	0
228	CK	nr	25	nr	0	nr	75	nr	nr	-103.74	0	-18.34	0	na	na	na	na	na	na	2.44	500	2
300	CK	nr	0	58.04	58	96.85	97	8.66	9	-78.64	0	-4.58	0	na	na	na	na	na	na	98.33	600	98
301	CK	74.10	74	23.80	24	-558.71	0	-376.85	0	-14967.21	0	-65.70	0	na	na	na	na	na	na	nr	420	75
302	CK	nr	50	-44.64	0	93.18	93	-292.55	0	-489.91	0	nr	0	na	na	na	na	na	na	nr	250	0
303	CK	-3.06	0	-30.43	0	-137.38	0	-574.52	0	-1447.69	0	66.67	0	na	na	na	na	na	na	nr	420	75
304	CK	33.67	34	48.89	49	90.27	90	-98.82	0	-17169.64	0	nr	0	na	na	na	na	na	na	nr	420	75
305	CK	-179.29	0	58.80	59	94.43	94	-169.43	0	42.54	43	10.42	0	na	na	na	na	na	na	88.89	460	89
306	CK	99.14	99	-99.06	0	-270.97	0	-504.69	0	-2568.48	0	nr	0	na	na	na	na	na	na	-266.30	730	100
308	CK	nr	0	-36.36	0	33.16	33	-968.07	0	-1036.85	0	-32.45	0	na	na	na	na	na	na	nr	440	75
309	CK	22.28	22	-25.78	0	89.71	90	-1574.72	0	-26.62	0	nr	0	na	na	na	na	na	na	nr	640	100
315	CK	nr	0	-2740.15	0	-307.71	0	-615.13	0	-2848.80	0	nr	0	na	na	na	na	na	na	nr	450	75
316	CK	nr	50	-154.44	0	-963.78	0	-1053.42	0	-121.45	0	-233.33	0	na	na	na	na	na	na	nr	500	75
317	CK	nr	0	-1230.87	0	-108.38	0	-241.51	0	-1239.86	0	64.17	0	na	na	na	na	na	na	83.87	500	84
318	CK	nr	0	-225.02	0	53.66	54	-332.38	0	-25.78	0	-207.69	0	na	na	na	na	na	na	nr	420	75
319	CK	45.76	46	20.00	20	90.38	90	-25.95	0	14.03	14	68.94	0	na	na	na	na	na	na	96.42	540	96
320	CK	nr	0	-899.98	0	-2606.88	0	-1709.29	0	-1125.21	0	80.10	0	na	na	na	na	na	na	-136.97	480	0
321	CK	nr	50	71.43	71	-802.93	0	-1294.44	0	-756.14	0	nr	0	na	na	na	na	na	na	nr	240	nr
322	CK	nr	0	-130.76	0	59.73	60	-208.71	0	-175.80	0	-170.27	0	na	na	na	na	na	na	nr	550	93
323	CK	nr	75	-7.14	0	93.06	93	0.42	0	27.55	28	-90.48	0	na	na	na	na	na	na	92.54	500	94
335	CK	25.54	26	-48.08	0	91.37	91	-647.06	0	46.05	46	-12.55	0	na	na	na	na	na	na	94.44	718	99
401	CK	50.49	50	42.41	42	93.35	93	19.03	19	-172.08	0	61.33	0	na	na	na	na	na	na	99.20	400	49
402	CK	6.66	7	43.93	44	98.23	98	24.87	25	-241.19	0	33.05	0	na	na	na	na	na	na	nr	450	0
403	CK	96.55	97	13.39	13	-100.61	0	-143.20	0	-9768.77	0	-13.19	0	na	na	na	na	na	na	nr	500	81
404	CK	-605.42	0	-528.18	0	-7.97	0	37.49	37	16.10	16	-25.96	0	na	na	na	na	na	na	nr	500	78
405	CK	-48.59	0	-36.56	0	93.69	94	72.09	72	-2120.60	0	6.65	0	na	na	na	na	na	na	nr	250	50
Floor Levels		30.00		0.015		60.00		80.00		60.00		6.00		100.00		na		na		0.20		
223	LWAK	3.22	3	-479.94	0	-962.76	0	-124.69	0	97.23	97	nr	0	0	-986.96	na	na	na	na	nr	na	0
224	LWAK	-109.49	0	-427.20	0	-1408.79	0	-331.05	0	-4203.56	0	nr	0	0	-1215.79	na	na	na	na	nr	na	0
225	LWAK	-541.04	0	-4045.81	0	-6064.30	0	-692.88	0	90.05	90	nr	50	0	-1182.05	na	na	na	na	nr	na	0
226	LWAK	nr	0	-1385.13	0	nr	0	nr	0	88.64	89	nr	0	0	-387.80	na	na	na	na	nr	na	0
227	LWAK	-79.59	0	-926.73	0	-193.58	0	-297.03	0	96.05	96	nr	52	93	92.51	na	na	na	na	nr	na	0
307	LWAK	93.89	94	-38.09	0	-946.18	0	-25.21	0	-166.00	0	nr	0	0	-120.61	na	na	na	na	nr	na	0
310	LWAK	-116.91	0	6.25	6	82.19	82	-33.99	0	94.98	95	-71.43	0	0	-15.47	na	na	na	na	nr	na	0
311	LWAK	-98.51	0	-150.00	0	86.54	87	-121.23	0	95.12	95	-22.45	0	0	-49.70	na	na	na	na	nr	na	0
312	LWAK	-255.93	0	-114.28	0	85.87	86	-126.36	0	95.38	95	-71.43	0	0	-15.47	na	na	na	na	nr	na	0
313	LWAK	-7991.07	0	-150.00	0	86.65	87	72.82	73	96.08	96	-39.53	0	0	-426.32	na	na	na	na	nr	na	0
314	LWAK	-19.05	0	42.18	42	96.37	96	60.57	61	92.70	93	-33.33	0	0	-2677.78	na	na	na	na	nr	na	0

TABLE C2-2a. REQUIRED REDUCTION TO MEET OPTION 5

EER Site ID No.	Type	Hg		PM		SVM		LVM		HC1/C12		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ Adj. Reduct.
		Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	
336	LWAK	nr	0	-84.34	0	nr	75	nr	nr	96.13	96	-22.45	0	-49.70	0	na	na	na	na	-418.13	0	
Floor Levels																						
209	INC	30.00	0	0.015	0	60.00	0	80.00	0	25.00	22	6.00	25	100.00	63	na	na	na	na	0.20	0	
210	INC	-836.18	75	-223.01	0	-650.89	50	-254.98	75	21.97	26	nr	nr	63.16	0	na	na	na	na	nr	75	
211	INC	nr	0	-44.23	0	nr	75	nr	nr	26.25	20	-54.77	0	-27385.21	0	na	na	na	na	nr	25	
212	INC	nr	0	36.13	36	nr	0	nr	nr	20.17	71	-158.20	0	-2002.04	0	na	na	na	na	nr	0	
214	INC	84.88	85	35.45	35	91.85	92	47.30	47	71.32	0	-386.48	0	-1934.62	0	na	na	na	na	nr	0	
216	INC	-45.02	0	50.15	50	92.40	92	38.76	39	-1345.23	0	nr	0	-561.99	0	na	na	na	na	nr	0	
221	INC	-258.57	0	-5.42	0	-46.48	0	-31.44	0	-36.47	0	-69.24	0	-869.84	0	na	na	na	na	nr	0	
222	INC	nr	50	-597.56	0	-2035.46	0	nr	0	-1297.25	0	-1731.17	0	-552.36	0	na	na	na	na	nr	52	
229	INC	nr	0	21.26	21	-32.26	0	nr	0	71.33	71	nr	0	-167.49	75	na	na	na	na	nr	83	
324	INC	nr	0	-38.89	0	90.69	91	27.68	28	79.02	79	nr	0	-219.83	0	na	na	na	na	nr	96	
325	INC	-3.78	0	-361.53	0	32.20	32	-152.27	0	-338.37	0	-609.18	0	-867.74	0	na	na	na	na	nr	75	
327	INC	96.53	97	-1094.70	0	-192.11	0	-200.94	0	-629.65	0	-15.27	0	-1096.05	0	na	na	na	na	nr	0	
329	INC	nr	75	50.74	51	nr	75	nr	75	-238.89	0	-142.58	0	-935.58	0	na	na	na	na	nr	99	
330	INC	-475.48	0	64.37	64	82.35	82	-49.79	0	64.22	64	nr	0	nr	0	na	na	na	na	nr	50	
331	INC	33.89	34	-87.50	87	98.38	98	-43.68	0	-300.33	0	nr	50	80.00	80	na	na	na	na	nr	99	
332	INC	nr	0	87.30	87	nr	0	nr	0	56.54	57	nr	0	-2136.89	0	na	na	na	na	nr	75	
333	INC	nr	0	-1053.82	0	nr	0	nr	50	57.22	57	nr	0	-195.75	0	na	na	na	na	nr	0	
334	INC	-401.49	0	72.94	73	98.68	99	84.07	84	-51.95	0	-84.35	0	-34.96	0	na	na	na	na	nr	89	
337	INC	81.67	82	-6247.01	0	27.17	27	64.19	64	-366.30	0	-228.32	0	-13061.51	0	na	na	na	na	nr	0	
338	INC	50.46	50	-1099.99	0	-102.30	0	-5.63	0	-12529.53	0	-384.19	0	-4878.93	0	na	na	na	na	nr	0	
339	INC	nr	75	-414.21	0	nr	50	nr	0	-43.64	0	nr	0	nr	0	na	na	na	na	nr	0	
340	INC	-191.15	0	-916.94	0	-588.07	0	-597.04	0	-40.06	0	-271.54	0	-238.04	0	na	na	na	na	nr	75	
341	INC	-3115.38	0	nr	0	-333.83	0	-944.00	0	-1540.53	0	nr	0	-73.46	0	na	na	na	na	nr	50	
342	INC	-347.50	0	-316.97	0	-210.32	0	-3408.50	0	-4187.10	0	nr	0	nr	0	na	na	na	na	nr	0	
344	INC	nr	50	-826.62	0	-271.78	0	-16.98	0	-2328.80	0	-234.50	0	-519.62	0	na	na	na	na	nr	25	
346	INC	-10688.31	0	-1067.30	0	33.47	33	-553.14	0	-3175.32	0	nr	0	-255.68	0	na	na	na	na	nr	0	
347	INC	-480.81	0	-115.39	0	-468.68	0	-443.92	0	-284.48	0	nr	0	nr	0	na	na	na	na	nr	0	
348	INC	nr	75	-1399.99	0	-593.53	0	-2435.15	0	-4410.34	0	nr	0	-1104.17	0	na	na	na	na	nr	75	
349	INC	nr	0	-690.51	0	-60.84	0	nr	75	-4412.86	0	nr	0	-1053.22	0	na	na	na	na	nr	0	
350	INC	nr	0	-633.69	0	nr	75	nr	50	-3043.84	0	nr	50	-2870.43	0	na	na	na	na	nr	0	
351	INC	nr	0	-68.16	0	nr	0	-645.40	0	-152.92	0	nr	0	-35.23	0	na	na	na	na	nr	0	
353	INC	-643.20	0	30.81	31	40.23	40	32.99	33	-1557.16	0	nr	0	-529.10	0	na	na	na	na	nr	50	
354	INC	-3490.59	0	-141.54	0	-2429.72	0	-684.78	0	-1325.07	0	nr	0	-3281.50	0	na	na	na	na	nr	0	
356	INC	nr	0	51.61	52	nr	0	nr	0	-274.25	0	nr	50	-2601.64	0	na	na	na	na	nr	75	
357	INC	nr	0	38.53	39	nr	75	nr	0	-251.75	0	nr	0	-808.60	0	na	na	na	na	nr	0	
358	INC	nr	0	52.79	53	nr	50	nr	0	-209.04	0	nr	0	-6563.08	0	na	na	na	na	nr	0	
359	INC	nr	75	19.91	20	88.43	88	99.85	100	84.03	84	nr	0	-0.58	0	na	na	na	na	nr	0	
400	INC	-86.85	0	-152.37	0	91.99	92	27.87	28	-714.97	0	nr	0	nr	0	na	na	na	na	nr	50	
500	INC	-906.41	0	-767.27	0	-2012.85	0	-2249.06	0	-9.18	0	nr	0	nr	0	na	na	na	na	nr	0	
502	INC	nr	50	57.14	57	95.25	95	-5.12	0	7.58	8	nr	0	nr	0	na	na	na	na	nr	0	
503	INC	-93.40	0	43.40	43	92.20	92	81.34	81	-456.38	0	nr	50	nr	50	na	na	na	na	nr	75	
504	INC	98.38	98	16.67	17	-54.59	0	46.56	47	3.82	4	nr	0	nr	0	na	na	na	na	nr	0	
600	INC	nr	0	-100.00	0	nr	0	nr	50	-300.35	0	nr	0	nr	0	na	na	na	na	nr	0	
700	INC	-570.04	0	65.40	65	99.77	100	88.65	89	-88.00	0	nr	0	nr	0	na	na	na	na	nr	0	
701	INC	nr	0	65.22	65	nr	0	nr	75	84.30	84	-679.22	0	nr	0	na	na	na	na	nr	50	

TABLE C2-2a. REQUIRED REDUCTION TO MEET OPTION 5

EER Site ID No.	Type	Hg		PM		SVM		LVM		HCI/CI2		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ Adj. Reduct.
		Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	Req. %	Adj. Reduct.	
702	INC	nr	0	81.59	82	nr	75	nr	0	-364.03	0	nr	0	nr	-8580.92	0	na	na	na	na	nr	75
703	INC	nr	75	-400.00	0	nr	0	nr	0	92.29	92	-1500.72	0	nr	0	na	na	na	na	na	na	0
704	INC	nr	0	23.08	23	nr	0	nr	0	83.78	84	nr	0	-2184.48	0	na	na	na	na	na	nr	0
705	INC	-134.03	0	43.74	44	64.66	65	32.84	33	-141.89	0	nr	0	-3364.34	0	na	na	na	na	na	nr	75
706	INC	nr	0	64.87	65	nr	0	nr	0	-13.91	0	-15.74	0	-151.49	0	na	na	na	na	na	-895.02	0
707	INC	nr	0	62.86	63	nr	75	nr	0	-89.52	0	nr	0	98.57	99	na	na	na	na	na	nr	50
708	INC	nr	0	39.80	40	nr	0	nr	50	-2206.92	0	nr	0	-1047.43	0	na	na	na	na	na	nr	75
709	INC	nr	50	63.41	63	nr	0	nr	0	-7.02	0	-369.24	0	-1188.66	0	na	na	na	na	na	nr	0
710	INC	nr	0	45.78	46	nr	75	nr	0	89.53	90	52.63	53	-240.91	0	na	na	na	na	na	nr	0
711	INC	nr	0	47.67	48	nr	0	nr	0	-1679.54	0	nr	0	-591.02	0	na	na	na	na	na	nr	0
712	INC	nr	0	30.97	31	-2569.12	0	-241.79	0	-146.58	0	nr	0	nr	0	na	na	na	na	na	nr	0
713	INC	nr	0	77.78	78	nr	50	nr	0	13.24	13	nr	50	-4897.31	0	na	na	na	na	na	nr	0
714	INC	nr	0	18.48	18	nr	75	nr	0	76.91	77	nr	0	-490.50	0	na	na	na	na	na	nr	75
725	INC	-1761.35	0	24.62	25	-52.46	0	-69.64	0	60.76	61	-242.86	0	-2320.90	0	na	na	na	na	na	3.85	50
726	INC	nr	75	-499.99	82	nr	75	nr	75	72.15	72	96.75	97	-394.32	0	na	na	na	na	na	nr	0
727	INC	nr	0	81.71	82	nr	75	nr	50	57.39	57	nr	0	95.49	95	na	na	na	na	na	nr	0
728	INC	nr	0	65.04	65	nr	0	nr	50	97.26	97	nr	0	-2646.55	0	na	na	na	na	na	nr	75
784	INC	nr	0	63.41	63	nr	75	nr	0	97.26	97	nr	0	nr	0	na	na	na	na	na	nr	0
805	INC	nr	0	73.50	73	nr	0	nr	0	2.26	2	-24.94	0	70.78	71	na	na	na	na	na	nr	75
806	INC	80.98	81	66.47	66	89.06	89	-1025.54	0	69.30	69	60.59	61	49.17	49	na	na	na	na	na	nr	0
807	INC	-162.61	0	39.43	39	66.18	66	53.04	53	-971.51	0	-168.74	0	-1762.35	0	na	na	na	na	na	42.53	43
808	INC	nr	0	-38.32	0	nr	75	nr	50	-27.78	0	nr	0	-96.76	0	na	na	na	na	na	-29.87	0
809	INC	nr	0	nr	0	99.41	99	97.87	98	42.51	43	-36.33	0	91.87	92	na	na	na	na	na	nr	75
810	INC	nr	0	nr	0	95.89	96	86.54	87	62.95	63	nr	0	-543.78	0	na	na	na	na	na	nr	0
824	INC	-4118.58	0	-134.37	0	-25.66	0	29.62	30	-758.30	0	nr	0	-1074.27	0	na	na	na	na	na	nr	0
825	INC	nr	50	80.00	80	nr	0	nr	0	36.75	37	nr	50	nr	75	na	na	na	na	na	nr	50
902	INC	35.72	36	28.23	28	-148.65	0	-725.08	0	-436.85	0	-36.44	0	-153.83	0	na	na	na	na	na	-3167.97	0
904	INC	nr	0	-68.54	0	99.77	100	56.79	57	70.76	71	22.02	22	-172.96	0	na	na	na	na	na	nr	0
905	INC	nr	0	nr	0	nr	50	nr	75	85.58	86	nr	0	-172.96	0	na	na	na	na	na	nr	25
906	INC	nr	0	77.68	78	nr	50	nr	75	88.30	88	-197.34	0	-1559.85	0	na	na	na	na	na	nr	75
914	INC	nr	0	-257.14	0	nr	0	nr	50	84.53	85	nr	75	-2677.78	0	na	na	na	na	na	95.44	95
915	INC	nr	75	73.45	73	95.11	95	88.18	88	95.93	96	72.09	72	84.49	84	na	na	na	na	na	52.94	53

TABLE C2-2b. MODEL GROUP SELECTION FOR OPTION 5

EER ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Option 5										Model Group No.	Required Add-on Flue Gas Control		
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-ByP	CO-ByP	D/F				
200	CK	FF	0	0	12	79	0	0	na	na	na	na	na	25	18	Add WQ + FF
201	CK	FF	0	0	0	77	0	0	na	na	na	na	na	75	18	Add WQ + FF
202	CK	FF	0	0	47	0	0	0	na	na	na	na	na	75	4	Add CI + FF
203	CK	ESP	0	0	89	0	0	47	na	na	na	na	na	96	16	Add WQ + CI + FF + PT
204	CK	ESP	0	0	87	0	0	0	na	na	na	na	na	65	18	Add WQ + FF
205	CK	ESP	0	35	96	0	0	0	na	na	na	na	na	0	3	Add FF
206	CK	ESP	0	0	78	0	0	25	na	na	na	na	na	83	19	Add WQ + IWS
207	CK	MC/ESP	0	0	83	0	0	0	na	na	na	na	na	0	3	Add FF
208	CK	ESP	0	0	30	0	0	0	na	na	na	na	na	0	2	Moderate DOM on ESP
228	CK	ESP	25	0	75	0	0	0	na	na	na	na	na	2	5	Add WQ + CI + FF
300	CK	ESP	0	58	97	9	0	0	na	na	na	na	na	98	5	Add WQ + CI + FF
301	CK	FF	74	24	0	0	0	0	na	71	14	na	na	75	28	Add CI + FF + Moderate DOM Combustor
302	CK	ESP	50	0	93	0	0	0	na	na	na	na	na	75	4	Add CI + FF
303	CK	QC/FF	0	0	0	0	0	0	na	0	0	0	0	0	1	None
304	CK	ESP	34	49	90	0	0	0	na	na	na	na	na	89	5	Add WQ + CI + FF
305	CK	ESP	0	59	94	0	0	43	na	na	na	na	na	100	16	Add WQ + CI + FF + PT
306	CK	MC/FF	99	0	0	0	0	0	na	na	na	na	na	0	29	Add WQ + CB
308	CK	ESP	0	0	33	0	0	0	na	na	na	na	na	75	4	Add CI + FF
309	CK	MC/ESP	22	0	90	0	0	0	na	na	na	na	na	100	5	Add WQ + CI + FF
315	CK	FF	0	0	0	0	0	0	na	0	0	0	0	75	4	Add CI + FF
316	CK	FF	50	0	0	0	0	0	na	0	64	0	0	75	5	Add WQ + CI + FF
317	CK	FF	0	0	0	0	0	0	na	na	na	na	na	84	17	Add WQ
318	CK	ESP	0	0	54	0	0	0	na	na	na	na	na	75	4	Add CI + FF
319	CK	ESP	46	20	90	0	0	14	na	na	na	na	na	96	16	Add WQ + CI + FF + PT
320	CK	FF	0	0	0	0	0	0	na	na	na	na	na	0	1	None
321	CK	ESP	50	71	0	0	0	0	na	nr	0	0	0	nr	4	Add CI + FF
322	CK	ESP	0	0	60	0	0	0	na	na	na	na	na	93	20	Moderate DOM on ESP + Add WQ
323	CK	ESP	75	0	93	0	0	28	na	na	na	na	na	94	16	Add WQ + CI + FF + PT
335	CK	ESP	26	0	91	0	0	46	na	na	na	na	na	99	16	Add WQ + CI + FF + PT
401	CK	ESP	50	42	93	19	0	0	na	na	na	na	na	49	4	Add CI + FF
402	CK	ESP	7	44	98	25	0	0	na	0	81	0	0	0	4	Add CI + FF
403	CK	ESP	97	13	0	0	0	0	na	na	na	na	na	81	30	Add WQ + CB + Small DOM on ESP
404	CK	ESP	0	0	0	0	0	16	na	na	na	na	na	78	19	Add WQ + IWS
405	CK	ESP	0	0	94	72	0	0	na	na	na	na	na	50	4	Add CI + FF
223	LWAK	FF	3	0	0	0	0	97	0	na	na	na	na	0	4	Add CI + FF + ST
224	LWAK	FF	0	0	0	0	0	0	0	na	na	na	na	0	1	None
225	LWAK	FF	0	0	0	0	0	90	50	na	na	na	na	0	14	Add AB + WQ + ST
226	LWAK	FF	226	0	0	0	0	89	0	na	na	na	na	0	5	Add ST
227	LWAK	FF	0	0	0	0	0	96	52	na	na	na	na	0	14	Add AB + WQ + ST
307	LWAK	FF/VS	94	0	0	0	0	0	0	na	na	na	na	0	3	Add CI + FF
310	LWAK	FF	0	6	82	0	0	95	0	na	na	na	na	0	6	Add IWS
311	LWAK	FF	0	0	87	0	0	95	0	na	na	na	na	0	6	Add IWS
312	LWAK	FF	0	0	86	0	0	95	0	na	na	na	na	0	6	Add IWS
313	LWAK	FF	0	0	87	73	0	96	0	na	na	na	na	0	6	Add IWS
314	LWAK	FF	0	42	96	61	0	93	0	na	na	na	na	0	6	Add IWS
336	LWAK	FF	0	0	75	0	0	96	0	na	na	na	na	0	6	Add IWS
209	INC	WHB,FF/VQ/PT/DM	0	0	0	0	0	22	25	na	na	na	na	75	69	Moderate DOM Combustor + Small DOM WS + Add CI
210	INC	FF/S	75	0	50	75	0	26	0	na	na	na	na	25	3	Moderate DOM on existing WS + Add RH + CI + FF
211	INC	SS/PT/VS	0	0	75	50	0	20	0	na	na	na	na	0	62	Small DOM on existing WS + Add FF

TABLE C2-2b. MODEL GROUP SELECTION FOR OPTION 5

EER ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Option 5					LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	D/F	Model Group No.	Required Add-on Flue Gas Control
			Hg	PM	SVM	SO ₂	NO _x									
212	INC	FF/S	0	36	0	0	0	0	0	0	na	na	0	7	Moderate DOM on existing FF & WS	
214	INC	IWS	85	35	92	47	0	0	0	0	na	na	0	9	Add RH + CI + FF	
216	INC	HES/WS	0	50	92	39	0	0	0	0	na	na	0	6	Add FF	
221	INC	PT	0	0	0	0	0	0	0	0	na	na	52	13	Add RH + CI + FF + PT	
222	INC	WHB/SD/ESP/Q/PBS	50	0	0	0	0	0	0	0	na	na	83	8	Add CI	
229	INC	WHB/ACS/HCS/CS	0	21	0	0	0	0	0	75	na	na	96	70	Moderate DOM WS + Add AB + RH + CB + FF	
324	INC	?	324	0	91	28	0	0	0	0	na	na	75	9	Add RH + CI + FF	
325	INC	SD/FF/WS/IWS	0	0	32	0	0	0	0	0	na	na	0	66	Moderate DOM on existing FF	
327	INC	SD/FF/WS/ESP	97	0	0	0	0	0	0	0	na	na	99	61	Add RH + CB	
329	INC	PT/IWS	75	51	75	75	0	0	0	0	na	na	50	3	Add RH + CI + FF	
330	INC	QT/WS/DM	0	64	82	0	64	0	0	0	na	na	99	3	Moderate DOM on existing WS + Add RH + CI + FF	
331	INC	PT/IWS	34	0	98	0	50	0	0	0	na	na	75	54	Moderate DOM on Combustor + Add RH + CI + FF	
332	INC	WS	0	87	0	0	57	0	0	80	na	na	0	70	Moderate DOM on WS + Add AB + RH + CI + FF	
333	INC	SD/FF	0	0	0	50	57	0	0	0	na	na	0	14	Moderate DOM on existing SD & FF	
334	INC	WS/ESP/PT	82	73	99	84	0	0	0	0	na	na	89	9	Add RH + CI + FF	
337	INC	WHB/DA/DI/FF	50	27	64	0	0	0	0	0	na	na	0	67	Moderate DOM on existing FF + Add CI	
338	INC	QC/FF/SS/C/HES/DM	0	0	0	0	0	0	0	0	na	na	0	8	Add CI	
339	INC	AT/PT/RIS/ESP	75	0	50	0	0	0	0	0	na	na	0	28	Moderate DOM on ESP + Add RH + CB	
340	INC	WHB/ESP/WS	0	0	0	0	0	0	0	0	na	na	75	8	Add CI	
341	INC	DA/DI/FF/HEPA/CA	0	0	0	0	0	0	0	0	na	na	50	8	Add CI	
342	INC	WHB/QC/S/VS/DM	0	0	0	0	0	0	0	0	na	na	0	1	None	
344	INC	QC/VS/PT/DM	50	0	0	0	0	0	0	0	na	na	25	9	Add RH + CI + FF	
346	INC	C/QC/VS/PT/DM	0	0	33	0	0	0	0	0	na	na	0	19	Moderate DOM on existing VS	
347	INC	C/QC/VS/DM	0	0	0	0	0	0	0	0	na	na	0	1	None	
348	INC	QC/AS/IWS	75	0	0	75	0	0	0	0	na	na	75	32	Add RH + CB	
349	INC	QC/FF/QC/PT	0	0	0	50	0	0	0	0	na	na	0	6	Add FF	
350	INC	WHB/HE/FF	0	0	75	50	0	50	0	0	na	na	0	55	Moderate DOM on Combustor + Add FF	
351	INC	GC/C/FF	0	0	0	0	0	0	0	0	na	na	50	8	Add CB	
353	INC	QC/VS/DM/ESP	0	31	40	33	0	0	0	0	na	na	0	17	Moderate DOM on existing ESP	
354	INC	QC/AS/VS/DM/IWS	0	0	0	0	0	0	0	0	na	na	0	1	None	
356	INC	QC/AS/FN/DM	0	52	0	0	0	50	0	0	na	na	75	54	Moderate DOM on Combustor + Add RH + CB + FF	
357	INC	QC/VS/PT/IWS	0	39	75	0	0	0	0	0	na	na	0	6	Add FF	
358	INC	QC/VS/C/CI/S/DM	0	53	50	0	0	0	0	0	na	na	0	19	Moderate DOM on existing VS	
359	INC	WHB/FF/S	75	20	88	100	84	0	0	0	na	na	0	13	Add RH + CI + FF + PT	
400	INC	SD/FF	0	0	92	28	0	0	0	0	na	na	50	49	Add CI + FF	
500	INC	QC/VS/KOV/DM	0	0	0	0	0	0	0	0	na	na	0	1	None	
502	INC	WHB/QC/PBC/VS/ES	50	57	95	0	8	0	0	0	na	na	0	29	Small DOM on existing WS + Add RH + CB + FF	
503	INC	HTHE/LTHE/FF	0	43	92	81	0	50	50	0	na	na	75	64	Moderate DOM on Combustor + Add CB + FF	
504	INC	VS/C	98	17	0	47	4	0	0	0	na	na	0	6	Add FF	
600	INC	WHB/QC/PT/IWS	0	0	0	50	0	0	0	0	na	na	0	6	Add FF	
700	INC	SD/RIS/VS/WS	0	65	100	89	0	0	0	0	na	na	0	6	Add FF	
701	INC	VS/PT	0	65	0	75	84	0	0	0	na	na	50	13	Add RH + CI + FF + PT	
702	INC	QT/S/C	0	82	75	0	92	0	0	0	na	na	75	9	Add RH + CI + FF	
703	INC	WHB	75	0	0	0	84	0	0	0	na	na	0	20	Add WQ + CB + PT	
704	INC	NONE	0	23	0	0	0	0	0	0	na	na	0	4	Add IWS	
705	INC	QT/VS/ESP/PT	0	44	65	33	0	0	0	0	na	na	75	9	Add RH + CI + FF	
706	INC	QT/HS/C	0	65	0	0	0	0	0	0	na	na	0	19	Moderate DOM on existing VS	
707	INC	QT/WS	0	63	75	0	0	0	99	0	na	na	50	25	Add AB + RH + CI + FF	
708	INC	WS/ESP	0	40	0	50	0	0	0	0	na	na	75	28	Moderate DOM on existing ESP + Add RH + CB	
709	INC	NONE	50	63	0	0	0	0	0	0	na	na	0	10	Add WQ + CB + FF	
710	INC	QT/OS/CS	0	46	75	0	90	53	0	0	na	na	0	33	Moderate DOM on Combustor + Add IWS	
711	INC	C/VS/AS	0	48	0	0	0	0	0	0	na	na	75	9	Add RH + CI + FF	
712	INC	NONE	0	31	0	0	0	0	0	0	na	na	0	6	Add FF	

TABLE C2-2b. MODEL GROUP SELECTION FOR OPTION 5

EER ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Option 5							Model Group No.	Required Add-on Flue Gas Control		
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO			HC-Byp	CO-Byp
713	INC	VS/PT	0	78	50	0	13	50	0	na	na	75	Moderate DOM Comb+Small DOM WS+Add RH+CB+FF
714	INC	WS	0	18	75	0	77	0	0	na	na	50	Add RH + CI + FF + PT
725	INC	WS/QT	0	25	0	0	61	0	0	na	na	4	Moderate DOM on existing WS + Add RH + CB + FF
726	INC	QC/CS/DM/VS	75	0	75	75	0	59	0	na	na	54	Moderate DOM on combustor + Add RH + CB + FF
727	INC	GC/C/FF	0	82	75	50	72	97	95	na	na	0	Add AB + IWS
728	INC	QT/PT/VS	0	65	0	0	57	0	0	na	na	75	Moderate DOM on existing VS & WS + Add RH + CB
784	INC	NONE	0	63	75	50	97	0	0	na	na	4	Add IWS
805	INC	QT/QS/VS/ES/PBS	0	73	0	0	2	0	71	na	na	75	Moderate DOM Comb+Small DOM WS+Add RH+CI+FF
806	INC	C/VS	81	66	89	0	69	61	49	na	na	24	Moderate DOM Combustor + Add RH + CI + FF + PT
807	INC	C/WHB/VQ/PT/HS/DM	0	39	66	53	0	0	0	na	na	43	Add RH + CI + FF
808	INC	QT/PBS/ESP	0	0	75	50	0	0	0	na	na	0	Add FF
809	INC	VS	0	0	99	98	43	0	92	na	na	39	Add AB + RH + CI + FF + PT
810	INC	Q/VS/PBS	0	0	96	87	63	0	0	na	na	0	Moderate DOM on existing WS + Add FF
824	INC	QT/VS/PT/DM	0	0	0	30	0	0	0	na	na	0	Moderate DOM on existing VS
825	INC	CCS/QC/ESP	50	80	0	0	37	50	75	na	na	50	Add AB + RH + CI + FF + PT
902	INC	QT/VS/PT	36	28	0	0	0	0	0	na	na	0	Add RH + CI + FF
904	INC	?	0	0	75	0	71	22	0	na	na	0	Moderate DOM on Combustor + Add IWS
905	INC	QT/VS/AS/CS	0	0	100	57	86	0	0	na	na	25	Add RH + CB + IWS
906	INC	QT/PT	0	78	50	75	88	0	0	na	na	75	Add RH + CB + IWS
914	INC	?	0	0	0	50	85	75	0	na	na	95	Add AB + RH + CI + FF + PT
915	INC	QC/VS/C	75	73	95	88	96	72	84	na	na	53	Add AB + RH + CI + FF + PT

TABLE C2-2c. CHARACTERIZATION OF MODEL PLANTS, FOR OPTION 5

Source Group	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
CK	None	1	303 *	L	Lone Star	MC/FF	408,681	370,000	
		3	320 *	L	Lafarge	FF	nr	370,000	
	Moderate DOM on ESP	1	208 *	L	Keystone	ESP	307,644	370,000	
		Add FF	1	207 *	S	Keystone	MC/ESP	90,681	147,000
	1		205	L	Holham	ESP	253,556	370,000	
	Add CI + FF	2	302 *	S	Lafarge	ESP	130,576	147,000	
		3	308 *	S	North Texas	ESP	162,599	147,000	
		1	315 *	S	Southdown	FF	102,042	147,000	
		4	318 *	S	Texas Industries	ESP	152,675	147,000	
		1	321 *	S	Lafarge	ESP	59,542	147,000	
		1	401	S	Ash Grove	ESP	172,481	147,000	
		1	402 *	S	Ash Grove	ESP	187,605	147,000	
		1	405 *	S	Ash Grove	ESP	194,905	147,000	
	Add WQ + CI + FF	1	202 *	L	Heartland	FF	221,421	370,000	
		1	228 *	S	Ash Grove	ESP	148,537	147,000	
			2	300 *	S	Essroc	ESP	164,692	147,000
Add WQ + CI + FF + FT	1	304 *	L	Lone Star	ESP	300,367	370,000		
	1	309	L	River Cement	MC/ESP	665,839	370,000		
	1	316 *	L	Southdown	FF	nr	370,000		
	2	305	S	Medusa	ESP	196,903	147,000	85	
Add WQ	1	323 *	S	Lafarge	FF	185,409	147,000	85	
	1	335	S	Medusa	ESP	100,378	147,000	85	
	1	203	L	Holham	ESP	291,645	370,000	85	
	1	319	L	Continental	ESP	344,250	370,000	85	
	1	317 *	L	Southdown	FF	422,190	370,000		
Add WQ + FF	2	200 *	S	Giant	FF	123,584	147,000		
	2	201 *	S	Giant	FF	137,945	147,000		
Add WQ + IWS	1	204 *	L	Holham	ESP	693,613	370,000		
	1	206	L	Holham	ESP	348,510	370,000	85	
Moderate DOM on ESP + Add WQ	1	404	L	Ash Grove	ESP	265,721	370,000	85	
	1	322 *	S	Lafarge	ESP	112,269	147,000		
	1	301 *	S	Essroc	FF	185,409	147,000		
	1	306 *	L	National	MC/FF	280,868	370,000		
	1	403	S	Ash Grove	ESP	184,877	147,000		
	1	224 *	M	Solite	FF	39,049	40,500		
	2	307 *	M	Norlite	FF/VS	49,050	40,500		
	1	223 *	M (hi HCl)	Solite	FF	29,092	40,500	1,570	
	1	226 *	M	Solite	FF	nr	40,500		
	1	311 *	M (hi HCl)	Solite	FF	51,627	40,500	1,570	
Add IWS	1	312 *	M (hi HCl)	Solite	FF	47,698	40,500	1,570	
	1	313 *	M (hi HCl)	Solite	FF	36,793	40,500	1,570	
	1	310 *	M (lo HCl)	Solite	FF	47,770	40,500	875	
	1	314 *	M (lo HCl)	Solite	FF	36,793	40,500	875	
LWAK	None	1	224 *	M	Solite	FF	39,049	40,500	
		2	307 *	M	Norlite	FF/VS	49,050	40,500	
	Add CI + FF	1	223 *	M (hi HCl)	Solite	FF	29,092	40,500	1,570
		1	226 *	M	Solite	FF	nr	40,500	
	Add IWS	1	311 *	M (hi HCl)	Solite	FF	51,627	40,500	1,570
		1	312 *	M (hi HCl)	Solite	FF	47,698	40,500	1,570

TABLE C2-2c. CHARACTERIZATION OF MODEL PLANTS, FOR OPTION 5

Source Group	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue Gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
Group 14	Add AB + WQ + ST	1	336 *	M (lo HCl)	Solite	FF	30,336	40,500	875
		1	227 *	M (hi HCl)	Solite	FF	38,796	40,500	1,570
		1	225 *	M (lo HCl)	Solite	FF	38,270	40,500	875
Group 1	None	1	342 *	S	Upjohn	WHB/QC/S/VS/DM	5,640	3,900	
		1	347 *	M	Department of Army	C/QC/S/VS/DM	10,795	22,100	
		1	354 *	M	Dow Chemical	QC/AS/VS/DM/IWS	27,383	22,100	
		1	500 *	L	Chevron	QC/VS/KOV/DM	49,822	60,800	
Group 3	Moderate DOM on existing WS + Add RH + CB + FF	1	725	S	Zeneca	WS/QT	1,489	3,900	
		1	330 *	M	General Electric	QT/WS/DM	10,345	22,100	
Group 4	Add IWS	1	210 *	L	LWD	FF/S	96,107	60,800	
		1	704 *	S	Ashland	NONE	5,011	3,900	92
Group 5	Add AB + IWS	1	784 *	S	Cook Composites	NONE	nr	3,900	92
		1	727 *	S	Iowa Army Ammo Plant	GC/C/FF	3,043	3,900	92
Group 6	Add FF	2	349 *	S	Radford Army Ammo Plant	QC/FF/QC/PT	5,653	3,900	
		1	357 *	M	Department of Energy	QC/VS/PT/IWS	20,778	22,100	
Group 7	Moderate DOM on existing FF & WS	1	700 *	M	Dupont	SD/RIS/VS/WS	30,185	22,100	
		1	808 *	M	Dow Chemical	Q1/PBS/ESP	35,720	22,100	
Group 8	Add CB	1	216 *	L	Rollins	HES/WS	40,002	60,800	
		1	600 *	L	Dow Chemical	WHB/QC/PT/IWS	43,839	60,800	
Group 9	Add RH + Cl + FF	1	712 *	L	Nepera	NONE	65,256	60,800	
		1	212 *	L	LWD	FF/S	44,610	60,800	
Group 10	Add WQ + CB + FF	1	351 *	S	Iowa Army Ammo Plant	GC/C/FF	3,457	3,900	
		1	340 *	M	Miles	WHB/ESP/WS	16,003	22,100	
Group 11	Add WQ + CB + FF	1	341 *	M	Glaxo	DA/DI/FF/HEPA/CA	nr	22,100	
		1	222 *	L	WTI	WHB/SD/ESP/Q/PBS	93,718	60,800	
Group 12	Moderate DOM on existing WS + Add FF	1	338 *	L	Dupont	QC/FF/SS/C/HES/DM	65,598	60,800	
		1	214 *	M	Rollins	IWS	34,655	22,100	
Group 13	Add RH + Cl + FF + PT	1	324 *	M	Allied	?	12,120	22,100	
		1	344 *	M	Department of Army	QC/VS/PT/DM	13,886	22,100	
Group 14	Add RH + Cl + FF + PT	1	702 *	M	Dupont	QT/S/C	nr	22,100	
		1	705 *	M	Ciba-Geigy	QT/VS/ESP/PT	36,116	22,100	
Group 15	Add RH + Cl + FF + PT	1	807	M	Bros Lagoon Site	C/WHB/V/Q/PT/HS/DM	34,109	22,100	
		1	902 *	M	Rocky Mountain Arsenal	QT/VS/PT	25,436	22,100	
Group 16	Add WQ + CB + FF	1	329 *	L	Dupont	PT/IWS	53,489	60,800	
		1	334 *	L	3M	WS/ESP/PT	40,599	60,800	
Group 17	Moderate DOM on existing WS + Add FF	1	711 *	L	Chevron Chemical	C/VS/AS	52,907	60,800	
		1	709 *	S	Cargill Chemical	NONE	3,123	3,900	
Group 18	Add WQ + CB + FF	1	810 *	M	Tennessee Eastman	Q/VS/PBS	28,434	22,100	
		1	359 *	M	Atochem	WHB/FF/S	13,802	22,100	92
Group 19	Add RH + Cl + FF + PT	1	701 *	M	Eli Lilly	VS/PT	9,208	22,100	92
		2	714 *	M	Ohlin Chemical	WS	19,185	22,100	92
Group 20	Add WQ + CB + FF	1	221	L	Rollins	PT	51,114	60,800	92

TABLE C2-2c. CHARACTERIZATION OF MODEL PLANTS, FOR OPTION 5

Source Group	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue Gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)
Group 14	Moderate DOM on existing SD & FF	1	333 *	L	Trade Waste	SD/FF	42,042	60,800	
Group 17	Moderate DOM on existing ESP	1	353 *	M	Dow Chemical	QC/VS/DM/ESP	nr	22,100	
Group 19	Moderate DOM on existing VS	1	824 *	S	Pennwalt	QT/VS/PT/DM	1,086	3,900	
		1	346 *	M	Department of Army	C/QC/VS/PT/DM	21,812	22,100	
		1	358 *	M	Eli Lilly	QC/VS/C/CT/S/DM	14,406	22,100	
		1	706 *	M	Ciba-Geigy	QT/HS/C	nr	22,100	
Group 20	Add WQ + CB + PT	1	703 *	S	Aristech	WHB	1,873	3,900	92
Group 24	Moderate DOM Combustor + Add RH + CI + FF + PT	1	806 *	M	Amoco Oli	C/VS	20,641	22,100	92
Group 25	Add AB + RH + CI + FF	1	707 *	L	Dupont	QT/WS	58,120	60,800	
Group 28	Moderate DOM on ESP + Add RH + CB	1	339 *	S	Dupont	AT/PT/RIS/ESP	6,263	3,900	
		1	708 *	S	Burroughs Wellcome	WS/ESP	3,687	3,900	92
Group 29	Small DOM on existing WS + Add RH + CB + FF	1	502 *	S	Pfizer	WHB/QC/PBC/VS/ES	6,647	3,900	
Group 32	Add RH + CB	1	348 *	S	Ocidental Chemical	QC/AS/IWS	nr	3,900	
Group 33	Moderate DOM on Combustor + Add IWS	1	904 *	S	First Chemical	?	5,950	3,900	92
		1	710 *	M	Dupont	QT/OS/C/S	nr	22,100	92
Group 39	Add AB + RH + CI + FF + PT	1	825 *	M	General Electric	CCS/QC/ESP	21,363	22,100	92
		1	914 *	M	Vertac Superfund	?	25,849	22,100	92
		1	915 *	M	Eastman Kodak	QC/VS/C	nr	22,100	92
		1	809 *	L	Tennessee Eastman	VS	40,524	60,800	92
Group 42	Add RH + CB + IWS	1	905 *	S	Velsicol Chemical	QT/VS/AS/CS	nr	3,900	92
		1	906 *	S	Monsanto	QT/PT	2,738	3,900	92
Group 49	Add CI + FF	1	400 *	L	Marine Shale	SD/FF	179,333	60,800	92
Group 54	Moderate DOM on Combustor + Add RH + CB + FF	1	356 *	S	Dupont	QC/AS/FF/DM	5,100	3,900	
		1	726 *	S	Shell Oil	QC/CS/DM/VS	3,669	3,900	
		1	331 *	L	Ross	PT/IWS	44,379	60,800	
Group 55	Moderate DOM on Combustor + Add FF	1	350 *	M	Dupont	WHB/HE/FF	15,883	22,100	
Group 61	Add RH + CB	1	327	L	Aptus	SD/FF/WS/ESP	49,572	60,800	
Group 62	Small DOM on existing WS + Add FF	1	211 *	L	LWD	SS/PT/VS	43,596	60,800	
Group 63	Moderate DOM on existing VS + Add RH + CB + PT	1	504 *	M	Chevron Chemical	VS/C	32,804	22,100	92
Group 64	Moderate DOM on Combustor + Add CB + FF	1	503 *	S	Lake City Army Ammo Pla	HTHE/LTHE/FF	4,747	3,900	
Group 65	Moderate DOM Comb+Small DOM WS+Add RH+CB+FF	1	713 *	S	Pfizer	VS/PT	2,625	3,900	
		1	805 *	M	American Cyanamid	QT/QS/VS/ES/PBS	31,943	22,100	
Group 66	Moderate DOM on existing FF	1	325 *	M	Aptus	SD/FF/WS/IWS	23,127	22,100	
Group 67	Moderate DOM on existing FF + Add CI	2	337 *	M	Olin Chemical	WHB/DA/DI/FF	13,807	22,100	
Group 68	Moderate DOM on existing VS & WS + Add RH + CB	1	728 *	S	Eli Lilly	QT/PT/VS	5,819	3,900	
Group 69	Moderate DOM Combustor + Small DOM WS + Add CI	1	209 *	M	Laidlaw	WHB/FF/VQ/PT/DM	21,716	22,100	
Group 70	Moderate DOM WS + Add AB + RH + CB + FF	1	229 *	S	Vulcan Materials	WHB/ACS/HCS/CS	1,171	3,900	
		1	332 *	M	Thermalkem	WS	20,208	22,100	

TABLE C2-2c. CHARACTERIZATION OF MODEL PLANTS, FOR OPTION 5

Source Group	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate	Equivalent HCl Conc (ppm)

* Facility has been assigned to model group based on assumed emission level. Facility did not report the necessary emission value, therefore one was assigned based on the distribution of reported values from other facilities.
 ** Reported Ratio is equal to the number of total units located at a site divided by the number of units for which information was reported.

Often a facility will report data for only one unit even when the facility has two or three units at the particular site, since the single reported unit can be considered as representative of the other nonreported units.
 nr = not reported

Source Type	Model Group	Size Category	Model Group Description	Number of Sources	Capital Cost	Annual Operating Cost	Total Annual Cost
CK	1	L	None	4	\$0K	\$0K	\$0K
CK	2	L	DOM ESP mod	1	\$3,136K	\$287K	\$699K
CK	3	S	Add FF	1	\$2,141K	\$355K	\$596K
CK	3	L		1	\$5,072K	\$754K	\$1,325K
CK	4	S	Add CI,FF	14	\$2,611K	\$718K	\$1,022K
CK	4	L		1	\$5,658K	\$1,490K	\$2,139K
CK	5	S	Add Q,CI,FF	3	\$3,144K	\$806K	\$1,180K
CK	5	L		3	\$6,570K	\$1,645K	\$2,414K
CK	16	S	Add Q, CI, FF, PT	4	\$4,045K	\$1,136K	\$1,656K
CK	16	L		2	\$8,505K	\$2,329K	\$3,413K
CK	17	L	Add Q	1	\$912K	\$155K	\$275K
CK	18	S	Add Q, FF	4	\$2,673K	\$443K	\$754K
CK	18	L		1	\$5,984K	\$909K	\$1,601K
CK	19	L	Add Q, IWS	2	\$5,322K	\$902K	\$1,740K
CK	20	S	Moderate DOM on existing ESP,	1	\$2,290K	\$237K	\$538K
CK	28	S	Moderate DOM on Combustor, Add	1	\$2,832K	\$718K	\$1,058K
CK	29	L	Add WQ, CB	1	\$16,598K	\$1,696K	\$3,878K
CK	30	S	Small DOM on existing ESP, Add	1	\$7,938K	\$863K	\$1,907K
INC	1	S	None	1	\$0K	\$0K	\$0K
INC	1	M		2	\$0K	\$0K	\$0K
INC	1	L		1	\$0K	\$0K	\$0K
INC	3	S	DOM WS mod, Add RH,CI/CB,FF	1	\$588K	\$243K	\$321K
INC	3	M		1	\$1,004K	\$405K	\$541K
INC	3	L		1	\$1,876K	\$712K	\$968K
INC	4	S	Add IWS	2	\$215K	\$97K	\$132K
INC	5	S	Add AB,IWS	1	\$480K	\$289K	\$359K
INC	6	S	Add FF	2	\$82K	\$89K	\$98K
INC	6	M		3	\$295K	\$121K	\$154K
INC	6	L		3	\$943K	\$198K	\$305K
INC	7	L	DOM FF mod, DOM WS mod	1	\$247K	\$58K	\$111K
INC	8	S	Add CI/CB	1	\$340K	\$91K	\$136K
INC	8	M		2	\$397K	\$147K	\$199K
INC	8	L		2	\$425K	\$224K	\$280K
INC	9	M	Add RH, CI/CB, FF	7	\$932K	\$391K	\$508K
INC	9	L		3	\$1,681K	\$672K	\$876K
INC	10	S	Add Q,CI/CB,FF	1	\$643K	\$221K	\$304K
INC	12	M	DOM WS mod, Add FF	1	\$367K	\$136K	\$188K
INC	13	M	Add PT, RH, CI/CB, FF	4	\$1,137K	\$515K	\$665K
INC	13	L		1	\$2,126K	\$866K	\$1,143K
INC	14	L	DOM SD mod, DOM FF mod	1	\$587K	\$74K	\$162K
INC	17	M	DOM ESP mod	1	\$535K	\$50K	\$120K
INC	19	S	DOM VS mod	1	\$11K	\$6K	\$10K
INC	19	M		3	\$46K	\$35K	\$47K
INC	20	S	Add Q,CI/CB,PT	1	\$619K	\$222K	\$305K
INC	24	M	DOM combustor, Add PT,RH,CI/CB	1	\$1,291K	\$515K	\$690K
INC	25	L	Add AB,RH,CI/CB,FF	1	\$2,223K	\$1,947K	\$2,223K
INC	28	S	DOM ESP mod, Add RH,CI/CB	2	\$673K	\$178K	\$267K

Source Type	Model Group	Size Category	Model Group Description	Number of Sources	Capital Cost	Annual Operating Cost	Total Annual Cost
INC	29	S	DOM IWS small, Add RH,CI/CB,FF	1	\$586K	\$246K	\$322K
INC	32	S	Add RH, CB/CI	1	\$493K	\$152K	\$216K
INC	33	S	DOM Combustor, Add IWS	1	\$331K	\$97K	\$151K
INC	33	M		1	\$834K	\$144K	\$280K
INC	39	M	Add RH, CI/CB, FF, PT, AB	3	\$1,554K	\$1,048K	\$1,253K
INC	39	L		1	\$2,669K	\$2,142K	\$2,490K
INC	42	S	Add RH, CI/CB, IWS	2	\$708K	\$249K	\$348K
INC	49	L	Add CI/CB, FF	1	\$1,368K	\$422K	\$584K
INC	54	S	Moderate DOM on Combustor, Add	2	\$691K	\$241K	\$334K
INC	54	L		1	\$1,866K	\$672K	\$906K
INC	55	M	Moderate DOM on Combustor, Add	1	\$450K	\$121K	\$179K
INC	61	L	Add RH, CB	1	\$3,687K	\$603K	\$1,088K
INC	62	L	Small DOM on existing WS, Add FF	1	\$1,044K	\$227K	\$354K
INC	63	M	Moderate DOM on existing VS, Add	1	\$1,830K	\$458K	\$711K
INC	64	S	Moderate DOM on Combustor, Add	1	\$538K	\$180K	\$253K
INC	65	S	Moderate DOM Comb, Small DOM	1	\$702K	\$246K	\$341K
INC	65	M		1	\$1,126K	\$403K	\$553K
INC	66	M	Moderate DOM on existing FF	1	\$19K	\$6K	\$7K
INC	67	M	Moderate DOM on existing FF, Add	2	\$415K	\$153K	\$206K
INC	68	S	Moderate DOM on Existing VS & W	1	\$517K	\$160K	\$232K
INC	69	M	Moderate DOM Combustor, Small D	1	\$591K	\$160K	\$245K
INC	70	S	Moderate DOM WS, Add AB, RH, C	1	\$853K	\$436K	\$548K
INC	70	M		1	\$1,420K	\$939K	\$1,129K
LWAK	1	M	None	1	\$0K	\$0K	\$0K
LWAK	3	M	Add CI, FF	2	\$1,074K	\$350K	\$480K
LWAK	4	M (hi HCl)	Add CI, FF, ST	1	\$2,302K	\$680K	\$1,009K
LWAK	5	M (lo HCl)	Add ST	1	\$1,229K	\$261K	\$461K
LWAK	6	M (lo HCl)		3	\$1,016K	\$449K	\$615K
LWAK	6	M (hi HCl)	Add IWS	3	\$1,016K	\$682K	\$847K
LWAK	14	M (lo HCl)		1	\$2,038K	\$1,525K	\$1,832K
LWAK	14	M (hi HCl)	Add AB, Q, ST	1	\$2,038K	\$1,594K	\$1,900K

TABLE C2-3a. REQUIRED REDUCTION TO MEET FLOOR 3

EER Site ID No.	Type	Hg Req. % Reduct.	Hg Adj. Reduct.	PM Req. % Reduct.	PM Adj. Reduct.	SVM Req. % Reduct.	SVM Adj. Reduct.	LVM Req. % Reduct.	LVM Adj. Reduct.	HCl/C12 Req. % Reduct.	HCl/C12 Adj. Reduct.	HC Req. % Reduct.	HC Adj. Reduct.	CO Req. % Reduct.	CO Adj. Reduct.	HC-Byp Req. % Reduct.	HC-Byp Adj. Reduct.	CO-Byp Req. % Reduct.	CO-Byp Adj. Reduct.	TEQ Req. % Reduct.	TEQ Adj. Reduct.	TFEQ Req. % Reduct.	TFEQ Adj. Reduct.
209	INC	5.70	-77.87	0.012	0	22.00	0	28.00	0	5.40	83.15	6.00	25	100.00	63	na	na	na	na	na	0.17	0	0
210	INC	nr	nr	-158.41	0	-175.33	75	-24.24	75	83.15	nr	nr	0	63.16	0	na	na	na	na	na	nr	75	0
211	INC	nr	nr	-133.77	0	nr	75	nr	75	84.07	-54.77	0	0	-27385.21	0	na	na	na	na	na	nr	50	50
212	INC	nr	nr	-15.38	0	nr	75	nr	75	82.76	-158.20	0	0	-2002.04	0	na	na	na	na	na	nr	0	0
214	INC	nr	nr	48.90	49	nr	0	nr	50	93.80	-73.45	0	0	-1934.62	0	na	na	na	na	na	nr	0	0
216	INC	72.45	72	48.36	48	97.01	97	81.55	82	-212.17	-386.48	0	0	-561.99	0	na	na	na	na	na	-187.16	0	0
221	INC	31.87	32	60.12	60	97.21	97	78.57	79	48.97	nr	0	0	-869.84	0	na	na	na	na	na	nr	0	0
222	INC	nr	nr	-458.05	0	-683.00	0	nr	54	70.52	-69.24	0	0	-552.36	0	na	na	na	na	na	nr	0	0
229	INC	nr	nr	37.01	37	51.50	52	53.14	53	-201.81	-1731.17	0	0	-167.49	0	na	na	na	na	na	nr	0	0
324	INC	nr	nr	-11.11	0	96.59	97	74.69	75	93.81	94	0	0	nr	75	na	na	na	na	na	nr	75	75
325	INC	80.28	80	-269.22	0	75.14	75	11.71	12	95.47	95	0	0	-219.83	0	na	na	na	na	na	nr	0	0
327	INC	99.34	99	-855.76	0	-7.11	0	-5.33	0	5.31	5	0	0	-867.74	0	na	na	na	na	na	nr	0	0
329	INC	nr	nr	60.59	61	nr	75	47.57	75	-57.60	-15.27	0	0	-1096.05	0	na	na	na	na	na	nr	0	0
330	INC	-9.34	0	71.50	71	93.53	94	47.57	48	26.80	27	0	0	-935.58	0	na	na	na	na	na	nr	0	0
331	INC	87.44	87	-50.00	0	99.41	99	49.71	50	92.27	92	0	0	nr	0	na	na	na	na	na	nr	0	0
332	INC	nr	nr	89.84	90	nr	50	nr	50	13.53	14	0	0	nr	80	na	na	na	na	na	nr	25	25
333	INC	nr	nr	-823.06	0	nr	75	nr	75	90.76	91	0	0	80.00	0	na	na	na	na	na	nr	75	75
334	INC	4.72	5	78.35	78	99.52	100	94.43	94	67.18	67	0	0	-2136.89	0	na	na	na	na	na	nr	0	0
337	INC	96.52	97	-4977.61	0	73.30	73	87.47	87	-195.75	-84.35	0	0	-34.96	0	na	na	na	na	na	nr	0	0
338	INC	90.59	91	-859.99	0	25.82	26	63.03	63	-0.72	0	0	0	-13061.51	0	na	na	na	na	na	nr	75	75
339	INC	nr	nr	-311.37	0	nr	75	nr	75	-2627.98	-228.32	0	0	-4878.93	0	na	na	na	na	na	nr	0	0
340	INC	44.68	45	-84.05	0	-152.29	0	-143.96	0	68.97	69	0	0	nr	0	na	na	na	na	na	nr	50	50
341	INC	-510.92	0	-713.55	0	-59.07	0	-265.40	0	69.75	70	0	0	-238.04	0	na	na	na	na	na	nr	0	0
342	INC	14.98	15	-233.58	0	-13.78	0	-1127.97	0	-254.35	0	0	0	-73.46	0	na	na	na	na	na	nr	75	75
344	INC	nr	nr	-641.30	0	-36.32	0	59.06	59	-826.01	0	0	0	nr	0	na	na	na	na	na	nr	0	0
346	INC	-1949.78	0	-833.84	0	75.61	76	-128.60	0	-424.62	0	0	0	-519.62	0	na	na	na	na	na	nr	0	0
347	INC	-10.35	75	-72.32	0	-108.51	0	-90.37	0	16.95	17	0	0	-255.68	0	na	na	na	na	na	-39.54	0	0
348	INC	nr	nr	-1099.99	0	-154.30	0	-787.30	0	-607.47	0	0	0	nr	0	na	na	na	na	na	-780.83	0	0
349	INC	nr	nr	-532.40	0	41.03	41	nr	75	-874.78	0	0	0	-1104.17	0	na	na	na	na	na	nr	0	0
350	INC	nr	nr	-486.95	0	nr	75	nr	75	-579.07	0	0	0	-1053.22	0	na	na	na	na	na	nr	0	0
351	INC	nr	nr	-34.53	0	nr	75	-160.89	75	45.37	45	0	0	-35.23	0	na	na	na	na	na	nr	50	50
353	INC	-41.21	0	44.65	45	78.08	78	76.54	77	-257.95	0	0	0	-529.10	0	na	na	na	na	na	-33.86	0	0
354	INC	-582.21	0	-93.23	0	-827.56	0	-174.67	0	-207.82	0	0	0	-3281.50	0	na	na	na	na	na	-2216.08	0	0
355	INC	nr	nr	61.29	61	nr	50	nr	50	19.16	19	0	0	-2601.64	0	na	na	na	na	na	nr	75	75
357	INC	nr	nr	50.82	51	nr	75	nr	75	24.02	24	0	0	-808.60	0	na	na	na	na	na	nr	0	0
358	INC	nr	nr	62.23	62	nr	75	nr	75	33.25	33	0	0	-6563.08	0	na	na	na	na	na	nr	0	0
359	INC	nr	nr	35.93	36	95.76	96	99.95	100	96.55	97	0	0	-0.58	0	na	na	na	na	na	nr	50	50
400	INC	64.50	64	-101.90	0	97.06	97	74.75	75	-76.03	97	0	0	nr	0	na	na	na	na	na	nr	75	75
500	INC	-91.22	0	-593.82	0	-674.71	0	-722.17	0	76.42	76	0	0	nr	0	na	na	na	na	na	-350.93	0	0
502	INC	nr	nr	65.71	66	98.26	98	63.21	63	80.04	80	0	0	nr	0	na	na	na	na	na	-662.33	0	0

TABLE C2-3a. REQUIRED REDUCTION TO MEET FLOOR 3

EER Site ID No.	Type	Hg Req. % Reduct.	Hg Adj. Reduct.	PM Req. % Reduct.	PM Adj. Reduct.	SVM Req. % Reduct.	SVM Adj. Reduct.	LVM Req. % Reduct.	LVM Adj. Reduct.	HCl/C12 Req. % Reduct.	HCl/C12 Adj. Reduct.	HC Req. % Reduct.	HC Adj. Reduct.	CO Req. % Reduct.	CO Adj. Reduct.	HC-Byp Req. % Reduct.	HC-Byp Adj. Reduct.	CO-Byp Req. % Reduct.	CO-Byp Adj. Reduct.	TEQ Req. % Reduct.	TEQ Adj. Reduct.	TFQ
503	INC	63.25	63	54.72	55	97.14	97	93.47	93	-20.18	0	nr	50	nr	50	na	na	na	na	nr	nr	25
504	INC	99.69	100	33.33	33	43.32	43	81.30	81	79.23	79	nr	0	nr	0	na	na	na	na	nr	nr	0
600	INC	nr	0	-60.00	0	nr	0	nr	75	13.52	14	nr	0	nr	0	na	na	na	na	nr	nr	0
700	INC	-27.31	0	72.32	72	99.91	100	96.03	96	59.39	59	nr	0	nr	0	na	na	na	na	nr	nr	75
701	INC	nr	50	72.18	72	nr	50	nr	75	96.61	97	-679.22	0	nr	0	na	na	na	na	nr	nr	50
702	INC	nr	0	85.27	85	nr	75	nr	0	-0.23	0	nr	0	nr	0	na	na	na	na	nr	nr	0
703	INC	nr	75	-300.00	0	nr	0	nr	50	98.33	98	-1500.72	0	-8580.92	0	na	na	na	na	nr	nr	0
704	INC	nr	25	38.46	38	nr	50	nr	0	96.50	96	nr	0	-2184.48	0	na	na	na	na	nr	nr	75
705	INC	55.53	56	54.99	55	87.04	87	76.50	76	47.75	48	nr	0	-3364.34	0	na	na	na	na	nr	nr	0
706	INC	nr	0	71.90	72	nr	0	nr	0	75.40	75	-15.74	0	-151.49	0	na	na	na	na	nr	nr	0
707	INC	nr	0	70.29	70	nr	75	nr	0	59.06	59	nr	0	98.57	99	na	na	na	na	nr	nr	75
708	INC	nr	50	51.84	52	nr	50	nr	75	-398.29	0	nr	0	-1047.43	0	na	na	na	na	nr	nr	50
709	INC	nr	75	70.73	71	nr	0	nr	0	76.88	77	-369.24	0	-1188.66	0	na	na	na	na	nr	nr	0
710	INC	nr	0	56.63	57	nr	75	nr	0	97.74	98	52.63	53	-240.91	0	na	na	na	na	nr	nr	0
711	INC	nr	0	58.14	58	nr	0	nr	50	-284.38	0	nr	0	-591.02	0	na	na	na	na	nr	nr	0
712	INC	nr	50	44.78	45	-878.68	0	-19.62	0	46.74	47	nr	0	nr	0	na	na	na	na	nr	nr	75
713	INC	nr	0	82.22	82	nr	75	nr	0	81.26	81	nr	50	-4897.31	0	na	na	na	na	nr	nr	0
714	INC	nr	0	34.78	35	nr	75	nr	0	95.01	95	nr	0	-490.50	0	na	na	na	na	nr	nr	50
725	INC	-253.66	0	39.70	40	44.10	44	40.63	41	91.52	92	-242.86	0	-2320.90	0	na	na	na	na	nr	nr	0
726	INC	nr	75	-380.00	0	nr	75	nr	75	56.26	56	58.92	59	-394.32	0	na	na	na	na	nr	nr	0
727	INC	nr	0	85.37	85	nr	75	nr	75	93.99	94	96.75	97	95.49	95	na	na	na	na	nr	nr	75
728	INC	nr	50	72.03	72	nr	0	nr	0	90.80	91	nr	0	nr	0	na	na	na	na	nr	nr	0
784	INC	nr	0	70.73	71	nr	75	nr	75	99.41	99	nr	0	-2646.55	0	na	na	na	na	nr	nr	0
805	INC	nr	0	78.80	79	nr	50	nr	50	78.89	79	-24.94	0	70.78	71	na	na	na	na	nr	nr	75
806	INC	96.39	96	73.18	73	95.99	96	-293.94	0	93.37	93	60.59	61	49.17	49	na	na	na	na	nr	nr	0
807	INC	50.10	50	51.54	52	87.60	88	83.57	84	-131.45	0	-168.74	0	-1762.35	0	na	na	na	na	nr	nr	0
808	INC	nr	50	-10.66	0	nr	75	nr	75	72.40	72	nr	0	-96.76	0	na	na	na	na	nr	nr	0
809	INC	nr	0	nr	0	99.78	100	99.25	99	87.58	88	-36.33	0	91.87	92	na	na	na	na	nr	nr	75
810	INC	nr	0	nr	0	98.49	98	95.29	95	92.00	92	nr	0	-543.78	0	na	na	na	na	nr	nr	0
824	INC	-701.53	0	-87.50	0	53.93	54	75.37	75	-85.39	0	nr	0	-1074.27	0	na	na	na	na	nr	nr	25
825	INC	nr	75	84.00	84	nr	0	nr	50	86.34	86	nr	50	nr	75	na	na	na	na	nr	nr	0
902	INC	87.79	88	42.58	43	8.83	9	-188.78	0	-15.96	0	-36.44	0	-153.83	0	na	na	na	na	nr	nr	0
904	INC	nr	50	-34.83	0	nr	75	nr	0	93.68	94	22.02	22	-19763.85	0	na	na	na	na	nr	nr	75
905	INC	nr	25	nr	0	99.92	100	84.88	85	96.89	97	nr	0	-172.96	0	na	na	na	na	nr	nr	0
906	INC	nr	0	82.14	82	nr	75	nr	75	97.47	97	-197.34	0	-1559.85	0	na	na	na	na	nr	nr	50
914	INC	nr	50	-185.71	0	nr	25	nr	75	96.66	97	nr	75	-2677.78	0	na	na	na	na	nr	nr	0
915	INC	nr	75	78.76	79	98.21	98	95.86	96	99.12	99	72.09	72	84.49	84	na	na	na	na	nr	nr	0

TABLE C2-3b. MODEL GROUP SELECTION FOR FLOOR 3 (Design - 12% Database)

EER Site ID No.	Type	% Emissions Reduction Required to Meet Floor 3											Model Group No.	Required Add-on Plue Gas Control
		Current APCD	Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	TEQ		
200	CK FF		0	0	0	95	46	0	na	na	na	0	6	Add IWS
201	CK FF		0	0	0	95	54	0	na	na	na	75	19	Add Q, IWS
202	CK FF		0	0	19	36	46	0	na	na	na	75	32	Moderate DOM on existing FF, Add Q, PT
203	CK ESP		0	0	83	31	92	0	na	na	na	98	16	Add Q, CI, FF, PT
204	CK ESP		0	20	81	0	0	0	na	na	na	75	18	Add Q, FF
205	CK ESP		0	48	94	4	43	0	na	na	na	6	6	Add IWS
206	CK ESP		0	0	66	0	89	0	na	na	na	88	19	Add Q, IWS
207	CK MC/ESP		0	0	75	2	0	0	na	na	na	3	3	Add FF
208	CK ESP		0	0	0	0	0	0	na	na	na	0	1	None
228	CK ESP		25	0	75	0	69	0	na	na	na	32	16	Add Q, CI, FF, PT
300	CK ESP		0	66	95	78	73	0	na	na	na	99	16	Add Q, CI, FF, PT
301	CK FF		67	39	0	0	0	0	na	71	14	75	28	Moderate DOM on Combustor, Add CI, FF
302	CK ESP		50	0	90	7	12	0	na	na	na	0	16	Add Q, CI, FF, PT
303	CK QC/FF		0	0	0	0	0	0	na	0	0	75	4	Add CI, FF
304	CK ESP		16	59	85	53	0	0	na	na	na	92	5	Add Q, CI, FF
305	CK ESP		99	67	91	36	91	0	na	na	na	100	16	Add Q, CI, FF, PT
306	CK MC/FF		0	0	0	0	0	0	na	na	na	0	29	Add WQ, CB
308	CK ESP		0	0	0	0	0	0	na	na	na	75	17	Add Q
309	CK MC/ESP		2	0	84	0	81	0	na	na	na	100	16	Add Q, CI, FF, PT
315	CK FF		25	0	0	0	0	0	na	0	0	75	17	Add Q
317	CK FF		0	0	0	0	67	0	na	0	0	75	16	Add Q, CI, FF, PT
318	CK ESP		0	0	29	0	81	0	na	na	na	89	31	Small DOM on existing FF, Add Q
319	CK ESP		31	36	85	70	87	0	na	na	na	75	16	Add Q, CI, FF, PT
320	CK FF		0	0	0	0	0	0	na	na	na	97	16	Add Q, CI, FF, PT
321	CK ESP		50	77	0	0	0	0	na	na	na	0	1	None
322	CK ESP		0	0	38	27	59	0	na	nr	0	75	4	Add CI, FF
323	CK ESP		75	14	89	76	89	0	na	na	na	95	19	Add Q, IWS
325	CK ESP		6	0	87	0	92	0	na	na	na	96	16	Add Q, CI, FF, PT
401	CK ESP		37	54	90	81	59	0	na	na	na	99	16	Add Q, CI, FF, PT
402	CK ESP		0	55	97	82	49	0	na	na	na	64	8	Add CI, FF, PT
403	CK ESP		96	31	0	42	0	0	na	0	81	50	19	Add Q, IWS
404	CK ESP		0	0	0	85	87	0	na	na	na	87	33	Moderate DOM on existing ESP, Add Q, CB
405	CK ESP		0	0	90	93	0	0	na	na	na	85	19	Add Q, IWS
									na	na	na	0	3	Add FF
223	LWAK FF		55	0	0	0	40	0	0	na	na	0	4	Add CI, FF, ST
224	LWAK FF		2	0	0	0	0	0	0	na	na	0	3	Add CI, FF
225	LWAK FF		0	0	0	0	0	50	0	na	na	0	12	Add AB, Q
226	LWAK FF		0	0	0	0	0	0	0	na	na	0	1	None
227	LWAK FF		16	0	0	0	14	52	93	na	na	0	11	Add AB, Q, CI, FF, ST
307	LWAK FF/VS		97	45	0	44	0	0	0	na	na	0	10	Moderate DOM on existing FF, Add CB
310	LWAK FF		0	63	91	40	0	0	0	na	na	0	2	Add FF
311	LWAK FF		7	0	93	0	0	0	0	na	na	0	3	Add CI, FF
312	LWAK FF		0	14	93	0	0	0	0	na	na	0	2	Add FF
313	LWAK FF		0	0	94	88	15	0	0	na	na	0	6	Add IWS
314	LWAK FF		44	77	98	82	0	0	0	na	na	0	3	Add CI, FF

TABLE C2-3b. MODEL GROUP SELECTION FOR FLOOR 3 (Design - 12% Database)

EER Site ID No.	Type	% Emissions Reduction Required to Meet Floor 3											Model Group No.	Required Add-on Plue Gas Control		
		Current APCD	Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	TEQ				
336	LWAKFF		0	26	75	0	16	0	0	na	na	na	na	0	6	Add IWS
209	INC	WHB/FF/VQ/PT/DM	0	0	0	0	83	25	63	na	na	na	na	0	27	DOM Combustor, Add PT
210	INC	FF/S	75	0	75	75	84	0	0	na	na	na	na	75	13	Add PT, RH, CI, FF
211	INC	SS/PT/VS	0	0	75	75	83	0	0	na	na	na	na	50	13	Add PT, RH, CI, FF
212	INC	FF/S	25	49	0	50	94	0	0	na	na	na	na	0	79	Moderate DOM on existing FF, Add Q, CI, PT
214	INC	IWS	97	48	97	82	0	0	0	na	na	na	na	0	88	Add RH, FF, CB
216	INC	HES/WS	72	60	97	79	49	0	0	na	na	na	na	0	3	Moderate DOM on existing WS, Add RH,CI,FF
221	INC	PT	32	16	46	54	71	0	0	na	na	na	na	0	8	Moderate DOM on existing WS, Add RH,CI,FF
222	INC	WHB/SD/ESP/Q/PBS	0	0	52	53	94	0	75	na	na	na	na	0	5	Add AB,IWS
229	INC	WHB/ACS/HCS/CS	0	37	0	97	95	0	0	na	na	na	na	0	45	Add CI, FF, PT
324	INC	?	50	0	75	75	5	0	0	na	na	na	na	75	29	DOM IWS small, Add RH,CI,FF
325	INC	SD/FF/WS/IWS	80	0	0	12	5	0	0	na	na	na	na	0	61	Add RH, CB
327	INC	SD/FF/WS/ESP	99	0	0	0	0	0	0	na	na	na	na	0	3	Moderate DOM on existing WS, Add RH,CI,FF
329	INC	PT/IWS	75	61	75	75	27	0	0	na	na	na	na	0	4	Add IWS
330	INC	QT/WS/DM	87	71	94	48	92	0	0	na	na	na	na	0	65	Moderate DOM Comb, Small DOM WS, Add RH, CI, FF
331	INC	PT/IWS	0	90	0	50	14	50	0	na	na	na	na	25	48	Add AB, Q, CI, FF, PT
332	INC	WS	0	0	99	50	91	0	80	na	na	na	na	45	45	Add CI, FF, PT
333	INC	SD/FF	50	0	0	75	91	0	0	na	na	na	na	0	3	Moderate DOM on existing WS, Add RH,CI,FF
334	INC	WS/ESP/PT	5	78	100	94	67	0	0	na	na	na	na	0	89	Add Q, FF, CB
337	INC	WHB/DAD/IFF	97	0	73	87	0	0	0	na	na	na	na	0	67	Moderate DOM on existing FF, Add CI
338	INC	QC/FF/SS/CHES/DM	91	0	26	63	0	0	0	na	na	na	na	0	3	Moderate DOM on existing WS, Add RH,CI,FF
339	INC	AT/PT/RJS/ESP	75	0	75	0	69	0	0	na	na	na	na	0	59	Moderate DOM on existing WS, Add CI, Q
340	INC	WHB/ESP/WS	45	0	0	0	70	0	0	na	na	na	na	0	8	Add CI/CB
341	INC	DA/DI/FF/HEPA/CA	0	0	0	0	0	0	0	na	na	na	na	0	61	Add RH, CB
342	INC	WHB/QC/S/VS/DM	15	0	0	0	0	0	0	na	na	na	na	0	9	Add RH, CI, FF
344	INC	QC/VS/PT/DM	75	0	0	59	0	0	0	na	na	na	na	0	6	Add FF
346	INC	C/QC/VS/PT/DM	0	0	76	0	17	0	0	na	na	na	na	0	18	Small DOM on existing WS
347	INC	C/QC/VS/S/DM	0	0	0	0	0	0	0	na	na	na	na	0	61	Add RH, CB
348	INC	QC/AS/IWS	75	0	0	0	0	0	0	na	na	na	na	0	6	Add FF
349	INC	QC/FF/QC/PT	0	0	41	75	0	0	0	na	na	na	na	0	64	Moderate DOM on Combustor, Add CI, FF
350	INC	WHB/HE/FF	50	0	75	75	45	50	0	na	na	na	na	0	34	Add CB, PT
351	INC	GC/C/FF	75	0	0	0	0	0	0	na	na	na	na	0	6	Add FF
353	INC	QC/VS/DM/ESP	0	45	78	77	0	0	0	na	na	na	na	0	1	None
354	INC	QC/AS/VS/DM/IWS	0	0	0	0	0	0	0	na	na	na	na	0	65	Moderate DOM Comb, Small DOM WS, Add RH, CB, FF
356	INC	QC/AS/FN/DM	0	61	50	0	19	50	0	na	na	na	na	75	62	Small DOM on existing WS, Add FF
357	INC	QC/VS/PT/IWS	50	51	75	75	24	0	0	na	na	na	na	0	3	Moderate DOM on existing WS, Add RH,CI,FF
358	INC	QC/VS/CCT/S/DM	50	62	75	50	33	0	0	na	na	na	na	0	36	Add CI, IWS
359	INC	WHB/FF/S	75	36	96	100	97	0	0	na	na	na	na	50	49	Add CI, FF
400	INC	SD/FF	64	0	97	75	0	0	0	na	na	na	na	0	2	Add PT
500	INC	QC/VS/KOV/DM	0	0	0	0	76	0	0	na	na	na	na	0	13	Add PT, RH, CB, FF
502	INC	WHB/QC/PBC/VS/ES	75	66	98	63	80	0	0	na	na	na	na	0	64	Moderate DOM on Combustor, Add CB, FF
503	INC	HTHE/LTHE/FF	63	55	97	93	0	50	50	na	na	na	na	25	90	Add PT, RH, FF, CB
504	INC	VS/C	100	33	43	81	79	0	0	na	na	na	na	0	62	Small DOM on existing WS, Add FF
600	INC	WHB/QC/PT/IWS	0	0	0	75	14	0	0	na	na	na	na	0	3	Moderate DOM on existing WS, Add RH,CI,FF
700	INC	SD/RIS/VS/WS	0	72	100	96	59	0	0	na	na	na	na	75	3	Add PT, RH, CI, FF
701	INC	VS/PT	50	72	50	75	97	0	0	na	na	na	na	50	13	

TABLE C2-3b. MODEL GROUP SELECTION FOR FLOOR 3 (Design - 12% Database)

EER Site ID No.	Type	Current APCD	% Emissions Reduction Required to Meet Floor 3											Model Group No.	Required Add-on Plue Gas Control		
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	TEQ					
702	INC	QT/S/C	0	85	75	0	0	0	0	0	0	0	na	na	0	6	Add FF
703	INC	WHB	75	0	0	50	98	0	0	0	0	0	na	na	0	42	Add RH, CB, IWS
704	INC	NONE	25	38	50	0	96	0	0	0	0	0	na	na	75	42	Add RH, CB, IWS
705	INC	QT/VS/ESP/PT	56	55	87	76	48	0	0	0	0	0	na	na	0	3	Moderate DOM on existing WS, Add RH, Cl, FF
706	INC	QT/HS/C	0	72	0	0	75	0	0	0	0	0	na	na	0	16	Moderate DOM on existing VS, Add PT
707	INC	QT/WS	0	70	75	0	59	0	0	99	0	0	na	na	75	70	Mod DOM on WS, Add AB, RH, Cl, FF
708	INC	WS/ESP	50	52	50	75	0	0	0	0	0	0	na	na	50	9	Add RH, CB, FF
709	INC	NONE	75	71	0	0	77	0	0	0	0	0	na	na	0	42	Add RH, CB, IWS
710	INC	QT/OS/C/S	0	57	75	0	98	53	0	0	0	0	na	na	0	33	DOM Combustor, Add IWS
711	INC	C/VS/AS	0	58	0	50	0	0	0	0	0	0	na	na	0	19	Moderate DOM on existing VS
712	INC	NONE	50	45	0	0	47	0	0	0	0	0	na	na	75	41	Add Q, Cl, FF, PT
713	INC	VS/PT	0	82	75	0	81	50	0	0	0	0	na	na	0	33	DOM Combustor, Add IWS
714	INC	WS	0	35	75	0	95	0	0	0	0	0	na	na	50	13	Add PT, RH, Cl, FF
725	INC	WS/QT	0	40	44	41	92	0	0	0	0	0	na	na	0	4	Add IWS
726	INC	QC/CS/DM/VS	75	0	75	75	56	59	0	0	0	0	na	na	0	56	Moderate DOM on WS, Combustor, Add RH, Cl, FF
727	INC	GC/FF	0	85	75	75	94	97	0	95	0	0	na	na	75	44	Add AB, CB, IWS
728	INC	QT/PT/VS	50	72	0	0	91	0	0	0	0	0	na	na	0	63	Moderate DOM on existing VS, Add RH, CB, PT
784	INC	NONE	0	71	75	75	99	0	0	0	0	0	na	na	0	4	Add IWS
805	INC	QT/QS/VS/ES/PBS	0	79	50	50	79	0	0	71	0	0	na	na	75	24	Moderate DOM on Combustor, Add PT, RH, Cl, FF
806	INC	C/VS	96	73	96	0	93	61	0	49	0	0	na	na	0	91	Mod DOM on Combustor, Add PT, RH, FF, CB
807	INC	C/WHB/VQ/PT/HS/DM	50	52	88	84	0	0	0	0	0	0	na	na	0	9	Add RH, Cl, FF
808	INC	QT/PBS/ESP	50	0	75	75	72	0	0	0	0	0	na	na	0	3	Moderate DOM on existing WS, Add RH, Cl, FF
809	INC	VS	0	0	100	99	88	0	0	92	0	0	na	na	75	39	Add RH, Cl, FF, PT, AB
810	INC	Q/VS/PBS	0	0	98	95	92	0	0	0	0	0	na	na	0	4	Add IWS
824	INC	QT/VS/PT/DM	0	0	54	75	0	0	0	0	0	0	na	na	25	92	Add Q, FF
825	INC	CCS/QC/ESP	75	84	0	50	86	50	0	75	0	0	na	na	0	39	Add RH, Cl, FF, PT, AB
902	INC	QT/VS/PT	88	43	9	0	0	0	0	0	0	0	na	na	0	9	Add RH, Cl, FF
904	INC	?	50	0	75	0	94	22	0	0	0	0	na	na	75	93	Moderate DOM on Combustor, Add RH, CB, IWS
905	INC	QT/VS/AS/CS	25	0	100	85	97	0	0	0	0	0	na	na	0	42	Add RH, CB, IWS
906	INC	QT/PT	50	82	75	75	97	0	0	0	0	0	na	na	50	42	Add RH, CB, IWS
914	INC	?	50	0	25	75	97	75	0	0	0	0	na	na	0	48	Add AB, Q, Cl, FF, PT
915	INC	QC/VS/C	75	79	98	96	99	72	0	84	0	0	na	na	0	39	Add RH, Cl, FF, PT, AB

TABLE C2-3c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 3

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate (acfm)	Equivalent HCl Conc (ppm)
CK	1	None	1	208 *	L	Keystone	ESP	307,644	370,000	
CK	1	None	3	320 *	L	Lafarge	FF	nr	370,000	
CK	3	Add FF	1	207 *	S	Keystone	MC/ESP	90,681	147,000	
CK	3	Add FF	1	405 *	S	Ash Grove	ESP	194,905	147,000	
CK	4	Add CI,FF	1	321 *	S	Lafarge	ESP	59,542	147,000	
CK	4	Add CI,FF	1	303	L	Lone Star	MC/FF	408,681	370,000	
CK	5	Add Q,CI,FF	1	304 *	L	Lone Star	ESP	300,367	370,000	
CK	6	Add IWS	2	200 *	S	Giant	FF	123,584	147,000	
CK	6	Add IWS	1	205	L	Holham	ESP	253,556	370,000	
CK	8	Add CI,FF,PT	1	401	S	Ash Grove	ESP	172,481	147,000	
CK	16	Add Q, CI, FF, PT	1	228 *	S	Ash Grove	ESP	148,537	147,000	
CK	16	Add Q, CI, FF, PT	2	300 *	S	Essroc	ESP	164,692	147,000	
CK	16	Add Q, CI, FF, PT	2	302 *	S	Lafarge	ESP	130,576	147,000	
CK	16	Add Q, CI, FF, PT	2	305	S	Medusa	ESP	196,903	147,000	85
CK	16	Add Q, CI, FF, PT	4	318 *	S	Texas Industries	ESP	152,675	147,000	
CK	16	Add Q, CI, FF, PT	1	323	S	Lafarge	FF	185,409	147,000	85
CK	16	Add Q, CI, FF, PT	1	335	S	Medusa	ESP	100,378	147,000	85
CK	16	Add Q, CI, FF, PT	1	203	L	Holham	ESP	291,645	370,000	85
CK	16	Add Q, CI, FF, PT	1	309	L	River Cement	MC/ESP	665,839	370,000	
CK	16	Add Q, CI, FF, PT	1	316 *	L	Southdown	FF	nr	370,000	
CK	16	Add Q, CI, FF, PT	1	319	L	Continental	ESP	344,250	370,000	85
CK	17	Add Q	3	308 *	S	North Texas	ESP	162,599	147,000	
CK	17	Add Q	1	315	S	Southdown	FF	102,042	147,000	
CK	18	Add Q, FF	1	204 *	L	Holham	ESP	693,613	370,000	
CK	19	Add Q, IWS	2	201 *	S	Giant	FF	137,945	147,000	
CK	19	Add Q, IWS	1	322 *	S	Lafarge	ESP	112,269	147,000	
CK	19	Add Q, IWS	1	402 *	S	Ash Grove	ESP	187,605	147,000	
CK	19	Add Q, IWS	1	206	L	Holham	ESP	348,510	370,000	85
CK	19	Add Q, IWS	1	404	L	Ash Grove	ESP	265,721	370,000	85
CK	28	Moderate DOM on Combustor, Add CI, FF	1	301	S	Essroc	FF	185,409	147,000	
CK	29	Add WQ, CB	1	306 *	L	National	MC/FF	280,868	370,000	
CK	31	Small DOM on existing FF, Add Q	1	317 *	L	Southdown	FF	422,190	370,000	
CK	32	Moderate DOM on existing FF, Add Q, PT	1	202 *	L	Heartland	FF	221,421	370,000	
CK	33	Moderate DOM on existing ESP, Add Q, CB	1	403	S	Ash Grove	ESP	184,877	147,000	
INC	1	None	1	354 *	M	Dow Chemical	QC/AS/VS/DM/IWS	27,383	22,100	
INC	2	Add PT	1	500 *	L	Chevron	QC/VS/KOV/DM	49,822	60,800	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	339 *	S	Dupont	AT/PT/RIS/ESP	6,263	3,900	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	358 *	M	Eli Lilly	QC/VS/C/CT/S/DM	14,406	22,100	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	700 *	M	Dupont	SD/RIS/VS/WS	30,185	22,100	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	705 *	M	Chba-Geigy	QT/VS/ESP/PT	36,116	22,100	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	808 *	M	Dow Chemical	QT/PBS/ESP	35,720	22,100	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	216 *	L	Rollins	HES/WS	40,002	60,800	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	221	L	Rollins	PT	51,114	60,800	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	329 *	L	Dupont	PT/IWS	53,489	60,800	
INC	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	334 *	L	3M	WS/ESP/PT	40,599	60,800	
INC	4	Add IWS	1	725	S	Zeneca	WS/OT	1,489	3,900	
INC	4	Add IWS	1	784 *	S	Cook Composites	NONE	nr	3,900	92
INC	4	Add IWS	1	330 *	M	General Electric	QT/WS/DM	10,345	22,100	
INC	4	Add IWS	1	810 *	M	Tennessee Eastman	Q/VS/PBS	28,434	22,100	
INC	5	Add AB,IWS	1	229 *	S	Vulcan Materials	WHB/ACS/HCS/CS	1,171	3,900	
INC	6	Add FF	2	349 *	S	Radford Army Ammo Plant	QC/FF/QC/PT	5,653	3,900	

TABLE C2-3c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 3

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate (acfm)	Equivalent HCl Conc (ppm)
INC	6	Add FF	1	346 *	M	Department of Army	C/QC/VS/PT/DM	21,812	22,100	
INC	6	Add FF	1	353 *	M	Dow Chemical	QC/VS/DM/ESP	nr	22,100	
INC	6	Add FF	1	702 *	M	Dupont	QT/S/C	nr	22,100	
INC	8	Add Cl/CB	1	341 *	M	Glaxo	DA/DI/FF/HEPA/CA	nr	22,100	
INC	8	Add Cl/CB	1	222 *	L	W-TI	WHB/SD/ESP/Q/PBS	93,718	60,800	
INC	9	Add RH, Cl/CB, FF	1	708 *	S	Burroughs Wellcome	WS/ESP	3,687	3,900	
INC	9	Add RH, Cl/CB, FF	1	344 *	M	Department of Army	QC/VS/PT/DM	13,886	22,100	
INC	9	Add RH, Cl/CB, FF	1	807	M	Bros Lagoon Site	C/WHB/VQ/PT/HS/DM	34,109	22,100	
INC	9	Add RH, Cl/CB, FF	1	902 *	M	Rocky Mountain Arsenal	QT/VS/PT	25,436	22,100	
INC	13	Add PT, RH, Cl/CB, FF	1	502 *	S	Pfizer	WHB/QC/PBC/VS/ES	6,647	3,900	
INC	13	Add PT, RH, Cl/CB, FF	1	701 *	M	Eli Lilly	VS/PT	9,208	22,100	92
INC	13	Add PT, RH, Cl/CB, FF	2	714 *	M	Ohlin Chemical	WS	19,185	22,100	92
INC	13	Add PT, RH, Cl/CB, FF	1	210 *	L	LWD	FF/S	96,107	60,800	
INC	13	Add PT, RH, Cl/CB, FF	1	211 *	L	LWD	SS/PT/VS	43,596	60,800	
INC	16	Moderate DOM on existing VS, Add PT	1	706 *	M	Ciba-Geigy	QT/HS/C	nr	22,100	
INC	18	Small DOM on existing WS	1	347 *	M	Department of Army	C/QC/VS/SD/DM	10,795	22,100	
INC	19	Small DOM on existing VS	1	711 *	L	Chevron Chemical	CVS/AS	52,907	60,800	
INC	24	Moderate DOM on Combustor, Add PT, RH, Cl/CB, FF	1	805 *	M	American Cyanamid	QT/QS/VS/ES/PBS	31,943	22,100	
INC	27	DOM Combustor, Add PT	1	209 *	M	Ladlaw	WHB, FF/VQ/PT/DM	21,716	22,100	
INC	29	DOM IWS small, Add RH, Cl/CB, FF	1	325 *	M	Aptus	SD/FF/WS/IWS	23,127	22,100	
INC	33	DOM Combustor, Add IWS	1	713 *	S	Pfizer	VS/PT	2,625	3,900	
INC	34	DOM Combustor, Add IWS	1	710 *	M	Dupont	QT/QS/C/S	nr	22,100	92
INC	34	Add Cl/CB, PT	1	351 *	S	Iowa Army Ammo Plant	GC/C/FF	3,457	3,900	
INC	36	Add RH, Cl/CB, IWS	1	359 *	M	Atochem	WHB/FF/S	13,802	22,100	
INC	39	Add RH, Cl/CB, FF, PT, AB	1	825 *	M	General Electric	CCS/QC/ESP	21,363	22,100	92
INC	39	Add RH, Cl/CB, FF, PT, AB	1	915 *	M	Eastman Kodak	QC/VS/C	nr	22,100	92
INC	39	Add RH, Cl/CB, FF, PT, AB	1	809 *	L	Tennessee Eastman	VS	40,524	60,800	92
INC	41	Add Q, Cl/CB, FF, PT	1	712 *	L	Nepera	NONE	65,256	60,800	
INC	42	Add RH, Cl/CB, IWS	1	703 *	S	Aristech	WHB	1,873	3,900	92
INC	42	Add RH, Cl/CB, IWS	1	704 *	S	Ashland	NONE	5,011	3,900	92
INC	42	Add RH, Cl/CB, IWS	1	709 *	S	Cargill Chemical	NONE	3,123	3,900	
INC	42	Add RH, Cl/CB, IWS	1	905 *	S	Velsicol Chemical	QT/VS/AS/CS	nr	3,900	92
INC	42	Add RH, Cl/CB, IWS	1	906 *	S	Monsanto	QT/PT	2,738	3,900	92
INC	44	Add AB, CB, IWS	1	727 *	S	Iowa Army Ammo Plant	GC/C/FF	3,043	3,900	92
INC	45	Add Cl/CB, FF, PT	1	324 *	M	Allied	?	12,120	22,100	92
INC	45	Add Cl/CB, FF, PT	1	333 *	L	Trade Waste	SD/FF	42,042	60,800	
INC	48	Add AB, Q, Cl/CB, FF, PT	1	332 *	M	Thermalkem	WS	20,208	22,100	
INC	48	Add AB, Q, Cl/CB, FF, PT	1	914 *	M	Vertac Superfund	?	25,849	22,100	92
INC	49	Add Cl/CB, FF	1	400 *	L	Marine Shale	SD/FF	179,333	60,800	
INC	56	Moderate DOM on WS, Combustor, Add RH, Cl/CB, FF	1	726 *	S	Shell Oil	QC/CS/DM/VS	3,669	3,900	
INC	59	Moderate DOM on existing WS, Add Cl/CB, Q	1	340 *	M	Miles	WHB/ESP/WS	16,003	22,100	
INC	61	Add RH, CB	1	342 *	S	Upjohn	WHB/QC/S/VS/DM	5,640	3,900	
INC	61	Add RH, CB	1	348 *	S	Occidental Chemical	QC/AS/IWS	nr	3,900	
INC	61	Add RH, CB	1	327 *	L	Aptus	SD/FF/WS/ESP	49,572	60,800	
INC	62	Small DOM on existing WS, Add FF	1	357 *	M	Department of Energy	QC/VS/PT/IWS	20,778	22,100	
INC	62	Small DOM on existing WS, Add FF	1	600 *	L	Dow Chemical	WHB/QC/PT/IWS	43,839	60,800	
INC	63	Moderate DOM on existing VS, Add RH, CB, PT	1	728 *	S	Eli Lilly	QT/PT/VS	5,819	3,900	
INC	64	Moderate DOM on Combustor, Add Cl/CB, FF	1	503 *	M	Lake City Army Ammo Plant	HTHE/LTHE/FF	4,747	3,900	
INC	64	Moderate DOM on Combustor, Add Cl/CB, FF	1	350 *	S	Dupont	WHB/HE/FF	15,883	22,100	
INC	65	Moderate DOM Comb, Small DOM WS, Add RH, Cl/CB, FF	1	356 *	S	Dupont	QC/AS/NI/DM	5,100	3,900	
INC	65	Moderate DOM Comb, Small DOM WS, Add RH, Cl/CB, FF	1	331 *	L	Ross	PT/WS	44,379	60,800	
INC	67	Moderate DOM on existing FF, Add Cl/CB	1	338 *	L	Dupont	QC/FF/SS/C/HS/DM	65,598	60,800	
INC	70	Mod DOM on WS, Add AB, RH, Cl, FF	1	707 *	L	Dupont	QT/WS	58,120	60,800	

TABLE C2-3c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 3

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate (acfm)	Equivalent HCl Conc (ppm)
INC	79	Moderate DOM on existing FF, Add Q, Cl, PT	1	212 *	L	LWD	FF/S	44,610	60,800	
INC	88	Add FF, RH, FF, CB	1	214 *	M	Rollins	IWS	34,655	22,100	
INC	89	Add Q, FF, CB	2	337 *	M	Ohlin Chemical	WHD/DA/DI/FF	13,807	22,100	
INC	90	Add PT, RH, FF, CB	1	504 *	M	Chevron Chemical	VS/C	32,804	22,100	92
INC	91	Mod DOM on Combustor, Add PT, RH, FF, CB	1	806 *	M	Amoco Oji	C/V/S	20,641	22,100	92
INC	92	Add Q, FF	1	824 *	S	Pennwalt	QT/VS/PT/D/M	1,086	3,900	
INC	93	Moderate DOM on Combustor, Add RH, CB, IWS	1	904 *	S	First Chemical	?	5,950	3,900	92
LWAK	1	None	1	226 *	M (Lo HCl)	Solite	FF	nr	40,500	
LWAK	2	Add FF	1	310 *	M (Lo HCl)	Solite	FF	47,770	40,500	
LWAK	2	Add FF	1	312 *	M (Hi HCl)	Solite	FF	47,698	40,500	
LWAK	3	Add Cl, FF	1	224 *	M (Lo HCl)	Solite	FF	39,049	40,500	
LWAK	3	Add Cl, FF	1	314 *	M (Lo HCl)	Solite	FF	36,793	40,500	
LWAK	3	Add Cl, FF	1	311 *	M (Hi HCl)	Solite	FF	51,627	40,500	
LWAK	4	Add Cl, FF, ST	1	223 *	M (Hi HCl)	Solite	FF	29,092	40,500	157
LWAK	6	Add IWS	1	313 *	M (Lo HCl)	Solite	FF	30,336	40,500	875
LWAK	6	Add IWS	1	316 *	M (Hi HCl)	Solite	FF	36,793	40,500	157
LWAK	10	Moderate DOM on existing FF, Add CB	2	307 *	M (Lo HCl)	Norlite	FF/VS	49,050	40,500	
LWAK	11	Add AB, Q, Cl, FF, ST	1	227 *	M (Hi HCl)	Solite	FF	38,796	40,500	157
LWAK	12	Add AB, Q	1	225 *	M (Lo HCl)	Solite	FF	38,270	40,500	

* Facility has been assigned to model group based on assumed emission level. Facility did not report the necessary emission value, therefore one was assigned based on the distribution of reported values from other facilities.

** Reported Ratio is equal to the number of total units located at a site divided by the number of units for which information was reported.

Often a facility will report data for only one unit even when the facility has two or three units at the particular site, since the single reported unit can be considered as representative of the other nonreported units.

nr = not reported

Source Group	Model Plant Number	Size Category	Required Equipment	Number of Sources	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	1	L	None	4	\$0K	\$0K	\$0K
CK	3	S	Add FF	2	\$2,141K	\$355K	\$597K
CK	4	S	Add CI,FF	1	\$2,611K	\$718K	\$1,022K
CK	4	L	Add CI,FF	1	\$5,658K	\$1,490K	\$2,139K
CK	5	L	Add Q,CI,FF	1	\$6,570K	\$1,645K	\$2,414K
CK	6	S	Add IWS	2	\$2,390K	\$379K	\$768K
CK	6	L	Add IWS	1	\$4,410K	\$747K	\$1,465K
CK	8	S	Add CI,FF,PT	1	\$3,512K	\$1,048K	\$1,498K
CK	16	S	Add Q, CI, FF, PT	13	\$4,045K	\$1,136K	\$1,656K
CK	16	L	Add Q, CI, FF, PT	4	\$8,505K	\$2,329K	\$3,413K
CK	17	S	Add Q	4	\$533K	\$88K	\$158K
CK	18	L	Add Q, FF	1	\$5,984K	\$909K	\$1,601K
CK	19	S	Add Q, IWS	4	\$2,923K	\$467K	\$926K
CK	19	L	Add Q, IWS	2	\$5,322K	\$902K	\$1,740K
CK	28	S	Moderate DOM on Combustor, Add CI, FF	1	\$2,832K	\$718K	\$1,058K
CK	29	L	Add WQ, CB	1	\$16,598K	\$1,696K	\$3,878K
CK	31	L	Small DOM on existing FF, Add Q	1	\$971K	\$204K	\$333K
CK	32	L	Moderate DOM on existing FF, Add Q, PT	1	\$3,161K	\$943K	\$1,389K
CK	33	S	Moderate DOM on existing ESP, Add Q, CB	1	\$9,162K	\$924K	\$2,129K
INC	1	M	None	1	\$0K	\$0K	\$0K
INC	2	L	Add PT	1	\$445K	\$195K	\$267K
INC	3	S	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	\$628K	\$264K	\$347K
INC	3	M	Moderate DOM on existing WS, Add RH,CI/CB,FF	4	\$1,004K	\$405K	\$541K
INC	3	L	Moderate DOM on existing WS, Add RH,CI/CB,FF	4	\$1,876K	\$712K	\$968K
INC	4	S	Add IWS	2	\$215K	\$97K	\$132K
INC	4	M	Add IWS	2	\$680K	\$144K	\$254K
INC	5	S	Add AB,IWS	1	\$480K	\$289K	\$359K
INC	6	S	Add FF	2	\$82K	\$89K	\$98K
INC	6	M	Add FF	3	\$295K	\$121K	\$154K
INC	8	M	Add CI/CB	1	\$397K	\$147K	\$199K
INC	8	L	Add CI/CB	1	\$425K	\$224K	\$280K
INC	9	S	Add RH, CI/CB, FF	1	\$575K	\$241K	\$315K
INC	9	M	Add RH, CI/CB, FF	3	\$932K	\$391K	\$508K
INC	13	S	Add PT, RH, CI/CB, FF	1	\$632K	\$331K	\$414K
INC	13	M	Add PT, RH, CI/CB, FF	3	\$1,137K	\$515K	\$665K
INC	13	L	Add PT, RH, CI/CB, FF	2	\$2,126K	\$866K	\$1,143K
INC	16	M	Moderate DOM on existing VS, Add PT	1	\$250K	\$159K	\$205K
INC	18	M	Small DOM on existing WS	1	\$40K	\$13K	\$20K
INC	19	L	Small DOM on existing VS	1	\$105K	\$97K	\$127K
INC	24	M	Moderate DOM on Combustor, Add PT,RH,CI/CB,FF	1	\$1,291K	\$515K	\$690K
INC	27	M	DOM Combustor, Add PT	1	\$359K	\$124K	\$183K
INC	29	M	DOM IWS small, Add RH,CI/CB,FF	1	\$972K	\$403K	\$528K
INC	33	S	DOM Combustor, Add IWS	1	\$331K	\$97K	\$151K
INC	33	M	DOM Combustor, Add IWS	1	\$834K	\$144K	\$280K
INC	34	S	Add CI/CB, PT	1	\$398K	\$181K	\$235K
INC	36	M	Add CI/CB, IWS	1	\$1,077K	\$291K	\$454K
INC	39	M	Add RH, CI/CB, FF, PT, AB	2	\$1,554K	\$1,048K	\$1,253K
INC	39	L	Add RH, CI/CB, FF, PT, AB	1	\$2,669K	\$2,142K	\$2,490K
INC	41	L	Add Q, CI/CB, FF, PT	1	\$2,180K	\$678K	\$961K
INC	42	S	Add RH, CI/CB, IWS	5	\$708K	\$249K	\$348K
INC	44	S	Add AB, CB, IWS	1	\$821K	\$381K	\$495K
INC	45	M	Add CI/CB, FF, PT	1	\$897K	\$392K	\$511K
INC	45	L	Add CI/CB, FF, PT	1	\$1,813K	\$616K	\$851K
INC	48	M	Add AB, Q, CI/CB, FF, PT	2	\$1,592K	\$974K	\$1,184K
INC	49	L	Add CI/CB, FF	1	\$1,368K	\$422K	\$584K
INC	56	S	Moderate DOM on WS, Combustor, Add RH, CI/CB, FF	1	\$704K	\$243K	\$340K
INC	59	M	Moderate DOM on existing WS, Add CI/CB, Q	1	\$746K	\$210K	\$317K
INC	61	S	Add RH, CB	2	\$493K	\$152K	\$216K
INC	61	L	Add RH, CB	1	\$3,687K	\$603K	\$1,088K
INC	62	M	Small DOM on existing WS, Add FF	1	\$335K	\$134K	\$175K
INC	62	L	Small DOM on existing WS, Add FF	1	\$1,044K	\$227K	\$354K
INC	63	S	Moderate DOM on existing VS, Add RH, CB, PT	1	\$561K	\$248K	\$326K
INC	64	S	Moderate DOM on Combustor, Add CI/CB, FF	1	\$578K	\$201K	\$280K
INC	64	M	Moderate DOM on Combustor, Add CI/CB, FF	1	\$846K	\$268K	\$379K
INC	65	S	Moderate DOM Comb, Small DOM WS, Add RH, CI/CB, FF	1	\$702K	\$246K	\$341K

Source Group	Model Plant Number	Size Category	Required Equipment	Number of Sources	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	65	L	Moderate DOM Comb, Small DOM WS, Add RH, CI/CB, FF	1	\$1,967K	\$702K	\$955K
INC	67	L	Moderate DOM on existing FF, Add CI/CB	1	\$476K	\$241K	\$299K
INC	70	L	Mod DOM on WS, Add AB, RH, CI, FF	1	\$2,418K	\$1,988K	\$2,314K
INC	79	L	Moderate DOM on existing FF, Add Q, CI, PT	1	\$1,288K	\$497K	\$675K
INC	88	M	Add FF, RH, FF, CB	1	\$1,875K	\$420K	\$661K
INC	89	M	Add Q, FF, CB	2	\$1,913K	\$345K	\$591K
INC	90	M	Add PT, RH, FF, CB	1	\$2,080K	\$544K	\$818K
INC	91	M	Mod DOM on Combustor, Add PT, RH, FF, CB	1	\$2,234K	\$544K	\$843K
INC	92	S	Add Q, FF	1	\$303K	\$130K	\$168K
INC	93	S	Moderate DOM on Combustor, Add RH, CB, IWS	1	\$824K	\$249K	\$367K
LWAK	1	M (Lo HCl)	None	1	\$0K	\$0K	\$0K
LWAK	2	M (Lo HCl)	Add FF	1	\$661K	\$161K	\$236K
LWAK	2	M (Hi HCl)	Add FF	1	\$661K	\$161K	\$236K
LWAK	3	M (Lo HCl)	Add CI, FF	2	\$1,074K	\$350K	\$480K
LWAK	3	M (Hi HCl)	Add CI, FF	1	\$1,074K	\$350K	\$480K
LWAK	4	M (Hi HCl)	Add CI, FF, ST	1	\$2,302K	\$680K	\$1,009K
LWAK	6	M (Lo HCl)	Add IWS	1	\$1,016K	\$449K	\$615K
LWAK	6	M (Hi HCl)	Add IWS	1	\$1,016K	\$682K	\$847K
LWAK	10	M (Lo HCl)	Moderate DOM on existing FF, Add CB	2	\$2,512K	\$281K	\$608K
LWAK	11	M (Hi HCl)	Add AB, Q, CI, FF, ST	1	\$3,112K	\$1,944K	\$2,380K
LWAK	12	M (Lo HCl)	Add AB, Q	1	\$809K	\$1,264K	\$1,371K

TABLE C2-4a. REQUIRED REDUCTION TO MEET FLOOR 4

EER Site ID No.	Type	Hg		PM		SVM		LVM		HCI/C12		HC		CO		HC-Byp		CO-Byp		TEQ		TEQ Adj. Reduct.	
		Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.	Req. % Reduct.	Adj. Reduct.		APCD Temp (°F)
312	LWAK	-10696.61	0	-242.85	0	98.26	98	-550.79	0	-7.81	0	-71.43	0	-15.47	0	na	na	na	na	na	na	0	
313	LWAK	#####	0	-299.99	0	98.35	98	21.85	22	8.55	9	-39.53	0	-426.32	0	na	na	na	na	na	na	0	
314	LWAK	-3511.11	0	7.48	7	99.55	100	-13.35	0	-70.31	0	-33.33	0	-2677.78	0	na	na	na	na	na	na	0	
336	LWAK	nr	0	-194.95	0	nr	75	nr	0	9.61	10	-22.45	0	-49.70	0	na	na	na	na	na	na	-12076.17	
Floor Levels																							
209	INC	53.00	0	0.038	0	120.00	0	110.00	0	22.00	6.00	25	100.00	63	na	na	na	na	na	na	20.00	20	
210	INC	-1553.91	75	-640.26	0	nr	50	-388.10	75	31.33	nr	0	63.16	0	na	na	na	na	na	na	nr	0	
211	INC	nr	0	-265.38	0	nr	75	nr	50	35.10	35	-54.77	0	-27385.21	0	na	na	na	na	na	na	nr	0
212	INC	nr	0	-61.82	0	nr	0	nr	0	29.75	30	-158.20	0	-2002.04	0	na	na	na	na	na	na	nr	0
214	INC	73.29	73	-63.52	0	nr	84	27.53	28	74.76	75	-73.45	0	-1934.62	0	na	na	na	na	na	na	nr	0
216	INC	-156.20	0	-26.29	0	84.81	85	15.80	16	-1171.80	0	-386.48	0	-561.99	0	na	na	na	na	na	na	-33683.78	0
221	INC	-533.47	0	-167.06	0	-192.96	0	-80.72	0	-107.88	0	nr	0	-869.84	0	na	na	na	na	na	na	nr	0
222	INC	nr	50	-1667.15	0	-4170.92	0	nr	0	-1731.17	0	-20.09	0	-552.36	0	na	na	na	na	na	na	-4661.90	0
229	INC	nr	0	-99.47	0	-164.52	0	-84.10	0	74.77	75	nr	0	-167.49	0	na	na	na	na	na	na	-1624.14	0
324	INC	nr	0	-251.85	0	81.39	81	0.56	1	81.54	82	nr	0	-219.83	0	na	na	na	na	na	na	nr	0
325	INC	-83.34	0	-1069.21	0	-35.61	0	-246.87	0	-285.77	0	-609.18	0	-867.74	0	na	na	na	na	na	na	nr	0
327	INC	93.87	94	-292.658	0	-484.22	0	-313.80	0	-542.09	0	-15.27	0	-1096.05	0	na	na	na	na	na	na	-25.00	0
329	INC	nr	75	-24.79	0	nr	75	nr	75	-198.22	0	-142.58	0	-935.58	0	na	na	na	na	na	na	nr	0
330	INC	-916.68	0	9.74	10	64.70	65	-105.96	0	68.51	69	nr	0	nr	0	na	na	na	na	na	na	24.53	0
331	INC	-16.80	0	-374.99	0	96.76	97	-97.56	0	252.29	0	nr	50	80.00	80	na	na	na	na	na	na	-29097.08	0
332	INC	nr	0	67.82	68	nr	0	nr	0	61.75	62	nr	0	nr	0	na	na	na	na	na	na	nr	0
333	INC	nr	0	-2823.02	0	nr	0	nr	25	62.36	62	nr	0	-2136.89	0	na	na	na	na	na	na	nr	0
334	INC	-785.97	0	31.44	31	97.37	97	78.10	78	-33.72	0	-195.75	0	-34.96	0	na	na	na	na	na	na	nr	0
337	INC	67.62	68	-15979.08	0	-45.66	0	50.77	51	-310.34	0	-84.35	0	-13061.51	0	na	na	na	na	na	na	-952.63	25
338	INC	12.48	12	-2939.97	0	-304.61	0	-45.23	0	-11013.99	0	-228.32	0	-4878.93	0	na	na	na	na	na	na	nr	0
339	INC	nr	75	-1202.67	0	nr	0	nr	0	-26.40	0	-384.19	0	nr	0	na	na	na	na	na	na	nr	0
340	INC	-414.56	0	-482.82	0	-1276.14	0	-858.43	0	-23.25	0	-271.54	0	-238.04	0	na	na	na	na	na	na	nr	0
341	INC	-5580.51	0	-2476.25	0	-767.66	0	-1335.50	0	-1343.66	0	nr	0	-73.46	0	na	na	na	na	na	na	nr	0
342	INC	-690.58	0	-956.32	0	-520.64	0	-4724.19	0	-3672.65	0	nr	0	nr	0	na	na	na	na	na	na	nr	0
344	INC	nr	50	-2247.44	0	-643.56	0	-60.85	0	-2037.34	0	-234.50	0	-519.62	0	na	na	na	na	na	na	nr	0
346	INC	-18959.35	0	-2857.17	0	-33.06	0	-798.07	0	-2782.29	0	nr	0	-255.68	0	na	na	na	na	na	na	-16293.44	0
347	INC	-926.10	0	-445.67	0	-1037.55	0	-647.89	0	-238.34	0	nr	0	nr	0	na	na	na	na	na	na	-10352.694	0
348	INC	nr	75	-3699.96	0	-1287.06	0	-3385.84	75	-238.34	0	-3869.10	0	-1104.17	0	na	na	na	na	na	na	nr	0
349	INC	nr	0	-1902.62	0	-221.68	0	nr	0	-3871.32	0	nr	0	-1053.22	0	na	na	na	na	na	na	nr	0
350	INC	nr	0	-326.00	0	nr	75	-924.92	0	-2666.58	0	nr	50	-2870.43	0	na	na	na	na	na	na	nr	0
351	INC	nr	0	-326.00	0	nr	0	nr	50	-122.57	0	nr	0	-35.23	0	na	na	na	na	na	na	nr	0
353	INC	nr	0	-75.27	0	-19.54	0	7.85	8	-1358.30	0	nr	0	-529.10	0	na	na	na	na	na	na	nr	0
354	INC	-6243.38	0	-511.90	0	-4959.44	0	-979.08	0	-1154.06	0	nr	0	-3281.50	0	na	na	na	na	na	na	-15648.03	0
356	INC	nr	0	-22.58	0	nr	0	nr	0	-209.54	0	nr	50	-808.60	0	na	na	na	na	na	na	nr	0
357	INC	nr	0	-55.74	0	nr	75	nr	0	-171.95	0	nr	0	-6563.08	0	na	na	na	na	na	na	nr	0
358	INC	nr	0	-19.59	0	nr	0	nr	0	-102.89	0	nr	0	-0.58	0	na	na	na	na	na	na	nr	0
359	INC	nr	0	-102.89	0	76.86	77	99.79	100	85.94	86	nr	0	nr	0	na	na	na	na	na	na	nr	0
400	INC	-230.10	0	-539.35	0	83.98	84	0.82	1	-617.18	0	nr	0	nr	0	na	na	na	na	na	na	nr	0
500	INC	-1677.99	0	-2097.08	0	-4125.69	0	-3129.96	0	3.92	4	nr	0	nr	0	na	na	na	na	na	na	-52950.40	0

TABLE C2-4a. REQUIRED REDUCTION TO MEET FLOOR 4

EER	Type	Hg	Hg	PM	PM	PM	SVM	SVM	LVM	LVM	HCI/CI2	HCI/CI2	HC	HC	CO	CO	HC-Byp	HC-Byp	CO-Byp	CO-Byp	TEQ	TEQ	APCD	TEQ
Site ID		Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Req. %	Adj.	Temp (°F)	Req. %	Adj.
No.		Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.	Reduct.		Reduct.	Reduct.
502	INC	nr	50	-8.57	0	90.50	91	-44.54	0	18.67	19	nr	0	nr	0	nr	na	na	na	na	-89586.10	0	0	
503	INC	-241.67	0	-43.39	0	84.41	84	74.34	74	-389.62	0	nr	50	nr	nr	50	na	na	na	na	nr	285	0	
504	INC	97.14	97	-111.11	0	-209.18	27	26.53	27	15.36	15	nr	0	nr	nr	0	na	na	na	na	nr		0	
600	INC	nr	0	-406.66	0	nr	0	nr	25	-252.31	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
700	INC	-1083.73	0	12.34	12	99.53	100	84.39	84	-65.44	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
701	INC	nr	0	11.90	12	nr	0	nr	75	86.18	86	-679.22	0	nr	nr	0	na	na	na	na	nr		0	
702	INC	nr	0	53.37	53	nr	75	nr	0	-308.35	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
703	INC	nr	0	-1166.65	0	nr	0	nr	0	93.21	93	-1500.72	0	nr	nr	0	na	na	na	na	nr		0	
704	INC	nr	0	-94.87	0	nr	0	nr	0	85.73	86	nr	0	nr	nr	0	na	na	na	na	nr		25	
705	INC	-313.45	0	-42.52	0	29.32	29	7.66	8	-112.86	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
706	INC	nr	0	11.01	11	nr	0	nr	0	-0.24	0	-15.74	0	nr	nr	0	na	na	na	na	nr		0	
707	INC	nr	0	5.92	6	nr	75	nr	0	-66.78	0	nr	0	nr	99	0	na	na	na	na	nr		0	
708	INC	nr	0	-52.51	0	nr	0	nr	50	-1930.09	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
709	INC	nr	50	7.32	7	nr	0	nr	0	5.83	6	-369.24	0	nr	nr	0	na	na	na	na	nr		0	
710	INC	nr	0	-37.35	0	nr	75	nr	0	90.78	91	52.63	53	nr	nr	0	na	na	na	na	nr		0	
711	INC	nr	0	-32.56	0	nr	0	nr	0	-1465.99	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
712	INC	nr	0	-74.87	0	-5238.24	0	-369.96	0	-116.99	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
713	INC	nr	0	43.70	44	nr	0	nr	0	23.65	24	nr	50	nr	nr	0	na	na	na	na	nr		0	
714	INC	nr	0	-106.52	0	nr	75	nr	0	79.68	80	nr	0	nr	nr	0	na	na	na	na	nr		0	
725	INC	-3188.38	0	-90.95	0	-204.92	0	-133.26	0	65.47	65	-242.86	0	nr	nr	0	na	na	na	na	nr		0	
726	INC	nr	0	-1419.98	0	nr	75	nr	75	-78.18	0	58.92	59	nr	nr	0	na	na	na	na	nr		0	
727	INC	nr	0	53.66	54	nr	75	nr	25	75.49	75	96.75	97	nr	95	0	na	na	na	na	nr		0	
728	INC	nr	0	11.42	11	nr	0	nr	0	62.51	63	nr	0	nr	nr	0	na	na	na	na	nr		0	
784	INC	nr	0	7.32	7	nr	75	nr	50	97.59	98	nr	0	nr	nr	0	na	na	na	na	nr		0	
805	INC	nr	0	32.86	33	nr	0	nr	0	13.99	14	-24.94	0	nr	nr	0	na	na	na	na	nr		0	
806	INC	66.41	66	15.06	15	78.12	78	-1447.61	0	72.98	73	60.59	61	nr	71	0	na	na	na	na	nr		0	
807	INC	-363.94	0	-53.44	0	32.35	32	35.44	35	-842.93	0	-168.74	0	nr	49	0	na	na	na	na	nr		0	
808	INC	nr	0	-250.42	0	nr	75	nr	25	-12.45	0	nr	0	nr	nr	0	na	na	na	na	nr		0	
809	INC	nr	0	nr	0	98.82	99	97.07	97	49.41	49	-36.33	0	nr	92	0	na	na	na	na	nr		0	
810	INC	nr	0	nr	0	91.78	92	81.50	81	67.39	67	nr	0	nr	0	nr	na	na	na	na	nr		0	
824	INC	-7352.82	0	-493.74	0	-151.32	0	3.22	3	-655.30	0	nr	0	nr	0	nr	na	na	na	na	nr		0	
825	INC	nr	25	49.33	49	nr	0	nr	0	44.34	44	nr	50	nr	75	0	na	na	na	na	nr		0	
902	INC	-13.56	0	-81.82	0	-397.31	0	-1034.49	0	-372.43	0	-36.44	0	nr	nr	0	na	na	na	na	nr		0	
904	INC	nr	0	-326.96	0	nr	75	nr	41	74.27	74	22.02	22	nr	0	nr	na	na	na	na	nr		0	
905	INC	nr	0	nr	0	99.54	100	40.59	41	87.31	87	nr	0	nr	0	nr	na	na	na	na	nr		0	
906	INC	nr	0	43.45	43	nr	50	nr	75	89.70	90	-197.34	0	nr	0	nr	na	na	na	na	nr		0	
914	INC	nr	0	-804.75	0	nr	0	nr	50	86.38	86	nr	75	nr	84	0	na	na	na	na	nr		0	
915	INC	nr	50	32.74	33	90.22	90	83.75	84	96.42	96	72.09	72	nr	84	0	na	na	na	na	nr		0	

TABLE C2-4b. MODEL GROUP SELECTION FOR FLOOR 4

EER ID No.	Type	Current APCD	% Emissions Reduction Required to meet Floor 4										Model Group No.	Required Add-on Flue Gas Control		
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	TEQ				
200	CK	FF	0	0	50	81	0	0	na	na	na	na	na	0	3	Add FF
201	CK	FF	0	0	32	79	0	0	na	na	na	na	na	75	18	Add Q, FF
202	CK	FF	0	0	70	0	0	0	na	na	na	na	na	0	7	Moderate DOM on existing FF
203	CK	ESP	0	0	94	0	0	0	na	na	na	na	na	16	18	Add Q, FF
204	CK	ESP	0	0	93	0	0	0	na	na	na	na	na	0	3	Add FF
205	CK	ESP	0	31	98	0	0	0	na	na	na	na	na	0	3	Add FF
206	CK	ESP	0	0	87	0	0	0	na	na	na	na	na	0	3	Add FF
207	CK	MC/ESP	0	0	91	0	0	0	na	na	na	na	na	0	2	Moderate DOM on existing ESP
208	CK	ESP	0	0	61	0	0	0	na	na	na	na	na	0	3	Add FF
228	CK	ESP	0	0	75	0	0	0	na	na	na	na	na	0	18	Add Q, FF
300	CK	ESP	0	55	98	17	0	0	na	na	na	na	na	61	28	Mod DOM combustor, AddCl, FF
301	CK	FF	5	19	0	0	0	0	na	71	na	na	na	0	3	Add FF
302	CK	ESP	0	0	96	0	0	0	na	na	na	na	na	0	1	None
303	CK	QC/FF	0	0	0	0	0	0	na	0	na	na	na	0	3	Add FF
304	CK	ESP	0	45	94	0	0	0	na	na	na	na	na	92	18	Add Q, FF
305	CK	ESP	0	56	97	0	0	0	na	na	na	na	na	0	29	Add Q, CB
306	CK	MC/FF	97	0	0	0	0	0	na	na	na	na	na	0	2	Moderate DOM on existing ESP
308	CK	ESP	0	0	62	0	0	0	na	na	na	na	na	91	18	Add Q, FF
309	CK	MC/ESP	0	0	94	0	0	0	na	na	na	na	na	50	17	Add Q
315	CK	FF	0	0	0	0	0	0	na	0	na	na	na	75	17	Add Q
316	CK	FF	0	0	0	0	0	0	na	na	na	na	na	0	1	None
317	CK	FF	0	0	0	0	0	0	na	na	na	na	na	0	2	Moderate DOM on existing ESP
318	CK	ESP	0	0	74	0	0	0	na	na	na	na	na	16	18	Add Q, FF
319	CK	ESP	0	15	95	0	0	0	na	na	na	na	na	0	1	None
320	CK	FF	0	0	0	0	0	0	na	na	na	na	na	0	2	Moderate DOM on existing ESP
321	CK	ESP	0	70	0	0	0	0	na	nr	na	na	na	0	3	Add FF
322	CK	ESP	0	0	77	0	0	0	na	na	na	na	na	0	5	Add Q, Cl, FF
323	CK	ESP	75	0	96	9	0	0	na	na	na	na	na	81	18	Add Q, FF
335	CK	ESP	0	0	95	0	0	0	na	na	na	na	na	0	3	Add FF
401	CK	ESP	0	39	96	26	0	0	na	na	na	na	na	0	3	Add FF
402	CK	ESP	0	40	99	31	0	0	na	0	na	na	na	0	3	Add FF
403	CK	ESP	87	8	0	0	0	0	na	na	na	na	na	0	5	Add Q, Cl, FF
404	CK	ESP	0	0	39	43	0	0	na	na	na	na	na	0	2	Moderate DOM on existing ESP
405	CK	ESP	0	0	96	75	0	0	na	na	na	na	na	0	3	Add FF
223	LWAK	FF	0	0	0	0	35	0	na	na	na	na	na	0	5	Add ST
224	LWAK	FF	0	0	0	0	0	0	na	na	na	na	na	0	1	None
225	LWAK	FF	0	0	0	0	0	50	na	na	na	na	na	0	12	Add AB, Q
226	LWAK	FF	0	0	0	0	0	0	na	na	na	na	na	0	1	None
227	LWAK	FF	0	0	64	0	8	52	na	na	na	na	na	0	15	Moderate DOM on existing FF, Add AB, Q, ST
307	LWAK	FF/VS	0	0	0	0	0	0	na	na	na	na	na	0	1	None
310	LWAK	FF	0	0	98	0	0	0	na	na	na	na	na	0	2	Add FF
311	LWAK	FF	0	0	98	0	0	0	na	na	na	na	na	0	2	Add FF
312	LWAK	FF	0	0	98	0	0	0	na	na	na	na	na	0	2	Add FF

TABLE C2-4b. MODEL GROUP SELECTION FOR FLOOR 4

EER ID No.	Type	Current APCD	% Emissions Reduction Required to meet Floor 4							Model Group			Required Add-on Flue Gas Control		
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	TEQ		No.	
313	LWAK	FF	0	0	98	22	9	0	0	0	na	na	0	6	Add IWS
314	LWAK	FF	0	7	100	0	0	0	0	0	na	na	0	2	Add FF
336	LWAK	FF	0	0	75	0	10	0	0	0	na	na	0	6	Add IWS
209	INC	WHB, FF/VQ/PT/DM	0	0	0	0	31	25	63	na	na	na	0	84	Moderate DOM on Combustor and existing WS
210	INC	FF/S	75	0	50	75	35	0	0	na	na	na	0	3	Moderate DOM on existing WS, Add RH, CI, FF
211	INC	SS/PT/VS	0	0	75	50	30	0	0	na	na	na	0	12	Moderate DOM on existing WS, Add FF
212	INC	FF/S	0	0	0	0	75	0	0	na	na	na	0	2	Add PT
214	INC	IWS	73	0	84	28	0	0	0	na	na	na	0	9	Add RH, CI, FF
216	INC	HES / WS	0	0	85	16	0	0	0	na	na	na	0	6	Add FF
221	INC	PT	0	0	0	0	0	0	0	na	na	na	0	1	None
222	INC	WHB/SD/ESP/Q/PBS	50	0	0	0	0	0	0	na	na	na	0	8	Add CI
229	INC	WHB/ACS/HCS/CS	0	0	0	0	75	na	75	na	na	na	0	57	Add AB, PT
324	INC	?	0	0	81	1	82	0	0	na	na	na	0	4	Add IWS
325	INC	SD/FF/WS/ IWS	0	0	0	0	0	0	0	na	na	na	0	1	None
327	INC	SD/FF/WS/ ESP	94	0	0	0	0	0	0	na	na	na	0	8	Add CI
329	INC	PT/IWS	75	0	75	75	0	0	0	na	na	na	0	9	Add RH, CI, FF
330	INC	QT/WS/DM	0	10	65	0	69	0	0	na	na	na	0	12	Moderate DOM on existing WS, Add FF
331	INC	PT/IWS	0	0	97	0	0	50	0	na	na	na	0	55	Moderate DOM on Combustor, Add FF
332	INC	WS	0	68	0	0	62	0	80	na	na	na	0	78	Moderate DOM on existing WS, Add AB, FF
333	INC	SD/FF	0	0	0	25	62	0	0	na	na	na	0	14	Moderate DOM on existing SD and FF
334	INC	WS/ESP/PT	0	31	97	78	0	0	0	na	na	na	0	6	Add FF
337	INC	WHB/DA/DI/FF	68	0	0	51	0	0	0	na	na	na	25	67	Moderate DOM on existing FF, Add CI
338	INC	QC/FF/SS/C/HES/DM	12	0	0	0	0	0	0	na	na	na	0	8	Add CI
339	INC	AT/PT/RIS/ESP	75	0	0	0	0	0	0	na	na	na	0	61	Add RH, CB
340	INC	WHB/ESP/WS	0	0	0	0	0	0	0	na	na	na	0	1	None
341	INC	DA/DI/FF/HEPA/CA	0	0	0	0	0	0	0	na	na	na	25	72	Add WQ
342	INC	WHB/QC/S/VS/DM	0	0	0	0	0	0	0	na	na	na	0	1	None
344	INC	QC/VS/PT/DM	50	0	0	0	0	0	0	na	na	na	0	9	Add RH, CI, FF
346	INC	C/QC/VS/S/DM	0	0	0	0	0	0	0	na	na	na	0	1	None
347	INC	C/QC/VS/S/DM	0	0	0	0	0	0	0	na	na	na	0	1	None
348	INC	QC/AS/IWS	75	0	0	0	0	0	0	na	na	na	0	61	Add RH, CB
349	INC	QC/FF/QC/PT	0	0	75	0	0	0	0	na	na	na	0	6	Add FF
350	INC	WHB/HE/FF	0	0	0	50	0	50	0	na	na	na	0	55	Moderate DOM on Combustor, Add FF
351	INC	GC/C/FF	0	0	0	0	0	0	0	na	na	na	0	1	None
353	INC	QC/VS/DM/ESP	0	0	0	8	0	0	0	na	na	na	0	72	Small DOM on ESP
354	INC	QC/AS/VS/DM/IWS	0	0	0	0	0	0	0	na	na	na	0	1	None
356	INC	QC/AS/FN/DM	0	0	0	0	0	0	0	na	na	na	0	94	Moderate DOM on Combustor
357	INC	QC/VS/PT/IWS	0	0	75	0	0	0	0	na	na	na	0	6	Add FF
358	INC	QC/VS/C/CT/S/DM	0	0	0	0	0	0	0	na	na	na	0	1	None
359	INC	WHB/FF/S	0	0	77	100	86	0	0	na	na	na	0	4	Add IWS
400	INC	SD/FF	0	0	84	0	4	0	0	na	na	na	0	6	Add FF
500	INC	QC/VS/KOV/ DM	0	0	0	0	0	0	0	na	na	na	0	2	Add PT
502	INC	WHB/QC/PBC/ VS/ES	50	0	91	0	19	0	0	na	na	na	0	42	Add RH, CB, IWS
503	INC	HTHE/LTHE/FF	0	0	84	74	0	50	50	na	na	na	0	55	Moderate DOM on Combustor, Add FF

TABLE C2-4b. MODEL GROUP SELECTION FOR FLOOR 4

EER ID No.	Type	Current APCD	% Emissions Reduction Required to meet Floor 4										Model				Required Add-on Flue Gas Control
			Hg	PM	SVM	LVM	HCl/Cl2	HC	CO	HC-Byp	CO-Byp	TEQ	Group No.				
504	INC	VS/C	97	0	0	27	15	0	0	0	na	na	0	80	Moderate DOM on existing VS, Add PT, RH, CB		
600	INC	WHB/QC/PT/IWS	0	0	0	25	0	0	0	0	na	na	0	6	Add FF		
700	INC	SD/RJS/V/S/WS	0	12	100	84	0	0	0	0	na	na	0	6	Add FF		
701	INC	VS/PT	0	12	0	75	86	0	0	0	na	na	0	4	Add IWS		
702	INC	QT/S/C	0	53	75	0	0	0	0	0	na	na	0	6	Add FF		
703	INC	WHB	0	0	0	0	93	0	0	0	na	na	0	2	Add PT		
704	INC	NONE	0	0	0	0	86	0	0	0	na	na	25	85	Add Q, PT		
705	INC	QT/VS/ESP/PT	0	0	29	8	0	0	0	0	na	na	0	17	Moderate DOM on existing ESP		
706	INC	QT/HS/C	0	11	0	0	0	0	0	0	na	na	0	95	Small DOM on existing VS		
707	INC	QT/WS	0	6	75	0	0	0	0	99	na	na	0	21	Add AB, FF		
708	INC	WS/ESP	0	0	0	50	0	0	0	0	na	na	0	17	Moderate DOM on existing ESP		
709	INC	NONE	50	7	0	0	6	0	0	0	na	na	0	86	Add Q, CB, IWS		
710	INC	QT/OS/C/S	0	0	75	0	91	0	0	0	na	na	0	33	DOM Combustor, Add IWS		
711	INC	C/V/S/AS	0	0	0	0	0	0	0	0	na	na	0	1	None		
712	INC	NONE	0	0	0	0	0	0	0	0	na	na	0	1	None		
713	INC	VS/PT	0	44	0	0	24	50	0	0	na	na	0	76	Mod DOM Comb, Mod DOM VS, Small DOM WS		
714	INC	WS	0	0	75	0	80	0	0	0	na	na	0	4	Add IWS		
725	INC	WS/QT	0	0	0	0	65	0	0	0	na	na	0	30	Moderate DOM on existing WS		
726	INC	QC/CS/DM/VS	0	0	75	75	0	59	0	0	na	na	0	55	Moderate DOM on Combustor, Add FF		
727	INC	GC/C/FF	0	54	75	25	75	97	95	0	na	na	0	5	Add AB, IWS		
728	INC	QT/PT/VS	0	11	0	0	63	0	0	0	na	na	0	87	Small DOM on VS, Mod DOM on WS		
784	INC	NONE	0	7	75	50	98	0	0	0	na	na	0	4	Add IWS		
805	INC	QT/QS/VS/ES/PBS	0	33	0	0	14	0	71	0	na	na	0	76	Mod DOM Comb, Mod DOM VS, Small DOM WS		
806	INC	C/V/S	66	15	78	0	73	61	49	0	na	na	0	24	Moderate DOM on Combustor, Add PT, RH, Cl, FF		
807	INC	C/WHB/VQ/PT/HS/DM	0	0	32	35	0	0	0	0	na	na	0	19	Moderate DOM on existing VS		
808	INC	QT/PBS/ESP	0	0	75	25	0	0	0	0	na	na	0	6	Add FF		
809	INC	VS	0	0	99	97	49	0	92	0	na	na	0	5	Add AB, IWS		
810	INC	Q/V/S/PBS	0	0	92	81	67	0	0	0	na	na	0	12	Moderate DOM on existing WS, Add FF		
824	INC	QT/VS/PT/DM	0	0	0	3	0	0	0	0	na	na	0	95	Small DOM on existing VS		
825	INC	CCS/QC/ESP	25	49	0	0	44	50	75	0	na	na	0	70	Moderate DOM WS, Add AB, RH, Cl, FF		
902	INC	QT/VS/PT	0	0	0	0	0	0	0	0	na	na	0	1	None		
904	INC	?	0	0	75	0	74	22	0	0	na	na	0	33	DOM Combustor, Add IWS		
905	INC	QT/VS/AS/CS	0	0	100	41	87	0	0	0	na	na	0	4	Add IWS		
906	INC	QT/PT	0	43	50	75	90	0	0	0	na	na	0	4	Add IWS		
914	INC	?	0	0	0	50	86	75	0	0	na	na	0	5	Add AB, IWS		
915	INC	QC/VS/C	50	33	90	84	96	72	84	0	na	na	0	39	Add RH, Cl/CB, FF, PT, AB		

TABLE C2-4c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 4

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate (acfm)	Equivalent HCl Conc (ppm)
CK	1	None	1	303	L	Lone Star		408,681	370,000	
CK	1	None	1	317 *	L	Southdown	QC/FF	422,190	370,000	
CK	1	None	3	320 *	L	Lafarge	FF	nr	370,000	
CK	2	Moderate DOM on existing ESP	3	308 *	S	North Texas	ESP	162,599	147,000	
CK	2	Moderate DOM on existing ESP	4	318 *	S	Texas Industries	ESP	152,675	147,000	
CK	2	Moderate DOM on existing ESP	1	321 *	S	Lafarge	ESP	59,542	147,000	
CK	2	Moderate DOM on existing ESP	1	208 *	L	Keystone	ESP	307,644	370,000	
CK	2	Moderate DOM on existing ESP	1	404	L	Ash Grove	ESP	265,721	370,000	85
CK	3	Add FF	2	200 *	S	Giant	FF	123,584	147,000	
CK	3	Add FF	1	207 *	S	Keystone	MC / ESP	90,681	147,000	
CK	3	Add FF	1	228 *	S	Ash Grove	ESP	148,537	147,000	
CK	3	Add FF	2	302 *	S	Lafarge	ESP	130,576	147,000	
CK	3	Add FF	1	322 *	S	Lafarge	ESP	112,269	147,000	
CK	3	Add FF	1	401	S	Ash Grove	ESP	172,481	147,000	
CK	3	Add FF	1	402 *	S	Ash Grove	ESP	187,605	147,000	
CK	3	Add FF	1	405 *	S	Ash Grove	ESP	194,905	147,000	
CK	3	Add FF	1	204 *	L	Holnam	ESP	693,613	370,000	
CK	3	Add FF	1	205	L	Holnam	ESP	253,556	370,000	
CK	3	Add FF	1	206	L	Holnam	ESP	348,510	370,000	85
CK	3	Add FF	1	304 *	L	Lone Star	ESP	300,367	370,000	
CK	5	Add Q, Cl, FF	1	323 *	S	Lafarge	ESP	185,409	147,000	85
CK	5	Add Q, Cl, FF	1	403	S	Ash Grove	ESP	184,877	147,000	
CK	7	Moderate DOM on existing FF	1	202 *	L	Heartland	FF	221,421	370,000	
CK	17	Add Q	1	315 *	S	Southdown	FF	102,042	147,000	
CK	17	Add Q	1	316 *	L	Southdown	FF	nr	370,000	
CK	18	Add Q, FF	2	201 *	S	Giant	FF	137,945	147,000	
CK	18	Add Q, FF	2	300 *	S	Essroc	ESP	164,692	147,000	
CK	18	Add Q, FF	2	305	S	Medusa	ESP	196,903	147,000	85
CK	18	Add Q, FF	1	335	S	Medusa	ESP	100,378	147,000	85
CK	18	Add Q, FF	1	203	L	Holnam	ESP	291,645	370,000	85
CK	18	Add Q, FF	1	309	L	River Cement	MC / ESP	665,839	370,000	
CK	18	Add Q, FF	1	319	L	Continental	ESP	344,250	370,000	85
CK	28	Mod DOM Combustor, Add Cl, FF	1	301	S	Essroc	FF	185,409	147,000	
CK	29	Add WQ, CB	1	306 *	L	National	MC/FF	280,868	370,000	
INC	1	None	1	342 *	S	Upjohn	WHB/QC/S/VS/DM	5,640	3,900	
INC	1	None	1	351 *	S	Iowa Army Ammo Plant	GC/C/FF	3,457	3,900	
INC	1	None	1	325 *	M	Aptus	SD/FF/WS/IWS	23,127	22,100	
INC	1	None	1	340 *	M	Miles	WHB/ESP/WS	16,003	22,100	
INC	1	None	1	346 *	M	Department of Army	C/QC/S/PT/DM	21,812	22,100	
INC	1	None	1	347 *	M	Department of Army	C/QC/VS/DM	10,795	22,100	
INC	1	None	1	354 *	M	Dow Chemical	QC/AS/VS/DM/IWS	27,383	22,100	
INC	1	None	1	358 *	M	Eli Lilly	QC/VS/C/CT/S/DM	14,406	22,100	
INC	1	None	1	902 *	M	Rocky Mountain Arsenal	QT/VS/PT	25,436	22,100	
INC	1	None	1	221	L	Rollins	PT	51,114	60,800	
INC	1	None	1	711 *	L	Chevron Chemical	C/VS/AS	52,907	60,800	
INC	1	None	1	712 *	L	Nepera	NONE	65,256	60,800	
INC	2	Add PT	1	703 *	S	Aristech	WHB	1,873	3,900	92

TABLE C2-4c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 4

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate (acfm)	Equivalent HCl Conc (ppm)
INC	2	Add PT	1	212 *	L	LWD	FF/S	44,610	60,800	
INC	2	Add PT	1	500 *	L	Chevron	QC/V/S/KOV/DM	49,822	60,800	
INC	3	Moderate DOM on existing W.S., Add RH, CI/CB, FF	1	210 *	L	LWD	FF/S	96,107	60,800	
INC	4	Add IWS	1	784 *	S	Cook Composites	NONE	nr	3,900	92
INC	4	Add IWS	1	905 **	S	Velsicol Chemical	QT/V/S/AS/CS	nr	3,900	92
INC	4	Add IWS	1	906 **	S	Monsanto	QT/PT	2,738	3,900	92
INC	4	Add IWS	1	324 *	M	Allied	?	12,120	22,100	92
INC	4	Add IWS	1	359 **	M	Atochem	WHB/FF/S	13,802	22,100	92
INC	4	Add IWS	1	701 **	M	Eli Lilly	VS/PT	9,208	22,100	92
INC	4	Add IWS	2	714 **	M	Olinh Chemical	WS	19,185	22,100	92
INC	5	Add AB, IWS	1	727 *	S	Iowa Army Ammo Plant	GC/C/FF	3,043	3,900	92
INC	5	Add AB, IWS	1	914 *	M	Ventec Superfund	?	25,849	22,100	92
INC	5	Add AB, IWS	1	809 **	L	Tennessee Eastman	VS	40,524	60,800	92
INC	6	Add FF	2	349 *	S	Radford Army Ammo Plant	QC/FF/QC/PT	5,653	3,900	
INC	6	Add FF	1	357 **	M	Department of Energy	QC/V/S/PT/IWS	20,778	22,100	
INC	6	Add FF	1	700 **	M	Dupont	SD/R/S/V/S/WS	30,185	22,100	
INC	6	Add FF	1	702 **	M	Dupont	QT/S/C	nr	22,100	
INC	6	Add FF	1	808 **	M	Dow Chemical	QT/PBS/ESP	35,720	22,100	
INC	6	Add FF	1	216 **	L	Rollins	HES / W/S	40,002	60,800	
INC	6	Add FF	1	334 **	L	3M	WS/ESP/PT	40,599	60,800	
INC	6	Add FF	1	400 **	L	Marine Shale	SD/FF	179,333	60,800	
INC	6	Add FF	1	600 **	L	Dow Chemical	WHB/QC/PT/IWS	43,839	60,800	
INC	8	Add CI/CB	1	222 *	L	WTI	WHB/SD/ESP/Q/PBS	93,718	60,800	
INC	8	Add CI/CB	1	327	L	Aptus	SD/FF/WS/ESP	49,572	60,800	
INC	8	Add CI/CB	1	338 **	L	Dupont	QC/FF/S/C/HES/DM	65,598	60,800	
INC	9	Add RH, CI/CB, FF	1	214 *	M	Rollins	IWS	34,655	22,100	
INC	9	Add RH, CI/CB, FF	1	344 *	M	Department of Army	QC/V/S/PT/DM	13,886	22,100	
INC	9	Add RH, CI/CB, FF	1	329 **	L	Dupont	PT/IWS	53,489	60,800	
INC	12	Moderate DOM on existing W.S., Add FF	1	330 **	M	General Electric	QT/W/S/DM	10,345	22,100	
INC	12	Moderate DOM on existing W.S., Add FF	1	810 **	M	Tennessee Eastman	Q/V/S/PBS	28,434	22,100	
INC	12	Moderate DOM on existing W.S., Add FF	1	211 **	L	LWD	SS/PT/V/S	43,596	60,800	
INC	14	Moderate DOM on existing SD and FF	1	333 *	L	Trade Waste	SD/FF	42,042	60,800	
INC	17	Moderate DOM on existing ESP	1	708 **	S	Burroughs Wellcome	WS/ESP	3,687	3,900	
INC	17	Moderate DOM on existing ESP	1	705 **	M	Ciba-Geigy	QT/V/S/ESP/PT	36,116	22,100	
INC	19	Moderate DOM on existing ESP	1	807	M	Bros Lagoon Site	C/WHB/VQ/PT/HS/DM	34,109	22,100	
INC	21	Add AB, FF	1	707 *	L	Dupont	QT/W/S	58,120	60,800	
INC	24	Moderate DOM on Combustor, Add PT, RH, CI/CB, FF	1	806 **	M	Amoco Oli	C/V/S	20,641	22,100	92
INC	30	Moderate DOM on existing WS	1	725	S	Zeneca	WS/QT	1,489	3,900	
INC	33	DOM Combustor, Add IWS	1	904 **	S	First Chemical	?	5,950	3,900	92
INC	33	DOM Combustor, Add IWS	1	710 **	M	Dupont	QT/O/S/C/S	nr	22,100	92
INC	39	Add RH, CI/CB, FF, PT, AB	1	915 **	M	Eastman Kodak	QC/V/S/C	nr	22,100	92
INC	42	Add RH, CI/CB, IWS	1	502 **	S	Pfizer	WHB /QC /PBC/ VS/ES	6,647	3,900	
INC	55	Moderate DOM on Combustor, Add FF	1	503 **	S	Lake City Army Ammo Plant	HTHE/LTHE/FF	4,747	3,900	
INC	55	Moderate DOM on Combustor, Add FF	1	726 **	S	Shell Oil	QC/CS/DM/V/S	3,669	3,900	
INC	55	Moderate DOM on Combustor, Add FF	1	350 **	M	Dupont	WHB/HE/FF	15,883	22,100	
INC	55	Moderate DOM on Combustor, Add FF	1	331 **	L	Ross	PT/IWS	44,379	60,800	
INC	57	Add AB, PT	1	229 **	S	Vulcan Materials	WHB/ACS/HCS/CS	1,171	3,900	
INC	61	Add RH, CB	1	339 **	S	Dupont	AT/PT/R/S/ESP	6,263	3,900	
INC	61	Add RH, CB	1	348 **	S	Oxidant Chemical	QC/AS/IWS	nr	3,900	
INC	67	Moderate DOM on existing FF, Add CI/CB	2	337 *	M	Olinh Chemical	WHB/DA/DI/FF	13,807	22,100	

TABLE C2-4c. CHARACTERIZATION OF MODEL PLANTS FOR FLOOR 4

Source Group	Model Plant Number	Required Equipment	Reported Ratio**	Site ID	Size Category	Facility Name	Existing APCD	Flue gas Flowrate (acfm)	Assigned Flue Gas Flowrate (acfm)	Equivalent HCl Conc (ppm)
INC	70	Moderate DOM WS, Add AB, RH, CI/CB, FF	1	825 *	M	General Electric	CCS/QC/ESP	21,363	22,100	92
INC	72	Add WQ	1	341 *	M	Glaxo	DA/DI/FF/HEPA/CA	nr	22,100	
INC	72	Add WQ	1	353 *	M	Dow Chemical	QC/V/S/DM/ESP	nr	22,100	
INC	76	Moderate DOM Combustor, Moderate DOM VS, Small DOM WS	1	713 *	S	Pfizer	VS/PT	2,625	3,900	
INC	76	Moderate DOM Combustor, Moderate DOM VS, Small DOM WS	1	805 *	M	American Cyanamid	QT/QS/V/S/ES/PBS	31,943	22,100	
INC	78	Moderate DOM Combustor, Moderate DOM VS, Add AB, FF	1	332 *	M	Thermalchem	WS	20,208	22,100	
INC	80	Moderate DOM on existing VS, Add PT, RH, CB	1	504 *	M	Chevron Chemical	V/S/C	32,804	22,100	92
INC	84	Moderate DOM on Combustor and existing WS	1	209 *	M	Laidlaw	WHB, FF/VQ/PT/DM	21,716	22,100	
INC	85	Add Q, PT	1	704 *	S	Ashland	NONE	5,011	3,900	92
INC	86	Add Q, CB, IWS	1	709 *	S	Cargill Chemical	NONE	3,123	3,900	
INC	87	Small DOM on VS, Mod DOM on WS	1	728 *	S	Eli Lilly	QT/PT/V/S	5,819	3,900	
INC	94	Moderate DOM on Combustor	1	356 *	S	Dupont	QC/AS/FN/DM	5,100	3,900	
INC	95	Small DOM on existing VS	1	824 *	S	Pennwalt	QT/V/S/PT/DM	1,086	3,900	
INC	95	Small DOM on existing VS	1	706 *	M	Ciba-Geigy	QT/HS/C	nr	22,100	
LWAK	1	None	1	224 *	M (Lo HCl)	Solite	FF	39,049	40,500	
LWAK	1	None	1	226 *	M (Lo HCl)	Solite	FF	nr	40,500	
LWAK	1	None	2	307 *	M (Lo HCl)	Norlite	FF/VS	49,050	40,500	
LWAK	2	Add FF	1	310 *	M (Lo HCl)	Solite	FF	47,770	40,500	
LWAK	2	Add FF	1	314 *	M (Lo HCl)	Solite	FF	36,793	40,500	
LWAK	2	Add FF	1	311 *	M (Hi HCl)	Solite	FF	51,627	40,500	
LWAK	2	Add FF	1	312 *	M (Hi HCl)	Solite	FF	47,698	40,500	
LWAK	5	Add ST	1	223 *	M (Hi HCl)	Solite	FF	29,092	40,500	1570
LWAK	6	Add IWS	1	336 *	M (Lo HCl)	Solite	FF	30,336	40,500	875
LWAK	6	Add IWS	1	313 *	M (Hi HCl)	Solite	FF	36,793	40,500	1570
LWAK	12	Add AB, Q	1	225 *	M (Lo HCl)	Solite	FF	38,270	40,500	
LWAK	15	Moderate DOM on existing FF, Add AB, Q, ST	1	227 *	M (Hi HCl)	Solite	FF	38,796	40,500	1570

* Facility has been assigned to model group based on assumed emission level. Facility did not report the necessary emission value, therefore one was assigned based on the distribution of reported values from other facilities.

** Reported Ratio is equal to the number of total units located at a site divided by the number of units for which information was reported.

Often a facility will report data for only one unit even when the facility has two or three units at the particular site, since the single reported unit can be considered as representative of the other nonreported units.

nr = not reported

TABLE C2-4d. COST ESTIMATES FOR MODEL PLANTS FOR FLOOR 4

Source Group	Model Plant Number	Size Category	Required Equipment	Number of Sources	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	L	1	None	5	\$0K	\$0K	\$0K
CK	L	2	Moderate DOM on existing ESP	2	\$3,136K	\$287K	\$699K
CK	S	2	Moderate DOM on existing ESP	8	\$1,757K	\$149K	\$380K
CK	L	3	Add FF	4	\$5,072K	\$754K	\$1,325K
CK	S	3	Add FF	10	\$2,141K	\$355K	\$597K
CK	S	5	Add Q,CI,FF	2	\$3,144K	\$806K	\$1,180K
CK	L	7	Moderate DOM on existing FF	1	\$315K	\$104K	\$115K
CK	L	17	Add Q	1	\$912K	\$155K	\$275K
CK	S	17	Add Q	1	\$533K	\$88K	\$158K
CK	L	18	Add Q, FF	3	\$5,984K	\$909K	\$1,601K
CK	S	18	Add Q, FF	7	\$2,673K	\$443K	\$754K
CK	S	28	Mod DOM on Combustor, Add CI, FF	1	\$2,832K	\$718K	\$1,058K
CK	L	29	Add WQ, CB	1	\$16,598K	\$1,696K	\$3,878K
INC	L	1	None	3	\$0K	\$0K	\$0K
INC	M	1	None	7	\$0K	\$0K	\$0K
INC	S	1	None	2	\$0K	\$0K	\$0K
INC	L	2	Add PT	2	\$445K	\$195K	\$267K
INC	S	2	Add PT	1	\$57K	\$90K	\$99K
INC	L	3	Moderate DOM on existing WS, Add RH,CI/CB,FF	1	\$1,876K	\$712K	\$968K
INC	M	4	Add IWS	5	\$680K	\$144K	\$254K
INC	S	4	Add IWS	3	\$215K	\$97K	\$132K
INC	L	5	Add AB,IWS	1	\$1,873K	\$1,504K	\$1,792K
INC	M	5	Add AB,IWS	1	\$1,097K	\$677K	\$843K
INC	S	5	Add AB,IWS	1	\$480K	\$289K	\$359K
INC	L	6	Add FF	4	\$943K	\$198K	\$305K
INC	M	6	Add FF	4	\$295K	\$121K	\$154K
INC	S	6	Add FF	2	\$82K	\$89K	\$98K
INC	L	8	Add CI/CB	3	\$425K	\$224K	\$280K
INC	L	9	Add RH, CI/CB, FF	1	\$1,681K	\$672K	\$876K
INC	M	9	Add RH, CI/CB, FF	2	\$932K	\$391K	\$508K
INC	L	12	Moderate DOM on existing WS, Add FF	1	\$1,138K	\$238K	\$397K
INC	M	12	Moderate DOM on existing WS, Add FF	2	\$367K	\$136K	\$188K
INC	L	14	Moderate DOM on existing SD and FF	1	\$587K	\$74K	\$162K
INC	M	17	Moderate DOM on existing ESP	1	\$278K	\$48K	\$84K
INC	S	17	Moderate DOM on existing ESP	1	\$221K	\$41K	\$70K
INC	M	19	Small DOM on existing VS	1	\$46K	\$35K	\$47K
INC	L	21	Add AB, FF	1	\$1,486K	\$1,473K	\$1,651K
INC	M	24	Moderate DOM on Combustor, Add PT,RH,CI/CB,FF	1	\$1,291K	\$515K	\$690K
INC	S	30	Moderate DOM on existing WS	1	\$13K	\$3K	\$6K
INC	M	33	DOM Combustor, Add IWS	1	\$834K	\$144K	\$280K
INC	S	33	DOM Combustor, Add IWS	1	\$331K	\$97K	\$151K
INC	M	39	Add RH, CI/CB, FF, PT, AB	1	\$1,554K	\$1,048K	\$1,253K
INC	S	42	Add RH, CI/CB, IWS	1	\$708K	\$249K	\$348K
INC	L	55	Moderate DOM on Combustor, Add FF	1	\$1,129K	\$198K	\$335K
INC	M	55	Moderate DOM on Combustor, Add FF	1	\$450K	\$121K	\$179K
INC	S	55	Moderate DOM on Combustor, Add FF	2	\$198K	\$89K	\$117K
INC	S	57	Add AB, PT	1	\$323K	\$282K	\$327K
INC	S	61	Add RH, CB	2	\$493K	\$152K	\$216K
INC	M	67	Moderate DOM on existing FF, Add CI/CB	2	\$416K	\$153K	\$206K
INC	M	70	Moderate DOM WS, Add AB, RH, CI/CB, FF	1	\$1,420K	\$939K	\$1,129K
INC	M	72	Add WQ	2	\$278K	\$48K	\$84K
INC	M	76	Moderate DOM Combustor, Moderate DOM VS, Small DOM WS	1	\$240K	\$48K	\$93K
INC	S	76	Moderate DOM Combustor, Moderate DOM VS, Small DOM WS	1	\$138K	\$11K	\$36K
INC	M	78	Moderate DOM on existing WS, Add AB, FF	1	\$783K	\$669K	\$776K
INC	M	80	Moderate DOM on existing VS, Add PT, RH, CB	1	\$1,830K	\$458K	\$711K
INC	M	84	Moderate DOM on Combustor and existing WS	1	\$225K	\$15K	\$59K
INC	S	85	Add Q, PT	1	\$278K	\$130K	\$169K
INC	S	86	Add Q, CB, IWS	1	\$776K	\$229K	\$338K
INC	S	87	Small DOM on VS, Mod DOM on WS	1	\$18K	\$9K	\$14K
INC	S	94	Moderate DOM on Combustor	1	\$116K	\$K	\$19K
INC	M	95	Small DOM on existing VS	1	\$46K	\$35K	\$47K
INC	S	95	Small DOM on existing VS	1	\$11K	\$6K	\$10K
LWAK	M (Lo HCl)	1	None	4	\$0K	\$0K	\$0K

TABLE C2-4d. COST ESTIMATES FOR MODEL PLANTS FOR FLOOR 4

Source Group	Model Plant Number	Size Category	Required Equipment	Number of Sources	Capital Cost	Annualized O&M Cost	Annualized Total Cost
LWAK	M (Hi HCl)	2	Add FF	2	\$661K	\$161K	\$236K
LWAK	M (Lo HCl)	2	Add FF	2	\$661K	\$161K	\$236K
LWAK	M (Hi HCl)	5	Add ST	1	\$1,229K	\$330K	\$530K
LWAK	M (Hi HCl)	6	Add IWS	1	\$1,016K	\$682K	\$847K
LWAK	M (Lo HCl)	6	Add IWS	1	\$1,016K	\$449K	\$615K
LWAK	M (Lo HCl)	12	Add AB, Q	1	\$809K	\$1,264K	\$1,371K
LWAK	M (Hi HCl)	15	Moderate DOM on existing FF, Add AB, Q, ST	1	\$2,072K	\$1,605K	\$1,913K

TABLE C2-5. NATIONAL EMISSION ESTIMATE (FOR 330 DAYS PER YEAR) FOR FLOOR 2 AND OPTION 5

System Type	Substance	Baseline	Floor 2 (5/9/95)	Option 5 (BTF 5/8/95)	Unit
Cement Kiln	Particulate	7.90E+06	5.54E+06	5.54E+06	lb/yr
Cement Kiln	LVM	6.32E+03	3.52E+03	3.52E+03	lb/yr
Cement Kiln	SVM	5.76E+04	5.58E+03	5.58E+03	lb/yr
Cement Kiln	Mercury	2.52E+04	3.47E+03	2.86E+03	lb/yr
Cement Kiln	TEQ	1.76E+00	6.18E-02	2.05E-02	lb/yr
Cement Kiln	HCl	4.65E+06	4.02E+06	4.02E+06	lb/yr
Cement Kiln	OO	1.32E+08	No Floor 2	No Option 5	lb/yr
Cement Kiln	CO(MHRA)	1.60E+08	No Floor 2	No Option 5	lb/yr
Cement Kiln	THC	8.83E+06	4.02E+06	4.02E+06	lb/yr
Cement Kiln	THC(MHRA)	1.13E+07	3.85E+06	3.85E+06	lb/yr
Incinerator	Particulate	4.10E+06	1.58E+06	1.58E+06	lb/yr
Incinerator	LVM	5.64E+04	3.98E+03	3.98E+03	lb/yr
Incinerator	SVM	1.08E+05	2.72E+03	2.72E+03	lb/yr
Incinerator	Mercury	9.48E+03	1.31E+03	1.31E+03	lb/yr
Incinerator	TEQ	1.74E-01	9.59E-02	8.77E-03	lb/yr
Incinerator	HCl	2.29E+06	1.09E+06	1.09E+06	lb/yr
Incinerator	OO	2.90E+07	2.63E+06	2.63E+06	lb/yr
Incinerator	CO(MHRA)	1.19E+07	7.30E+06	7.30E+06	lb/yr
Incinerator	THC	4.93E+05	3.92E+05	3.92E+05	lb/yr
Incinerator	THC(MHRA)	1.40E+06	7.70E+05	7.70E+05	lb/yr
LWA Kiln	Particulate	7.98E+04	7.31E+04	7.31E+04	lb/yr
LWA Kiln	LVM	3.76E+02	2.06E+02	2.06E+02	lb/yr
LWA Kiln	SVM	1.16E+03	1.11E+02	1.11E+02	lb/yr
LWA Kiln	Mercury	5.45E+02	7.31E+01	7.31E+01	lb/yr
LWA Kiln	TEQ	1.76E-04	1.75E-04	1.76E-04	lb/yr
LWA Kiln	HCl	5.27E+06	4.78E+06	3.18E+05	lb/yr
LWA Kiln	OO	1.27E+06	3.10E+05	3.10E+05	lb/yr
LWA Kiln	CO(MHRA)	6.59E+06	5.15E+05	5.15E+05	lb/yr
LWA Kiln	THC	7.63E+04	4.85E+04	4.85E+04	lb/yr
LWA Kiln	THC(MHRA)	1.03E+05	4.85E+04	4.85E+04	lb/yr

TABLE C2-6. NATIONAL EMISSIONS ESTIMATE (FOR 330 DAYS/YR) FOR FLOORS 3 AND 4

System Type	Substance	Baseline	Floor 3	Floor 4	Unit
Cement Kiln	Particulate	7.90E+06	4.96E+06	5.72E+06	lb/yr
Cement Kiln	LVM	6.32E+03	1.67E+03	3.37E+03	lb/yr
Cement Kiln	SVM	5.76E+04	8.05E+03	3.43E+03	lb/yr
Cement Kiln	Mercury	2.52E+04	3.35E+03	5.41E+03	lb/yr
Cement Kiln	TEQ	1.76E+00	1.54E-02	2.28E-02	lb/yr
Cement Kiln	HCl	4.65E+06	1.07E+06	4.65E+06	lb/yr
Cement Kiln	OO	1.32E+08	No Floor	No Floor	lb/yr
Cement Kiln	CO(MHRA)	1.60E+08	No Floor	No Floor	lb/yr
Cement Kiln	THC	8.83E+06	4.02E+06	4.02E+06	lb/yr
Cement Kiln	THC(MHRA)	1.13E+07	3.85E+06	3.85E+06	lb/yr
Incinerator	Particulate	4.10E+06	1.34E+06	2.73E+06	lb/yr
Incinerator	LVM	5.64E+04	1.69E+03	4.82E+03	lb/yr
Incinerator	SVM	1.08E+05	1.23E+03	4.71E+03	lb/yr
Incinerator	Mercury	9.48E+03	3.55E+02	1.99E+03	lb/yr
Incinerator	TEQ	1.74E-01	7.78E-03	1.58E-01	lb/yr
Incinerator	HCl	2.29E+06	3.92E+05	1.02E+06	lb/yr
Incinerator	OO	2.90E+07	2.63E+06	2.63E+06	lb/yr
Incinerator	CO(MHRA)	1.19E+07	7.30E+06	7.30E+06	lb/yr
Incinerator	THC	4.93E+05	3.92E+05	3.92E+05	lb/yr
Incinerator	THC(MHRA)	1.40E+06	7.70E+05	7.70E+05	lb/yr
LWA Kiln	Particulate	7.98E+04	4.39E+04	7.98E+04	lb/yr
LWA Kiln	LVM	3.76E+02	1.26E+02	3.57E+02	lb/yr
LWA Kiln	SVM	1.16E+03	6.47E+01	2.42E+01	lb/yr
LWA Kiln	Mercury	5.45E+02	4.73E+01	5.45E+02	lb/yr
LWA Kiln	TEQ	1.76E-04	1.76E-04	1.74E-04	lb/yr
LWA Kiln	Total Cl	5.27E+06	4.78E+06	4.91E+06	lb/yr
LWA Kiln	OO	1.27E+06	3.10E+05	3.10E+05	lb/yr
LWA Kiln	CO(MHRA)	6.59E+06	5.15E+05	5.15E+05	lb/yr
LWA Kiln	THC	7.63E+04	4.85E+04	4.85E+04	lb/yr
LWA Kiln	THC(MHRA)	1.03E+05	4.85E+04	4.85E+04	lb/yr

TABLE C2-7. NATIONAL ENGINEERING COST BREAKDOWN BY HAP FOR FLOOR 2 AND OPTION 5A

MACT Option	System Type	Hg	PM	SVM	LVM	HC/Cl2	HC	CO	D/F	Total
Floor 2 (5/9/95)	CK	9,221,162	2,856,300	16,817,985	4,063,941	3,843,688	30,832	5,875	7,951,761	44,791,546
Floor 2 (5/9/95)	INC	24,498,549	7,493,150	9,298,945	6,177,853	7,781,272	3,924,548	12,252,772	500,370	71,927,460
Floor 2 (5/9/95)	LWAK	731,604	66,582	1,731,100	425,076	1,241,058	1,862,276	879,146	0	6,936,842
Floor 2 (5/9/95)	Total	34,451,315	10,416,033	27,848,030	10,666,870	12,866,019	5,817,656	13,137,793	8,452,131	123,655,848
Option 5 (5/8/95)	CK	11,261,321	2,142,509	12,796,020	4,193,305	4,905,205	30,688	6,019	24,997,568	60,332,636
Option 5 (5/8/95)	INC	19,835,864	6,486,979	8,102,340	5,594,598	7,785,906	3,924,548	12,252,772	37,437,571	101,420,578
Option 5 (5/8/95)	LWAK	1,438,668	109,765	1,839,691	368,930	4,048,018	1,862,276	879,146	0	10,546,494
Option 5 (5/8/95)	Total	32,535,854	8,739,254	22,738,051	10,156,833	16,739,129	5,817,512	13,137,937	62,435,139	172,299,708

TABLE C2-8. NATIONAL ENGINEERING COST BREAKDOWN BY HAP FOR FLOORS 3 AND 4

MACT Option	System Type	Hg	PM	SVM	LVM	HCl/Cl ₂	HC	CO	D/F	Total
Floor 3 (6/22/95)	OK	9,721,266	2,550,442	9,309,057	5,414,641	15,462,207	30,832	5,875	23,556,766	66,051,086
Floor 3 (6/22/95)	INC	42,708,997	5,334,381	9,824,449	8,577,233	16,217,058	4,655,788	12,039,719	32,000,000 *	131,357,625
Floor 3 (6/22/95)	LWAK	3,178,036	316,851	1,409,065	503,449	1,208,610	1,858,841	873,002	0	9,347,854
Floor 3 (6/22/95)	Total	55,608,299	8,201,675	20,542,571	14,495,322	32,887,875	6,545,461	12,918,596	55,556,766	206,756,565
Floor 4 (6/22/95)	OK	6,527,826	3,185,075	20,516,322	2,785,739	0	30,661	6,046	1,307,869	34,359,538
Floor 4 (6/22/95)	INC	16,816,955	1,999,383	10,874,738	6,434,887	8,921,567	3,924,585	12,252,735	734,802	61,959,651
Floor 4 (6/22/95)	LWAK	0	15,419	2,125,641	144,460	1,190,851	1,862,276	879,146	0	6,217,793
Floor 4 (6/22/95)	Total	23,344,780	5,199,877	33,516,701	9,365,086	10,112,418	5,817,523	13,137,926	2,042,671	102,536,982

* Cost assigned to TEQ is estimated

APPENDIX D

Summary and Detailed Model Plant Group Cost Tables

LIST OF TABLES

D-1	Summary of Model Plant Group Costs For Cement Kilns
D-2	Summary of Model Plant Group Costs For Incinerators
D-3	Summary of Model Plant Group Costs For LWA Kilns
D-4	Detailed Model Plant Costs For Cement Kilns
D-5	Detailed Model Plant Costs For Incinerators
D-6	Detailed Model Plant Costs For LWA Kilns

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
CK	1	S	None	\$0K	\$0K	\$0K
CK	1	L	None	\$0K	\$0K	\$0K
CK	2	S	Moderate DOM on existing ESP	\$1,757K	\$149K	\$380K
CK	2	L	Moderate DOM on existing ESP	\$3,136K	\$287K	\$699K
CK	3	S	Add FF	\$2,141K	\$355K	\$596K
CK	3	L	Add FF	\$5,072K	\$754K	\$1,325K
CK	4	S	Add CI,FF	\$2,611K	\$718K	\$1,022K
CK	4	L	Add CI,FF	\$5,658K	\$1,490K	\$2,139K
CK	5	S	Add Q,CI,FF	\$3,144K	\$806K	\$1,180K
CK	5	L	Add Q,CI,FF	\$6,570K	\$1,645K	\$2,414K
CK	6	S	Add IWS	\$2,390K	\$379K	\$768K
CK	6	L	Add IWS	\$4,410K	\$747K	\$1,465K
CK	7	S	Moderate DOM on existing FF	\$125K	\$41K	\$46K
CK	7	L	Moderate DOM on existing FF	\$315K	\$104K	\$115K
CK	8	S	Add CI,FF,PT	\$3,512K	\$1,048K	\$1,498K
CK	8	L	Add CI,FF,PT	\$7,593K	\$2,174K	\$3,138K
CK	9	S	Add PT	\$901K	\$330K	\$476K
CK	9	L	Add PT	\$1,934K	\$684K	\$999K
CK	10	S	Small DOM on existing ESP	\$533K	\$88K	\$158K
CK	10	L	Small DOM on existing ESP	\$912K	\$155K	\$275K
CK	11	S	Small DOM on Existing FF	\$26K	\$22K	\$26K
CK	11	L	Small DOM on Existing FF	\$59K	\$49K	\$58K
CK	12	S	Add Q, CI, FF, AB	\$3,825K	\$4,318K	\$4,781K
CK	12	L	Add Q, CI, FF, AB	\$7,437K	\$10,098K	\$10,980K
CK	13	S	Add Q, CI, FF, AB, PT	\$4,726K	\$4,648K	\$5,258K
CK	13	L	Add Q, CI, FF, AB, PT	\$9,371K	\$10,782K	\$11,979K
CK	14	S	Moderate DOM on existing FF, Add AB, Q	\$1,339K	\$3,641K	\$3,805K
CK	14	L	Moderate DOM on existing FF, Add AB, Q	\$2,093K	\$8,711K	\$8,956K
CK	16	S	Add Q, CI, FF, PT	\$4,045K	\$1,136K	\$1,656K
CK	16	L	Add Q, CI, FF, PT	\$8,505K	\$2,329K	\$3,413K
CK	17	S	Add Q	\$533K	\$88K	\$158K
CK	17	L	Add Q	\$912K	\$155K	\$275K
CK	18	S	Add Q, FF	\$2,673K	\$443K	\$754K
CK	18	L	Add Q, FF	\$5,984K	\$909K	\$1,601K
CK	19	S	Add Q, IWS	\$2,923K	\$467K	\$926K
CK	19	L	Add Q, IWS	\$5,322K	\$902K	\$1,740K
CK	20	S	Moderate DOM on existing ESP, Add Q	\$2,290K	\$237K	\$538K
CK	20	L	Moderate DOM on existing ESP, Add Q	\$4,048K	\$442K	\$974K
CK	21	S	Moderate DOM on existing FF, Add Q	\$658K	\$129K	\$203K
CK	21	L	Moderate DOM on existing FF, Add Q	\$1,226K	\$259K	\$390K
CK	22	S	Small DOM on existing ESP, Add Q	\$1,065K	\$176K	\$316K
CK	22	L	Small DOM on existing ESP, Add Q	\$1,824K	\$310K	\$550K
CK	24	S	Add AB, Q, FF	\$3,354K	\$3,954K	\$4,356K
CK	24	L	Add AB, Q, FF	\$6,851K	\$9,362K	\$10,167K
CK	26	S	Add AB, Q, IWS	\$3,604K	\$3,979K	\$4,527K
CK	26	L	Add AB, Q, IWS	\$6,189K	\$9,355K	\$10,306K
CK	27	S	Moderate DOM on existing ESP, Add AB, Q	\$2,971K	\$3,749K	\$4,139K
CK	27	L	Moderate DOM on existing ESP, Add AB, Q	\$4,915K	\$8,894K	\$9,541K
CK	28	S	Moderate DOM on Combustor, Add CI, FF	\$2,832K	\$718K	\$1,058K
CK	28	L	Moderate DOM on Combustor, Add CI, FF	\$5,925K	\$1,490K	\$2,182K
CK	29	S	Add Q, CB	\$7,405K	\$775K	\$1,749K
CK	29	L	Add Q, CB	\$16,598K	\$1,696K	\$3,878K
CK	30	S	Small DOM on existing ESP, Add Q, CB	\$7,938K	\$863K	\$1,907K
CK	30	L	Small DOM on existing ESP, Add Q, CB	\$17,510K	\$1,851K	\$4,153K
CK	31	S	Small DOM on Existing FF, Add Q	\$559K	\$110K	\$184K

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
CK	31	L	Small DOM on Existing FF, Add Q	\$971K	\$204K	\$333K
CK	32	S	Moderate DOM on Existing FF, Add Q, PT	\$1,559K	\$459K	\$680K
CK	32	L	Moderate DOM on Existing FF, Add Q, PT	\$3,161K	\$943K	\$1,389K
CK	33	S	Moderate DOM on Existing ESP, Add Q, CB	\$9,162K	\$924K	\$2,129K
CK	33	L	Moderate DOM on Existing ESP, Add Q, CB	\$19,735K	\$1,982K	\$4,577K
CK	34	S	Small DOM on Existing FF, Add Q, CB	\$7,431K	\$798K	\$1,775K
CK	34	L	Small DOM on Existing FF, Add Q, CB	#####	\$1,744K	\$3,936K
CK	35	S	Moderate DOM on Combustor, Add Q	\$753K	\$88K	\$194K
CK	35	L	Moderate DOM on Combustor, Add Q	\$1,179K	\$155K	\$319K
CK	36	S	Moderate DOM on Combustor, Add FF	\$2,361K	\$355K	\$632K
CK	36	L	Moderate DOM on Combustor, Add FF	\$5,339K	\$754K	\$1,369K
CK	37	S	Moderate DOM on Combustor, Add Q, CI, FF	\$3,365K	\$806K	\$1,216K
CK	37	L	Moderate DOM on Combustor, Add Q, CI, FF	\$6,837K	\$1,645K	\$2,457K
CK	38	S	Moderate DOM on Combustor and FF, Add CB	\$7,218K	\$729K	\$1,673K
CK	38	L	Moderate DOM on Combustor and FF, Add CB	#####	\$1,644K	\$3,761K
CK	39	S	Moderate DOM on Combustor, Add Q, CI, FF, PT	\$4,266K	\$1,136K	\$1,692K
CK	39	L	Moderate DOM on Combustor, Add Q, CI, FF, PT	\$8,772K	\$2,329K	\$3,456K
CK	40	S	Moderate DOM on Combustor, Add Q, IWS	\$3,144K	\$467K	\$962K
CK	40	L	Moderate DOM on Combustor, Add Q, IWS	\$5,589K	\$902K	\$1,783K

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
INC	1	S	None	\$0K	\$0K	\$0K
INC	1	M	None	\$0K	\$0K	\$0K
INC	1	L	None	\$0K	\$0K	\$0K
INC	2	S	Add PT	\$57K	\$90K	\$99K
INC	2	M	Add PT	\$204K	\$124K	\$157K
INC	2	L	Add PT	\$445K	\$195K	\$267K
INC	3	S	Moderate DOM on Existing WS, Add RH, CB, FF	\$588K	\$243K	\$321K
INC	3	M	Moderate DOM on Existing WS, Add RH, CI, FF	\$1,004K	\$405K	\$541K
INC	3	L	Moderate DOM on Existing WS, Add RH, CI, FF	\$1,876K	\$712K	\$968K
INC	4	S	Add IWS	\$215K	\$97K	\$132K
INC	4	M	Add IWS	\$680K	\$144K	\$254K
INC	4	L	Add IWS	\$1,331K	\$228K	\$445K
INC	5	S	Add AB, IWS	\$480K	\$289K	\$359K
INC	5	M	Add AB, IWS	\$1,097K	\$677K	\$843K
INC	5	L	Add AB, IWS	\$1,873K	\$1,504K	\$1,792K
INC	6	S	Add FF	\$82K	\$89K	\$98K
INC	6	M	Add FF	\$295K	\$121K	\$154K
INC	6	L	Add FF	\$943K	\$198K	\$305K
INC	7	S	Moderate DOM on Existing FF and WS	\$16K	\$4K	\$7K
INC	7	M	Moderate DOM on Existing FF and WS	\$90K	\$21K	\$40K
INC	7	L	Moderate DOM on Existing FF and WS	\$247K	\$58K	\$111K
INC	8	S	Add CB	\$340K	\$91K	\$136K
INC	8	M	Add CI	\$397K	\$147K	\$199K
INC	8	L	Add CI	\$425K	\$224K	\$280K
INC	9	S	Add RH, CB, FF	\$575K	\$241K	\$315K
INC	9	M	Add RH, CI, FF	\$932K	\$391K	\$508K
INC	9	L	Add RH, CI, FF	\$1,681K	\$672K	\$876K
INC	10	S	Add Q, CB, FF	\$643K	\$221K	\$304K
INC	10	M	Add Q, CI, FF	\$970K	\$316K	\$438K
INC	10	L	Add Q, CI, FF	\$1,735K	\$483K	\$694K
INC	11	S	Moderate DOM on Existing FF, Add PT	\$61K	\$91K	\$100K
INC	11	M	Moderate DOM on Existing FF, Add PT	\$223K	\$130K	\$164K
INC	11	L	Moderate DOM on Existing FF, Add PT	\$497K	\$212K	\$286K
INC	12	S	Moderate DOM on Existing WS, Add FF	\$95K	\$92K	\$104K
INC	12	M	Moderate DOM on Existing WS, Add FF	\$367K	\$136K	\$188K
INC	12	L	Moderate DOM on Existing WS, Add FF	\$1,138K	\$238K	\$397K
INC	13	S	Add PT, RH, CB, FF	\$632K	\$331K	\$414K
INC	13	M	Add PT, RH, CI, FF	\$1,137K	\$515K	\$665K
INC	13	L	Add PT, RH, CI, FF	\$2,126K	\$866K	\$1,143K
INC	14	S	Moderate DOM on Existing SD and FF	\$213K	\$5K	\$39K
INC	14	M	Moderate DOM on Existing SD and FF	\$381K	\$27K	\$86K
INC	14	L	Moderate DOM on Existing SD and FF	\$587K	\$74K	\$162K
INC	15	S	Moderate DOM on Existing FF, Add CB, PT	\$401K	\$182K	\$236K
INC	15	M	Moderate DOM on Existing FF, Add CI, PT	\$620K	\$278K	\$364K
INC	15	L	Moderate DOM on Existing FF, Add CI, PT	\$922K	\$436K	\$566K
INC	16	S	Moderate DOM on Existing VS, Add PT	\$68K	\$96K	\$109K
INC	16	M	Moderate DOM on Existing VS, Add PT	\$250K	\$159K	\$205K
INC	16	L	Moderate DOM on Existing VS, Add PT	\$550K	\$291K	\$394K
INC	17	S	Moderate DOM on Existing ESP	\$180K	\$27K	\$50K
INC	17	M	Moderate DOM on Existing ESP	\$535K	\$50K	\$120K
INC	17	L	Moderate DOM on Existing ESP	\$1,010K	\$86K	\$219K
INC	18	S	Small DOM on Existing WS	\$11K	\$5K	\$7K
INC	18	M	Small DOM on Existing WS	\$40K	\$13K	\$20K
INC	18	L	Small DOM on Existing WS	\$101K	\$30K	\$49K
INC	19	S	Moderate DOM on Existing VS	\$11K	\$6K	\$10K
INC	19	M	Moderate DOM on Existing VS	\$46K	\$35K	\$47K
INC	19	L	Moderate DOM on Existing VS	\$105K	\$97K	\$127K
INC	20	S	Add Q, CB, PT	\$619K	\$222K	\$305K
INC	20	M	Add Q, CI, PT	\$879K	\$319K	\$441K
INC	20	L	Add Q, CI, PT	\$1,237K	\$480K	\$656K
INC	21	S	Add AB, FF	\$347K	\$282K	\$326K
INC	21	M	Add AB, FF	\$712K	\$654K	\$742K
INC	21	L	Add AB, FF	\$1,486K	\$1,473K	\$1,651K
INC	22	S	Moderate DOM on Existing ESP, Add PT	\$238K	\$117K	\$150K
INC	22	M	Moderate DOM on Existing ESP, Add PT	\$740K	\$174K	\$277K

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
INC	22	L	Moderate DOM on Existing ESP, Add PT	\$1,455K	\$280K	\$486K
INC	23	S	Moderate DOM on Combustor and VS, Add PT	\$185K	\$96K	\$128K
INC	23	M	Moderate DOM on Combustor and VS, Add PT	\$404K	\$159K	\$230K
INC	23	L	Moderate DOM on Combustor and VS, Add PT	\$736K	\$291K	\$424K
INC	24	S	Moderate DOM on Combustor, Add PT, RH, CB, FF	\$749K	\$331K	\$433K
INC	24	M	Moderate DOM on Combustor, Add PT, RH, CI, FF	\$1,291K	\$515K	\$690K
INC	24	L	Moderate DOM on Combustor, Add PT, RH, CI, FF	\$2,312K	\$866K	\$1,173K
INC	25	S	Add AB, RH, CB, FF	\$840K	\$433K	\$542K
INC	25	M	Add AB, RH, CI, FF	\$1,349K	\$924K	\$1,096K
INC	25	L	Add AB, RH, CI, FF	\$2,223K	\$1,947K	\$2,223K
INC	26	S	Moderate DOM on Existing VS, Add AB, RH, CB, FF	\$851K	\$439K	\$552K
INC	26	M	Moderate DOM on Existing VS, Add AB, RH, CI, FF	\$1,395K	\$959K	\$1,143K
INC	26	L	Moderate DOM on Existing VS, Add AB, RH, CI, FF	\$2,328K	\$2,044K	\$2,350K
INC	27	S	Moderate DOM on Combustor, Add PT	\$174K	\$90K	\$118K
INC	27	M	Moderate DOM on Combustor, Add PT	\$359K	\$124K	\$183K
INC	27	L	Moderate DOM on Combustor, Add PT	\$631K	\$195K	\$297K
INC	28	S	Moderate DOM on Existing ESP, Add RH, CB	\$673K	\$178K	\$267K
INC	28	M	Moderate DOM on Existing ESP, Add RH, CI	\$1,172K	\$319K	\$474K
INC	28	L	Moderate DOM on Existing ESP, Add RH, CI	\$1,747K	\$560K	\$790K
INC	29	S	Small DOM on Existing WS, Add RH, CB, FF	\$586K	\$246K	\$322K
INC	29	M	Small DOM on Existing WS, Add RH, CI, FF	\$972K	\$403K	\$528K
INC	29	L	Small DOM on Existing WS, Add RH, CI, FF	\$1,782K	\$702K	\$925K
INC	30	S	Moderate DOM on existing WS	\$13K	\$3K	\$6K
INC	30	M	Moderate DOM on existing WS	\$71K	\$15K	\$33K
INC	30	L	Moderate DOM on existing WS	\$195K	\$41K	\$92K
INC	31	S	Moderate DOM on existing WS, VS & Combustor	\$140K	\$9K	\$35K
INC	31	M	Moderate DOM on existing WS, VS & Combustor	\$271K	\$50K	\$106K
INC	31	L	Moderate DOM on existing WS, VS & Combustor	\$485K	\$137K	\$249K
INC	32	S	Add RH, CB	\$493K	\$152K	\$216K
INC	32	M	Add RH, CI	\$637K	\$270K	\$354K
INC	32	L	Add RH, CI	\$737K	\$474K	\$571K
INC	33	S	Moderate DOM on Combustor, Add IWS	\$331K	\$97K	\$151K
INC	33	M	Moderate DOM on Combustor, Add IWS	\$834K	\$144K	\$280K
INC	33	L	Moderate DOM on Combustor, Add IWS	\$1,516K	\$228K	\$475K
INC	34	S	Add CB, PT	\$398K	\$181K	\$235K
INC	34	M	Add CI, PT	\$601K	\$271K	\$357K
INC	34	L	Add CI, PT	\$870K	\$419K	\$547K
INC	35	S	Moderate DOM on Combustor, Add Q, PT	\$395K	\$130K	\$188K
INC	35	M	Moderate DOM on Combustor, Add Q, PT	\$637K	\$172K	\$267K
INC	35	L	Moderate DOM on Combustor, Add Q, PT	\$998K	\$256K	\$407K
INC	36	S	Add CB, IWS	\$555K	\$188K	\$268K
INC	36	M	Add CI, IWS	\$1,077K	\$291K	\$454K
INC	36	L	Add CI, IWS	\$1,755K	\$452K	\$725K
INC	37	S	Moderate DOM on existng VS, Add RH, CB, PT	\$561K	\$248K	\$326K
INC	37	M	Moderate DOM on existng VS, Add RH, CI, PT	\$887K	\$429K	\$558K
INC	37	L	Moderate DOM on existng VS, Add RH, CI, PT	\$1,288K	\$765K	\$965K
INC	38	S	Moderate DOM on Combustor, Add CB, IWS	\$672K	\$188K	\$287K
INC	38	M	Moderate DOM on Combustor, Add CI, IWS	\$1,231K	\$291K	\$479K
INC	38	L	Moderate DOM on Combustor, Add CI, IWS	\$1,941K	\$452K	\$755K
INC	39	S	Add AB, RH, CB, FF, PT	\$898K	\$523K	\$642K
INC	39	M	Add AB, RH, CI, FF, PT	\$1,554K	\$1,048K	\$1,253K
INC	39	L	Add AB, RH, CI, FF, PT	\$2,669K	\$2,142K	\$2,490K
INC	40	S	Add RH, CB, PT	\$550K	\$242K	\$316K
INC	40	M	Add RH, CI, PT	\$841K	\$394K	\$511K
INC	40	L	Add RH, CI, PT	\$1,183K	\$669K	\$838K
INC	41	S	Add Q, CB, FF, PT	\$700K	\$311K	\$403K
INC	41	M	Add Q, CI, FF, PT	\$1,175K	\$440K	\$595K
INC	41	L	Add Q, CI, FF, PT	\$2,180K	\$678K	\$961K
INC	42	S	Add RH, CB, IWS	\$708K	\$249K	\$348K
INC	42	M	Add RH, CI, IWS	\$1,317K	\$414K	\$608K
INC	42	L	Add RH, CI, IWS	\$2,068K	\$702K	\$1,016K
INC	43	S	Add AB, RH, CB, IWS	\$973K	\$441K	\$576K
INC	43	M	Add AB, RH, CI, IWS	\$1,734K	\$947K	\$1,196K
INC	43	L	Add AB, RH, CI, IWS	\$2,611K	\$1,978K	\$2,363K
INC	44	S	Add AB, CB	\$821K	\$381K	\$495K

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Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
INC	44	M	Add AB, CI	\$1,493K	\$825K	\$1,042K
INC	44	L	Add AB, CI	\$2,298K	\$1,728K	\$2,071K
INC	45	S	Add CB, FF, PT	\$479K	\$270K	\$334K
INC	45	M	Add CI, FF, PT	\$897K	\$392K	\$511K
INC	45	L	Add CI, FF, PT	\$1,813K	\$616K	\$851K
INC	46	S	Moderate DOM on Combustor, Add CB, PT	\$514K	\$181K	\$254K
INC	46	M	Moderate DOM on Combustor, Add CI, PT	\$755K	\$271K	\$382K
INC	46	L	Moderate DOM on Combustor, Add CI, PT	\$1,056K	\$419K	\$577K
INC	47	S	Moderate DOM on existing VS, Add AB, RH, CB, PT	\$827K	\$440K	\$553K
INC	47	M	Moderate DOM on existing VS, Add AB, RH, CI, PT	\$1,304K	\$963K	\$1,147K
INC	47	L	Moderate DOM on existing VS, Add AB, RH, CI, PT	\$1,830K	\$2,041K	\$2,312K
INC	48	S	Add AB, Q, CB, FF, PT	\$966K	\$503K	\$631K
INC	48	M	Add AB, Q, CI, FF, PT	\$1,592K	\$974K	\$1,184K
INC	48	L	Add AB, Q, CI, FF, PT	\$2,723K	\$1,953K	\$2,308K
INC	49	S	Add CB, FF	\$422K	\$180K	\$234K
INC	49	M	Add CI, FF	\$692K	\$268K	\$354K
INC	49	L	Add CI, FF	\$1,368K	\$422K	\$584K
INC	51	S	Moderate DOM on existing WS, VS & Combustor, Add RH, CB	\$633K	\$160K	\$251K
INC	51	M	Moderate DOM on existing WS, VS & Combustor, Add RH, CI	\$908K	\$320K	\$459K
INC	51	L	Moderate DOM on existing WS, VS & Combustor, Add RH, CI	\$1,223K	\$611K	\$820K
INC	52	S	Add AB, Q, PT	\$544K	\$323K	\$396K
INC	52	M	Add AB, Q, PT	\$899K	\$706K	\$830K
INC	52	L	Add AB, Q, PT	\$1,355K	\$1,531K	\$1,723K
INC	53	S	Moderate DOM on Combustor, Add CB	\$457K	\$91K	\$155K
INC	53	M	Moderate DOM on Combustor, Add CI	\$551K	\$147K	\$225K
INC	53	L	Moderate DOM on Combustor, Add CI	\$610K	\$224K	\$310K
INC	54	S	Moderate DOM on Combustor, Add RH, CB, FF	\$691K	\$241K	\$334K
INC	54	M	Moderate DOM on Combustor, Add RH, CI, FF	\$1,087K	\$391K	\$533K
INC	54	L	Moderate DOM on Combustor, Add RH, CI, FF	\$1,866K	\$672K	\$906K
INC	55	S	Moderate DOM on Combustor, Add FF	\$198K	\$89K	\$117K
INC	55	M	Moderate DOM on Combustor, Add FF	\$450K	\$121K	\$179K
INC	55	L	Moderate DOM on Combustor, Add FF	\$1,129K	\$198K	\$335K
INC	56	S	Moderate DOM on Combustor & WS, Add RH, CB, FF	\$704K	\$243K	\$340K
INC	56	M	Moderate DOM on Combustor & WS, Add RH, CI, FF	\$1,158K	\$405K	\$566K
INC	56	L	Moderate DOM on Combustor & WS, Add RH, CI, FF	\$2,061K	\$712K	\$998K
INC	57	S	Add AB, PT	\$323K	\$282K	\$327K
INC	57	M	Add AB, PT	\$621K	\$658K	\$746K
INC	57	L	Add AB, PT	\$988K	\$1,470K	\$1,614K
INC	58	S	Moderate DOM on existing DI and FF, Add CB	\$554K	\$96K	\$175K
INC	58	M	Moderate DOM on existing DI and FF, Add CI	\$778K	\$174K	\$286K
INC	58	L	Moderate DOM on existing DI and FF, Add CI	\$1,011K	\$298K	\$442K
INC	59	S	Moderate DOM on existing WS, Add CB, Q	\$574K	\$134K	\$212K
INC	59	M	Moderate DOM on existing WS, Add CI, Q	\$746K	\$210K	\$317K
INC	59	L	Moderate DOM on existing WS, Add CI, Q	\$986K	\$326K	\$481K
INC	60	S	Small DOM on existing VS, Add PT	\$68K	\$95K	\$106K
INC	60	M	Small DOM on existing VS, Add PT	\$244K	\$137K	\$178K
INC	60	L	Small DOM on existing VS, Add PT	\$546K	\$224K	\$316K
INC	61	S	Add RH, CB	\$493K	\$152K	\$216K
INC	61	M	Add RH, CB	\$1,580K	\$299K	\$507K
INC	61	L	Add RH, CB	\$3,687K	\$603K	\$1,088K
INC	62	S	Small DOM on existing WS, Add FF	\$93K	\$94K	\$105K
INC	62	M	Small DOM on existing WS, Add FF	\$335K	\$134K	\$175K
INC	62	L	Small DOM on existing WS, Add FF	\$1,044K	\$227K	\$354K
INC	63	S	Moderate DOM on existing VS, Add RH, CB	\$504K	\$158K	\$226K
INC	63	M	Moderate DOM on existing VS, Add RH, CB	\$1,625K	\$334K	\$554K
INC	63	L	Moderate DOM on existing VS, Add RH, CB	\$3,792K	\$700K	\$1,215K
INC	64	S	Moderate DOM on Combustor, Add CB, FF	\$538K	\$180K	\$253K
INC	64	M	Moderate DOM on Combustor, Add CI, FF	\$846K	\$268K	\$379K
INC	64	L	Moderate DOM on Combustor, Add CI, FF	\$1,553K	\$422K	\$615K
INC	65	S	Moderate DOM Combustor, Small DOM WS, Add RH, CB, FF	\$702K	\$246K	\$341K
INC	65	M	Moderate DOM Combustor, Small DOM WS, Add RH, CI, FF	\$1,126K	\$403K	\$553K
INC	65	L	Moderate DOM Combustor, Small DOM WS, Add RH, CI, FF	\$1,967K	\$702K	\$955K
INC	66	S	Moderate DOM on existing FF	\$3K	\$1K	\$1K
INC	66	M	Moderate DOM on existing FF	\$19K	\$6K	\$7K
INC	66	L	Moderate DOM on existing FF	\$52K	\$17K	\$19K

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
INC	67	S	Moderate DOM on existing FF, Add CB	\$344K	\$92K	\$137K
INC	67	M	Moderate DOM on existing FF, Add CI	\$415K	\$153K	\$206K
INC	67	L	Moderate DOM on existing FF, Add CI	\$476K	\$241K	\$299K
INC	68	S	Moderate DOM on Existing VS and WS, Add RH, CB	\$517K	\$160K	\$232K
INC	68	M	Moderate DOM on Existing VS and WS, Add RH, CB	\$754K	\$320K	\$434K
INC	68	L	Moderate DOM on Existing VS and WS, Add RH, CB	\$1,037K	\$611K	\$790K
INC	69	S	Moderate DOM Combustor, Small DOM WS, Add CB	\$468K	\$96K	\$162K
INC	69	M	Moderate DOM Combustor, Small DOM WS, Add CI	\$591K	\$160K	\$245K
INC	69	L	Moderate DOM Combustor, Small DOM WS, Add CI	\$711K	\$254K	\$359K
INC	70	S	Moderate DOM on Existing WS, Add AB, RH, CB, FF	\$853K	\$436K	\$548K
INC	70	M	Moderate DOM on Existing WS, Add AB, RH, CI, FF	\$1,420K	\$939K	\$1,129K
INC	70	L	Moderate DOM on Existing WS, Add AB, RH, CI, FF	\$2,418K	\$1,988K	\$2,314K
INC	71	S	Add AB, FF	\$347K	\$282K	\$326K
INC	71	M	Add AB, FF	\$712K	\$654K	\$742K
INC	71	L	Add AB, FF	\$1,486K	\$1,473K	\$1,651K
INC	72	S	Add Q	\$221K	\$41K	\$70K
INC	72	M	Add Q	\$278K	\$48K	\$84K
INC	72	L	Add Q	\$367K	\$61K	\$110K
INC	73	S	Moderate DOM Combustor, Small DOM WS, Add FF	\$209K	\$94K	\$124K
INC	73	M	Moderate DOM Combustor, Small DOM WS, Add FF	\$489K	\$134K	\$200K
INC	73	L	Moderate DOM Combustor, Small DOM WS, Add FF	\$1,230K	\$227K	\$384K
INC	74	S	Moderate DOM Combustor, Small DOM WS	\$127K	\$5K	\$26K
INC	74	M	Moderate DOM Combustor, Small DOM WS	\$194K	\$13K	\$46K
INC	74	L	Moderate DOM Combustor, Small DOM WS	\$287K	\$30K	\$79K
INC	75	S	Moderate DOM on Combustor and FF	\$120K	\$1K	\$20K
INC	75	M	Moderate DOM on Combustor and FF	\$173K	\$6K	\$32K
INC	75	L	Moderate DOM on Combustor and FF	\$237K	\$17K	\$49K
INC	76	S	Moderate DOM on Combustor and VS, Small DOM on WS	\$138K	\$11K	\$36K
INC	76	M	Moderate DOM on Combustor and VS, Small DOM on WS	\$240K	\$48K	\$93K
INC	76	L	Moderate DOM on Combustor and VS, Small DOM on WS	\$391K	\$126K	\$206K
INC	77	S	Moderate DOM on existing VS and WS	\$24K	\$9K	\$16K
INC	77	M	Moderate DOM on existing VS and WS	\$117K	\$50K	\$81K
INC	77	L	Moderate DOM on existing VS and WS	\$300K	\$137K	\$219K
INC	78	S	Moderate DOM on existing WS, Add AB, FF	\$360K	\$284K	\$332K
INC	78	M	Moderate DOM on existing WS, Add AB, FF	\$783K	\$669K	\$776K
INC	78	L	Moderate DOM on existing WS, Add AB, FF	\$1,681K	\$1,514K	\$1,743K
INC	79	S	Moderate DOM on Existing FF, Add AB, Q, PT	\$547K	\$324K	\$397K
INC	79	M	Moderate DOM on Existing FF, Add AB, Q, PT	\$918K	\$712K	\$837K
INC	79	L	Moderate DOM on Existing FF, Add AB, Q, PT	\$1,406K	\$1,548K	\$1,742K
INC	80	M	Moderate DOM on Existing VS, Add PT, RH, CB	\$1,830K	\$458K	\$711K
INC	80	L	Moderate DOM on Existing VS, Add PT, RH, CB	\$4,237K	\$894K	\$1,482K
INC	81	S	Add AB	\$265K	\$192K	\$227K
INC	81	M	Add AB	\$417K	\$534K	\$588K
INC	81	L	Add AB	\$543K	\$1,276K	\$1,347K
INC	82	S	Moderate DOM on Existing Combustor and ESP	\$337K	\$41K	\$89K
INC	82	M	Moderate DOM on Existing Combustor and ESP	\$432K	\$48K	\$110K
INC	82	L	Moderate DOM on Existing Combustor and ESP	\$552K	\$61K	\$140K
INC	83	S	Moderate DOM on VS, Small DOM on WS, Add AB	\$287K	\$204K	\$244K
INC	83	M	Moderate DOM on VS, Small DOM on WS, Add AB	\$502K	\$581K	\$656K
INC	83	L	Moderate DOM on VS, Small DOM on WS, Add AB	\$748K	\$1,402K	\$1,523K
INC	84	S	Moderate DOM on Combustor and WS	\$129K	\$3K	\$25K
INC	84	M	Moderate DOM on Combustor and WS	\$225K	\$15K	\$59K
INC	84	L	Moderate DOM on Combustor and WS	\$381K	\$41K	\$122K
INC	85	S	Add Q, PT	\$278K	\$130K	\$169K
INC	85	M	Add Q, PT	\$483K	\$172K	\$242K
INC	85	L	Add Q, PT	\$812K	\$256K	\$377K
INC	86	S	Add Q, IWS, CB	\$776K	\$229K	\$338K
INC	86	M	Add Q, IWS, CI	\$1,355K	\$339K	\$538K
INC	86	L	Add Q, IWS, CI	\$2,122K	\$513K	\$834K
INC	87	S	Moderate DOM on WS, Small DOM on VS	\$18K	\$9K	\$14K
INC	87	M	Moderate DOM on WS, Small DOM on VS	\$92K	\$30K	\$53K
INC	87	L	Moderate DOM on WS, Small DOM on VS	\$242K	\$75K	\$135K
INC	88	M	Add RH, FF, CB	\$1,875K	\$420K	\$661K
INC	88	L	Add RH, FF, CB	\$4,630K	\$801K	\$1,392K
INC	89	M	Add WQ, FF, CB	\$1,913K	\$345K	\$591K

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
INC	89	L	Add WQ, FF, CB	\$4,684K	\$612K	\$1,211K
INC	90	M	Add FF, PT, RH, CB	\$2,080K	\$544K	\$818K
INC	90	L	Add FF, PT, RH, CB	\$5,076K	\$995K	\$1,659K
INC	91	S	Moderate DOM on Combustor, Add FF, PT, RH, CB	\$749K	\$331K	\$433K
INC	91	M	Moderate DOM on Combustor, Add FF, PT, RH, CB	\$2,234K	\$544K	\$843K
INC	91	L	Moderate DOM on Combustor, Add FF, PT, RH, CB	\$5,261K	\$995K	\$1,689K
INC	92	S	Add Q, FF	\$303K	\$130K	\$168K
INC	92	M	Add Q, FF	\$574K	\$169K	\$239K
INC	92	L	Add Q, FF	\$1,310K	\$259K	\$414K
INC	93	S	Moderate DOM on Combustor, Add IWS, RH, CB	\$824K	\$249K	\$367K
INC	93	M	Moderate DOM on Combustor, Add IWS, RH, CI	\$1,471K	\$414K	\$633K
INC	93	L	Moderate DOM on Combustor, Add IWS, RH, CI	\$2,254K	\$702K	\$1,046K
INC	94	S	Moderate DOM on Combustor	\$116K	\$0K	\$19K
INC	94	M	Moderate DOM on Combustor	\$154K	\$0K	\$25K
INC	94	L	Moderate DOM on Combustor	\$186K	\$0K	\$30K
INC	95	S	Small DOM on Existing VS	\$5K	\$7K	\$8K
INC	95	M	Small DOM on Existing VS	\$21K	\$15K	\$19K
INC	95	L	Small DOM on Existing VS	\$47K	\$34K	\$43K
INC	96	S	Moderate DOM on Existing Combustor and VS	\$127K	\$6K	\$29K
INC	96	M	Moderate DOM on Existing Combustor and VS	\$200K	\$35K	\$72K
INC	96	L	Moderate DOM on Existing Combustor and VS	\$290K	\$97K	\$157K
INC	97	S	Add AB, CB, FF	\$687K	\$373K	\$462K
INC	97	M	Add AB, CI, FF	\$1,109K	\$802K	\$942K
INC	97	L	Add AB, CI, FF	\$1,910K	\$1,697K	\$1,931K
INC	98	S	Small DOM on Existing WS, Add AB, RH, CB, FF	\$851K	\$438K	\$549K
INC	98	M	Small DOM on Existing WS, Add AB, RH, CI, FF	\$1,389K	\$937K	\$1,116K
INC	98	L	Small DOM on Existing WS, Add AB, RH, CI, FF	\$2,324K	\$1,977K	\$2,272K
INC	99	S	Moderate DOM on Existing FF and WS, Add Q, CB	\$577K	\$136K	\$213K
INC	99	M	Moderate DOM on Existing FF and WS, Add Q, CI	\$765K	\$216K	\$324K
INC	99	L	Moderate DOM on Existing FF and WS, Add Q, CI	\$1,038K	\$343K	\$500K
INC	100	S	Moderate DOM on Existing FF, Add CB	\$344K	\$92K	\$137K
INC	100	M	Moderate DOM on Existing FF, Add CB	\$1,358K	\$183K	\$359K
INC	100	L	Moderate DOM on Existing FF, Add CB	\$3,426K	\$370K	\$815K
INC	101	S	Add AB, RH, CB, FF	\$840K	\$433K	\$542K
INC	101	M	Add AB, RH, CB, FF	\$2,292K	\$953K	\$1,249K
INC	101	L	Add AB, RH, CB, FF	\$5,173K	\$2,076K	\$2,739K
INC	102	S	Moderate DOM on Existing WS, Add RH, CB, FF	\$588K	\$243K	\$321K
INC	102	M	Moderate DOM on Existing WS, Add RH, CI, FF	\$1,004K	\$405K	\$541K
INC	102	L	Moderate DOM on Existing WS, Add RH, CI, FF	\$1,876K	\$712K	\$968K
INC	103	S	Moderate DOM on Existing ESP, Add CB	\$561K	\$132K	\$206K

Source Type	Model Plant Group	Size Category	Description of Model Plant Group	Capital Cost	Annualized O & M Cost	Annualized Total Cost
LWAK	1	M (Lo HCl)	None	\$0K	\$0K	\$0K
LWAK	1	M (Hi HCl)	None	\$0K	\$0K	\$0K
LWAK	2	M (Lo HCl)	Add FF	\$661K	\$161K	\$236K
LWAK	2	M (Hi HCl)	Add FF	\$661K	\$161K	\$236K
LWAK	3	M (Lo HCl)	Add CI, FF	\$1,074K	\$350K	\$480K
LWAK	3	M (Hi HCl)	Add CI, FF	\$1,074K	\$350K	\$480K
LWAK	4	M (Lo HCl)	Add CI, FF, ST	\$2,302K	\$611K	\$941K
LWAK	4	M (Hi HCl)	Add CI, FF, ST	\$2,302K	\$680K	\$1,009K
LWAK	5	M (Lo HCl)	Add ST	\$1,229K	\$261K	\$461K
LWAK	5	M (Hi HCl)	Add ST	\$1,229K	\$330K	\$530K
LWAK	6	M (Lo HCl)	Add IWS	\$1,016K	\$449K	\$615K
LWAK	6	M (Hi HCl)	Add IWS	\$1,016K	\$682K	\$847K
LWAK	7	M (Lo HCl)	Moderate DOM on Existing FF	\$34K	\$11K	\$13K
LWAK	7	M (Hi HCl)	Moderate DOM on Existing FF	\$34K	\$11K	\$13K
LWAK	9	M (Lo HCl)	Add AB, WQ, CI, FF	\$1,883K	\$1,615K	\$1,850K
LWAK	9	M (Hi HCl)	Add AB, WQ, CI, FF	\$1,883K	\$1,615K	\$1,850K
LWAK	10	M (Lo HCl)	Moderate DOM on Existing FF, Add CB	\$2,512K	\$281K	\$608K
LWAK	10	M (Hi HCl)	Moderate DOM on Existing FF, Add CB	\$2,512K	\$281K	\$608K
LWAK	11	M (Lo HCl)	Add AB, WQ, CI, FF, ST	\$3,112K	\$1,876K	\$2,311K
LWAK	11	M (Hi HCl)	Add AB, WQ, CI, FF, ST	\$3,112K	\$1,944K	\$2,380K
LWAK	12	M (Lo HCl)	Add AB, WQ	\$809K	\$1,264K	\$1,371K
LWAK	12	M (Hi HCl)	Add AB, WQ	\$809K	\$1,264K	\$1,371K
LWAK	13	M (Lo HCl)	Add AB, WQ, IWS	\$1,825K	\$1,713K	\$1,985K
LWAK	13	M (Hi HCl)	Add AB, WQ, IWS	\$1,825K	\$1,946K	\$2,218K
LWAK	14	M (Lo HCl)	Add AB, WQ, ST	\$2,038K	\$1,525K	\$1,832K
LWAK	14	M (Hi HCl)	Add AB, WQ, ST	\$2,038K	\$1,594K	\$1,900K
LWAK	15	M (Lo HCl)	Moderate DOM on Existing FF, Add AB, WQ, ST	\$2,072K	\$1,537K	\$1,844K
LWAK	15	M (Hi HCl)	Moderate DOM on Existing FF, Add AB, WQ, ST	\$2,072K	\$1,605K	\$1,913K
LWAK	16	M (Lo HCl)	Moderate DOM on Combustor, Add FF	\$833K	\$161K	\$264K
LWAK	16	M (Hi HCl)	Moderate DOM on Combustor, Add FF	\$833K	\$161K	\$264K
LWAK	17	M (Lo HCl)	Add AB, Q, FF	\$1,470K	\$1,425K	\$1,606K
LWAK	17	M (Hi HCl)	Add AB, Q, FF	\$1,470K	\$1,425K	\$1,606K
LWAK	18	M (Lo HCl)	Moderate DOM on Combustor	\$172K	\$0K	\$28K
LWAK	18	M (Hi HCl)	Moderate DOM on Combustor	\$172K	\$0K	\$28K
LWAK	19	M (Lo HCl)	Moderate DOM on Combustor, Add ST	\$1,401K	\$261K	\$489K
LWAK	19	M (Hi HCl)	Moderate DOM on Combustor, Add ST	\$1,401K	\$330K	\$558K
LWAK	20	M (Lo HCl)	Moderate DOM on Combustor, Add IWS	\$1,188K	\$449K	\$643K
LWAK	20	M (Hi HCl)	Moderate DOM on Combustor, Add IWS	\$1,188K	\$682K	\$875K
LWAK	21	M (Lo HCl)	Moderate DOM on Combustor, Add CI, FF	\$1,246K	\$350K	\$508K
LWAK	21	M (Hi HCl)	Moderate DOM on Combustor, Add CI, FF	\$1,246K	\$350K	\$508K
LWAK	22	M (Lo HCl)	Moderate DOM on Existing FF, Add CB, ST	\$3,740K	\$542K	\$1,069K
LWAK	22	M (Hi HCl)	Moderate DOM on Existing FF, Add CB, ST	\$3,740K	\$611K	\$1,138K
LWAK	23	M (Lo HCl)	Moderate DOM on Combustor, Add CI, FF, ST	\$2,474K	\$611K	\$969K
LWAK	23	M (Hi HCl)	Moderate DOM on Combustor, Add CI, FF, ST	\$2,474K	\$680K	\$1,037K
LWAK	24	M (Lo HCl)	Add CB	\$2,477K	\$270K	\$596K
LWAK	24	M (Hi HCl)	Add CB	\$2,477K	\$270K	\$596K

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Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	1		None		\$0K	\$0K	\$0K
CK	2	S	DOM ESP mod	3M	\$1,757K	\$149K	\$380K
CK	2	L	DOM ESP mod	3M	\$3,136K	\$287K	\$699K
CK	3	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	3	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	4	S	Add CI	9M	\$471K	\$364K	\$425K
CK	4	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	4	S	TOTAL		\$2,611K	\$718K	\$1,022K
CK	4	L	Add CI	9M	\$586K	\$736K	\$813K
CK	4	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	4	L	TOTAL		\$5,658K	\$1,490K	\$2,139K
CK	5	S	Add CI	9M	\$471K	\$364K	\$425K
CK	5	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	5	S	Add Q	2M	\$533K	\$88K	\$158K
CK	5	S	TOTAL		\$3,144K	\$806K	\$1,180K
CK	5	L	Add CI	9M	\$586K	\$736K	\$813K
CK	5	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	5	L	Add Q	2M	\$912K	\$155K	\$275K
CK	5	L	TOTAL		\$6,570K	\$1,645K	\$2,414K
CK	6	S	Add IWS	15M	\$2,390K	\$379K	\$768K
CK	6	L	Add IWS	15M	\$4,410K	\$747K	\$1,465K
CK	7	S	DOM FF mod	4E	\$125K	\$41K	\$46K
CK	7	L	DOM FF mod	4E	\$315K	\$104K	\$115K
CK	8	S	Add CI	9M	\$471K	\$364K	\$425K
CK	8	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	8	S	Add PT	16M	\$901K	\$330K	\$476K
CK	8	S	TOTAL		\$3,512K	\$1,048K	\$1,498K
CK	8	L	Add CI	9M	\$586K	\$736K	\$813K
CK	8	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	8	L	Add PT	16M	\$1,934K	\$684K	\$999K
CK	8	L	TOTAL		\$7,593K	\$2,174K	\$3,138K
CK	9	S	Add PT	16M	\$901K	\$330K	\$476K
CK	9	L	Add PT	16M	\$1,934K	\$684K	\$999K
CK	10	S	DOM ESP small	2M	\$533K	\$88K	\$158K
CK	10	L	DOM ESP small	2M	\$912K	\$155K	\$275K
CK	11	S	DOM FF small	3E	\$26K	\$22K	\$26K
CK	11	L	DOM FF small	3E	\$59K	\$49K	\$58K
CK	12	S	Add AB	17M	\$681K	\$3,512K	\$3,601K
CK	12	S	Add CI	9M	\$471K	\$364K	\$425K
CK	12	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	12	S	Add Q	2M	\$533K	\$88K	\$158K
CK	12	S	TOTAL		\$3,825K	\$4,318K	\$4,781K
CK	12	L	Add AB	17M	\$867K	\$8,453K	\$8,567K
CK	12	L	Add CI	9M	\$586K	\$736K	\$813K
CK	12	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	12	L	Add Q	2M	\$912K	\$155K	\$275K
CK	12	L	TOTAL		\$7,437K	\$10,098K	\$10,980K
CK	13	S	Add AB	17M	\$681K	\$3,512K	\$3,601K
CK	13	S	Add CI	9M	\$471K	\$364K	\$425K
CK	13	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	13	S	Add PT	16M	\$901K	\$330K	\$476K
CK	13	S	Add Q	2M	\$533K	\$88K	\$158K
CK	13	S	TOTAL		\$4,726K	\$4,648K	\$5,258K
CK	13	L	Add AB	17M	\$867K	\$8,453K	\$8,567K
CK	13	L	Add CI	9M	\$586K	\$736K	\$813K
CK	13	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	13	L	Add PT	16M	\$1,934K	\$684K	\$999K
CK	13	L	Add Q	2M	\$912K	\$155K	\$275K
CK	13	L	TOTAL		\$9,371K	\$10,782K	\$11,979K
CK	14	S	Add AB	17M	\$681K	\$3,512K	\$3,601K
CK	14	S	Add Q	2M	\$533K	\$88K	\$158K
CK	14	S	DOM FF mod	4E	\$125K	\$41K	\$46K
CK	14	S	TOTAL		\$1,339K	\$3,641K	\$3,805K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	14	L	Add AB	17M	\$867K	\$8,453K	\$8,567K
CK	14	L	Add Q	2M	\$912K	\$155K	\$275K
CK	14	L	DOM FF mod	4E	\$315K	\$104K	\$115K
CK	14	L	TOTAL		\$2,093K	\$8,711K	\$8,956K
CK	16	S	Add CI	9M	\$471K	\$364K	\$425K
CK	16	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	16	S	Add PT	16M	\$901K	\$330K	\$476K
CK	16	S	Add Q	2M	\$533K	\$88K	\$158K
CK	16	S	TOTAL		\$4,045K	\$1,136K	\$1,656K
CK	16	L	Add CI	9M	\$586K	\$736K	\$813K
CK	16	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	16	L	Add PT	16M	\$1,934K	\$684K	\$999K
CK	16	L	Add Q	2M	\$912K	\$155K	\$275K
CK	16	L	TOTAL		\$8,505K	\$2,329K	\$3,413K
CK	17	S	Add Q	2M	\$533K	\$88K	\$158K
CK	17	L	Add Q	2M	\$912K	\$155K	\$275K
CK	18	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	18	S	Add Q	2M	\$533K	\$88K	\$158K
CK	18	S	TOTAL		\$2,673K	\$443K	\$754K
CK	18	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	18	L	Add Q	2M	\$912K	\$155K	\$275K
CK	18	L	TOTAL		\$5,984K	\$909K	\$1,601K
CK	19	S	Add IWS	15M	\$2,390K	\$379K	\$768K
CK	19	S	Add Q	2M	\$533K	\$88K	\$158K
CK	19	S	TOTAL		\$2,923K	\$467K	\$926K
CK	19	L	Add IWS	15M	\$4,410K	\$747K	\$1,465K
CK	19	L	Add Q	2M	\$912K	\$155K	\$275K
CK	19	L	TOTAL		\$5,322K	\$902K	\$1,740K
CK	20	S	Add Q	2M	\$533K	\$88K	\$158K
CK	20	S	DOM ESP mod	3M	\$1,757K	\$149K	\$380K
CK	20	S	TOTAL		\$2,290K	\$237K	\$538K
CK	20	L	Add Q	2M	\$912K	\$155K	\$275K
CK	20	L	DOM ESP mod	3M	\$3,136K	\$287K	\$699K
CK	20	L	TOTAL		\$4,048K	\$442K	\$974K
CK	21	S	Add Q	2M	\$533K	\$88K	\$158K
CK	21	S	DOM FF mod	4E	\$125K	\$41K	\$46K
CK	21	S	TOTAL		\$658K	\$129K	\$203K
CK	21	L	Add Q	2M	\$912K	\$155K	\$275K
CK	21	L	DOM FF mod	4E	\$315K	\$104K	\$115K
CK	21	L	TOTAL		\$1,226K	\$259K	\$390K
CK	22	S	Add Q	2M	\$533K	\$88K	\$158K
CK	22	S	DOM ESP small	2M	\$533K	\$88K	\$158K
CK	22	S	TOTAL		\$1,065K	\$176K	\$316K
CK	22	L	Add Q	2M	\$912K	\$155K	\$275K
CK	22	L	DOM ESP small	2M	\$912K	\$155K	\$275K
CK	22	L	TOTAL		\$1,824K	\$310K	\$550K
CK	24	S	Add AB	17M	\$681K	\$3,512K	\$3,601K
CK	24	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	24	S	Add Q	2M	\$533K	\$88K	\$158K
CK	24	S	TOTAL		\$3,354K	\$3,954K	\$4,356K
CK	24	L	Add AB	17M	\$867K	\$8,453K	\$8,567K
CK	24	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	24	L	Add Q	2M	\$912K	\$155K	\$275K
CK	24	L	TOTAL		\$6,851K	\$9,362K	\$10,167K
CK	26	S	Add AB	17M	\$681K	\$3,512K	\$3,601K
CK	26	S	Add IWS	15M	\$2,390K	\$379K	\$768K
CK	26	S	Add Q	2M	\$533K	\$88K	\$158K
CK	26	S	TOTAL		\$3,604K	\$3,979K	\$4,527K
CK	26	L	Add AB	17M	\$867K	\$8,453K	\$8,567K
CK	26	L	Add IWS	15M	\$4,410K	\$747K	\$1,465K
CK	26	L	Add Q	2M	\$912K	\$155K	\$275K
CK	26	L	TOTAL		\$6,189K	\$9,355K	\$10,306K
CK	27	S	Add AB	17M	\$681K	\$3,512K	\$3,601K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	27	S	Add Q	2M	\$533K	\$88K	\$158K
CK	27	S	DOM ESP mod	3M	\$1,757K	\$149K	\$380K
CK	27	S	TOTAL		\$2,971K	\$3,749K	\$4,139K
CK	27	L	Add AB	17M	\$867K	\$8,453K	\$8,567K
CK	27	L	Add Q	2M	\$912K	\$155K	\$275K
CK	27	L	DOM ESP mod	3M	\$3,136K	\$287K	\$699K
CK	27	L	TOTAL		\$4,915K	\$8,894K	\$9,541K
CK	28	S	Add CI	9M	\$471K	\$364K	\$425K
CK	28	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	28	S	DOM Combustor	14E	\$221K	\$K	\$36K
CK	28	S	TOTAL		\$2,832K	\$718K	\$1,058K
CK	28	L	Add CI	9M	\$586K	\$736K	\$813K
CK	28	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	28	L	DOM Combustor	14E	\$267K	\$K	\$43K
CK	28	L	TOTAL		\$5,925K	\$1,490K	\$2,182K
CK	29	S	Add CB	6M	\$6,873K	\$688K	\$1,591K
CK	29	S	Add Q	2M	\$533K	\$88K	\$158K
CK	29	S	TOTAL		\$7,405K	\$775K	\$1,749K
CK	29	L	Add CB	6M	\$15,686K	\$1,540K	\$3,603K
CK	29	L	Add Q	2M	\$912K	\$155K	\$275K
CK	29	L	TOTAL		\$16,598K	\$1,696K	\$3,878K
CK	30	S	Add CB	6M	\$6,873K	\$688K	\$1,591K
CK	30	S	Add Q	2M	\$533K	\$88K	\$158K
CK	30	S	DOM ESP small	2M	\$533K	\$88K	\$158K
CK	30	S	TOTAL		\$7,938K	\$863K	\$1,907K
CK	30	L	Add CB	6M	\$15,686K	\$1,540K	\$3,603K
CK	30	L	Add Q	2M	\$912K	\$155K	\$275K
CK	30	L	DOM ESP small	2M	\$912K	\$155K	\$275K
CK	30	L	TOTAL		\$17,510K	\$1,851K	\$4,153K
CK	31	S	Add Q	2M	\$533K	\$88K	\$158K
CK	31	S	DOM FF small	3E	\$26K	\$22K	\$26K
CK	31	S	TOTAL		\$559K	\$110K	\$184K
CK	31	L	Add Q	2M	\$912K	\$155K	\$275K
CK	31	L	DOM FF small	3E	\$59K	\$49K	\$58K
CK	31	L	TOTAL		\$971K	\$204K	\$333K
CK	32	S	Add PT	16M	\$901K	\$330K	\$476K
CK	32	S	Add Q	2M	\$533K	\$88K	\$158K
CK	32	S	DOM FF mod	4E	\$125K	\$41K	\$46K
CK	32	S	TOTAL		\$1,559K	\$459K	\$680K
CK	32	L	Add PT	16M	\$1,934K	\$684K	\$999K
CK	32	L	Add Q	2M	\$912K	\$155K	\$275K
CK	32	L	DOM FF mod	4E	\$315K	\$104K	\$115K
CK	32	L	TOTAL		\$3,161K	\$943K	\$1,389K
CK	33	S	Add CB	6M	\$6,873K	\$688K	\$1,591K
CK	33	S	Add Q	2M	\$533K	\$88K	\$158K
CK	33	S	DOM ESP mod	3M	\$1,757K	\$149K	\$380K
CK	33	S	TOTAL		\$9,162K	\$924K	\$2,129K
CK	33	L	Add CB	6M	\$15,686K	\$1,540K	\$3,603K
CK	33	L	Add Q	2M	\$912K	\$155K	\$275K
CK	33	L	DOM ESP mod	3M	\$3,136K	\$287K	\$699K
CK	33	L	TOTAL		\$19,735K	\$1,982K	\$4,577K
CK	34	S	Add CB	6M	\$6,873K	\$688K	\$1,591K
CK	34	S	Add Q	2M	\$533K	\$88K	\$158K
CK	34	S	Small DOM on existing FF	3E	\$26K	\$22K	\$26K
CK	34	S	TOTAL		\$7,431K	\$798K	\$1,775K
CK	34	L	Add CB	6M	\$15,686K	\$1,540K	\$3,603K
CK	34	L	Add Q	2M	\$912K	\$155K	\$275K
CK	34	L	Small DOM on existing FF	3E	\$59K	\$49K	\$58K
CK	34	L	TOTAL		\$16,657K	\$1,744K	\$3,936K
CK	35	S	Add Q	2M	\$533K	\$88K	\$158K
CK	35	S	Moderate DOM on Combustor	14E	\$221K	\$K	\$36K
CK	35	S	TOTAL		\$753K	\$88K	\$194K
CK	35	L	Add Q	2M	\$912K	\$155K	\$275K

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Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
CK	35	L	Moderate DOM on Combustor	14E	\$267K	\$K	\$43K
CK	35	L	TOTAL		\$1,179K	\$155K	\$319K
CK	36	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	36	S	Moderate DOM on Combustor	14E	\$221K	\$K	\$36K
CK	36	S	TOTAL		\$2,361K	\$355K	\$632K
CK	36	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	36	L	Moderate DOM on Combustor	14E	\$267K	\$K	\$43K
CK	36	L	TOTAL		\$5,339K	\$754K	\$1,369K
CK	37	S	Add CI	9M	\$471K	\$364K	\$425K
CK	37	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	37	S	Add Q	2M	\$533K	\$88K	\$158K
CK	37	S	Moderate DOM on Combustor	14E	\$221K	\$K	\$36K
CK	37	S	TOTAL		\$3,365K	\$806K	\$1,216K
CK	37	L	Add CI	9M	\$586K	\$736K	\$813K
CK	37	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	37	L	Add Q	2M	\$912K	\$155K	\$275K
CK	37	L	Moderate DOM on Combustor	14E	\$267K	\$K	\$43K
CK	37	L	TOTAL		\$6,837K	\$1,645K	\$2,457K
CK	38	S	Add CB	6M	\$6,873K	\$688K	\$1,591K
CK	38	S	Moderate DOM on Combustor	14E	\$221K	\$K	\$36K
CK	38	S	Moderate DOM on existing FF	4E	\$125K	\$41K	\$46K
CK	38	S	TOTAL		\$7,218K	\$729K	\$1,673K
CK	38	L	Add CB	6M	\$15,686K	\$1,540K	\$3,603K
CK	38	L	Moderate DOM on Combustor	14E	\$267K	\$K	\$43K
CK	38	L	Moderate DOM on existing FF	4E	\$315K	\$104K	\$115K
CK	38	L	TOTAL		\$16,268K	\$1,644K	\$3,761K
CK	39	S	Add CI	9M	\$471K	\$364K	\$425K
CK	39	S	Add FF	4M	\$2,141K	\$355K	\$597K
CK	39	S	Add PT	16M	\$901K	\$330K	\$476K
CK	39	S	Add Q	2M	\$533K	\$88K	\$158K
CK	39	S	Moderate DOM on Combustor	14E	\$221K	\$K	\$36K
CK	39	S	TOTAL		\$4,266K	\$1,136K	\$1,692K
CK	39	L	Add CI	9M	\$586K	\$736K	\$813K
CK	39	L	Add FF	4M	\$5,072K	\$754K	\$1,325K
CK	39	L	Add PT	16M	\$1,934K	\$684K	\$999K
CK	39	L	Add Q	2M	\$912K	\$155K	\$275K
CK	39	L	Moderate DOM on Combustor	14E	\$267K	\$K	\$43K
CK	39	L	TOTAL		\$8,772K	\$2,329K	\$3,456K
CK	40	S	Add IWS	15M	\$2,390K	\$379K	\$768K
CK	40	S	Add Q	2M	\$533K	\$88K	\$158K
CK	40	S	Moderate DOM on Combustor	14E	\$221K	\$K	\$36K
CK	40	S	TOTAL		\$3,144K	\$467K	\$962K
CK	40	L	Add IWS	15M	\$4,410K	\$747K	\$1,465K
CK	40	L	Add Q	2M	\$912K	\$155K	\$275K
CK	40	L	Moderate DOM on Combustor	14E	\$267K	\$K	\$43K
CK	40	L	TOTAL		\$5,589K	\$902K	\$1,783K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	1		None		\$0K	\$0K	\$0K
INC	2	S	Add PT	16M	\$57K	\$90K	\$99K
INC	2	M	Add PT	16M	\$204K	\$124K	\$157K
INC	2	L	Add PT	16M	\$445K	\$195K	\$267K
INC	3	S	Add CB	6M	\$340K	\$91K	\$136K
INC	3	S	Add FF	4M	\$82K	\$89K	\$98K
INC	3	S	Add RH	18M	\$153K	\$60K	\$80K
INC	3	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	3	S	TOTAL		\$588K	\$243K	\$321K
INC	3	M	Add CI	9M	\$397K	\$147K	\$199K
INC	3	M	Add FF	4M	\$295K	\$121K	\$154K
INC	3	M	Add RH	18M	\$240K	\$122K	\$154K
INC	3	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	3	M	TOTAL		\$1,004K	\$405K	\$541K
INC	3	L	Add CI	9M	\$425K	\$224K	\$280K
INC	3	L	Add FF	4M	\$943K	\$198K	\$305K
INC	3	L	Add RH	18M	\$313K	\$250K	\$291K
INC	3	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	3	L	TOTAL		\$1,876K	\$712K	\$968K
INC	4	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	4	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	4	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	5	S	Add AB	17M	\$265K	\$192K	\$227K
INC	5	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	5	S	TOTAL		\$480K	\$289K	\$359K
INC	5	M	Add AB	17M	\$417K	\$534K	\$588K
INC	5	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	5	M	TOTAL		\$1,097K	\$677K	\$843K
INC	5	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	5	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	5	L	TOTAL		\$1,873K	\$1,504K	\$1,792K
INC	6	S	Add FF	4M	\$82K	\$89K	\$98K
INC	6	M	Add FF	4M	\$295K	\$121K	\$154K
INC	6	L	Add FF	4M	\$943K	\$198K	\$305K
INC	7	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	7	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	7	S	TOTAL		\$16K	\$4K	\$7K
INC	7	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	7	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	7	M	TOTAL		\$90K	\$21K	\$40K
INC	7	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	7	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	7	L	TOTAL		\$247K	\$58K	\$111K
INC	8	S	Add CB	6M	\$340K	\$91K	\$136K
INC	8	M	Add CI	9M	\$397K	\$147K	\$199K
INC	8	L	Add CI	9M	\$425K	\$224K	\$280K
INC	9	S	Add CB	6M	\$340K	\$91K	\$136K
INC	9	S	Add FF	4M	\$82K	\$89K	\$98K
INC	9	S	Add RH	18M	\$153K	\$60K	\$80K
INC	9	S	TOTAL		\$575K	\$241K	\$315K
INC	9	M	Add CI	9M	\$397K	\$147K	\$199K
INC	9	M	Add FF	4M	\$295K	\$121K	\$154K
INC	9	M	Add RH	18M	\$240K	\$122K	\$154K
INC	9	M	TOTAL		\$932K	\$391K	\$508K
INC	9	L	Add CI	9M	\$425K	\$224K	\$280K
INC	9	L	Add FF	4M	\$943K	\$198K	\$305K
INC	9	L	Add RH	18M	\$313K	\$250K	\$291K
INC	9	L	TOTAL		\$1,681K	\$672K	\$876K
INC	10	S	Add CB	6M	\$340K	\$91K	\$136K
INC	10	S	Add FF	4M	\$82K	\$89K	\$98K
INC	10	S	Add Q	2M	\$221K	\$41K	\$70K
INC	10	S	TOTAL		\$643K	\$221K	\$304K
INC	10	M	Add CI	9M	\$397K	\$147K	\$199K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	10	M	Add FF	4M	\$295K	\$121K	\$154K
INC	10	M	Add Q	2M	\$278K	\$48K	\$84K
INC	10	M	TOTAL		\$970K	\$316K	\$438K
INC	10	L	Add CI	9M	\$425K	\$224K	\$280K
INC	10	L	Add FF	4M	\$943K	\$198K	\$305K
INC	10	L	Add Q	2M	\$367K	\$61K	\$110K
INC	10	L	TOTAL		\$1,735K	\$483K	\$694K
INC	11	S	Add PT	16M	\$57K	\$90K	\$99K
INC	11	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	11	S	TOTAL		\$61K	\$91K	\$100K
INC	11	M	Add PT	16M	\$204K	\$124K	\$157K
INC	11	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	11	M	TOTAL		\$223K	\$130K	\$164K
INC	11	L	Add PT	16M	\$445K	\$195K	\$267K
INC	11	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	11	L	TOTAL		\$497K	\$212K	\$286K
INC	12	S	Add FF	4M	\$82K	\$89K	\$98K
INC	12	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	12	S	TOTAL		\$95K	\$92K	\$104K
INC	12	M	Add FF	4M	\$295K	\$121K	\$154K
INC	12	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	12	M	TOTAL		\$367K	\$136K	\$188K
INC	12	L	Add FF	4M	\$943K	\$198K	\$305K
INC	12	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	12	L	TOTAL		\$1,138K	\$238K	\$397K
INC	13	S	Add CB	6M	\$340K	\$91K	\$136K
INC	13	S	Add FF	4M	\$82K	\$89K	\$98K
INC	13	S	Add PT	16M	\$57K	\$90K	\$99K
INC	13	S	Add RH	18M	\$153K	\$60K	\$80K
INC	13	S	TOTAL		\$632K	\$331K	\$414K
INC	13	M	Add CI	9M	\$397K	\$147K	\$199K
INC	13	M	Add FF	4M	\$295K	\$121K	\$154K
INC	13	M	Add PT	16M	\$204K	\$124K	\$157K
INC	13	M	Add RH	18M	\$240K	\$122K	\$154K
INC	13	M	TOTAL		\$1,137K	\$515K	\$665K
INC	13	L	Add CI	9M	\$425K	\$224K	\$280K
INC	13	L	Add FF	4M	\$943K	\$198K	\$305K
INC	13	L	Add PT	16M	\$445K	\$195K	\$267K
INC	13	L	Add RH	18M	\$313K	\$250K	\$291K
INC	13	L	TOTAL		\$2,126K	\$866K	\$1,143K
INC	14	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	14	S	DOM SD mod	13E	\$210K	\$4K	\$38K
INC	14	S	TOTAL		\$213K	\$5K	\$39K
INC	14	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	14	M	DOM SD mod	13E	\$362K	\$21K	\$79K
INC	14	M	TOTAL		\$381K	\$27K	\$86K
INC	14	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	14	L	DOM SD mod	13E	\$535K	\$57K	\$143K
INC	14	L	TOTAL		\$587K	\$74K	\$162K
INC	15	S	Add CB	6M	\$340K	\$91K	\$136K
INC	15	S	Add PT	16M	\$57K	\$90K	\$99K
INC	15	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	15	S	TOTAL		\$401K	\$182K	\$236K
INC	15	M	Add CI	9M	\$397K	\$147K	\$199K
INC	15	M	Add PT	16M	\$204K	\$124K	\$157K
INC	15	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	15	M	TOTAL		\$620K	\$278K	\$364K
INC	15	L	Add CI	9M	\$425K	\$224K	\$280K
INC	15	L	Add PT	16M	\$445K	\$195K	\$267K
INC	15	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	15	L	TOTAL		\$922K	\$436K	\$566K
INC	16	S	Add PT	16M	\$57K	\$90K	\$99K
INC	16	S	DOM VS mod	7E	\$11K	\$6K	\$10K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	16	S	TOTAL		\$68K	\$96K	\$109K
INC	16	M	Add PT	16M	\$204K	\$124K	\$157K
INC	16	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	16	M	TOTAL		\$250K	\$159K	\$205K
INC	16	L	Add PT	16M	\$445K	\$195K	\$267K
INC	16	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	16	L	TOTAL		\$550K	\$291K	\$394K
INC	17	S	DOM ESP mod	3M	\$180K	\$27K	\$50K
INC	17	M	DOM ESP mod	3M	\$535K	\$50K	\$120K
INC	17	L	DOM ESP mod	3M	\$1,010K	\$86K	\$219K
INC	18	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	18	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	18	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	19	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	19	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	19	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	20	S	Add CB	6M	\$340K	\$91K	\$136K
INC	20	S	Add PT	16M	\$57K	\$90K	\$99K
INC	20	S	Add Q	2M	\$221K	\$41K	\$70K
INC	20	S	TOTAL		\$619K	\$222K	\$305K
INC	20	M	Add CI	9M	\$397K	\$147K	\$199K
INC	20	M	Add PT	16M	\$204K	\$124K	\$157K
INC	20	M	Add Q	2M	\$278K	\$48K	\$84K
INC	20	M	TOTAL		\$879K	\$319K	\$441K
INC	20	L	Add CI	9M	\$425K	\$224K	\$280K
INC	20	L	Add PT	16M	\$445K	\$195K	\$267K
INC	20	L	Add Q	2M	\$367K	\$61K	\$110K
INC	20	L	TOTAL		\$1,237K	\$480K	\$656K
INC	21	S	Add AB	17M	\$265K	\$192K	\$227K
INC	21	S	Add FF	4M	\$82K	\$89K	\$98K
INC	21	S	TOTAL		\$347K	\$282K	\$326K
INC	21	M	Add AB	17M	\$417K	\$534K	\$588K
INC	21	M	Add FF	4M	\$295K	\$121K	\$154K
INC	21	M	TOTAL		\$712K	\$654K	\$742K
INC	21	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	21	L	Add FF	4M	\$943K	\$198K	\$305K
INC	21	L	TOTAL		\$1,486K	\$1,473K	\$1,651K
INC	22	S	Add PT	16M	\$57K	\$90K	\$99K
INC	22	S	DOM ESP mod	3M	\$180K	\$27K	\$50K
INC	22	S	TOTAL		\$238K	\$117K	\$150K
INC	22	M	Add PT	16M	\$204K	\$124K	\$157K
INC	22	M	DOM ESP mod	3M	\$535K	\$50K	\$120K
INC	22	M	TOTAL		\$740K	\$174K	\$277K
INC	22	L	Add PT	16M	\$445K	\$195K	\$267K
INC	22	L	DOM ESP mod	3M	\$1,010K	\$86K	\$219K
INC	22	L	TOTAL		\$1,455K	\$280K	\$486K
INC	23	S	Add PT	16M	\$57K	\$90K	\$99K
INC	23	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	23	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	23	S	TOTAL		\$185K	\$96K	\$128K
INC	23	M	Add PT	16M	\$204K	\$124K	\$157K
INC	23	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	23	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	23	M	TOTAL		\$404K	\$159K	\$230K
INC	23	L	Add PT	16M	\$445K	\$195K	\$267K
INC	23	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	23	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	23	L	TOTAL		\$736K	\$291K	\$424K
INC	24	S	Add CB	6M	\$340K	\$91K	\$136K
INC	24	S	Add FF	4M	\$82K	\$89K	\$98K
INC	24	S	Add PT	16M	\$57K	\$90K	\$99K
INC	24	S	Add RH	18M	\$153K	\$60K	\$80K
INC	24	S	DOM Combustor	14E	\$116K	\$K	\$19K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	24	S	TOTAL		\$749K	\$331K	\$433K
INC	24	M	Add CI	9M	\$397K	\$147K	\$199K
INC	24	M	Add FF	4M	\$295K	\$121K	\$154K
INC	24	M	Add PT	16M	\$204K	\$124K	\$157K
INC	24	M	Add RH	18M	\$240K	\$122K	\$154K
INC	24	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	24	M	TOTAL		\$1,291K	\$515K	\$690K
INC	24	L	Add CI	9M	\$425K	\$224K	\$280K
INC	24	L	Add FF	4M	\$943K	\$198K	\$305K
INC	24	L	Add PT	16M	\$445K	\$195K	\$267K
INC	24	L	Add RH	18M	\$313K	\$250K	\$291K
INC	24	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	24	L	TOTAL		\$2,312K	\$866K	\$1,173K
INC	25	S	Add AB	17M	\$265K	\$192K	\$227K
INC	25	S	Add CB	6M	\$340K	\$91K	\$136K
INC	25	S	Add FF	4M	\$82K	\$89K	\$98K
INC	25	S	Add RH	18M	\$153K	\$60K	\$80K
INC	25	S	TOTAL		\$840K	\$433K	\$542K
INC	25	M	Add AB	17M	\$417K	\$534K	\$588K
INC	25	M	Add CI	9M	\$397K	\$147K	\$199K
INC	25	M	Add FF	4M	\$295K	\$121K	\$154K
INC	25	M	Add RH	18M	\$240K	\$122K	\$154K
INC	25	M	TOTAL		\$1,349K	\$924K	\$1,096K
INC	25	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	25	L	Add CI	9M	\$425K	\$224K	\$280K
INC	25	L	Add FF	4M	\$943K	\$198K	\$305K
INC	25	L	Add RH	18M	\$313K	\$250K	\$291K
INC	25	L	TOTAL		\$2,223K	\$1,947K	\$2,223K
INC	26	S	Add AB	17M	\$265K	\$192K	\$227K
INC	26	S	Add CB	6M	\$340K	\$91K	\$136K
INC	26	S	Add FF	4M	\$82K	\$89K	\$98K
INC	26	S	Add RH	18M	\$153K	\$60K	\$80K
INC	26	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	26	S	TOTAL		\$851K	\$439K	\$552K
INC	26	M	Add AB	17M	\$417K	\$534K	\$588K
INC	26	M	Add CI	9M	\$397K	\$147K	\$199K
INC	26	M	Add FF	4M	\$295K	\$121K	\$154K
INC	26	M	Add RH	18M	\$240K	\$122K	\$154K
INC	26	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	26	M	TOTAL		\$1,395K	\$959K	\$1,143K
INC	26	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	26	L	Add CI	9M	\$425K	\$224K	\$280K
INC	26	L	Add FF	4M	\$943K	\$198K	\$305K
INC	26	L	Add RH	18M	\$313K	\$250K	\$291K
INC	26	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	26	L	TOTAL		\$2,328K	\$2,044K	\$2,350K
INC	27	S	Add PT	16M	\$57K	\$90K	\$99K
INC	27	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	27	S	TOTAL		\$174K	\$90K	\$118K
INC	27	M	Add PT	16M	\$204K	\$124K	\$157K
INC	27	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	27	M	TOTAL		\$359K	\$124K	\$183K
INC	27	L	Add PT	16M	\$445K	\$195K	\$267K
INC	27	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	27	L	TOTAL		\$631K	\$195K	\$297K
INC	28	S	Add CB	6M	\$340K	\$91K	\$136K
INC	28	S	Add RH	18M	\$153K	\$60K	\$80K
INC	28	S	DOM ESP mod	3M	\$180K	\$27K	\$50K
INC	28	S	TOTAL		\$673K	\$178K	\$267K
INC	28	M	Add CI	9M	\$397K	\$147K	\$199K
INC	28	M	Add RH	18M	\$240K	\$122K	\$154K
INC	28	M	DOM ESP mod	3M	\$535K	\$50K	\$120K
INC	28	M	TOTAL		\$1,172K	\$319K	\$474K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	28	L	Add CI	9M	\$425K	\$224K	\$280K
INC	28	L	Add RH	18M	\$313K	\$250K	\$291K
INC	28	L	DOM ESP mod	3M	\$1,010K	\$86K	\$219K
INC	28	L	TOTAL		\$1,747K	\$560K	\$790K
INC	29	S	Add CB	6M	\$340K	\$91K	\$136K
INC	29	S	Add FF	4M	\$82K	\$89K	\$98K
INC	29	S	Add RH	18M	\$153K	\$60K	\$80K
INC	29	S	DOM IWS small	5E	\$11K	\$5K	\$7K
INC	29	S	TOTAL		\$586K	\$246K	\$322K
INC	29	M	Add CI	9M	\$397K	\$147K	\$199K
INC	29	M	Add FF	4M	\$295K	\$121K	\$154K
INC	29	M	Add RH	18M	\$240K	\$122K	\$154K
INC	29	M	DOM IWS small	5E	\$40K	\$13K	\$20K
INC	29	M	TOTAL		\$972K	\$403K	\$528K
INC	29	L	Add CI	9M	\$425K	\$224K	\$280K
INC	29	L	Add FF	4M	\$943K	\$198K	\$305K
INC	29	L	Add RH	18M	\$313K	\$250K	\$291K
INC	29	L	DOM IWS small	5E	\$101K	\$30K	\$49K
INC	29	L	TOTAL		\$1,782K	\$702K	\$925K
INC	30	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	30	S	TOTAL		\$13K	\$3K	\$6K
INC	30	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	30	M	TOTAL		\$71K	\$15K	\$33K
INC	30	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	30	L	TOTAL		\$195K	\$41K	\$92K
INC	31	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	31	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	31	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	31	S	TOTAL		\$140K	\$9K	\$35K
INC	31	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	31	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	31	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	31	M	TOTAL		\$271K	\$50K	\$106K
INC	31	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	31	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	31	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	31	L	TOTAL		\$485K	\$137K	\$249K
INC	32	S	Add CB	6M	\$340K	\$91K	\$136K
INC	32	S	Add RH	18M	\$153K	\$60K	\$80K
INC	32	S	TOTAL		\$493K	\$152K	\$216K
INC	32	M	Add CI	9M	\$397K	\$147K	\$199K
INC	32	M	Add RH	18M	\$240K	\$122K	\$154K
INC	32	M	TOTAL		\$637K	\$270K	\$354K
INC	32	L	Add CI	9M	\$425K	\$224K	\$280K
INC	32	L	Add RH	18M	\$313K	\$250K	\$291K
INC	32	L	TOTAL		\$737K	\$474K	\$571K
INC	33	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	33	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	33	S	TOTAL		\$331K	\$97K	\$151K
INC	33	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	33	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	33	M	TOTAL		\$834K	\$144K	\$280K
INC	33	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	33	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	33	L	TOTAL		\$1,516K	\$228K	\$475K
INC	34	S	Add CB	6M	\$340K	\$91K	\$136K
INC	34	S	Add PT	16M	\$57K	\$90K	\$99K
INC	34	S	TOTAL		\$398K	\$181K	\$235K
INC	34	M	Add CI	9M	\$397K	\$147K	\$199K
INC	34	M	Add PT	16M	\$204K	\$124K	\$157K
INC	34	M	TOTAL		\$601K	\$271K	\$357K
INC	34	L	Add CI	9M	\$425K	\$224K	\$280K
INC	34	L	Add PT	16M	\$445K	\$195K	\$267K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	34	L	TOTAL		\$870K	\$419K	\$547K
INC	35	S	Add PT	16M	\$57K	\$90K	\$99K
INC	35	S	Add Q	2M	\$221K	\$41K	\$70K
INC	35	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	35	S	TOTAL		\$395K	\$130K	\$188K
INC	35	M	Add PT	16M	\$204K	\$124K	\$157K
INC	35	M	Add Q	2M	\$278K	\$48K	\$84K
INC	35	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	35	M	TOTAL		\$637K	\$172K	\$267K
INC	35	L	Add PT	16M	\$445K	\$195K	\$267K
INC	35	L	Add Q	2M	\$367K	\$61K	\$110K
INC	35	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	35	L	TOTAL		\$998K	\$256K	\$407K
INC	36	S	Add CB	6M	\$340K	\$91K	\$136K
INC	36	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	36	S	TOTAL		\$555K	\$188K	\$268K
INC	36	M	Add CI	9M	\$397K	\$147K	\$199K
INC	36	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	36	M	TOTAL		\$1,077K	\$291K	\$454K
INC	36	L	Add CI	9M	\$425K	\$224K	\$280K
INC	36	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	36	L	TOTAL		\$1,755K	\$452K	\$725K
INC	37	S	Add CB	6M	\$340K	\$91K	\$136K
INC	37	S	Add PT	16M	\$57K	\$90K	\$99K
INC	37	S	Add RH	18M	\$153K	\$60K	\$80K
INC	37	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	37	S	TOTAL		\$561K	\$248K	\$326K
INC	37	M	Add CI	9M	\$397K	\$147K	\$199K
INC	37	M	Add PT	16M	\$204K	\$124K	\$157K
INC	37	M	Add RH	18M	\$240K	\$122K	\$154K
INC	37	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	37	M	TOTAL		\$887K	\$429K	\$558K
INC	37	L	Add CI	9M	\$425K	\$224K	\$280K
INC	37	L	Add PT	16M	\$445K	\$195K	\$267K
INC	37	L	Add RH	18M	\$313K	\$250K	\$291K
INC	37	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	37	L	TOTAL		\$1,288K	\$765K	\$965K
INC	38	S	Add CB	6M	\$340K	\$91K	\$136K
INC	38	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	38	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	38	S	TOTAL		\$672K	\$188K	\$287K
INC	38	M	Add CI	9M	\$397K	\$147K	\$199K
INC	38	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	38	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	38	M	TOTAL		\$1,231K	\$291K	\$479K
INC	38	L	Add CI	9M	\$425K	\$224K	\$280K
INC	38	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	38	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	38	L	TOTAL		\$1,941K	\$452K	\$755K
INC	39	S	Add AB	17M	\$265K	\$192K	\$227K
INC	39	S	Add CB	6M	\$340K	\$91K	\$136K
INC	39	S	Add FF	4M	\$82K	\$89K	\$98K
INC	39	S	Add PT	16M	\$57K	\$90K	\$99K
INC	39	S	Add RH	18M	\$153K	\$60K	\$80K
INC	39	S	TOTAL		\$898K	\$523K	\$642K
INC	39	M	Add AB	17M	\$417K	\$534K	\$588K
INC	39	M	Add CI	9M	\$397K	\$147K	\$199K
INC	39	M	Add FF	4M	\$295K	\$121K	\$154K
INC	39	M	Add PT	16M	\$204K	\$124K	\$157K
INC	39	M	Add RH	18M	\$240K	\$122K	\$154K
INC	39	M	TOTAL		\$1,554K	\$1,048K	\$1,253K
INC	39	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	39	L	Add CI	9M	\$425K	\$224K	\$280K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	39	L	Add FF	4M	\$943K	\$198K	\$305K
INC	39	L	Add PT	16M	\$445K	\$195K	\$267K
INC	39	L	Add RH	18M	\$313K	\$250K	\$291K
INC	39	L	TOTAL		\$2,669K	\$2,142K	\$2,490K
INC	40	S	Add CB	6M	\$340K	\$91K	\$136K
INC	40	S	Add PT	16M	\$57K	\$90K	\$99K
INC	40	S	Add RH	18M	\$153K	\$60K	\$80K
INC	40	S	TOTAL		\$550K	\$242K	\$316K
INC	40	M	Add CI	9M	\$397K	\$147K	\$199K
INC	40	M	Add PT	16M	\$204K	\$124K	\$157K
INC	40	M	Add RH	18M	\$240K	\$122K	\$154K
INC	40	M	TOTAL		\$841K	\$394K	\$511K
INC	40	L	Add CI	9M	\$425K	\$224K	\$280K
INC	40	L	Add PT	16M	\$445K	\$195K	\$267K
INC	40	L	Add RH	18M	\$313K	\$250K	\$291K
INC	40	L	TOTAL		\$1,183K	\$669K	\$838K
INC	41	S	Add CB	6M	\$340K	\$91K	\$136K
INC	41	S	Add FF	4M	\$82K	\$89K	\$98K
INC	41	S	Add PT	16M	\$57K	\$90K	\$99K
INC	41	S	Add Q	2M	\$221K	\$41K	\$70K
INC	41	S	TOTAL		\$700K	\$311K	\$403K
INC	41	M	Add CI	9M	\$397K	\$147K	\$199K
INC	41	M	Add FF	4M	\$295K	\$121K	\$154K
INC	41	M	Add PT	16M	\$204K	\$124K	\$157K
INC	41	M	Add Q	2M	\$278K	\$48K	\$84K
INC	41	M	TOTAL		\$1,175K	\$440K	\$595K
INC	41	L	Add CI	9M	\$425K	\$224K	\$280K
INC	41	L	Add FF	4M	\$943K	\$198K	\$305K
INC	41	L	Add PT	16M	\$445K	\$195K	\$267K
INC	41	L	Add Q	2M	\$367K	\$61K	\$110K
INC	41	L	TOTAL		\$2,180K	\$678K	\$961K
INC	42	S	Add CB	6M	\$340K	\$91K	\$136K
INC	42	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	42	S	Add RH	18M	\$153K	\$60K	\$80K
INC	42	S	TOTAL		\$708K	\$249K	\$348K
INC	42	M	Add CI	9M	\$397K	\$147K	\$199K
INC	42	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	42	M	Add RH	18M	\$240K	\$122K	\$154K
INC	42	M	TOTAL		\$1,317K	\$414K	\$608K
INC	42	L	Add CI	9M	\$425K	\$224K	\$280K
INC	42	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	42	L	Add RH	18M	\$313K	\$250K	\$291K
INC	42	L	TOTAL		\$2,068K	\$702K	\$1,016K
INC	43	S	Add AB	17M	\$265K	\$192K	\$227K
INC	43	S	Add CB	6M	\$340K	\$91K	\$136K
INC	43	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	43	S	Add RH	18M	\$153K	\$60K	\$80K
INC	43	S	TOTAL		\$973K	\$441K	\$576K
INC	43	M	Add AB	17M	\$417K	\$534K	\$588K
INC	43	M	Add CI	9M	\$397K	\$147K	\$199K
INC	43	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	43	M	Add RH	18M	\$240K	\$122K	\$154K
INC	43	M	TOTAL		\$1,734K	\$947K	\$1,196K
INC	43	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	43	L	Add CI	9M	\$425K	\$224K	\$280K
INC	43	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	43	L	Add RH	18M	\$313K	\$250K	\$291K
INC	43	L	TOTAL		\$2,611K	\$1,978K	\$2,363K
INC	44	S	Add AB	17M	\$265K	\$192K	\$227K
INC	44	S	Add CB	6M	\$340K	\$91K	\$136K
INC	44	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	44	S	TOTAL		\$821K	\$381K	\$495K
INC	44	M	Add AB	17M	\$417K	\$534K	\$588K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	44	M	Add CI	9M	\$397K	\$147K	\$199K
INC	44	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	44	M	TOTAL		\$1,493K	\$825K	\$1,042K
INC	44	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	44	L	Add CI	9M	\$425K	\$224K	\$280K
INC	44	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	44	L	TOTAL		\$2,298K	\$1,728K	\$2,071K
INC	45	S	Add CB	6M	\$340K	\$91K	\$136K
INC	45	S	Add FF	4M	\$82K	\$89K	\$98K
INC	45	S	Add PT	16M	\$57K	\$90K	\$99K
INC	45	S	TOTAL		\$479K	\$270K	\$334K
INC	45	M	Add CI	9M	\$397K	\$147K	\$199K
INC	45	M	Add FF	4M	\$295K	\$121K	\$154K
INC	45	M	Add PT	16M	\$204K	\$124K	\$157K
INC	45	M	TOTAL		\$897K	\$392K	\$511K
INC	45	L	Add CI	9M	\$425K	\$224K	\$280K
INC	45	L	Add FF	4M	\$943K	\$198K	\$305K
INC	45	L	Add PT	16M	\$445K	\$195K	\$267K
INC	45	L	TOTAL		\$1,813K	\$616K	\$851K
INC	46	S	Add CB	6M	\$340K	\$91K	\$136K
INC	46	S	Add PT	16M	\$57K	\$90K	\$99K
INC	46	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	46	S	TOTAL		\$514K	\$181K	\$254K
INC	46	M	Add CI	9M	\$397K	\$147K	\$199K
INC	46	M	Add PT	16M	\$204K	\$124K	\$157K
INC	46	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	46	M	TOTAL		\$755K	\$271K	\$382K
INC	46	L	Add CI	9M	\$425K	\$224K	\$280K
INC	46	L	Add PT	16M	\$445K	\$195K	\$267K
INC	46	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	46	L	TOTAL		\$1,056K	\$419K	\$577K
INC	47	S	Add AB	17M	\$265K	\$192K	\$227K
INC	47	S	Add CB	6M	\$340K	\$91K	\$136K
INC	47	S	Add PT	16M	\$57K	\$90K	\$99K
INC	47	S	Add RH	18M	\$153K	\$60K	\$80K
INC	47	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	47	S	TOTAL		\$827K	\$440K	\$553K
INC	47	M	Add AB	17M	\$417K	\$534K	\$588K
INC	47	M	Add CI	9M	\$397K	\$147K	\$199K
INC	47	M	Add PT	16M	\$204K	\$124K	\$157K
INC	47	M	Add RH	18M	\$240K	\$122K	\$154K
INC	47	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	47	M	TOTAL		\$1,304K	\$963K	\$1,147K
INC	47	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	47	L	Add CI	9M	\$425K	\$224K	\$280K
INC	47	L	Add PT	16M	\$445K	\$195K	\$267K
INC	47	L	Add RH	18M	\$313K	\$250K	\$291K
INC	47	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	47	L	TOTAL		\$1,830K	\$2,041K	\$2,312K
INC	48	S	Add AB	17M	\$265K	\$192K	\$227K
INC	48	S	Add CB	6M	\$340K	\$91K	\$136K
INC	48	S	Add FF	4M	\$82K	\$89K	\$98K
INC	48	S	Add PT	16M	\$57K	\$90K	\$99K
INC	48	S	Add Q	2M	\$221K	\$41K	\$70K
INC	48	S	TOTAL		\$966K	\$503K	\$631K
INC	48	M	Add AB	17M	\$417K	\$534K	\$588K
INC	48	M	Add CI	9M	\$397K	\$147K	\$199K
INC	48	M	Add FF	4M	\$295K	\$121K	\$154K
INC	48	M	Add PT	16M	\$204K	\$124K	\$157K
INC	48	M	Add Q	2M	\$278K	\$48K	\$84K
INC	48	M	TOTAL		\$1,592K	\$974K	\$1,184K
INC	48	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	48	L	Add CI	9M	\$425K	\$224K	\$280K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	48	L	Add FF	4M	\$943K	\$198K	\$305K
INC	48	L	Add PT	16M	\$445K	\$195K	\$267K
INC	48	L	Add Q	2M	\$367K	\$61K	\$110K
INC	48	L	TOTAL		\$2,723K	\$1,953K	\$2,308K
INC	49	S	Add CB	6M	\$340K	\$91K	\$136K
INC	49	S	Add FF	4M	\$82K	\$89K	\$98K
INC	49	S	TOTAL		\$422K	\$180K	\$234K
INC	49	M	Add CI	9M	\$397K	\$147K	\$199K
INC	49	M	Add FF	4M	\$295K	\$121K	\$154K
INC	49	M	TOTAL		\$692K	\$268K	\$354K
INC	49	L	Add CI	9M	\$425K	\$224K	\$280K
INC	49	L	Add FF	4M	\$943K	\$198K	\$305K
INC	49	L	TOTAL		\$1,368K	\$422K	\$584K
INC	51	S	Add CB	6M	\$340K	\$91K	\$136K
INC	51	S	Add RH	18M	\$153K	\$60K	\$80K
INC	51	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	51	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	51	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	51	S	TOTAL		\$633K	\$160K	\$251K
INC	51	M	Add CI	9M	\$397K	\$147K	\$199K
INC	51	M	Add RH	18M	\$240K	\$122K	\$154K
INC	51	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	51	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	51	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	51	M	TOTAL		\$908K	\$320K	\$459K
INC	51	L	Add CI	9M	\$425K	\$224K	\$280K
INC	51	L	Add RH	18M	\$313K	\$250K	\$291K
INC	51	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	51	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	51	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	51	L	TOTAL		\$1,223K	\$611K	\$820K
INC	52	S	Add AB	17M	\$265K	\$192K	\$227K
INC	52	S	Add PT	16M	\$57K	\$90K	\$99K
INC	52	S	Add Q	2M	\$221K	\$41K	\$70K
INC	52	S	TOTAL		\$544K	\$323K	\$396K
INC	52	M	Add AB	17M	\$417K	\$534K	\$588K
INC	52	M	Add PT	16M	\$204K	\$124K	\$157K
INC	52	M	Add Q	2M	\$278K	\$48K	\$84K
INC	52	M	TOTAL		\$899K	\$706K	\$830K
INC	52	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	52	L	Add PT	16M	\$445K	\$195K	\$267K
INC	52	L	Add Q	2M	\$367K	\$61K	\$110K
INC	52	L	TOTAL		\$1,355K	\$1,531K	\$1,723K
INC	53	S	Add CB	6M	\$340K	\$91K	\$136K
INC	53	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	53	S	TOTAL		\$457K	\$91K	\$155K
INC	53	M	Add CI	9M	\$397K	\$147K	\$199K
INC	53	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	53	M	TOTAL		\$551K	\$147K	\$225K
INC	53	L	Add CI	9M	\$425K	\$224K	\$280K
INC	53	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	53	L	TOTAL		\$610K	\$224K	\$310K
INC	54	S	Add CB	6M	\$340K	\$91K	\$136K
INC	54	S	Add FF	4M	\$82K	\$89K	\$98K
INC	54	S	Add RH	18M	\$153K	\$60K	\$80K
INC	54	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	54	S	TOTAL		\$691K	\$241K	\$334K
INC	54	M	Add CI	9M	\$397K	\$147K	\$199K
INC	54	M	Add FF	4M	\$295K	\$121K	\$154K
INC	54	M	Add RH	18M	\$240K	\$122K	\$154K
INC	54	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	54	M	TOTAL		\$1,087K	\$391K	\$533K
INC	54	L	Add CI	9M	\$425K	\$224K	\$280K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	54	L	Add FF	4M	\$943K	\$198K	\$305K
INC	54	L	Add RH	18M	\$313K	\$250K	\$291K
INC	54	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	54	L	TOTAL		\$1,866K	\$672K	\$906K
INC	55	S	Add FF	4M	\$82K	\$89K	\$98K
INC	55	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	55	S	TOTAL		\$198K	\$89K	\$117K
INC	55	M	Add FF	4M	\$295K	\$121K	\$154K
INC	55	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	55	M	TOTAL		\$450K	\$121K	\$179K
INC	55	L	Add FF	4M	\$943K	\$198K	\$305K
INC	55	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	55	L	TOTAL		\$1,129K	\$198K	\$335K
INC	56	S	Add CB	6M	\$340K	\$91K	\$136K
INC	56	S	Add FF	4M	\$82K	\$89K	\$98K
INC	56	S	Add RH	18M	\$153K	\$60K	\$80K
INC	56	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	56	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	56	S	TOTAL		\$704K	\$243K	\$340K
INC	56	M	Add CI	9M	\$397K	\$147K	\$199K
INC	56	M	Add FF	4M	\$295K	\$121K	\$154K
INC	56	M	Add RH	18M	\$240K	\$122K	\$154K
INC	56	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	56	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	56	M	TOTAL		\$1,158K	\$405K	\$566K
INC	56	L	Add CI	9M	\$425K	\$224K	\$280K
INC	56	L	Add FF	4M	\$943K	\$198K	\$305K
INC	56	L	Add RH	18M	\$313K	\$250K	\$291K
INC	56	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	56	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	56	L	TOTAL		\$2,061K	\$712K	\$998K
INC	57	S	Add AB	17M	\$265K	\$192K	\$227K
INC	57	S	Add PT	16M	\$57K	\$90K	\$99K
INC	57	S	TOTAL		\$323K	\$282K	\$327K
INC	57	M	Add AB	17M	\$417K	\$534K	\$588K
INC	57	M	Add PT	16M	\$204K	\$124K	\$157K
INC	57	M	TOTAL		\$621K	\$658K	\$746K
INC	57	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	57	L	Add PT	16M	\$445K	\$195K	\$267K
INC	57	L	TOTAL		\$988K	\$1,470K	\$1,614K
INC	58	S	Add CB	6M	\$340K	\$91K	\$136K
INC	58	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	58	S	Moderate DOM on existing DI	13E	\$210K	\$4K	\$38K
INC	58	S	TOTAL		\$554K	\$96K	\$175K
INC	58	M	Add CI	9M	\$397K	\$147K	\$199K
INC	58	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	58	M	Moderate DOM on existing DI	13E	\$362K	\$21K	\$79K
INC	58	M	TOTAL		\$778K	\$174K	\$286K
INC	58	L	Add CI	9M	\$425K	\$224K	\$280K
INC	58	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	58	L	Moderate DOM on existing DI	13E	\$535K	\$57K	\$143K
INC	58	L	TOTAL		\$1,011K	\$298K	\$442K
INC	59	S	Add CB	6M	\$340K	\$91K	\$136K
INC	59	S	Add Q	2M	\$221K	\$41K	\$70K
INC	59	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	59	S	TOTAL		\$574K	\$134K	\$212K
INC	59	M	Add Q	2M	\$278K	\$48K	\$84K
INC	59	M	Add CI	9M	\$397K	\$147K	\$199K
INC	59	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	59	M	TOTAL		\$746K	\$210K	\$317K
INC	59	L	Add CI	9M	\$425K	\$224K	\$280K
INC	59	L	Add Q	2M	\$367K	\$61K	\$110K
INC	59	L	DOM WS mod	12E	\$195K	\$41K	\$92K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	59	L	TOTAL		\$986K	\$326K	\$481K
INC	60	S	Add PT	16M	\$57K	\$90K	\$99K
INC	60	S	Small DOM on existing WS	5E	\$11K	\$5K	\$7K
INC	60	S	TOTAL		\$68K	\$95K	\$106K
INC	60	M	Add PT	16M	\$204K	\$124K	\$157K
INC	60	M	Small DOM on existing WS	5E	\$40K	\$13K	\$20K
INC	60	M	TOTAL		\$244K	\$137K	\$178K
INC	60	L	Add PT	16M	\$445K	\$195K	\$267K
INC	60	L	Small DOM on existing WS	5E	\$101K	\$30K	\$49K
INC	60	L	TOTAL		\$546K	\$224K	\$316K
INC	61	S	Add CB	6M	\$340K	\$91K	\$136K
INC	61	S	Add RH	18M	\$153K	\$60K	\$80K
INC	61	S	TOTAL		\$493K	\$152K	\$216K
INC	61	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	61	M	Add RH	18M	\$240K	\$122K	\$154K
INC	61	M	TOTAL		\$1,580K	\$299K	\$507K
INC	61	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	61	L	Add RH	18M	\$313K	\$250K	\$291K
INC	61	L	TOTAL		\$3,687K	\$603K	\$1,088K
INC	62	S	Add FF	4M	\$82K	\$89K	\$98K
INC	62	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	62	S	TOTAL		\$93K	\$94K	\$105K
INC	62	M	Add FF	4M	\$295K	\$121K	\$154K
INC	62	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	62	M	TOTAL		\$335K	\$134K	\$175K
INC	62	L	Add FF	4M	\$943K	\$198K	\$305K
INC	62	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	62	L	TOTAL		\$1,044K	\$227K	\$354K
INC	63	S	Add CB	6M	\$340K	\$91K	\$136K
INC	63	S	Add PT	16M	\$57K	\$90K	\$99K
INC	63	S	Add RH	18M	\$153K	\$60K	\$80K
INC	63	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	63	S	TOTAL		\$561K	\$248K	\$326K
INC	63	S	Add CB	6M	\$340K	\$91K	\$136K
INC	63	S	Add RH	18M	\$153K	\$60K	\$80K
INC	63	S	Moderate DOM on existing VS	7E	\$11K	\$6K	\$10K
INC	63	S	TOTAL		\$504K	\$158K	\$226K
INC	63	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	63	M	Add PT	16M	\$204K	\$124K	\$157K
INC	63	M	Add RH	18M	\$240K	\$122K	\$154K
INC	63	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	63	M	TOTAL		\$1,830K	\$458K	\$711K
INC	63	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	63	M	Add RH	18M	\$240K	\$122K	\$154K
INC	63	M	Moderate DOM on existing VS	7E	\$46K	\$35K	\$47K
INC	63	M	TOTAL		\$1,625K	\$334K	\$554K
INC	63	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	63	L	Add PT	16M	\$445K	\$195K	\$267K
INC	63	L	Add RH	18M	\$313K	\$250K	\$291K
INC	63	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	63	L	TOTAL		\$4,237K	\$894K	\$1,482K
INC	63	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	63	L	Add RH	18M	\$313K	\$250K	\$291K
INC	63	L	Moderate DOM on existing VS	7E	\$105K	\$97K	\$127K
INC	63	L	TOTAL		\$3,792K	\$700K	\$1,215K
INC	64	S	Add CB	6M	\$340K	\$91K	\$136K
INC	64	S	Add FF	4M	\$82K	\$89K	\$98K
INC	64	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	64	S	TOTAL		\$538K	\$180K	\$253K
INC	64	M	Add CI	9M	\$397K	\$147K	\$199K
INC	64	M	Add FF	4M	\$295K	\$121K	\$154K
INC	64	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	64	M	TOTAL		\$846K	\$268K	\$379K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	64	L	Add CI	9M	\$425K	\$224K	\$280K
INC	64	L	Add FF	4M	\$943K	\$198K	\$305K
INC	64	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	64	L	TOTAL		\$1,553K	\$422K	\$615K
INC	65	S	Add CB	6M	\$340K	\$91K	\$136K
INC	65	S	Add FF	4M	\$82K	\$89K	\$98K
INC	65	S	Add RH	18M	\$153K	\$60K	\$80K
INC	65	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	65	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	65	S	TOTAL		\$702K	\$246K	\$341K
INC	65	M	Add CI	9M	\$397K	\$147K	\$199K
INC	65	M	Add FF	4M	\$295K	\$121K	\$154K
INC	65	M	Add RH	18M	\$240K	\$122K	\$154K
INC	65	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	65	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	65	M	TOTAL		\$1,126K	\$403K	\$553K
INC	65	L	Add CI	9M	\$425K	\$224K	\$280K
INC	65	L	Add FF	4M	\$943K	\$198K	\$305K
INC	65	L	Add RH	18M	\$313K	\$250K	\$291K
INC	65	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	65	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	65	L	TOTAL		\$1,967K	\$702K	\$955K
INC	66	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	66	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	66	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	67	S	Add CB	6M	\$340K	\$91K	\$136K
INC	67	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	67	S	TOTAL		\$344K	\$92K	\$137K
INC	67	M	Add CI	9M	\$397K	\$147K	\$199K
INC	67	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	67	M	TOTAL		\$416K	\$153K	\$206K
INC	67	L	Add CI	9M	\$425K	\$224K	\$280K
INC	67	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	67	L	TOTAL		\$476K	\$241K	\$299K
INC	68	S	Add CB	6M	\$340K	\$91K	\$136K
INC	68	S	Add RH	18M	\$153K	\$60K	\$80K
INC	68	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	68	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	68	S	TOTAL		\$517K	\$160K	\$232K
INC	68	M	Add CI	9M	\$397K	\$147K	\$199K
INC	68	M	Add RH	18M	\$240K	\$122K	\$154K
INC	68	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	68	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	68	M	TOTAL		\$754K	\$320K	\$434K
INC	68	L	Add CI	9M	\$425K	\$224K	\$280K
INC	68	L	Add RH	18M	\$313K	\$250K	\$291K
INC	68	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	68	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	68	L	TOTAL		\$1,037K	\$611K	\$790K
INC	69	S	Add CB	6M	\$340K	\$91K	\$136K
INC	69	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	69	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	69	S	TOTAL		\$468K	\$96K	\$162K
INC	69	M	Add CI	9M	\$397K	\$147K	\$199K
INC	69	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	69	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	69	M	TOTAL		\$591K	\$160K	\$245K
INC	69	L	Add CI	9M	\$425K	\$224K	\$280K
INC	69	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	69	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	69	L	TOTAL		\$711K	\$254K	\$359K
INC	70	S	Add AB	17M	\$265K	\$192K	\$227K
INC	70	S	Add CB	6M	\$340K	\$91K	\$136K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	70	S	Add FF	4M	\$82K	\$89K	\$98K
INC	70	S	Add RH	18M	\$153K	\$60K	\$80K
INC	70	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	70	S	TOTAL		\$853K	\$436K	\$548K
INC	70	M	Add AB	17M	\$417K	\$534K	\$588K
INC	70	M	Add CI	9M	\$397K	\$147K	\$199K
INC	70	M	Add FF	4M	\$295K	\$121K	\$154K
INC	70	M	Add RH	18M	\$240K	\$122K	\$154K
INC	70	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	70	M	TOTAL		\$1,420K	\$939K	\$1,129K
INC	70	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	70	L	Add CI	9M	\$425K	\$224K	\$280K
INC	70	L	Add FF	4M	\$943K	\$198K	\$305K
INC	70	L	Add RH	18M	\$313K	\$250K	\$291K
INC	70	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	70	L	TOTAL		\$2,418K	\$1,988K	\$2,314K
INC	71	S	Add AB	17M	\$265K	\$192K	\$227K
INC	71	S	Add FF	4M	\$82K	\$89K	\$98K
INC	71	S	TOTAL		\$347K	\$282K	\$326K
INC	71	M	Add AB	17M	\$417K	\$534K	\$588K
INC	71	M	Add FF	4M	\$295K	\$121K	\$154K
INC	71	M	TOTAL		\$712K	\$654K	\$742K
INC	71	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	71	L	Add FF	4M	\$943K	\$198K	\$305K
INC	71	L	TOTAL		\$1,486K	\$1,473K	\$1,651K
INC	72	S	Add Q	2M	\$221K	\$41K	\$70K
INC	72	M	Add Q	2M	\$278K	\$48K	\$84K
INC	72	L	Add Q	2M	\$367K	\$61K	\$110K
INC	73	S	Add FF	4M	\$82K	\$89K	\$98K
INC	73	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	73	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	73	S	TOTAL		\$209K	\$94K	\$124K
INC	73	M	Add FF	4M	\$295K	\$121K	\$154K
INC	73	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	73	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	73	M	TOTAL		\$489K	\$134K	\$200K
INC	73	L	Add FF	4M	\$943K	\$198K	\$305K
INC	73	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	73	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	73	L	TOTAL		\$1,230K	\$227K	\$384K
INC	74	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	74	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	74	S	TOTAL		\$127K	\$5K	\$26K
INC	74	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	74	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	74	M	TOTAL		\$194K	\$13K	\$46K
INC	74	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	74	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	74	L	TOTAL		\$287K	\$30K	\$79K
INC	75	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	75	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	75	S	TOTAL		\$120K	\$1K	\$20K
INC	75	M	DOM Combustor	14E	\$154K	\$K	\$25K
INC	75	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	75	M	TOTAL		\$173K	\$6K	\$32K
INC	75	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	75	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	75	L	TOTAL		\$237K	\$17K	\$49K
INC	76	S	DOM Combustor	14E	\$116K	\$K	\$19K
INC	76	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	76	S	DOM WS small	5E	\$11K	\$5K	\$7K
INC	76	S	TOTAL		\$138K	\$11K	\$36K
INC	76	M	DOM Combustor	14E	\$154K	\$K	\$25K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	76	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	76	M	DOM WS small	5E	\$40K	\$13K	\$20K
INC	76	M	TOTAL		\$240K	\$48K	\$93K
INC	76	L	DOM Combustor	14E	\$186K	\$K	\$30K
INC	76	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	76	L	DOM WS small	5E	\$101K	\$30K	\$49K
INC	76	L	TOTAL		\$391K	\$126K	\$206K
INC	77	S	DOM VS mod	7E	\$11K	\$6K	\$10K
INC	77	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	77	S	TOTAL		\$24K	\$9K	\$16K
INC	77	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	77	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	77	M	TOTAL		\$117K	\$50K	\$81K
INC	77	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	77	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	77	L	TOTAL		\$300K	\$137K	\$219K
INC	78	S	Add AB	17M	\$265K	\$192K	\$227K
INC	78	S	Add FF	4M	\$82K	\$89K	\$98K
INC	78	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	78	S	TOTAL		\$360K	\$284K	\$332K
INC	78	M	Add AB	17M	\$417K	\$534K	\$588K
INC	78	M	Add FF	4M	\$295K	\$121K	\$154K
INC	78	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	78	M	TOTAL		\$783K	\$669K	\$776K
INC	78	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	78	L	Add FF	4M	\$943K	\$198K	\$305K
INC	78	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	78	L	TOTAL		\$1,681K	\$1,514K	\$1,743K
INC	79	S	Add AB	17M	\$265K	\$192K	\$227K
INC	79	S	Add PT	16M	\$57K	\$90K	\$99K
INC	79	S	Add Q	2M	\$221K	\$41K	\$70K
INC	79	S	DOM FF mod	4E	\$3K	\$1K	\$1K
INC	79	S	TOTAL		\$547K	\$324K	\$397K
INC	79	M	Add AB	17M	\$417K	\$534K	\$588K
INC	79	M	Add PT	16M	\$204K	\$124K	\$157K
INC	79	M	Add Q	2M	\$278K	\$48K	\$84K
INC	79	M	DOM FF mod	4E	\$19K	\$6K	\$7K
INC	79	M	TOTAL		\$918K	\$712K	\$837K
INC	79	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	79	L	Add PT	16M	\$445K	\$195K	\$267K
INC	79	L	Add Q	2M	\$367K	\$61K	\$110K
INC	79	L	DOM FF mod	4E	\$52K	\$17K	\$19K
INC	79	L	TOTAL		\$1,406K	\$1,548K	\$1,742K
INC	80	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	80	M	Add PT	16M	\$204K	\$124K	\$157K
INC	80	M	Add RH	18M	\$240K	\$122K	\$154K
INC	80	M	DOM VS mod	7E	\$46K	\$35K	\$47K
INC	80	M	TOTAL		\$1,830K	\$458K	\$711K
INC	80	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	80	L	Add PT	16M	\$445K	\$195K	\$267K
INC	80	L	Add RH	18M	\$313K	\$250K	\$291K
INC	80	L	DOM VS mod	7E	\$105K	\$97K	\$127K
INC	80	L	TOTAL		\$4,237K	\$894K	\$1,482K
INC	81	S	Add AB	17M	\$265K	\$192K	\$227K
INC	81	M	Add AB	17M	\$417K	\$534K	\$588K
INC	81	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	82	S	Moderate DOM on Combustor	14E	\$116K	\$K	\$19K
INC	82	S	Small DOM on existing ESP	2E	\$221K	\$41K	\$70K
INC	82	S	TOTAL		\$337K	\$41K	\$89K
INC	82	M	Moderate DOM on Combustor	14E	\$154K	\$K	\$25K
INC	82	M	Small DOM on existing ESP	2E	\$278K	\$48K	\$84K
INC	82	M	TOTAL		\$432K	\$48K	\$110K
INC	82	L	Moderate DOM on Combustor	14E	\$186K	\$K	\$30K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	82	L	Small DOM on exisiting ESP	2E	\$367K	\$61K	\$110K
INC	82	L	TOTAL		\$552K	\$61K	\$140K
INC	83	S	Add AB	17M	\$265K	\$192K	\$227K
INC	83	S	Moderate DOM on exisiting VS	7E	\$11K	\$6K	\$10K
INC	83	S	Small DOM on existing WS	5E	\$11K	\$5K	\$7K
INC	83	S	TOTAL		\$287K	\$204K	\$244K
INC	83	M	Add AB	17M	\$417K	\$534K	\$588K
INC	83	M	Moderate DOM on exisiting VS	7E	\$46K	\$35K	\$47K
INC	83	M	Small DOM on existing WS	5E	\$40K	\$13K	\$20K
INC	83	M	TOTAL		\$502K	\$581K	\$656K
INC	83	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	83	L	Moderate DOM on exisiting VS	7E	\$105K	\$97K	\$127K
INC	83	L	Small DOM on existing WS	5E	\$101K	\$30K	\$49K
INC	83	L	TOTAL		\$748K	\$1,402K	\$1,523K
INC	84	S	DOM Combustor mod	14E	\$116K	\$K	\$19K
INC	84	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	84	S	TOTAL		\$129K	\$3K	\$25K
INC	84	M	DOM Combustor mod	14E	\$154K	\$K	\$25K
INC	84	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	84	M	TOTAL		\$225K	\$15K	\$59K
INC	84	L	DOM Combustor mod	14E	\$186K	\$K	\$30K
INC	84	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	84	L	TOTAL		\$381K	\$41K	\$122K
INC	85	S	Add PT	16M	\$57K	\$90K	\$99K
INC	85	S	Add Q	2M	\$221K	\$41K	\$70K
INC	85	S	TOTAL		\$278K	\$130K	\$169K
INC	85	M	Add PT	16M	\$204K	\$124K	\$157K
INC	85	M	Add Q	2M	\$278K	\$48K	\$84K
INC	85	M	TOTAL		\$483K	\$172K	\$242K
INC	85	L	Add PT	16M	\$445K	\$195K	\$267K
INC	85	L	Add Q	2M	\$367K	\$61K	\$110K
INC	85	L	TOTAL		\$812K	\$256K	\$377K
INC	86	S	Add CB	6M	\$340K	\$91K	\$136K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	86	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	86	S	Add Q	2M	\$221K	\$41K	\$70K
INC	86	S	TOTAL		\$776K	\$229K	\$338K
INC	86	M	Add CI	9M	\$397K	\$147K	\$199K
INC	86	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	86	M	Add Q	2M	\$278K	\$48K	\$84K
INC	86	M	TOTAL		\$1,355K	\$339K	\$538K
INC	86	L	Add CI	9M	\$425K	\$224K	\$280K
INC	86	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	86	L	Add Q	2M	\$367K	\$61K	\$110K
INC	86	L	TOTAL		\$2,122K	\$513K	\$834K
INC	87	S	DOM VS small	6E	\$5K	\$7K	\$8K
INC	87	S	DOM WS mod	12E	\$13K	\$3K	\$6K
INC	87	S	TOTAL		\$18K	\$9K	\$14K
INC	87	M	DOM VS small	6E	\$21K	\$15K	\$19K
INC	87	M	DOM WS mod	12E	\$71K	\$15K	\$33K
INC	87	M	TOTAL		\$92K	\$30K	\$53K
INC	87	L	DOM VS small	6E	\$47K	\$34K	\$43K
INC	87	L	DOM WS mod	12E	\$195K	\$41K	\$92K
INC	87	L	TOTAL		\$242K	\$75K	\$135K
INC	88	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	88	M	Add FF	4M	\$295K	\$121K	\$154K
INC	88	M	Add RH	18M	\$240K	\$122K	\$154K
INC	88	M	TOTAL		\$1,875K	\$420K	\$661K
INC	88	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	88	L	Add FF	4M	\$943K	\$198K	\$305K
INC	88	L	Add RH	18M	\$313K	\$250K	\$291K
INC	88	L	TOTAL		\$4,630K	\$801K	\$1,392K
INC	89	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	89	M	Add FF	4M	\$295K	\$121K	\$154K
INC	89	M	Add Q	2M	\$278K	\$48K	\$84K
INC	89	M	TOTAL		\$1,913K	\$345K	\$591K
INC	89	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	89	L	Add FF	4M	\$943K	\$198K	\$305K
INC	89	L	Add Q	2M	\$367K	\$61K	\$110K
INC	89	L	TOTAL		\$4,684K	\$612K	\$1,211K
INC	90	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	90	M	Add FF	4M	\$295K	\$121K	\$154K
INC	90	M	Add PT	16M	\$204K	\$124K	\$157K
INC	90	M	Add RH	18M	\$240K	\$122K	\$154K
INC	90	M	TOTAL		\$2,080K	\$544K	\$818K
INC	90	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	90	L	Add FF	4M	\$943K	\$198K	\$305K
INC	90	L	Add PT	16M	\$445K	\$195K	\$267K
INC	90	L	Add RH	18M	\$313K	\$250K	\$291K
INC	90	L	TOTAL		\$5,076K	\$995K	\$1,659K
INC	91	S	Add CB	6M	\$340K	\$91K	\$136K
INC	91	S	Add FF	4M	\$82K	\$89K	\$98K
INC	91	S	Add PT	16M	\$57K	\$90K	\$99K
INC	91	S	Add RH	18M	\$153K	\$60K	\$80K
INC	91	S	DOM Combustor Mod	14E	\$116K	\$K	\$19K
INC	91	S	TOTAL		\$749K	\$331K	\$433K
INC	91	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	91	M	Add FF	4M	\$295K	\$121K	\$154K
INC	91	M	Add PT	16M	\$204K	\$124K	\$157K
INC	91	M	Add RH	18M	\$240K	\$122K	\$154K
INC	91	M	DOM Combustor Mod	14E	\$154K	\$K	\$25K
INC	91	M	TOTAL		\$2,234K	\$544K	\$843K
INC	91	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	91	L	Add FF	4M	\$943K	\$198K	\$305K
INC	91	L	Add PT	16M	\$445K	\$195K	\$267K
INC	91	L	Add RH	18M	\$313K	\$250K	\$291K
INC	91	L	DOM Combustor Mod	14E	\$186K	\$K	\$30K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	91	L	TOTAL		\$5,261K	\$995K	\$1,689K
INC	92	S	Add FF	4M	\$82K	\$89K	\$98K
INC	92	S	Add Q	2M	\$221K	\$41K	\$70K
INC	92	S	TOTAL		\$303K	\$130K	\$168K
INC	92	M	Add FF	4M	\$295K	\$121K	\$154K
INC	92	M	Add Q	2M	\$278K	\$48K	\$84K
INC	92	M	TOTAL		\$574K	\$169K	\$239K
INC	92	L	Add FF	4M	\$943K	\$198K	\$305K
INC	92	L	Add Q	2M	\$367K	\$61K	\$110K
INC	92	L	TOTAL		\$1,310K	\$259K	\$414K
INC	93	S	Add CB	6M	\$340K	\$91K	\$136K
INC	93	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	93	S	Add RH	18M	\$153K	\$60K	\$80K
INC	93	S	DOM Combustor mod	14E	\$116K	\$K	\$19K
INC	93	S	TOTAL		\$824K	\$249K	\$367K
INC	93	M	Add CI	9M	\$397K	\$147K	\$199K
INC	93	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	93	M	Add RH	18M	\$240K	\$122K	\$154K
INC	93	M	DOM Combustor mod	14E	\$154K	\$K	\$25K
INC	93	M	TOTAL		\$1,471K	\$414K	\$633K
INC	93	L	Add CI	9M	\$425K	\$224K	\$280K
INC	93	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	93	L	Add RH	18M	\$313K	\$250K	\$291K
INC	93	L	DOM Combustor mod	14E	\$186K	\$K	\$30K
INC	93	L	TOTAL		\$2,254K	\$702K	\$1,046K
INC	94	S	DOM Combustor mod	14E	\$116K	\$K	\$19K
INC	94	M	DOM Combustor mod	14E	\$154K	\$K	\$25K
INC	94	L	DOM Combustor mod	14E	\$186K	\$K	\$30K
INC	95	S	DOM VS small	6E	\$5K	\$7K	\$8K
INC	95	M	DOM VS small	6E	\$21K	\$15K	\$19K
INC	95	L	DOM VS small	6E	\$47K	\$34K	\$43K
INC	96	S	Moderate DOM on Combustor	14E	\$116K	\$K	\$19K
INC	96	S	Moderate DOM on existing VS	7E	\$11K	\$6K	\$10K
INC	96	S	TOTAL		\$127K	\$6K	\$29K
INC	96	M	Moderate DOM on Combustor	14E	\$154K	\$K	\$25K
INC	96	M	Moderate DOM on existing VS	7E	\$46K	\$35K	\$47K
INC	96	M	TOTAL		\$200K	\$35K	\$72K
INC	96	L	Moderate DOM on Combustor	14E	\$186K	\$K	\$30K
INC	96	L	Moderate DOM on existing VS	7E	\$105K	\$97K	\$127K
INC	96	L	TOTAL		\$290K	\$97K	\$157K
INC	97	S	Add AB	17M	\$265K	\$192K	\$227K
INC	97	S	Add CB	6M	\$340K	\$91K	\$136K
INC	97	S	Add FF	4M	\$82K	\$89K	\$98K
INC	97	S	TOTAL		\$687K	\$373K	\$462K
INC	97	M	Add AB	17M	\$417K	\$534K	\$588K
INC	97	M	Add CI	9M	\$397K	\$147K	\$199K
INC	97	M	Add FF	4M	\$295K	\$121K	\$154K
INC	97	M	TOTAL		\$1,109K	\$802K	\$942K
INC	97	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	97	L	Add CI	9M	\$425K	\$224K	\$280K
INC	97	L	Add FF	4M	\$943K	\$198K	\$305K
INC	97	L	TOTAL		\$1,910K	\$1,697K	\$1,931K
INC	98	S	Add AB	17M	\$265K	\$192K	\$227K
INC	98	S	Add CB	6M	\$340K	\$91K	\$136K
INC	98	S	Add FF	4M	\$82K	\$89K	\$98K
INC	98	S	Add RH	18M	\$153K	\$60K	\$80K
INC	98	S	Small DOM on existing WS	5E	\$11K	\$5K	\$7K
INC	98	S	TOTAL		\$851K	\$438K	\$549K
INC	98	M	Add AB	17M	\$417K	\$534K	\$588K
INC	98	M	Add CI	9M	\$397K	\$147K	\$199K
INC	98	M	Add FF	4M	\$295K	\$121K	\$154K
INC	98	M	Add RH	18M	\$240K	\$122K	\$154K
INC	98	M	Small DOM on existing WS	5E	\$40K	\$13K	\$20K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	98	M	TOTAL		\$1,389K	\$937K	\$1,116K
INC	98	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	98	L	Add CI	9M	\$425K	\$224K	\$280K
INC	98	L	Add FF	4M	\$943K	\$198K	\$305K
INC	98	L	Add RH	18M	\$313K	\$250K	\$291K
INC	98	L	Small DOM on existing WS	5E	\$101K	\$30K	\$49K
INC	98	L	TOTAL		\$2,324K	\$1,977K	\$2,272K
INC	99	S	Add CB	6M	\$340K	\$91K	\$136K
INC	99	S	Add Q	2M	\$221K	\$41K	\$70K
INC	99	S	Moderate DOM on existing FF	4E	\$3K	\$1K	\$1K
INC	99	S	Moderate DOM on existing WS	12E	\$13K	\$3K	\$6K
INC	99	S	TOTAL		\$577K	\$136K	\$213K
INC	99	M	Add CI	9M	\$397K	\$147K	\$199K
INC	99	M	Add Q	2M	\$278K	\$48K	\$84K
INC	99	M	Moderate DOM on existing FF	4E	\$19K	\$6K	\$7K
INC	99	M	Moderate DOM on existing WS	12E	\$71K	\$15K	\$33K
INC	99	M	TOTAL		\$765K	\$216K	\$324K
INC	99	L	Add CI	9M	\$425K	\$224K	\$280K
INC	99	L	Add Q	2M	\$367K	\$61K	\$110K
INC	99	L	Moderate DOM on existing FF	4E	\$52K	\$17K	\$19K
INC	99	L	Moderate DOM on existing WS	12E	\$195K	\$41K	\$92K
INC	99	L	TOTAL		\$1,038K	\$343K	\$500K
INC	100	S	Add CB	6M	\$340K	\$91K	\$136K
INC	100	S	Moderate DOM on existing FF	4E	\$3K	\$1K	\$1K
INC	100	S	TOTAL		\$344K	\$92K	\$137K
INC	100	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	100	M	Moderate DOM on existing FF	4E	\$19K	\$6K	\$7K
INC	100	M	TOTAL		\$1,358K	\$183K	\$359K
INC	100	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	100	L	Moderate DOM on existing FF	4E	\$52K	\$17K	\$19K
INC	100	L	TOTAL		\$3,426K	\$370K	\$815K
INC	101	S	Add AB	17M	\$265K	\$192K	\$227K
INC	101	S	Add CB	6M	\$340K	\$91K	\$136K
INC	101	S	Add FF	4M	\$82K	\$89K	\$98K
INC	101	S	Add RH	18M	\$153K	\$60K	\$80K
INC	101	S	TOTAL		\$840K	\$433K	\$542K
INC	101	M	Add AB	17M	\$417K	\$534K	\$588K
INC	101	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	101	M	Add FF	4M	\$295K	\$121K	\$154K
INC	101	M	Add RH	18M	\$240K	\$122K	\$154K
INC	101	M	TOTAL		\$2,292K	\$953K	\$1,249K
INC	101	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	101	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	101	L	Add FF	4M	\$943K	\$198K	\$305K
INC	101	L	Add RH	18M	\$313K	\$250K	\$291K
INC	101	L	TOTAL		\$5,173K	\$2,076K	\$2,739K
INC	102	S	Add CB	6M	\$340K	\$91K	\$136K
INC	102	S	Add FF	4M	\$82K	\$89K	\$98K
INC	102	S	Add RH	18M	\$153K	\$60K	\$80K
INC	102	S	Moderate DOM on existing WS	12E	\$13K	\$3K	\$6K
INC	102	S	TOTAL		\$588K	\$243K	\$321K
INC	102	M	Add CI	9M	\$397K	\$147K	\$199K
INC	102	M	Add FF	4M	\$295K	\$121K	\$154K
INC	102	M	Add RH	18M	\$240K	\$122K	\$154K
INC	102	M	Moderate DOM on existing WS	12E	\$71K	\$15K	\$33K
INC	102	M	TOTAL		\$1,004K	\$405K	\$541K
INC	102	L	Add CI	9M	\$425K	\$224K	\$280K
INC	102	L	Add FF	4M	\$943K	\$198K	\$305K
INC	102	L	Add RH	18M	\$313K	\$250K	\$291K
INC	102	L	Moderate DOM on existing WS	12E	\$195K	\$41K	\$92K
INC	102	L	TOTAL		\$1,876K	\$712K	\$968K
INC	103	S	Add CB	6M	\$340K	\$91K	\$136K
INC	103	S	Small DOM on existing ESP	2E	\$221K	\$41K	\$70K

US EPA ARCHIVE DOCUMENT

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	103	S	TOTAL		\$561K	\$132K	\$206K
INC	103	M	Add CI	9M	\$397K	\$147K	\$199K
INC	103	M	Small DOM on existing ESP	2E	\$278K	\$48K	\$84K
INC	103	M	TOTAL		\$675K	\$195K	\$284K
INC	103	L	Add CI	9M	\$425K	\$224K	\$280K
INC	103	L	Small DOM on existing ESP	2E	\$367K	\$61K	\$110K
INC	103	L	TOTAL		\$791K	\$285K	\$389K
INC	104	S	Add CB	6M	\$340K	\$91K	\$136K
INC	104	S	Small DOM on existing WS	5E	\$11K	\$5K	\$7K
INC	104	S	TOTAL		\$351K	\$96K	\$143K
INC	104	M	Add CI	9M	\$397K	\$147K	\$199K
INC	104	M	Small DOM on existing WS	5E	\$40K	\$13K	\$20K
INC	104	M	TOTAL		\$437K	\$160K	\$220K
INC	104	L	Add CI	9M	\$425K	\$224K	\$280K
INC	104	L	Small DOM on existing WS	5E	\$101K	\$30K	\$49K
INC	104	L	TOTAL		\$526K	\$254K	\$329K
INC	105	S	Add CB	6M	\$340K	\$91K	\$136K
INC	105	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	105	S	TOTAL		\$555K	\$188K	\$268K
INC	105	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	105	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	105	M	TOTAL		\$2,019K	\$320K	\$607K
INC	105	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	105	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	105	L	TOTAL		\$4,705K	\$581K	\$1,241K
INC	106	S	Add AB	17M	\$265K	\$192K	\$227K
INC	106	S	Add CB	6M	\$340K	\$91K	\$136K
INC	106	S	Add IWS	15M	\$215K	\$97K	\$132K
INC	106	S	Add RH	18M	\$153K	\$60K	\$80K
INC	106	S	TOTAL		\$973K	\$441K	\$576K
INC	106	M	Add AB	17M	\$417K	\$534K	\$588K
INC	106	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	106	M	Add IWS	15M	\$680K	\$144K	\$254K
INC	106	M	Add RH	18M	\$240K	\$122K	\$154K
INC	106	M	TOTAL		\$2,676K	\$976K	\$1,349K
INC	106	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	106	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	106	L	Add IWS	15M	\$1,331K	\$228K	\$445K
INC	106	L	Add RH	18M	\$313K	\$250K	\$291K
INC	106	L	TOTAL		\$5,560K	\$2,107K	\$2,879K
INC	107	S	Add CB	6M	\$340K	\$91K	\$136K
INC	107	S	Add RH	18M	\$153K	\$60K	\$80K
INC	107	S	Moderate DOM on existing WS	12E	\$13K	\$3K	\$6K
INC	107	S	Small DOM on existing VS	6E	\$5K	\$7K	\$8K
INC	107	S	TOTAL		\$511K	\$161K	\$230K
INC	107	M	Add CI	9M	\$397K	\$147K	\$199K
INC	107	M	Add RH	18M	\$240K	\$122K	\$154K
INC	107	M	Moderate DOM on existing WS	12E	\$71K	\$15K	\$33K
INC	107	M	Small DOM on existing VS	6E	\$21K	\$15K	\$19K
INC	107	M	TOTAL		\$729K	\$300K	\$406K
INC	107	L	Add CI	9M	\$425K	\$224K	\$280K
INC	107	L	Add RH	18M	\$313K	\$250K	\$291K
INC	107	L	Moderate DOM on existing WS	12E	\$195K	\$41K	\$92K
INC	107	L	Small DOM on existing VS	6E	\$47K	\$34K	\$43K
INC	107	L	TOTAL		\$980K	\$549K	\$706K
INC	108	S	Add CB	6M	\$340K	\$91K	\$136K
INC	108	S	Moderate DOM on existing WS	12E	\$13K	\$3K	\$6K
INC	108	S	Small DOM on existing ESP	2E	\$221K	\$41K	\$70K
INC	108	S	TOTAL		\$574K	\$134K	\$212K
INC	108	M	Add CI	9M	\$397K	\$147K	\$199K
INC	108	M	Moderate DOM on existing WS	12E	\$71K	\$15K	\$33K
INC	108	M	Small DOM on existing ESP	2E	\$278K	\$48K	\$84K
INC	108	M	TOTAL		\$746K	\$210K	\$317K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
INC	108	L	Add CI	9M	\$425K	\$224K	\$280K
INC	108	L	Moderate DOM on exsiting WS	12E	\$195K	\$41K	\$92K
INC	108	L	Small DOM on exisiting ESP	2E	\$367K	\$61K	\$110K
INC	108	L	TOTAL		\$986K	\$326K	\$481K
INC	109	S	Add CB	6M	\$340K	\$91K	\$136K
INC	109	S	Add RH	18M	\$153K	\$60K	\$80K
INC	109	S	Small DOM on existing FF	3E	\$6K	\$5K	\$6K
INC	109	S	TOTAL		\$499K	\$157K	\$222K
INC	109	M	Add CB	6M	\$1,339K	\$177K	\$353K
INC	109	M	Add RH	18M	\$240K	\$122K	\$154K
INC	109	M	Small DOM on existing FF	3E	\$8K	\$7K	\$9K
INC	109	M	TOTAL		\$1,588K	\$306K	\$515K
INC	109	L	Add CB	6M	\$3,374K	\$353K	\$796K
INC	109	L	Add RH	18M	\$313K	\$250K	\$291K
INC	109	L	Small DOM on existing FF	3E	\$14K	\$12K	\$14K
INC	109	L	TOTAL		\$3,701K	\$615K	\$1,102K
INC	110	S	Add AB	17M	\$265K	\$192K	\$227K
INC	110	S	Add CB	6M	\$340K	\$91K	\$136K
INC	110	S	Moderate DOM on exsiting WS	12E	\$13K	\$3K	\$6K
INC	110	S	TOTAL		\$618K	\$286K	\$369K
INC	110	M	Add AB	17M	\$417K	\$534K	\$588K
INC	110	M	Add CI	9M	\$397K	\$147K	\$199K
INC	110	M	Moderate DOM on exsiting WS	12E	\$71K	\$15K	\$33K
INC	110	M	TOTAL		\$885K	\$696K	\$821K
INC	110	L	Add AB	17M	\$543K	\$1,276K	\$1,347K
INC	110	L	Add CI	9M	\$425K	\$224K	\$280K
INC	110	L	Moderate DOM on exsiting WS	12E	\$195K	\$41K	\$92K
INC	110	L	TOTAL		\$1,162K	\$1,540K	\$1,719K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
LWAK	1		None		\$0K	\$0K	\$0K
LWAK	2	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	2	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	3	M (Lo HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	3	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	3	M (Lo HCl)	TOTAL		\$1,074K	\$350K	\$480K
LWAK	3	M (Hi HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	3	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	3	M (Hi HCl)	TOTAL		\$1,074K	\$350K	\$480K
LWAK	4	M (Lo HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	4	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	4	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	4	M (Lo HCl)	TOTAL		\$2,302K	\$611K	\$941K
LWAK	4	M (Hi HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	4	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	4	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	4	M (Hi HCl)	TOTAL		\$2,302K	\$680K	\$1,009K
LWAK	5	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	5	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	6	M (Lo HCl)	Add IWS	15M	\$1,016K	\$449K	\$615K
LWAK	6	M (Hi HCl)	Add IWS	15M	\$1,016K	\$682K	\$847K
LWAK	7	M (Lo HCl)	DOM FF mod	4E	\$34K	\$11K	\$13K
LWAK	7	M (Hi HCl)	DOM FF mod	4E	\$34K	\$11K	\$13K
LWAK	9	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	9	M (Lo HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	9	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	9	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	9	M (Lo HCl)	TOTAL		\$1,883K	\$1,615K	\$1,850K
LWAK	9	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	9	M (Hi HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	9	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	9	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	9	M (Hi HCl)	TOTAL		\$1,883K	\$1,615K	\$1,850K
LWAK	10	M (Lo HCl)	Add CB	6M	\$2,477K	\$270K	\$596K
LWAK	10	M (Lo HCl)	DOM FF mod	4E	\$34K	\$11K	\$13K
LWAK	10	M (Lo HCl)	TOTAL		\$2,512K	\$281K	\$608K
LWAK	10	M (Hi HCl)	Add CB	6M	\$2,477K	\$270K	\$596K
LWAK	10	M (Hi HCl)	DOM FF mod	4E	\$34K	\$11K	\$13K
LWAK	10	M (Hi HCl)	TOTAL		\$2,512K	\$281K	\$608K
LWAK	11	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	11	M (Lo HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	11	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	11	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	11	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	11	M (Lo HCl)	TOTAL		\$3,112K	\$1,876K	\$2,311K
LWAK	11	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	11	M (Hi HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	11	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	11	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	11	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	11	M (Hi HCl)	TOTAL		\$3,112K	\$1,944K	\$2,380K
LWAK	12	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	12	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	12	M (Lo HCl)	TOTAL		\$809K	\$1,264K	\$1,371K
LWAK	12	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	12	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	12	M (Hi HCl)	TOTAL		\$809K	\$1,264K	\$1,371K
LWAK	13	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	13	M (Lo HCl)	Add IWS	15M	\$1,016K	\$449K	\$615K
LWAK	13	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	13	M (Lo HCl)	TOTAL		\$1,825K	\$1,713K	\$1,985K
LWAK	13	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	13	M (Hi HCl)	Add IWS	15M	\$1,016K	\$682K	\$847K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
LWAK	13	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	13	M (Hi HCl)	TOTAL		\$1,825K	\$1,946K	\$2,218K
LWAK	14	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	14	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	14	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	14	M (Lo HCl)	TOTAL		\$2,038K	\$1,525K	\$1,832K
LWAK	14	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	14	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	14	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	14	M (Hi HCl)	TOTAL		\$2,038K	\$1,594K	\$1,900K
LWAK	15	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	15	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	15	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	15	M (Lo HCl)	DOM FF mod	4E	\$34K	\$11K	\$13K
LWAK	15	M (Lo HCl)	TOTAL		\$2,072K	\$1,537K	\$1,844K
LWAK	15	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	15	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	15	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	15	M (Hi HCl)	DOM FF mod	4E	\$34K	\$11K	\$13K
LWAK	15	M (Hi HCl)	TOTAL		\$2,072K	\$1,605K	\$1,913K
LWAK	16	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	16	M (Lo HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	16	M (Lo HCl)	TOTAL		\$833K	\$161K	\$264K
LWAK	16	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	16	M (Hi HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	16	M (Hi HCl)	TOTAL		\$833K	\$161K	\$264K
LWAK	17	M (Lo HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	17	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	17	M (Lo HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	17	M (Lo HCl)	TOTAL		\$1,470K	\$1,425K	\$1,606K
LWAK	17	M (Hi HCl)	Add AB	17M	\$487K	\$1,210K	\$1,274K
LWAK	17	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	17	M (Hi HCl)	Add Q	2M	\$323K	\$54K	\$96K
LWAK	17	M (Hi HCl)	TOTAL		\$1,470K	\$1,425K	\$1,606K
LWAK	18	M (Lo HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	18	M (Lo HCl)	TOTAL		\$172K	\$K	\$28K
LWAK	18	M (Hi HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	18	M (Hi HCl)	TOTAL		\$172K	\$K	\$28K
LWAK	19	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	19	M (Lo HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	19	M (Lo HCl)	TOTAL		\$1,401K	\$261K	\$489K
LWAK	19	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	19	M (Hi HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	19	M (Hi HCl)	TOTAL		\$1,401K	\$330K	\$558K
LWAK	20	M (Lo HCl)	Add IWS	15M	\$1,016K	\$449K	\$615K
LWAK	20	M (Lo HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	20	M (Lo HCl)	TOTAL		\$1,188K	\$449K	\$643K
LWAK	20	M (Hi HCl)	Add IWS	15M	\$1,016K	\$682K	\$847K
LWAK	20	M (Hi HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	20	M (Hi HCl)	TOTAL		\$1,188K	\$682K	\$875K
LWAK	21	M (Lo HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	21	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	21	M (Lo HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	21	M (Lo HCl)	TOTAL		\$1,246K	\$350K	\$508K
LWAK	21	M (Hi HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	21	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	21	M (Hi HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	21	M (Hi HCl)	TOTAL		\$1,246K	\$350K	\$508K
LWAK	22	M (Lo HCl)	Add CB	6M	\$2,477K	\$270K	\$596K
LWAK	22	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	22	M (Lo HCl)	Moderate DOM on existing FF	4E	\$34K	\$11K	\$13K
LWAK	22	M (Lo HCl)	TOTAL		\$3,740K	\$542K	\$1,069K
LWAK	22	M (Hi HCl)	Add CB	6M	\$2,477K	\$270K	\$596K

Source Group	Model Plant	Size Category	Description of Model Plant	Cost Model Used	Capital Cost	Annualized O&M Cost	Annualized Total Cost
LWAK	22	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	22	M (Hi HCl)	Moderate DOM on existing FF	4E	\$34K	\$11K	\$13K
LWAK	22	M (Hi HCl)	TOTAL		\$3,740K	\$611K	\$1,138K
LWAK	23	M (Lo HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	23	M (Lo HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	23	M (Lo HCl)	Add ST	12M	\$1,229K	\$261K	\$461K
LWAK	23	M (Lo HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	23	M (Lo HCl)	TOTAL		\$2,474K	\$611K	\$969K
LWAK	23	M (Hi HCl)	Add CI	9M	\$413K	\$190K	\$244K
LWAK	23	M (Hi HCl)	Add FF	4M	\$661K	\$161K	\$236K
LWAK	23	M (Hi HCl)	Add ST	12M	\$1,229K	\$330K	\$530K
LWAK	23	M (Hi HCl)	Moderate DOM on Combustor	14E	\$172K	\$K	\$28K
LWAK	23	M (Hi HCl)	TOTAL		\$2,474K	\$680K	\$1,037K
LWAK	24	M (Lo HCl)	Add CB	6M	\$2,477K	\$270K	\$596K
LWAK	24	M (Hi HCl)	Add CB	6M	\$2,477K	\$270K	\$596K

APPENDIX E

COST MODEL AND D/O/M COST ESTIMATE DOCUMENTATION

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APPENDIX E

COST MODEL AND D/O/M EQUATION DOCUMENTATION

The retrofit cost of each Model Plant Group is estimated based on the specific design/operation/maintenance (D/O/M) modifications of existing equipment or on the installation of new equipment that is required to achieve the desired emission reductions. Cost models are used to estimate the cost of new equipment installation and D/O/M equations are used to estimate the cost of the D/O/M modifications. The outputs of each cost model or D/O/M equation are total capital investment, annualized capital cost, annual operating costs, and total annual costs. The costs for each Model Plant Group are calculated as the sum of cost model or D/O/M equation outputs corresponding to the retrofits and/or upgrades required for that particular Model Plant Group.

A summary of the cost models utilized in this analysis is presented in Table E-1. A reference for each cost model is also shown in the table. The cost models utilized in this analysis are basically those specified in the *OAQPS Control Cost Manual* and EPA Handbook: *Control Technologies for Hazardous Air Pollutants*. The models which were available in these references were modified as appropriate to meet the specific needs of the present analysis. In cases where no suitable cost model existed for a specific APCD installation, a new model was created. The inputs to the cost models used to calculate the total capital investment and annual operating costs of each specific pollutant control technology include the size and physical properties of the source, the characteristics of the air pollutant to be controlled, and control technology parameters.

A summary of the D/O/M equations utilized in this analysis is presented in Table E-2. A reference for each D/O/M equations is also shown in the table. The D/O/M equations utilized were created specifically for this analysis. Separate D/O/M equations are used to calculate the capital cost and the annual operating cost of the D/O/M modification. In cases where multiple D/O/M modifications could be used to achieve a prescribed emission reduction, the costs of the D/O/Ms were averaged to yield a single D/O/M equation. The D/O/M equations have been normalized to calculate costs based solely on the flue gas flow rate, in acfm.

E.1 COST MODELS

Cost models are used to estimate the cost of installing new retrofit APCD equipment. The complete spreadsheets for all fifteen cost models are presented as Tables E-11 through E-25 at the end of this appendix. The cost models include user input parameters, calculated parameters, and calculated costs. The input parameters vary depending on the specific application of the cost model, whereas, the formulas used to define the calculated parameters and the calculated costs are fixed throughout the analysis.

E.1.1 Cost Model Sections

The input parameters, calculated parameters, and calculated costs have been classified into one of the twelve different sections of each of the cost models as summarized in Table E-3.

Each of the input parameters and calculated parameters of all cost models is identified by a unique symbol. The symbols are common to all fifteen cost models meaning that input parameters, calculated parameters, and calculated costs with the same symbol request or calculate the same information across all cost models. Each symbol is composed of a letter followed by a number. The letters (A - L) correspond to the parameters in the twelve different sections of the cost models and the numbers identify each distinct symbol within that section. Not all symbols are used in each of the cost models, however, consecutive numbering across all cost models is used so that each symbol is unique.

A description of the type of input parameters, calculated parameters, and calculated costs in each section of the cost models is provided below. A key which summarizes the input parameters, calculated parameters, and calculated costs and their corresponding symbols, definitions, and references for all cost models is presented in Table E-9 at the end of this appendix just prior to the spreadsheets for the individual cost models.

A. Annual Costs

The annual cost sections include the Total Annual Cost (A1), Annual Operating Cost (A2), and Annualized Capital Cost (A3). These three calculated costs are the ultimate output of the cost models. They are used to determine the costs associated with each Model Plant Group.

B. Capital Investment

The capital cost of the retrofit specified by the cost model is presented in calculating equation, Total Capital Investment (B1). This capital cost includes both the direct installation and indirect installation costs.

C. Model Plant Input Parameters

Five model plant input parameters are defined which characterize each of the source/size categories across all the cost models. These five model plant input parameters are the only parameters which differ between source category/size classifications for each cost model. Table E-5 summarizes the five model plant input parameters for the six source/size categories. The Flue Gas Flow Rate, acfm (C1), Flue Gas Flow Rate, dscfm (C2), and Flue Gas Moisture, % (C4), are based on the average values for each source/size category from the EER database. The Operational Time, hr/yr (C5) is based on an assumed operational time of 8,000 hrs/yr for all sources.

The HCl Inlet Concentration, ppm (C3) is defined as an equivalent HCl emission which is the HCl concentration plus two times the Cl₂ concentration measured in the stack. A separate HCl inlet concentration is calculated for each source category. The HCl inlet concentration for each is calculated as the average equivalent HCl emission for all sources in the source category

which require a APCD retrofit to meet the original floor emission standards.

For cement kilns and incinerators, one HCl inlet concentration is defined which is used throughout all floor and above-the-floor regulatory options in the present analysis. This HCl inlet concentration is based on the equivalent HCl emission for all sources which require APCD retrofit to meet the original floor option. The average equivalent HCl emission is 85 ppm for all cement kilns which require an APCD retrofit to meet an emission standard of 60 ppm HCl and 1 ppm Cl₂. The average equivalent HCl emission is 92 ppm for all incinerators which require an APCD retrofit to meet an emission standard of 25 ppm HCl and 1 ppm Cl₂. Therefore, the HCl Inlet Concentration (C3) for CK is 85 ppm and for INC is 92 ppm.

For light weight aggregate kilns, due to wide variability in the proposed emissions limits for the various floor and above-the-floor options, two HCl inlet concentrations are defined. The first is based on the average equivalent HCl emission for all LWAKs which require an APCD retrofit to meet the original floor emissions standards of 1,300 ppm HCl and 2.5 ppm Cl₂. This HCl Inlet Concentration (C3) is 1,570 ppm and is designated as "hi HCl". The second inlet concentration is based on all LWAKs which require an APCD retrofit to meet the more stringent emissions standards of 60 ppm HCl and 1 ppm Cl₂, but that did not require an APCD retrofit to meet the 1,300 ppm HCl and 2.5 ppm Cl₂ emissions standards. This HCl Inlet Concentration (C3) is 875 ppm and is designated as "lo HCl".

D. Control Option Design Input Parameters

The control option design input parameters are specific to each of the cost models. A total of 40 different input parameters have been defined and are summarized in Table E-4. These parameters which are unique to each of the cost models are discussed in more detail during the discussion of the specific cost model. They are used in conjunction with the generic model plant parameters as the input to the cost model calculations and are based on OAQPS cost models, vendor information, engineering constants, or sound engineering judgement.

E. Economic Factors

The assumed economic factors used as input to the cost model equations are input in this section. These economic factors include the Projected Equipment Life, years (E1), Projected FF Bag Life in years (E2), and Interest Rate, % (E3) used to calculate the Equipment Capital Recovery Factor (E4) and FF Bag Capital Recovery Factor (E12). Other economic factors include the Retrofit Factor (E5), Operator Labor, \$/hr (E6), Maintenance Labor, \$/hr (E7), and utility rates.

The Projected Equipment Life (E1), corresponding Capital Recovery Factor (E4), and the Retrofit Factor (E5) are unique for each of the cost models. The values used in this analysis for these economic factors will be discussed specifically for each cost model in the appropriate section of this documentation. The values of the remaining economic factors used in this analysis are consistent between all of the cost models. The assumed values for each are summarized in Table E-6.

F. Emissions Levels

The projected Particulate Matter (PM) Loading Upstream of the APCD (F1) and the Desired PM Stack Emissions (F2) are used to estimate the quantity of solid waste collected for disposal.

G. Model Plant Calculated Parameters

The model plant calculated parameters are computed based on the input parameters and the calculating equations in each of the cost models. The calculated parameters in this section of the cost model include all of the non-cost calculations in the models. A total of 27 different calculated parameters including physical properties and sizes of the APCD, water and additive feed rates, and utility usage rates are computed. The equations used to compute each of these calculated parameters are outlined in Cost Model Key, Table E-10.

H. Estimating Equipment Cost Based on Size

This section is used exclusively with the fabric filter cost model (4M). The fabric filter cost model uses either H1 and H2, H3 and H4, or H5 and H6 to calculate the cost of the baghouse and insulation based on the flue gas flow rate. The Bag Cost (H8) is also calculated. A more detailed discussion of the specific equations in this section will be presented during the discussion of the fabric filter cost model.

I. Direct Equipment and Installation Costs

The direct costs, both purchased equipment and installation, are calculated in this section. The first 30 (I1 - I30) calculated costs are used to compute the purchased equipment costs for the various cost models. The final 11 (I31 - I50) calculated costs are used to compute the installation costs for the cost models. The basis for the purchased equipment cost algorithms for each model will be presented in the discussion of each cost model.

J. Indirect Costs

The indirect costs include Engineering (J1), Construction and Field Expense (J2), Contractor Fees (J3), Start-up (J4), Performance Test (J5), Model Study (J6), and Contingencies (J7). These indirect costs are all computed based on a fractional relationship to the Total Purchased Equipment Cost (I30). The fractional constants used for each of the cost models are summarized in the Cost Model Key, Table E-10.

K. Direct Annual Costs

The direct annual costs include the estimated costs for labor, utilities, consumables, and waste disposal for each of the cost models. The equations used to compute these calculated costs for each of the cost models are summarized in the Cost Model Key, Table E-10.

L. Indirect Annual Costs

The following indirect annual costs are calculated for each of the cost models: Overhead (L1), Administrative Charges (L2), Property Taxes (L3), Insurance (L4), and Capital Recovery (L5). The equations used to compute these indirect annual costs are summarized in the Cost Models Key, Table E-10.

E.1.2 Cost Model Descriptions

Following is a brief description of each of the fifteen cost models utilized in the present analysis. The complete spreadsheets for all fifteen cost models are presented as Tables E-11 through E-25.

E.1.2.1 Cost Model 1M - Installation of an ESP

This cost model is used to calculate the cost of installing a retrofit electrostatic precipitator (ESP). The ESP cost model is based on algorithms presented in the OAQPS Control Cost Manual with only minor modifications as necessary for the present analysis. The model uses the capital equipment cost algorithms just as they are presented in this manual. The equipment escalations which are used in the present analysis are those presented in the OAQPS ESP Cost Model to escalate costs from 2Q87 to 1Q93. Only minimal differences exist between EER's ESP Cost Model and the OAQPS ESP Cost Model such as the algorithms used to calculate electricity usage and the addition of waste disposal costs.

The control option design input parameters used for the ESP cost model include the Specific Collection Area (D1) and the Increased Pressure Drop (D2). A specific collection area of 400 ft²/1000 acfm and an increase of 3 inches of water column were assumed. The Projected Equipment Life (E1) was estimated to be 20 years. A retrofit factor of 1.25 applied to the direct installation cost was assumed.

Additional operator labor of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 1 hour per shift and maintenance materials are estimated at 1% of the purchased equipment cost per year.

E.1.2.2 Cost Model - 2M Installation of a Water Quench Tower and ESP D/O/M Small

The water quench cost model assumes a retrofit installation of a quench tower into an existing APCD train. This cost model is used to calculate the cost of installing a water quench tower to cool the flue gas in an APCD train as well as to calculate the cost of ESP humidification which is a small D/O/M modification. The cost model is based on the OAQPS Humidification Cost Model with only minor modifications. The purchased equipment cost algorithms used in the present analysis were taken directly from the OAQPS cost model documentation which references the MWC Background Information Document EPA-450/3-89-27a. Purchased equipment costs have been escalated to 1993 dollars using the escalation factors presented in the OAQPS cost model.

The Projected Equipment Life (E1) of the water quench tower is 15 years which is a

typical value presented in the OAQPS Control Cost Manual for this type of equipment. A retrofit factor of 1.20 applied to the purchased equipment cost has been assumed.

Control option design inputs to the 2M Water Quench Cost Model are used to calculate the amount of water required, electricity costs, and the cost of the new duct work required for the retrofit installation. The Water Quench Temperature Drop in °F (D3) used in this analysis is 400°F which is based on a "typical" flue gas temperature drop required to reach an outlet temperature of 300 - 450°F. The required water Pump Head Loss (D37) of 200 feet is based on best engineering judgement for line friction losses, gravimetric head, and atomizer pressure drop. For the purposes of computing the additional fan power requirements, it has been assumed that the Increased Pressure Drop (D2) through the facility as a result of installing the water quench tower is 2 inches of water column.

Additional operator labor for the water quench retrofit of 0.5 hours per shift is included in the cost model. Maintenance labor is assumed to be 0.5 hour per shift. Maintenance materials are estimated at 1% of the total capital investment per year.

E.1.2.3 Cost Model 3M - D/O/M Moderate for ESP

This cost model is used to calculate the cost of installing an additional field to an existing ESP. As with cost model 1M, this cost model is based on algorithms presented in the OAQPS Control Cost Manual with only minor modifications as necessary for the present analysis. The model uses the capital equipment cost algorithms just as they are presented in this manual. The equipment escalations which are used in the present analysis are those presented in the OAQPS ESP Cost Model to escalate costs from 2Q87 to 1Q93. Only minimal differences exist between EER's ESP Cost Model and the OAQPS ESP Cost Model such as the algorithms used to calculate electricity usage and the addition of waste disposal costs.

The control option design input parameters used for the More ESP Fields cost model include the Existing ESP Specific Collection Area (D4), the Number of Existing ESP Fields (D5), the Number of Additional ESP Fields Desired (D6), and the Incremental Pressure Drop Per Additional ESP Field (D7). For the purposes of the present analysis, it was assumed that the existing ESP has a total specific collection area of 400 ft²/1000 acfm in three fields. The model was used to calculate the cost of adding one additional field to this existing ESP. The Projected Equipment Life (E1) was estimated to be 15 years. A retrofit factor of 1.30 applied to the purchased equipment cost was assumed.

Additional operator labor of 1/2 hour per shift is included in the cost model. Maintenance labor is assumed to be 1/4 hour per shift and maintenance materials are estimated at 1% of the purchased equipment cost per year.

E.1.2.4 Cost Model 4M - Installation of a Fabric Filter

This cost model is used to calculate the cost of installing a retrofit fabric filter to an existing APCD train. The cost model is based on algorithms presented in the OAQPS Control Cost Manual with only minor modification as necessary for the present analysis. The purchased equipment cost algorithms assume a reverse air design baghouse for units with cloth areas greater

than 15,000 square feet and a pulse-jet design baghouse for units with cloth areas less than 15,000 square feet. The algorithms used to calculate these costs which are taken directly from the OAQPS Control Cost Manual are nested in Section H of the cost model. One of three different algorithms is used to calculate baghouse and insulation costs depending on the calculated Required Cloth Area (G7). The escalation rates which are used are those presented in the OAQPS fabric filter Cost Model documentation to escalate the capital costs to 1st quarter 1993 dollars.

The control option design input parameters used for the fabric filter cost model include the Increased Pressure Drop (D2), Bag Material Cost (D8), Gas-to-Cloth Ratio (D9), and Bag Replacement Labor Rate (D10). An increase of 10 inches of water column in pressure drop through the APCD train has been assumed for retrofit installation of a fabric filter.

In the present analysis, it has been assumed that fiberglass bags would be installed with a Bag Material Cost (D8) of \$0.76 per square foot and a Bag Replacement Labor Rate (D10) of \$0.16 per square foot. Furthermore, it has been assumed that a Gas-to-Cloth Ratio (D9) of 2.0 would be utilized. Alternately, the use of teflon coated fiberglass or Goretex bags was considered but not adopted for the cost model. It was assumed that these alternate materials, although more expensive, could be used at higher gas-to-cloth ratios. Therefore, the values used in the present analysis are representative of a range of bag material alternatives.

The Projected FF Equipment Life (E1) was estimated to be 20 years and the Project FF Bag Life was estimated to be 2 years as recommended in the OAQPS Control Cost Manual. A Retrofit Factor (E5) of 1.25 was assumed and was applied to the total cost of the baghouse including purchased equipment and installation costs.

Additional operator labor of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 1 hour per shift (excluding the cost of scheduled bag replacement). Maintenance materials are estimated at 1% of the purchased equipment cost per year, excluding the cost of regularly scheduled bag replacement.

The fabric filter cost model capital equipment cost does not include the cost of purchasing and installing auxiliary equipment such as dust conveyors, new induced draft fans, fan motors, etc. For most retrofit installations, a new induced draft fan will not be required, however, a new electric motor to drive the fan would likely be required. Therefore, the actual capital cost of a fabric filter retrofit will be slightly higher than that predicted by the cost model. The increased electricity consumption associated with the new electric motor, however, has been included in the cost model calculations.

E.1.2.5 Cost Model 6M - Installation of a Carbon Bed

This cost model is used to calculate the cost of installing a retrofit carbon bed to an existing APCD train. The cost model follows the general format presented in the OAQPS Control Cost Manual, however, the cost algorithms were developed within EER based on vendor supplied cost information. EER received a budgetary installed capital cost estimates from a carbon bed manufacturer as a function of flue gas flow rate. A Projected Equipment Life (E1)

of 15 years is used for the carbon bed cost model and no retrofit factor is assumed.

The control option design input parameters for the carbon bed cost model include the physical properties, replacement frequency, and cost of carbon as well as physical characteristics of the carbon bed. Physical properties of the bed included the target Bed Velocity (D13) of 0.2 m/s for the flue gas velocity through the carbon bed which was used to size the bed. A Bed Depth (D14) of 2 feet was assumed and a Carbon Density (D40) of 24 lb/ft³ was assumed based on "typical" carbon bed operation. For the present analysis, it was assumed that the Bed Pressure Drop (D12) would be 1.5 inches of water per foot of bed depth.

For the purposes of the present analysis, the Cost of Carbon (D11) was assumed to be \$0.50 per pound based on discussions with carbon injection, carbon bed, and activated carbon vendors. The number of Carbon Exchanges (D15) per year was estimated to be 2. This is based on the assumed operating procedure of rotating the carbon through the bed by removing 1/4 of the bed from the most upstream location, shifting the remainder of the carbon, and replacing new activated carbon in the most downstream location of the bed. It has been assumed that this procedure would be repeated eight times per year.

Additional operator labor of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 0.5 hour per shift. Maintenance materials are estimated at 1% of the total capital investment per year.

E.1.2.6 Cost Models 8M & 9M - Installation of a Carbon Injection System (8M with existing SI or SD; 9M without)

These two cost models are used in the present analysis to estimate the capital and annual costs of installing and operating a carbon injection system. The only difference between the two models is that 8M assumes that a sorbent injection (SI) or spray dryer (SD) is already in operation and that the existing pneumatic conveying system could also be used to inject the carbon. Cost Model 9M assumes that such equipment would need to be installed and is included in the capital investment.

The algorithms used in the carbon injection cost models are based on those presented in the OAQPS Activated Carbon Injection Cost Model documentation. Only minor modifications to the algorithms are required for the present analysis.

The control option design input parameters used for the carbon injection cost model include the Cost of Carbon (D11), the Carbon Injection Rate (D16), and the estimated Injection Blower Fan Power (D17) requirements. The cost of carbon is estimated at \$0.50 per pound based on discussions with activated carbon vendors. The carbon injection rate is assumed to be constant at 200 mg/dscm regardless of the HAP emission concentration for which control is desired. This assumption allows a single cost model to be used to control a wide range of PCDD/PCDF and Hg emissions concentrations. This carbon injection rate is lower than that assumed by the OAQPS Cost Model for cement kiln applications. The Projected Equipment Life (E1) of the carbon injection system is 15 years which is a typical value presented in the OAQPS Control Cost Manual. A Retrofit Factor (E5) of 1.15 applied to the purchased equipment cost is utilized.

Additional operator labor for the carbon injection system of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 0.5 hour per shift. Maintenance materials are estimated at 5% of the purchased equipment cost per year.

The carbon injection cost models are dominated by the annual operating costs which account for greater than 75% of the total annual cost. All annual costs are fixed costs since the existing emission rate of the HAP to be controlled is not an input parameter. The major contributor to the total annual cost is the cost of carbon which accounts for approximately 50% of the total cost. Therefore, changes in the assumed value of the Cost of Carbon (D11) will significantly affect the total annual cost. For instance, if a source elects to use a more expensive activated carbon (e.g. sulfur impregnated carbon) to control a particular HAP, the cost of the technology will be significantly higher than that predicted by the Carbon Injection Cost Model. However, if such an activated carbon is selected, it is likely that less material will be required per unit flue gas flow rate. Therefore, based on best engineering judgement, it is assumed that the \$0.50/lb carbon cost is justifiable and will, on average, assure compliance with the HAP emissions limits.

E.1.2.7 Cost Model 10M - Installation of a Spray Dryer

This cost model is used to estimate the cost of installing a spray dryer as a retrofit upgrade to an existing air pollution control system. The cost model equipment costs are based on algorithms presented in the OAQPS Spray Dryer Cost Model for Cement Kilns. These costs were developed by OAQPS using the Municipal Waste Combustor Background Information Documents. Costs are in 1Q93 dollars.

The control option design input parameters include Increased Pressure Drop (D2), Sorbent HCl Stoichiometry (D20), Ca(OH)_2 Cost (D21), Pump Head Loss (D37), new Ductwork Length (D38), and Solids Content of Scrubber Sorbent (D39). For the present analysis, a sorbent stoichiometry (Ca/Cl_2 molar ratio) of 1.8 is assumed which is typical of spray dryer operation. The cost of Ca(OH)_2 is input at \$95/ton which is representative of the cost of hydrated lime including delivery. A Projected Equipment Life (E1) of 15 years is used which is typical for non-wetted acid gas control equipment. A Retrofit Factor (E5) of 1.15 applied to the purchased equipment cost is also assumed.

Additional operator labor for the spray dryer retrofit of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 0.5 hour per shift. Maintenance materials are estimated at 1% of the purchased equipment cost per year.

E.1.2.8 Cost Model 11M - Installation of a Venturi Scrubber

The Venturi Scrubber cost model estimates the cost of installing a retrofit venturi scrubber to an existing APCD train. The algorithms used in the venturi scrubber cost model are based on those presented in the EPA Handbook *Control Technologies for Hazardous Air Pollutants*. The cost algorithms assume 316 stainless steel construction for the venturi scrubber wetted parts.

The control option design input parameters include Increased Pressure Drop (D2),

Liquid/Gas Ratio (D18), Water Make-up Rate (D19), Sorbent HCl Stoichiometry (D20), $\text{Ca}(\text{OH})_2$ Cost (D21), and Pump Head Loss (D37). An increase in pressure drop of 50 inches of water column for the retrofit venturi scrubber is used to calculate fan electricity usage and cost. $\text{Ca}(\text{OH})_2$ is used as the sorbent at a stoichiometry (Ca/Cl_2 molar ratio) relative to the equivalent HCl emission concentration of 1.1. This value is typical of such wet scrubbing acid gas control technologies. The recirculating liquid-to-gas ratio and water make-up rates of 20 gpm/1000 acfm and 20% of the recirculation rate are based on average typical values found in the literature and through vendor contacts. The Projected Equipment Life (E1) of the venturi scrubber is 10 years due to the corrosive nature of the wet scrubbing solution and a Retrofit Factor (E5) of 1.25 is applied to the installation costs.

Additional operator labor for the venturi scrubber in the amount of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 1 hour per shift. Maintenance materials are estimated to be equal to the annual maintenance labor cost.

E.1.2.9 Cost Model 12M - Installation of a Spray Tower Scrubber

This cost model estimates the cost to install a retrofit spray tower scrubber for acid gas control. The algorithms used to calculate the equipment cost are based on the OAQPS Spray Tower cost model for cement kilns, however, several changes are made in determining various calculated parameters.

The control option design input parameters include Increased Pressure Drop (D2), Liquid/Gas Ratio (D18), Water Make-up Rate (D19), Sorbent HCl Stoichiometry (D20), $\text{Ca}(\text{OH})_2$ Cost (D21), and Pump Head Loss (D37). $\text{Ca}(\text{OH})_2$ is used as the sorbent at a stoichiometry (Ca/Cl_2 molar ratio) relative to the equivalent HCl emission concentration of 1.1. This value is typical of such wet scrubbing acid gas control technologies. The recirculating liquid-to-gas ratio and water make-up rates of 20 gpm/1000 acfm and 20% of the recirculation rate are based on average typical values found in the literature and through vendor contacts. The Projected Equipment Life (E1) of the spray tower scrubber is 10 years due to the corrosive nature of the wet scrubbing solution and a Retrofit Factor (E5) of 1.25 is applied to the purchased equipment costs.

Additional operator labor for the retrofit spray tower in the amount of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 1 hour per shift. Maintenance materials are estimated to be equal to 1% of the purchased equipment cost per year.

E.1.2.10 Cost Model 13M - Installation of a Sorbent Injection System

This cost model is used in the present analysis to estimate the capital and annual costs of installing and operating a sorbent injection system. The algorithms used in the sorbent injection cost model are based on the carbon injection cost model algorithms and the general cost estimating procedure presented in the OAQPS Control Cost Manual.

The control option design input parameters used for the sorbent injection cost model include the Injection Blower Fan Power (D17), Sorbent HCl Stoichiometry (D20), and $\text{Ca}(\text{OH})_2$ Cost (D21). $\text{Ca}(\text{OH})_2$ is used as the sorbent at a stoichiometry (Ca/Cl_2 molar ratio) of 1.5 relative

to the equivalent HCl emission concentration. This value is slightly higher than the ratio used in the wet scrubbing systems as is typical for sorbent injection applications. The sorbent injection cost model is only used as an acid gas control technology which is followed by a wet polishing system.

Additional operator labor for the sorbent injection system of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 0.5 hours per shift. Maintenance materials are estimated at 3% of the purchased equipment cost per year.

E.1.2.11 Cost Model 15M - Installation of an IWS

The ionizing wet scrubber (IWS) cost model estimates the capital cost and annual operating costs for a retrofit of an ionizing wet scrubber to an existing APCD train. The IWS is used to control both acid gas and particulate matter by combining the technical attributes of a wet ESP and a packed tower scrubber. The IWS cost model algorithms are based on those used in both the ESP cost model and the packed tower cost model. The purchased equipment cost for an IWS was not available from the manufacturer in a timely manner to be used in the cost model, so the purchased equipment costs are estimated. The IWS Equipment Cost (I15) is based on 75% of the cost of the purchased equipment for a packed tower from Cost Model 16M plus the cost of the purchased equipment for an ESP from Cost Model 1M.

The control option design input parameters include Liquid/Gas Ratio (D18), Water Make-up Rate (D19), Sorbent HCl Stoichiometry (D20), IWS Electricity Requirements (D22), Scrubber Packing Depth (D23), NaOH Cost (D24), Scrubber Pressure Drop (D25), and Pump Head Loss (D37). NaOH is used as the sorbent in the scrubber liquor at a stoichiometry (Na/Cl molar ratio) relative to the equivalent HCl emission concentration of 1.1. This value is typical of such wet scrubbing acid gas control technologies. The recirculating liquid-to-gas ratio and water make-up rates of 20 gpm/1000 acfm and 20% of the recirculation rate are based on average typical values for wet scrubbers found in the literature and through vendor contacts. The scrubber packing depth of 4 ft and pressure drop of 1 inch of water column per foot of packing depth are also typical of packed bed technologies. The Projected Equipment Life (E1) of the IWS is 10 years due to the corrosive nature of the wet scrubbing solution. No retrofit factor is utilized in this cost model.

Additional operator labor, maintenance labor, and maintenance materials are included in the IWS cost model. 2 hours of operator labor per shift and 1 hour of maintenance labor per shift are assumed in this cost model. Furthermore, 1% of the purchased equipment cost is allowed for annual maintenance materials.

E.1.2.12 Cost Model 16M - Installation of a Packed Tower Scrubber

This cost model estimates the cost to install a retrofit packed tower scrubber for acid gas control. The algorithms used to calculate the equipment cost are based on those presented in the OAQPS Control Cost Manual with only minimal modifications. Although it is more expensive than $\text{Ca}(\text{OH})_2$, NaOH is used as the sorbent in the scrubber liquor since the insolubility of $\text{Ca}(\text{OH})_2$ causes difficulty with the scrubber packing.

The control option design input parameters include Liquid/Gas Ratio (D18), Water Make-up Rate (D19), Sorbent HCl Stoichiometry (D20), IWS Electricity Requirements (D22), Scrubber Packing Depth (D23), NaOH Cost (D24), Scrubber Pressure Drop (D25), and Pump Head Loss (D37). NaOH is used as the sorbent in the scrubber liquor at a stoichiometry (Na/Cl molar ratio) relative to the equivalent HCl emission concentration of 1.1. This value is typical of such wet scrubbing acid gas control technologies. The recirculating liquid-to-gas ratio and water make-up rates of 20 gpm/1000 acfm and 20% of the recirculation rate are based on average typical values for wet scrubbers found in the literature and through vendor contacts. The scrubber packing depth of 4 ft and pressure drop of 1 inch of water column per foot of packing depth are also typical of packed bed technologies. The Projected Equipment Life (E1) of the packed tower scrubber is 10 years due to the corrosive nature of the wet scrubbing solution and a Retrofit Factor (E5) of 1.25 is applied to the installation costs.

Additional operator labor for the retrofit spray tower in the amount of 2 hours per shift is included in the cost model. Maintenance labor is assumed to be 1 hour per shift. Maintenance materials are estimated to be equal to 1% of the purchased equipment cost per year.

E.1.2.13 Cost Model 17M - Installation of an Afterburner

Separate afterburner cost models are utilized for the incinerators and the industrial furnaces (i.e., cement kilns and LWAKs). The incinerator afterburner cost model assumes that the afterburner will burn natural gas at a firing rate which is a fraction (input) of the primary combustion chamber. The afterburner cost model for the cement and light weight aggregate kilns assumes a given flue gas temperature increase (input) requirement. The algorithms utilized in each are based on the afterburner costs presented in the EPA Handbook of Control Technologies for Hazardous Air Pollutants.

The control option design input parameters for the CK/LWAK afterburner include Increased Pressure Drop (D2), Fuel Cost (D32), Flue Gas Density (D33), Specific Heat of Flue Gas (D34), and desired Afterburner Increase in Flue Gas Temperature (D35). The flue gas density and specific heat values are based on average values for air which is generally a good approximation for the properties of flue gas. The cost of fuel is based on a typical cost of natural gas of \$3.50/MMBtu. In the present analysis, the desired flue gas temperature increase for the cement kilns is 1,000°F and for the LWAKs is 1,100°F. This is generally based on increasing the flue gas temperature to 1,600°F to assure complete destruction of organics.

The control option design input parameters for the incinerator afterburner cost model include Increased Pressure Drop (D2), Fuel Cost (D27), Natural Gas Heating Value (D28), Primary Heat Input (D29), Afterburner/Primary Heat Input Ratio (D30). The fuel cost which is used for the incinerator afterburner is \$3.50/1,000 ft³. In combination with the assumed heating value of natural gas of 990 Btu/ft³, the cost is \$3.54/MMBtu which is slightly higher than the fuel cost used in the CK/LWAK afterburner model. Although different, both cost estimates are typical of average natural gas prices based on best engineering judgement.

In the CK/LWAK afterburner cost model, the heat input to the afterburner is calculated based on a desired flue gas temperature increase. However, in the incinerator afterburner model, the heat input to the afterburner is based on a fractional relationship between the heat input to

the afterburner and the heat input to the primary combustion chamber. For the present analysis, this ratio is set at 40% based on an average "typical" value of incinerators in the EER database for which primary and afterburner heat input data is available. Furthermore, a heat input to the primary as a function of flue gas flow rate of 50 Btu/dscf is used based on an average "typical" value in the EER database. For the purposes of the cost model, it has been assumed that the total flue gas flow rate will remain unchanged (i.e., diversion of excess air from primary to the secondary combustion chamber).

For both the incinerator and the CK/LWAK afterburner cost model, a Projected Equipment Life (E1) of 15 years is used. Also, a Retrofit Factor (E5) of 1.25 applied to the installation costs is used to account for the added cost of working in a retrofit installation situation. In both models, additional operator labor of 2 hours per shift is allowed. Annual maintenance costs include maintenance labor of 1 hour per shift and maintenance materials.

The cost models predict significant cost associated with adding an afterburner for CO and THC control. The total annual cost of the retrofit is dominated by the cost of fuel. Therefore, the costs are very dependent on the assumptions used to calculate fuel usage and the fuel costs. Seemingly minor deviations in these assumptions could result in significant changes in cost.

E.1.2.14 Cost Model 18M - Installation of a Reheat Burner

The Reheat Cost Model is used to estimate the cost of reheating saturated flue gas so that it can pass through a dry APCD (e.g., fabric filter). The algorithms used in the reheat cost model are based on the algorithms presented in the EPA Handbook *Control Technologies for Hazardous Air Pollutants*. The model assumes that a natural gas fired burner will be placed downstream of a wet air pollution control device and will heat the flue gas to avoid condensation in a dry APCD.

The control design input parameters include Increased Pressure Drop (D2), Natural Gas Fuel Cost (D27), Natural Gas Heating Value (D28), Additional Combustion Air Required (D31), Flue Gas Density (D33), Specific Heat of Flue Gas (D34), and Reheat Increase in Temperature (D36). The fuel cost which is used for the reheat cost model is \$3.50/1,000 ft³. In combination with the assumed heating value of natural gas of 990 Btu/ft³, the cost is \$3.54/MMBtu which is the same as that used for incinerator afterburner cost model. In the Reheat Cost Model, the assumed desired temperature increase is 100°F which is enough to prevent condensation of moisture from the flue gas.

As with the afterburner cost models, the reheat model is dominated by the fuel cost. Therefore, the cost of the technology could change significantly if the basic assumptions for calculating fuel usage and cost change.

E.1.3 Discussion of Cost Models

This section highlights and discusses those cost model assumptions which may have a significant impact on the cost projections.

Waste Water Disposal

The cost models use an estimated cost of \$0.80/1,000 lb as the waste water disposal cost. This estimate is based on that used in the OAQPS Spray Tower cost model and assumes that the waste water can be released to a sewer district without any on-site treatment. The capital cost of an on-site waste water pre-treatment facility may be significant. Although many systems may require such on-site pretreatment, exclusion of the associated cost is justifiable for incinerators. However, significant additional costs which are not accounted in the cost models may be incurred for cement kilns and light weight aggregate kiln which must retrofit wet acid gas scrubbing systems.

Almost all existing incinerators (i.e., 80 - 90%) have wet systems that use wet scrubbers for acid gas control which produce scrubber blow-down. If scrubber blow-down cannot be released to the sewer district without pre-treatment, these sources would already have a pre-treatment facility on site. Therefore, the addition of a new wet scrubber on the source would not require installation of a new waste water pre-treatment system. Likely, only a small incremental increase would be required. For new source incinerator costing, similar waste water treatment procedures would be required for both the baseline as well as the state-of-the-art APCD system. Therefore, the assumption of no waste water pre-treatment facility required for the cost models is justifiable.

No existing hazardous waste burning cement kilns and only one light weight aggregate kiln have wet acid gas scrubbers installed. No wet systems are required for CKs to meet the 6 Percent Floor or BTF Proposal. Wet systems have been proposed for two LWAKs to meet the 6 Percent Floor and for ten LWAKs to meet the 6 Percent BTF Proposal. The BTF design level for LWAKs is based on the control performance consistently achieved with dry scrubbing. Dry scrubbing is presently being used at two hazardous waste burning LWAKs (Solite's Carolina and Florida facilities). If the water treatment cost incurred with wet scrubbing is prohibitive at a specific site, dry scrubbing can provide an economic alternative. An additional mitigating fact is that with the Bevill exclusion on CKD, and a similar exclusion on scrubber blow-down, the scrubber blow-down may not need to be treated as hazardous waste. In such a case, the cost of waste water pre-treatment would be only a small increase in cost to be added to the costs predicted by the wet scrubber cost models.

Flue Gas Flow Rate

The capital and operating costs calculated by many of the cost models is based on the flue gas flow rate. Some of the models utilize the flue gas flow rate at standard conditions while others use the actual cubic feet per minute of flue gas flow. In this analysis the stack gas temperature and moisture were utilized to calculate the actual cubic feet per minute of flue gas flow. In most cases the temperature at the stack is lower than the temperature at the APCD so the resulting capital and operating costs based on the acfm of flow would be understated. The devices for which a change in acfm has the largest impact on total annual cost are FFs, ESPs and wet scrubbers.

The stack temperature assumption is valid for wet scrubbers because the temperature at the scrubber will be close to the stack temperature since the flue gas is quenched and saturated

with water in the scrubber. The costs for FFs will be understated for most applications due to this assumption. The impact of this assumption is calculated to be less than 5 percent of the overall engineering costs.

Fixed and Variable Operating Costs

For all costs models except the acid gas control technologies, (i.e., Spray Tower, Packed Tower, Spray Dryer, Sorbent Injection, and IWS) the variable (i.e., dependent on HAP concentration) costs are zero; all costs are based on the flue gas flow rate. Table 7 summarizes the variable costs as a percentage of total annual costs and annual operating costs for the Spray Tower, Packed Tower, and IWS APCD retrofits (these are the only acid gas control technologies used in the model group plant assignments for existing sources).

Although all other cost models do not calculate costs as a function of HAP concentration, the assignment of APCD retrofits to sources is dependent on HAP concentration. For instance, in the Carbon Injection cost model used in the present analysis, the carbon injection rate is only a function of flue gas flow rate and is independent of the HAP concentration. This is not to say that the cost of compliance is strictly independent of HAP concentration in the flue gas. For instance, for PCDD/PCDF control, water quench, and carbon injection are used as control technologies depending on the emission reduction requirement. Also, carbon injection and carbon beds are both used for mercury control depending on the emission reduction requirement.

Discount rate for annualizing capital investments

The OAQPS Control Cost Manual, January 1990, recommends that a "10% pre-tax marginal rate of return on private investment" be used to calculate the capital recoveries. In all cost models used for the present analysis, a 10% real rate of return is used to calculate the capital recoveries. The capital recovery factors (CRF) are calculated using the following equation.

$$CRF = \frac{i(1 + i)^n}{(1 + i)^n - 1}$$

where: i = 10%
 n = 10, 15, or 20 years

E.2 COST EQUATIONS FOR D/O/M UPGRADES TO AN EXISTING APCD

If the percent reduction required (%RR) for a HAP is below 75% and an active control device for that HAP is present, it was assumed that active control for that HAP could be accomplished through design operation and maintenance (D/O/M) modifications to the control device. These D/O/M modifications are divided into two categories. For %RR of 25% or below a "small" D/O/M can be performed on the existing APCD to control the HAP of interest. If the %RR is between 25 and 75% a "moderate" D/O/M is required to control the HAP.

Literature research and vendor contacts were utilized to determine D/O/Ms that would increase efficiency for each control device. This list of D/O/Ms was screened to determine which of these D/O/Ms would provide the required increase in control efficiency. If more than one D/O/M was developed for a %RR category for a control device, the costs for all of the D/O/Ms were averaged. The final list of D/O/Ms is provided in Table E-2.

Equations were developed for average total capital investment (TCI), operation and maintenance (O&M) and total annual costs as a function of acfm of flue gas at the stack. These equations were used to calculate costs for D/O/M modifications for each HWC source type and size. The D/O/M equations are given in Table E-7

D/O/Ms were developed for PM, LVM, and SVM control devices, acid gas control devices and the combustor for control of THC and CO. Existing control devices were classified into broader categories of similar type devices. For example, the category low energy wet scrubbers represents a number of different types of acid gas scrubbers including packed bed, plate or tray and impingement type scrubbers. When more than one type of control device exists in a category, the D/O/M was developed for the most prevalent device within that category. For example, packed bed scrubbers are the most prevalent type of low energy wet scrubber for acid control so packed bed scrubber D/O/Ms are used for the low energy wet scrubbers.

Breakdown of Costs

Assumptions, costs and references for each of the D/O/Ms are shown in Tables E-8 and E-9. Table E-8 details the total capital investment for each of the D/O/Ms. In this table the equipment modification performed to the control device and some general notes concerning the modification are given. The references for the cost estimation procedure are listed by number. A listing of these references is given at the end of this appendix. Costs are listed in the table for example purposes. The costs given in this table are calculated for the average size device of that type in the OSW database. The sizes are based on the stack gas flowrate in actual cubic foot per minute (acfm) for a facility with that type of device. This size basis is listed in the table.

The cost scaling procedure, assumed equipment life and capital recovery factor are also given in this table. Equation 1 referenced in the table is an equation for scaling equipment cost. This scaling equation is given below.

Equipment Scaling Equation: $C_2 = C_1 * (Q_2/Q_1)^n$

where

- Q_2 = flow rate 2 (acfm)
- Q_1 = flow rate 1 (acfm)
- C_2 = equipment cost with Q_2
- C_1 = equipment cost with Q_1
- n = model scale factor

The model scaling factor in the equation is dependent on the type of equipment. The capital recovery factor (CRF) is calculated with the equation presented in Section E.1.3.

Table E-9 gives a breakdown of the additional annual operating and maintenance costs and the total annual cost of the D/O/M. The operation and maintenance cost categories include operating labor, maintenance requirement (labor and material), water, electrical, consumables (such as additional NaOH for acid scrubbers) and waste disposal and treatment. These cost estimates utilize the same costs for labor, utilities, disposal costs and consumables (such as NaOH) as are used in the cost models and presented in Table E-5. The total annual cost is the total of the operation and maintenance costs and the indirect annual costs (IAC). A list of the indirect annual costs that are included in the estimate is given in the table. Different combinations of the following items are included in the indirect annual costs for each particular D/O/M.

- Capital Recovery (CR)
- Administrative Costs (AC)
- Insurance (ins.)
- Property Taxes (PT)
- Overhead (OH)

The following sections contain a discussion of each of the D/O/Ms.

E.2.1 Small D/O/M for Existing ESP (1E)

The small D/O/M for ESPs is humidification. The OAQPS based model for water quench (2M) is used for humidification. A temperature drop of 300°F was assumed and used in the quench model. The quench model is described in detail in section E.1.2.2.

E.2.2 Moderate D/O/M for Existing ESP (2E)

The addition of a field to the existing ESP is the moderate D/O/M for ESPs. This cost model (3M) is based on the model developed by OAQPS. A detailed description of this model is given in Section E.1.2.3. For the purposes of the present analysis, it was assumed that the existing ESP had a total specific collection area of 400 ft²/1000 acfm in three fields. The model was used to calculate the cost of adding one additional field to this existing ESP. The Projected Equipment Life (E1) was estimated to be 15 years. A retrofit factor of 1.30 applied to the purchased equipment cost was assumed. Additional operator labor of 1/2 hour per shift is included in the cost model. Maintenance labor is assumed to be 1/4 hour per shift and maintenance materials are estimated at 1% of the purchased equipment cost per year.

E.2.3 Small D/O/M for Existing Fabric Filter (3E)

Two D/O/Ms were developed that would provide a small increase in collection efficiency for a fabric filter. Costs for these two D/O/Ms were averaged for the small FF D/O/M. These two D/O/Ms are optimization of cleaning cycles and minimization of leak paths in the fabric filter.

E.2.3.1 Optimization of Cleaning Cycles

Cleaning cycles are often established at lower-than-optimum pressure drop to minimize fan load. The cleaning cycles can be optimized by varying the pressure drop at which the bags are cleaned with simultaneous monitoring of PM emissions with an opacity meter. Leaks in bags can also be detected with the installed opacity meter. These meters are capable of detecting PM levels as low as .000002 gr/dscf. Multiple (up to ten) probes can be installed with a single opacity meter. The meter can be installed in a control room while the probes are installed in the FF exhaust stack for a single module baghouse or in the ducting manifold for multiple module baghouses. The capital cost for installation of the opacity meter and probes for the average sized FF is \$41,000.

Optimization tests are included as an increase in yearly operating cost. The operating costs include test planning and performance. Costs are also included for the replacement of an additional three percent of bags each year. No shutdown time is assumed in the cost estimates.

E.2.3.2 Minimization of Leak Paths

To achieve the levels of PM control required to meet the MACT floor and BTF emission limits, fabric filter leak paths must be minimized. Leaks in a Fabric Filter can occur at the tubesheet, joints, seals, bags or bypass valves. These leaks are detected through injection of a florescent powder into the flue gas flow stream. A black light is utilized to locate powder that has leaked through the tubesheet, seals or bags. Vendor quotes were used to establish the cost for the fabric filter leak tests. Engineering judgement was used to estimate the cost of repairing leaks in the tubesheets, seals bags and valves. All of the costs are accounted for as an increase in annual operation and maintenance.

E.2.4 Moderate D/O/M for Existing Fabric Filter (4E)

The moderate D/O/M for a fabric filter is installation of improved bags. Fiberglass bags are the most commonly used bags in fabric filters for HWCs in the OSW database. A significant increase in PM collection efficiency can be achieved through replacement of the fiberglass bags with a high efficiency PTFE (teflon) membrane type bag.

The average cost of a fiberglass bag is \$0.95/ ft². The average cost of fiberglass bags with a high efficiency PTFE (teflon) membrane is \$3.70/ ft². This cost is the average of reverse flow and pulse jet bags based on vendor quotes. An average life of a fiberglass bag is two years so the change in bags can be made at the regularly scheduled time with no incremental increase

in labor costs for installation of the new bags. Based on vendor information, a three year bag life is expected for these bags in HWC applications. The only additional cost incurred for installation of PTFE membrane bags is the marginal increase in material cost for the bags. The annualized incremental capital cost for replacement of the bags is the difference between the annual capital costs for fiberglass bags based on a two year life and the PTFE membrane bags based on a three year life.

E.2.5 Moderate D/O/M for Existing High Energy Wet Scrubber (7E)

This category includes all types of high energy impaction type PM scrubbers. The high energy scrubbers found in the OSW database include venturi (VS), hydrosonic eductor (HES), orifice (OS), and reverse jet (RJS). The majority of WSHEs in the database are venturi scrubbers. No "small" D/O/M was needed for high energy scrubbers. The "moderate" D/O/M is an increase in pressure drop across the venturi from 24 to 47 inches. This increase in pressure drop increases collection efficiency of 1 um particles from 96% to 99.8%¹.

The capital cost includes installation of a new venturi insert along with installation of a larger fan to handle the increased pressure drop. Many high energy scrubbers have an adjustable venturi throat that will not require replacement but this cost is included to cover added time for adjustment and optimization of the scrubber. The only additional operating costs are the additional electrical requirement of the larger fan and the disposal cost for the collected PM.

E.2.6 Small D/O/M for Existing Low Energy Wet Scrubber (5E)

This category of scrubber includes the mass transfer type scrubbers or gas absorbers. These "wet" scrubbers are designed to maximize contact time and surface area between the scrubbing liquid and the gas. Some large (>5um) PM can be collected in these devices but sub-micron sized PM cannot be efficiently collected, so the low energy wet scrubbers are not considered PM control devices for this analysis. The primary type of "wet" scrubbers are packed bed or tower, plate scrubber and spray tower. Various names are used to describe these scrubbers in the OSW database. These names and the corresponding acronyms include: Packed Bed or Tower (PBS, PT), Acid (ACS), Caustic (CS), Counter Current (CCS), Chlorine (CLS), HCl Scrubber or Absorber (HCS, HCA), Wet Scrubber (WS). Since the scrubber section of an ionizing wet scrubber is a packed bed, the D/O/Ms for low energy wet scrubbers are also applied to acid gas control for ionizing wet scrubbers. The D/O/M cost equations were developed for packed bed scrubbers which make up the majority of the "wet" scrubbers on HWCs in the OSW database.

Two "small" low energy wet scrubber D/O/Ms were developed. One of the "small" D/O/Ms is refurbishment of the scrubber including replacement of the water distribution system and replacement of the packing with a standard random packing. Capital costs are for a new water distribution manifold, added redistribution plates and new packing. Costs for this refurbishment were obtained from a combination of vendor quotes and the OAQPS Control Cost Manual. The only additional O&M cost is for increased NaOH usage and disposal costs associated with the supplemental chlorine absorption.

The other "small" D/O/M is an increase in the liquid to gas ratio. Water flow is increased from 10 to 20 gpm / 1000 acfm. Ten gpm / 1000 acfm is an avg water flow for packed bed scrubbers. Twenty gpm / 1000 acfm is the maximum achievable water flow without flooding for a standard size scrubber and packing. Pressure drop through the scrubber will increase 2.5 inches through the scrubber. Capital equipment costs include a new water pump, surge tank and ancillary equipment as well as a new fan to handle the increased pressure drop. Additional O&M costs include increased water, electricity, NaOH and disposal costs.

Both of these D/O/Ms increase HCl and Cl₂ absorption through improved liquid-gas contacting. In many scrubbers the water is poorly distributed initially and it flows to the scrubber walls as it moves down the scrubber. Fragmented packing also degrades water distribution and liquid-gas contacting.

E.2.7 Moderate D/O/M for Existing Low Energy Wet Scrubber (12E)

A "moderate" reduction in acid gas emissions can be achieved through replacement of the standard size random packing with a smaller random packing or a structured packing. An increase in water flow from 10 to 15 gpm / 1000 acfm is also included to further improve gas/liquid contacting. A pressure drop increase of about 3 inches is estimated with the installation of the smaller packing and the increase in water flow.

Capital costs include packing at an average installed price of \$180/ft³ and a new water pump and fan. The volume of packing was based on depth requirements specified by packing vendors to achieve the required efficiency and the average packing depth for those scrubbers in the OSW database which had a packing depth available. Additional O&M costs include water, electricity, NaOH and waste disposal.

E.2.8 Moderate D/O/M for Spray Dryer (SD) or Dry Sorbent Injection (DI)(13E)

There are only eight spray dryer or dry injection systems on HWCs in the OSW database. No "small" D/O/Ms were required in the floor or BTF cost analysis. One spray dryer and one dry injection system required a "moderate" D/O/M for several of the floor and BTF options. The same "moderate" D/O/M was utilized for both the spray dryer and dry sorbent injection system. The D/O/M includes redesign and refurbishment of the injection system and a 20% increase in sorbent flow. Modification of the spray dryer/dry injection system includes replacement and optimization of placement of nozzles and injectors.

The capital cost for redesign and refurbishment is estimated as \$100,000 for engineering design including flow modeling and 25% of the cost of a new spray dryer (cost model 10M) for modification of the existing injection system. This estimate provides a conservative estimate of the cost of redesigning and refurbishing an injection system.

E.2.9 Moderate D/O/M of the Combustor

For incinerators and LWAKs where greater than 75% reduction of CO or HC is required, a "moderate" D/O/M of the burner/combustion system is applied. For cement kilns it is assumed that all the facilities are currently meeting the floor, since the floor is the existing standard. A

combustor D/O/M is only applied to cement kilns if both the CO and HC emission from the bypass stack exceed the MACT limit.

In some cases operational changes such as adjustment of burner zone temperature or back-end oxygen concentrations may provide the required increase in combustion efficiency. These options were not costed. The option costed included a hardware oriented evaluation of the combustion system, and equipment redesign and modification to increase combustion efficiency. Potential areas of equipment modification include the waste delivery system or the burner pipe. The moderate combustor D/O/M cost estimate is a conservative estimate that includes \$50,000 for engineering costs and 25 percent of the capital cost for installation of an afterburner (cost model 17M). The base engineering cost does not vary by facility size but the hardware costs vary as specified in the cost model.

References for D/O/M Discussion and Tables

1. EPA/625/6-91-014 *Control Technologies for Hazardous Air Pollutants*
2. Buonicore, Anthony J., Davis, Wayne T., *Air Pollution Engineering Manual*, Air and Waste Management Association, Van Nostrand Reinhold, New York, 1992.
3. Survey on Shutdown Time for Retrofitting APCDs to HWCs, Prepared by EER for EPA Contract 68-D2-0164 (Basis for Section 5 of this Document)
4. Vendor Information
5. McKenna, J.D., Turner, J.H., *Fabric Filter - Baghouses I: Theory, Design, and Selection*, ETS International, Inc., 1989.
6. Peters, Max., *Plant Design and Economics For Chemical Engineers*, McGraw-Hill Publishing Co., 1980
7. EPA/ 450/3-90-006 *OAQPS Cost Control Manual*

TABLE E-1. COST MODELS

Model No.	Description	Reference
1M	Installation of an ESP	OAQPS Control Cost Manual
2M	Installation of Water Quench Tower and DOM small for ESP	OAQPS Cost Model
3M	DOM moderate for ESP (additional ESP fields)	OAQPS Cost Model and Cost Model 1M
4M	Installation of a Fabric Filter (FF)	OAQPS Control Cost Manual
6M	Installation of a carbon bed	EER vendor quote
8M	Retrofit of carbon injection to a facility with existing dry injection system or spray dryer	Cost Model 9M
9M	Installation of carbon injection system	OAQPS Cost Model
10M	Installation of a spray dryer	OAQPS Cost Model
11M	Installation of a venturi scrubber	EER
12M	Installation of spray tower scrubber	OAQPS Cost Model
13M	Installation of sorbent injection system	Cost Model 9M
15M	Installation of IWS	EER
16M	Installation of packed tower scrubber	OAQPS Control Cost Manual
17M	Installation of an afterburner	ORD AB model
18M	Installation of a reheat burner	Cost Model 17M

TABLE E-2. D/O/M EQUATIONS

Equation No	Description	Reference
1E	DOM small for ESP	OAQPS Cost Model
2E	DOM moderate for ESP	OAQPS Cost Model
3E	DOM small for FF	EER
4E	DOM moderate for FF	EER
5E	DOM small for low energy wet scrubber	EER
7E	DOM moderate for High Energy Wet Scrubber	EER
12E	DOM moderate for low energy wet scrubber	EER
13E	DOM moderate for spray dryer/ Sorbent Injection	EER
14E	DOM moderate for combustor	EER

TABLE E-3. COST MODEL SECTIONS

ID	Section	Type
A.	Annual Costs	Calculated Costs
B.	Capital Investment	Calculated Costs
C.	Model Plant Input Parameters	Input Parameters
D.	Control Option Design Input Parameters	Input Parameters
E.	Economic Factors	Input Parameters and Calculated Parameters
F.	Emission Levels	Input Parameters
G.	Model Plant Calculated Parameters	Calculated Parameters
H.	Estimating Equipment Costs Based on Size	Calculated Costs
I.	Direct Equipment and Installation Costs	Calculated Costs
J.	Indirect Installation Costs	Calculated Costs
K.	Direct Annual Costs	Calculated Costs
L.	Indirect Annual Costs	Calculated Costs

TABLE E-4. MODEL PLANT INPUT PARAMETERS

Model Plant Input Parameter	CK-S	CK-L	LWAK	INC-S	INC-M	INC-L
C1: Flue Gas Flow Rate, acfm	147,000	370,000	40,500	3,900	22,100	60,800
C2: Flue Gas Flow Rate, dscfm	73,700	179,000	24,600	2,910	12,700	34,300
C3: HCl Inlet, ppm	85	85	1,570 (hi HCl) 875 (lo HCl)	92	92	92
C4: Flue Gas Moisture, %	24%	25%	13%	16%	30%	28%
C5: Operational Time, hr/yr	8,000	8,000	8,000	8,000	8,000	8,000

TABLE E-5. ASSUMED ECONOMIC FACTORS

Economic Factor	Value	Reference
E3: Interest (Discount) Rate, %	10%	OAQPS Control Cost Manual
E6: Operator Labor, \$/hr	\$14.00	OAQPS Cost Models
E7: Maintenance Labor, \$/hr	\$18.00	OAQPS Cost Models
E8: Electricity Cost, \$/kWh	\$0.048	9 month avg. for 1994 industrial retail from the Energy Information Admn.
E9: Water, \$/1,000 gal	\$0.20	OAQPS Cost Models
E10: Waste water Disposal, \$/1,000 lb	\$0.80	OAQPS Spray Tower Model
E11: Hazardous Waste Disposal, \$/ton	\$150.00	Vendor Quotes

TABLE E-6. VARIABLE OPERATING COSTS

Cost Model	Packed Tower		I W S		Spray Tower	
Variable Costs · NaOH · Lime · Water · Waste Water · Electricity (partial)		X		X		X
		X		X		X
		X		X		X
		X		X		
Source/Size Category	% of Annual Operating Costs	% of Total Annual Costs	% of Annual Operating Costs	% of Total Annual Costs	% of Annual Operating Costs	% of Total Annual Costs
CK-S	50%	35%	33%	16%	not used	not used
CK-L	60%	41%	41%	21%	not used	not used
LWAK - (hi HCl)	not used	not used	79%	63%	52%	32%
LWAK - (lo HCl)	not used	not used	68%	49%	39%	22%
INC-S	6%	6%	5%	4%	not used	not used
INC-M	23%	12%	15%	9%	not used	not used
INC-L	39%	29%	26%	13%	not used	not used

TABLE E-7. D/OM EQUATIONS

D/O/M	Total Capital Investment (TCI) (TCI)	Annual Operating Cost (AOC) (AOC)	Total Annual Cost (TAC) (TAC)
ESP - Small (1E)	Cost Model 2M	Cost Model 2M	Cost Model 2M
ESP - Moderate (2E)	Cost Model 3M	Cost Model 3M	Cost Model 3M
FF - Small (3E)	$0.145 * (\text{acfm}) + 5000$	$0.0119 * (\text{acfm}) + 4690$	$0.142 * (\text{acfm}) + 5500$
FF - Moderate (4E)	$0.85 * (\text{acfm})$	$0.28 * (\text{acfm})$	$0.31 * (\text{acfm})$
Low Energy Wet Scrubber - Small (5E)	$1.58 * (\text{acfm}) + 4870$	$0.436 * (\text{acfm}) + 3130$	$0.739 * (\text{acfm}) + 4090$
Low Energy Wet Scrubber - Moderate (12E)	$3.2 * (\text{acfm}) + 450$	$0.667 * (\text{acfm})$	$1.51 * (\text{acfm}) + 120$
High Energy Scrubber - Moderate (7E)	$21.8 * (\text{acfm})^{0.82}$	$1.59 * (\text{acfm})$	$2.06 * (\text{acfm}) + 1805$
Spray Dryer - Moderate (13E)	$100000 + (370000 * (\text{acfm}/44000)^{0.5})$	$41000 * (\text{acfm}/44000)$	$\text{AOC} + (\text{TCI} * .162)$
Combustor - Moderate (14E)	$(50000 + (0.25 * (30650 * (\text{acfm})^{.261})))$	0	$(50000 + (0.25 * (30650 * (\text{acfm})^{.261}))) * 0.162$

acfm = actual cubic feet per minute of flue gas flow

TABLE E-8. TOTAL CAPITAL INVESTMENT FOR D/O/MS

APCD	D/O/M Size	Modification	General Notes	Required Down Time For Retrofit Time	Capital Cost	Cost Est. Proc. Used	Size Basis (acfm)	Inclusivity of Reported Capital Cost	Capital Cost Adj. for Inclusivity & Size	Comment	Yearly Capital Cost (\$/yrs)	Sealing Proc.	Assumed Equipment Life (Yrs)	Cost Rec. Factor (%)	Invest. Return (%)
ESP	DOM small	Humidification	Reduce gas temperature 300°F	2-3 weeks (Ref. 4)	584,400	Model 2M	170,000	All including installation	584,400	None	76,840	OAQPS model	15	15.15	10
	DOM moderate	Add ESP fields	Add 133 ft2 kacfim section. Maintain same design as existing ESP	6-11 weeks (Ref. 3)	1,925,000	Model 3M	170,000	All including installation	1,925,000	None	226,000	OAQPS model	20	11.7	10
FF	DOM small	Optimize bag cleaning & early detect. of bag leaks	Install opacity meters	1 week (Ref. 3)	41,000	Ref. 4	107,000	all including installation	41,000	None	6,690	Base + linear	10	16.3	10
	DOM moderate	FF Leak minimization	No capital cost - Accounted for as nm. increased main. cost	1 week (Ref. 3)	0	BEJ and Ref. 4	107,000	na.	0	None	na	na	na	na	na.
High Energy Wet Scrubber	DOM moderate	Install improved bags	Diff. in cost between install of Bags w/PTFE membrane @ \$3.70/ft2 vs. fiberglass bags @ \$0.95/ft2 (G/C of 3.0 - avg. in db)	1 week (Ref. 3)	90,950	Ref. 4 & 5	107,000	All including installation	90,950	Yearly cap. cost is diff. between PTFE bags with 3 yr. life and fiberglass with 2 yr life	30,170	Linear	3	40.2	10
	DOM moderate	Increase energy (pressure drop)	Install new fan to provide higher dp and installation or mod. of venturi throat. (inc. from 24 in. to 47 in. - increases CE from 96% to 99.8% with 1u particles)	2 weeks (Ref. 3)	71,450	BEJ and Ref. 4	20,000	PEC only - factor of 2.09 to adj for inst. and IAC	149,250	Fan costed from OAQPS, updated to 4Q 94 using M&S index	24,370	Equat. 1, n=8 (ref.6)	10	16.3	10
Low Energy Wet Scrubber & TWS	DOM small	Refurbish	New packing, inlet distribution manifold and dist. plates between beds (removal of old packing and plates)	1 week (Ref. 3)	56,000	BEJ and Ref. 1, 2, 4, 7	24,000	Incl. install cost & remove and replace of packing	56,000	capital cost recovery factor of 7.5 yrs. based on 5 yrs. for packing and 10 for equip. mods.	10,976	Eqn. 1 & n=8 (ref. 6)	7.5	19.6	10
	DOM moderate	Increase liquid/gas ratio	Cost of new wir pump, tank and ancillary equip and exhaust fan	1 week (Ref. 3)	41,680	Ref. 7	24,000	installed cost	41,680	na.	11,000	na.	5	26.4	10
Spray Dryer/ Dry Sorbent Injection	DOM moderate	Change packing material to structured or smaller packing and inc. L/G ratio	Avg. installed cost of packing is \$180/ft2 & packed bed size is avg. for this flow rate from database; priced new pump and fan for inc. wir flow and dp	1 week (Ref. 3)	77,510	Ref. 4 & 7	24,000	includes cost of old packing removal and new install costs	77,510	Cost is difference between avg. cost of random packing and avg. cost of structured packing	20,460		5	26.4	10
	DOM moderate	Increase sorbent injection by 20% and redesign to improve sorbent distribution	Engineering cost is \$100,000 and cost for modifications is 25% of new spray dryer cost based on the OAQPS spray dryer model (10M)	1-2 weeks (Ref. 3)	614,500	BEJ and Cost Model 10M	50,000	All including installation	614,500		80,800	Eng. Cost of \$100,000 + 25% of Model 10M	10	16.3	10
Combustor	DOM moderate	Modification and optimization of burner and combustion	Engineering cost is \$50,000 and cost for hardware modifications and testing is 25% of new afterburner cost (model 17M)	2 weeks (Ref. 3)	482,600	BEJ and Cost Model 17M	25,500	All including installation	482,600		78,520	BL cost of \$50k + 25% of Model 17M	no change	16.3	10

TABLE E-9. ANNUAL OPERATING AND MAINTENANCE AND TOTAL ANNUAL COSTS FOR D/O/Ms

APCD	D/O/M Size	Modification	General Notes	Operating Labor Requirement	Operating Labor Costs *	Maintenance Requirement (Labor + Material)	Maintenance Costs *	Water Requirement	Water Costs *	Electrical Requirement	Electrical Costs *	Consumable	Cons. Costs *	Waste Disposal / Treatment Requirement	Waste Disposal / Treatment Costs	IAC Requirement	IAC Cost	Total Annual O&M Costs
ESP	DOM - small	Humidification	Costs based On Cost Model for Water Quench (QM)	Operating labor is \$15 per shift and supervision is 15% of OL	8,050	labor is \$15 per shift. Materials are 1% of TCI	15,700	30 gpm are required to achieve desired quench	3,700	Cost for one pressure drop of 2 inch. & to pump water	25,500	no increase	0	Disposal cost for additional PM collected (assume no recycle)	1020	CR, AC&ins for equip.-OH for labor	11,950	170,420
	DOM - moderate	Add ESP Fields	Add 134.12 acfm for 170,000 acfm unit and add additional field (Based On Cost Model QM)	1/4 of labor requirement for complete ESP	8,050	labor is 1/4 of total ESP labor plus 10% of purchased equip. cost	10,850	No water requirement	0	Includes cost for charging electrodes and 1 inch of add.dp	28,675	no increase	0	Disposal cost for additional PM collected (assume no recycle)	4100	CR, AC&ins for equip.-OH for labor	314,300	365,975
Fabric Filter	DOM - small	Optimize bag Cleaning	Oper. labor for opacity monitor and Main. labor for leaking bags-4,5ed avg. value for bag cost and G/C of 3.0(avg in db)	Bl of 5/12day and scaled wept. (n=3)(ref =6)	6,010	Ann. replace of 3% of Bags, ML-\$1,012. Mt.-\$3,712 for PTFE mem. bags	4,290	no increase	0	Estimate an additional 0.5 inch pressure drop	3000	no increase	0	Disposal cost for additional PM collected (assume no recycle)	1620	CR, AC&ins for equip.-OH for labor	12,165	27,085
		Leak minimization retrofit	Leak id, repair of rimpseal, joint, seal, bag and bypass valve leaks	Leak test and overall scaled wept. (n=35)	5,290	Repair labor and parts. Vent. 1 (10-60) & parts linear	9,120	No increase	0	No Increase	0	Fluorescent powder scaled linearly	200	Disposal cost for additional PM collected (assume no recycle)	1620	OH and admin.	3,440	19,670
High Energy Wet Scrubber	DOM - moderate	Install improved bags	No increase in operating requirements	No increase	0	Replacement of 2% of bags/yr.	3,000	No increase	0	No increase	0	No increase	0	Disposal cost for additional PM collected (assume no recycle)	4100	CR on bags	30,170	37,270
		Increase energy (pressure drop)	Only additional O&M cost is electricity and add. disposal cost. Elec. diff. between 25 & 47 in. dp	no increase	0	no increase	0	no increase	0	Diff. in fan power required for 47 in. p. v.s. 25 in. dp. (Ref- 1)	32,600	no increase	0	Disposal cost for additional PM collected (assume no recycle)	900	Yearly capital recovery	11,950	45,450
Low Energy Wet Scrubber	DOM - small	Refresh scrubber incl. new packing and improved water distribution	Only additional O&M cost is for increased Na(OH)2 use and disposal cost	no increase	0	no increase	0	no increase	0	no increase	0	Additional NaOH	1,110	Additional waste treatment	160	yearly capital recovery	10,976	12,246
		Increase liquid/gas ratio	Water flow is increased from 10 to 20 gpm/1000 acfm with no inc. in dp of 2.5 inch	no increase	0	no increase	0	Increase water flow from 10 to 20 gpm/1000acfm.	9,500	Pressure drop inc. 4 inch and inc. wr. flow	9,800	Additional NaOH	3,000	Additional waste treatment	350	yearly capital recovery	11,000	33,650
Spray dryer/ Dry Sorbent Injection	DOM - moderate	Install higher efficiency packing (either structured or smaller diameter)	Costs are for increase in wr. flow and resulting inc. in pressure drop	no increase	0	no increase	0	Increase water flow from 10 to 17 gpm/1000 acfm	6,000	Pressure drop inc. of 2.5 inch (avg. of struc. & small pack)	6,500	Additional NaOH	3,340	Additional waste treatment	490	yearly capital recovery	20,460	36,790
		Improve sorbent distribution and increase sorbent by 20%		no increase	0	no increase	0	minimal cost increase	80	Estimated increase in pressure drop of 0.25 inches	900	Increased Ca(OH)2 scaled linearly	17,680	Disposal cost for additional sorbent	27,930	yearly capital recovery	80,800	127,390
Combustor	DOM - moderate	Mod. and opt. of burner and combustion	No additional O&M costs	no increase	0	no increase	0	no increase	0	no increase	0	no increase	0	no increase	0	Yearly capital cost	78,520	78,520

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
A. Annual Costs																				
A1	Total Annual Cost (\$/yr): Calculated as the sum of the annual operating cost and annualized capital cost.																			= A2 + A3
A2	Annual Operating Cost (\$/yr): Calculated as the sum of the direct and indirect annual costs less capital recovery.																			= L6 + L5 + K15
A3	Annualized Capital Cost (\$/yr): Calculated as the Total Capital Investment multiplied by the Capital Recovery Factor.																			= L5
B. Total Capital Investment																				= I50 + J8; or = I7 for 6M
B1	Total Capital Investment (\$): Calculated as the Direct Costs and Indirect Installation Costs.																			
C. Model Plant Input Parameters																				
C1	Flue Gas Flowrate (acfm): Input model plant actual flue gas flowrate based on average dry flue gas flowrate, average measured stack temperature and average moisture content for each of six categories.																			= 147,000 for CK-S; = 370,000 for CK-L; = 40,500 for LWAK; = 3,900 for INC-S; = 22,100 for INC-M; = 60,800 for INC-L
C2	Flue Gas Flowrate (dscfm): Input model plant dry flue gas flowrate based on average measured flowrate for each of six categories.																			= 73,700 for CK-S; = 179,000 for CK-L; = 24,600 for LWAK; = 2,910 for INC-S; = 12,700 for INC-M; = 34,300 for INC-L
C3	HCl Inlet (ppm): Input the model plant equivalent HCl concentration based on the average measured stack emissions (= ppm HCl + 2 * ppm Cl2) for each of six categories.																			= Source category specific
C4	Flue Gas Moisture (%): Input model plant average flue gas moisture content based on the average measured stack moisture.																			= 24% for CK-S; = 25% for CK-L; = 13% for LWAK; = 16% for INC-S; = 30% for INC-M; = 28% for INC-L
C5	Operational Time (hr/yr): Input the number of hours of operational time per year																			= 8,000
D. Control Option Design Input Parameters																				
D1	Specific Collection Area (ft ² /1000 cfm): Input the specified ESP SCA.																			= 400 based on engineering judgement
D2	Increased Pressure Drop (" H2O): Input the increased pressure drop across the APCD; used to calculate increased ID fan electricity usage.																			= 1 for 17(b)M; = 2 for 2M, 10M, 17(a)M, 18M; = 3 doe 1M; = 4 for 12M; = 10 for 4M; = 50 for 1IM based on sound engineering judgement.

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
D3 Water Quench Temperature Drop (°F): Input the specified water quench temperature drop.																		= 400: assumed as an average for all facilities based on engineering judgement		
D4 Existing ESP Specific Collection Area (ft ² /1000 cfm): Input the existing SCA of the ESP to which additional fields are to be added.																		= 400: assumed as an average of all facilities based on engineering judgement.		
D5 Number of Existing ESP Fields: Input the number of existing fields in the ESP to which additional fields are to be added.																		= 3: assumed as an average of all facilities based on engineering judgement.		
D6 Number of Additional ESP Fields Desired: Input the number of additional ESP fields desired for the ESP to which additional fields are to be added.																		= 1: assumed as an average for all facilities to which additional fields are to be added based on engineering judgement.		
D7 Incremental Pressure Drop per Additional ESP Field (in H2O): Input the incremental pressure drop per additional ESP field.																		= 1: assumed based on engineering judgement		
D8 FF Bag Material Cost (\$/sq. ft.): Input the average cost of fabric filter bag material.																		= \$0.76 based on OAQPS FF Cost Model for fiberglass bags.		
D9 FF Gas-to-Cloth Ratio (air/min): Input the average gas-to-cloth ratio for each model plant.																		= 2 based on engineering judgement		
D10 FF Bag Replacement Labor Rate (\$/sq.ft.): Input the bag replacement labor rate based on the hourly maintenance rate and the expected bags/hour.																		= \$0.16 based on OAQPS Control Cost Manual, January, 1990.		
D11 Cost of carbon (\$/lb): Input the cost of activated carbon used for carbon bed and carbon injection applications.																		= \$0.50/lb based on		
D12 Bed Pressure drop (in. H2O/ft of bed): Input the anticipated pressure drop across each foot of carbon																		= 1.5 based on sound engineering judgement.		
D13 Bed Velocity (m/s): Input the bed velocity to be used to calculate the bed size in the carbon usage calculation.																		= 0.2 based on sound engineering judgement.		
D14 Bed Depth (ft): Input the bed depth to be used to calculate the bed size in the carbon usage calculation.																		= 2 based on sound engineering judgement.		
D15 Carbon exchanges (number/yr): Input the number of effective annual carbon bed exchanges to be used in the carbon usage calculation.																		= 2 based on sound engineering judgement.		
D16 Carbon injection rate (mg/dscm): Input the carbon injection rate to be used to calculate carbon usage for the carbon injection model.																		= 200 based on sound engineering judgement.		
D17 Injection Blower fan power (HP): Input the estimated injection blower horsepower to be used to calculate the electricity usage for the sorbent and carbon injection models.																		= 15 for 8M; 9M; = 25 for 13M based on sound engineering judgement.		
D18 Liquid/gas ratio (gpm/1000 acfm): Input liquid to gas ratio for the acid scrubber.																		= 10 for 15M; = 20 for 11M, 12M, 16M based on sound engineering judgement.		

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
D19	Water make-up rate (% of recirc rate): Input the rate at which make-up water will be added to the scrubber liquor, as a percentage of the recirculation rate to be used to calculate water usage and wastewater disposal																		= 20% based on sound engineering judgement.	
D20	Sorbent HCl stoichiometry: Input the desired HCl stoichiometry.																		= 1.1 for 11M, 12M, 15M, 16M; = 1.5 for 13M; = 1.8 for 10M based on sound engineering judgement.	
D21	Ca(OH) ₂ Cost (\$/ton): Input the cost of lime per ton.																		= \$95/ton based on	
D22	IWS Electricity requirements (kVA/1000 acfm): Input the IWS electricity requirements used to calculate the electricity usage costs.																		= 0.3 based on sound engineering judgement.	
D23	Scrubber packing depth (ft): Input the depth of scrubber packing desired to be used to calculate the NaOH Cost (\$/ton): Input the cost of NaOH.																		= 4 based on sound engineering judgement.	
D24																			= \$434/ton based on	
D25	Scrubber Pressure drop (in H ₂ O/ft packing): Input the anticipated pressure drop per foot of scrubber packing to be used to calculate increased fan electricity																		= 1 based on sound engineering judgement.	
D26	Scrubber Packing cost (\$/ft ³): Input the cost of the scrubber packing to be used.																		= \$50 based on	
D27	Fuel Cost (\$/1000ft ³): Input the cost of the fuel used in the afterburner (INC) and reheat models.																		= \$3.50 based on	
D28	Natural Gas Heating Value (Btu/ft ³): Input the heating value of natural gas.																		= 990 based on typical heating value of natural gas.	
D29	Primary Heat Input (Btu/dscf): Input the average heat input to the primary combustion zone used to calculate the afterburner heat input requirements for the Incinerators.																		= 50 based on typical value from database.	
D30	Afterburner/Primary Heat Input Ratio: Input the desired ratio of afterburner heat input relative to the existing heat input in the primary combustion zone.																		= 0.4 based on average ratio of selected sources in database with primary and secondary combustion chambers.	
D31	Additional Combustion Air Required (ft ³ air/ft ³ fuel): Input the additional combustion air required relative to the quantity of fuel added.																		= 11.19 based on typical value for approximate SR = 1.1.	
D32	Fuel Cost (\$/MMBtu): Input the cost of the fuel used in the afterburner (CK and LWAK) model.																		= \$3.50 based on	
D33	Flue Gas Density @STP (lb/ft ³): Input the average estimated flue gas density at standard conditions to be used to calculate the mass flow of flue gas.																		= 0.074 based on density of air at STP	

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
D34 Specific Heat of Flue gas (Btu/lb°F): Input the estimated flue gas specific heat to be used to calculate the heat required to increase the flue gas temperature.																		= 0.253 based on specific heat of air		
D35 Afterburner Increase in Flue Gas Temp (°F): Input the desired afterburner flue gas temperature increase.	•																	= 1,000 for CK-S and CK-L; = 1,100 for LWAK		
D36 Reheat Increase in Flue Gas Temp (°F): Input the desired reheat flue gas temperature increase.																		= 100		
D37 Water head loss (ft): Input the estimated head loss.																		= 200 for 2M; = 100 for 10M, 11M, 12M, 15M, 16M		
D38 New Ductwork length (ft): Input the estimated length of new ductwork required for the installation.	•						•	•	•	•								= 125 for 2M; = 200 for 10M		
D39 Solids content of scrubber sorbent (%): Input the estimated solids content of the sorbent slurry injected to be used to calculate the water usage.																		= 10% for 10M		
D40 Carbon Density (lb/ft³): Input the estimated density of carbon used in carbon bed and for carbon injection.																		= 24 based on		
E. Economic Factors																				
E1 Projected Equipment Life (years): Input the projected equipment life.																			= 10 for 11M, 12M, 15M, 16M; = 15 for 2M, 3M, 6M, 8M, 9M, 10M, 13M, 17(a)M, 17(b)M, 18M; = 20 for 1M, 4M; assumed values based on OAQPS Control Cost Manual, January 1990 and sound engineering judgement	
E2 Projected FF Bag Life (years): Input the projected FF bag life	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= 2 for 4M based on assumed value in OAQPS Control Cost Manual, January 1990; n/a for other models)	
E3 Interest Rate (%): Input the pretax marginal rate of return on private investment																			= 10% based on assumed value in OAQPS Control Cost Manual, January 1990	
E4 Equipment Capital Recovery Factor (CRF, CRFe): Calculated based on the equipment life and interest rate.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= E3 * (1 + E3)^E1 / ((1 + E3)^E1 - 1)	
E5 Retrofit Factor (RF): Input the retrofit factor corresponding to the retrofit difficulty.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= 1.1 for 13M; 1.15 for 9M; = 1.15 for 10M; = 1.20 for 2M, = 1.25 for 1M, 4M, 6M, 12M, 15M, 16M, 18M; = 1.3 for 3M; assumed values based on OAQPS Control Cost Manual, January 1990 and sound engineering.	

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
E6	Operator Labor (\$/hr): Input operator labor rate.																		= \$14/hr based on OAQPS Spray Tower Cost Model Documentation, April 1994	
E7	Maintenance Labor (\$/hr): Input maintenance labor rate.																		= \$18/hr based on OAQPS Spray Tower Cost Model Documentation, April 1994	
E8	Electricity Cost (\$/kWh): Input electricity cost.																		= \$0.048/kWh based on 9 month average for 1994 industrial retail electrical costs from the Energy Information Administration - DOE	
E9	Water Cost (\$/1000 gal): Input water cost.																		= \$0.20/1000 gal based on OAQPS Control Cost Manual, January 1990	
E10	Wastewater Disposal (\$/1000 lb): Input wastewater disposal cost.																		= \$0.80/1000 lb based on OAQPS Spray Tower Cost Model Documentation, April 1994	
E11	Hazardous Waste Disposal Cost (\$/ton): Input hazardous waste disposal cost.																		= \$150/ton assumed value based on sound engineering judgement of waste disposal costs	
E12	FF Bag Capital Recovery Factor (CRFb): Calculated based on the bag life and interest rate.																			= $E3 * (1 + E3)^{E2} / ((1 + E3)^{E2} - 1)$
F. Emissions Levels																				
F1	PM Emissions upstream of APCD (gr/dscf): Input the existing PM emissions upstream of the proposed APCD to be used to calculate the solid waste disposal costs.																		= 0.08 based on the maximum allowable emission under existing regulations.	
F2	Desired PM stack emissions (gr/dscf): Input the target PM emissions downstream of the proposed APCD to be used to calculate the solid waste disposal costs.																		= 0.015 based on the anticipated MACT emission limit.	
G. Model Plant Calculated Parameters																				
G1	ESP Total Collection Area (sq ft): Calculated based on the ESP SCA and flue gas flowrate.																			= $C1 / 1,000 * D1$
G2	WQ Water Requirement (gpm): Calculated based on the water quench temperature drop and flue gas																			= $C2 / (1 - C4) * D34 * D33 * D3 / 900 / 8.33$
G3	ESP Existing Collection Area (sq. ft.): Calculated based on the existing ESP SCA and flue gas flowrate.																			= $C1 / 1,000 * D4$

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17a	17b			18
G4 ESP Existing Collection Area per Field (sq ft): Calculated based on the existing number of ESP fields and the ESP existing total collection area.																					= G3 / D5
G5 ESP Additional Collection Area In New Fields (sq ft): Calculated based on the existing collection area per field and the number of new fields desired.																					= G4 * D6
G6 ESP Additional Pressure Drop (in H2O): Calculated based on the number of additional fields and the pressure drop per field.																					= D6 * D7
G7 FF Required Cloth Area (sq. ft.): Calculated based on the flue gas flowrate and the desired gas-to-cloth ratio.																					= C1 / D9
G8 Carbon Bed Pressure Drop (in H2O): Calculated based on the carbon bed depth and the estimated pressure drop per unit depth.																					= D12 * D14
G9 Carbon Bed Volume (ft ³): Calculated based on the target bed velocity and bed depth.																					= C1 / D13 * D14 / 60(sec/min) / 3.28(ft/m)
G10 Annual Carbon Consumption (lb): Calculated based on the carbon bed volume and the number of effective annual carbon exchanges.																					= D15 * D40 * G9
G11 Carbon feed rate (lbs/hr): Calculated based on the carbon injection rate and the flue gas flowrate.																					= D16 * C2 * 60(min/hr) / 3.28(ft/m) ³ / 1000(mg/g) / 454(g/lb)
G12 Carbon Silo storage volume (cf): Calculated based on the carbon feed rate, estimated bulk density, and a 15 day storage capacity																					= G11 * 24(hr/day) * 1.5(day) / 24 (lb/ft ³)
G13 Scrubber recirculation rate (gpm): Calculated based on the desired liquid-to-gas ratio and the flue gas flowrate.																					= C1 / 1000 * D18
G14 Scrubber water makeup rate (gpm): Calculated based on the water make-up ratio and the scrubber recirculation rate.																					= G13 * D19
G15 Sorbent use (lb/hr): Calculated based on the flue gas flowrate, HCl inlet concentration, and HCl sorbent stoichiometry.																					= C2 * C3 / 2 / 1,000,000(ppm) * D20 * 60(min/hr) * 74(lb/lbmol) / 386.7(ft ³ /lbmol)
G16 Scrubber blowdown rate (lb/hr): Calculated based on the sorbent use rate using a scaling factor of 40 from the OAQPS Spray Tower Cost Model.																					= 40 * G15
G17 Scrubber diameter (ft): Calculated based on the flue gas flowrate using a scaling factor of 0.053 from the OAQPS Spray Tower Cost Model.																					= 0.053 * C1 ^{0.5}
G18 Scrubber length (ft): Calculated based on the flue gas flowrate and packing depth using a correlation from the OAQPS Spray Tower Cost Model.																					= 3.9 * C1 ^{0.14} + (D23 - 4)

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17a	17b		
G19	Scrubber surface area (ft ²): Calculated based on the scrubber diameter and scrubber length.																			= 3.14 * G17 * (G18 + G17/2)
G20	Scrubber packing volume (ft ³): Calculated based on the scrubber diameter and packing depth.																			= 3.14 / 4 * G17 ² * D23
G22	Sorbent silo storage volume (ft ³): Calculated based on the sorbent feed rate, estimated bulk density (24 pcf), and a 15 day storage capacity.																			= G15 * 24(hr/day) * 15(day) / 24 (lb/ft ³)
G23	Slurry Flow Rate (lb/hr): Calculated based on the sorbent solids content of the slurry and the sorbent use rate.																			= G15 / D39
G24	Slurry Water Use (gpm): Calculated based on the sorbent solids content of the slurry and the sorbent use rate.																			= (1 - D39) / D39 * G15 / 60(min/hr) / 8.33(lb/gal)
G25	Required Heat Input (MMBtu/hr): Calculated based on the average primary combustion zone heat input and the afterburner-to-primary heat input ratio.																			= C2 / (1 - C4) * D33 * D34 * (1.1 * D35) * 60(min/hr) / 1000000(Btu/MMBtu)
G26	Required Fuel Flow (scfm): Calculated based on the																			= C2 / D29 * D30 / D28 for 17(b)M; = C1 * 1.09 * D36 / D28 / 60(min/hr) for 18M
G27	Required Combustion Air (scfm): Calculated based on the required fuel flow and the air required per scfm of fuel.																			= G26 * D31
H. Estimating Equipment Cost based on Control Option Size																				
H1	Cost without bags (\$): Calculated for FF < 15,000 ft ² based on required cloth area using correlations presented in the OAQPS Control Cost Manual, January, 1990.																			= 9,688 + 5.552 * G7
H2	Insulation add-on (\$): Calculated for FF < 15,000 ft ² based on required cloth area using correlations presented in the OAQPS Control Cost Manual, January, 1990.																			= 1,428 + 0.931 * G7
H3	Cost without bags (\$): Calculated for FF > 15,000 ft ² and < 100,000 ft ² based on required cloth area using correlations presented in the OAQPS Control Cost Manual, January, 1990.																			= 29,253 + 7.012 * G7
H4	Insulation add-on (\$): Calculated for FF > 15,000 ft ² and < 100,000 ft ² based on required cloth area using correlations presented in the OAQPS Control Cost Manual, January, 1990.																			= 1,130 + 0.8 * G7
H5	Cost without bags (\$): Calculated for FF > 100,000 ft ² and < 400,000 ft ² based on required cloth area using correlations presented in the OAQPS Control Cost Manual, January, 1990.																			= 225,000 + 5.52 * G7
H6	Insulation add-on (\$): Calculated for FF > 100,000 ft ² and < 400,000 ft ² based on required cloth area using correlations presented in the OAQPS Control Cost Manual, January, 1990.																			= 60,184 + 0.637 * G7

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
H7																			= SUM(H1 - H6)	
H8																			= G7 * D8	
H9																			= H8 * 1.16885 * 1.08	
I. Direct Costs: Purchased Equipment Costs																				
I1																			= 83.91 * [G1(or G5)]^0.8431 for G1(or G5) > 50,000; = 891.1 * [G1(or G5)]^0.6276 for G1(or G5) < 50,000	
I3																			= 0.372 * 1.25 * C1 + 67,980	
I4																			= 0.981 * D38 * (C1*1.25)^0.5	
I5																			= H7 + H8	
I7																			= 126,000 * (C2/1000)^0.93	
I8																			= 1000 * 2.1 * (63 + 0.0038 * [G12(orG15)]) for [G12(orG15) < 4,600; = 1000 * 2.1 * (34.2 + 0.016 * [G12(orG15)]) for [G12(orG15) > 4,600	
I9																			= 1000 * 0.0906 * [G11(orG15)]^0.6145	
I10																			= 1000 * 1.024 * (0.000289 * [G11(orG15)]) + 9.293)	
I11																			= 1000 * 1.05 * (26.4 + 0.0073 * [G11(orG15)]) + 0.4 * (12.8 + 11.23 * [G11(orG15)]^0.23)	

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
112 Carbon Injection ports (\$): Calculated based on the carbon injection rate and correlations derived by EPA from the MWC Bid EPA-450/3-89-27b, pg A-10.																			$= 1000 * 1.05 * (22.2 + 0.0014 * [G11(\text{or}G15)])$	
113 Venturi Scrubber Equipment cost (with instrumentation)																			$= 33,200 + 1.872 * C1$ for $C1 < 50,000$; $= 10,000 + 35.52 * C1^{0.7513}$ for $C1 > 50,000$	
114 Spray Tower Equipment Cost (\$): Calculated based on flue gas flowrate and correlations derived from vendor data by EPA in the OAQPS Spray Tower Scrubber Cost Algorithm.																			$= 1000 * (400 + 0.0037 * C1)$	
115 IWS Equipment Cost (\$): Calculated based on flue gas flowrate using a correlation derived by EER based on 75% of the combined cost of an ESP and a packed tower scrubber.																			$= 432 * C1^{0.6635}$	
116 Scrubber Tower cost (\$): Calculated based on scrubber surface area using correlation presented in the OAQPS Control Cost Manual, January, 1990.																			$= 115 * G19$	
117 Scrubber Packing cost (\$): Calculated based on packing volume and packing cost.																			$= G20 * D26$	
118 Scrubber Auxiliary Equipment Cost (\$): Calculated based on the scrubber tower and scrubber packing costs using fractional correlations developed by EER.																			$= 0.4 * (I16 + I17)$	
119 Afterburner Cost (\$): Calculated based on flue gas flowrate and correlations presented in the OAQPS Control Cost Manual, January, 1990.																			$= 13,149 * (C1 + G26)^{0.2609}$	
120 Reheater Cost (\$): Calculated based on flue gas flowrate and correlations developed by EER based on the afterburner correlations presented in the OAQPS Control Cost Manual, January, 1990.																			$= 13,149 * (G26 + G27 + 0.1 * C1)^{0.2609}$	
121 Spray dryer equipment cost (\$): Calculated based on flue gas flowrate using correlations derived by EPA in the Spray Dryer Cost Algorithm.																			$= 8.428 * 1,000 * C1^{0.46}$	
122 SD Ductwork (\$): Calculated based on the required additional feet of duct, flue gas flowrate, and correlations derived by EPA in the Spray Dryer Cost Algorithm.																			$= 1.3868 * D34 * (1.25 * C1)^{0.5}$	
123 Total Equipment (\$): Calculated as the sum of the equipment purchased.																			$= \text{SUM}(I1 - I22)$	
124 Instrumentation (\$): Calculated based on the total equipment cost using fractional correlations presented in the OAQPS Control Cost Manual, January, 1990.																			$= 0.1 * I23$	
125 Sales Tax (\$): Calculated as the total equipment multiplied by 0.03.																			$= 0.03 * I23$	

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
126 Freight (\$): Calculated as the total equipment multiplied by 0.05.		= 0.05 * I23	
127 Purchased Equipment with Tax and Freight (\$): Calculated as the sum of the total equipment plus tax and freight.		= SUM (I23 - I26)	
128 Purchased Equipment with Escalation (\$): Calculated as the purchased equipment multiplied by an escalation factor based on the reference year of the equipment cost.		= 1.1391 * I27 for 2M, 10M, 13M; 1.1615 * I27 for 3M; = 1.16885 * I27 for 4M, 17M, 18M; = 1.1319 * I27 for 8M, 9M; = 1.1611 * I27 for 1M; = 1.1615 * I27 for 3M	
129 Purchased Equipment with Retrofit Factor (\$): Calculated as the purchased equipment with tax and freight (or, if applicable, purchased equipment with escalation) multiplied by a the retrofit factor		= I28 * E5 or if I28 not calculated = I27 * E5	
130 Total Purchased Equipment Cost (\$): Equal to the calculated total purchased equipment cost including tax & freight, escalation, and retrofit factors.		= I29; or if I29 not calculated = I28; or if I28 not calculated = I27	
131 Foundation and Supports (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.		= 0.04 * I30 for 1M, 3M, 4M; = 0.06 * I30 for 11M, 15M, 16M; = 0.08 * I30 for 17M, 18M	
132 Handling and Erection (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.		= 0.4 * I30 for 11M, 15M, 16M; 0.5 * I30 for 1M, 3M, 4M; = 0.14 * I30 for 17M, 18M	
133 Electrical (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.		= 0.01 * I30 for 11M, 15M, 16M; 0.08 * I30 for 1M, 3M, 4M; = 0.04 * I30 for 17M, 18M	
134 Piping (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.		= 0.01 * I30 for 1M, 3M, 4M; = 0.02 * I30 for 17M, 18M; = 0.05 * I30 for 11M, 15M, 16M	
135 Insulation and ductwork (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.		= 0.01 * I30 for 17M, 18M; = 0.02 * I30 for 1M, 3M; = 0.03 * I30 for 11M, 15M, 16M; = 0.07 * I30 for 4M	
136 Painting (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.		= 0.01 * I30 for 11M, 15M, 16M, 17M, 18M; = 0.02 * I30 for 1M, 3M, 4M	

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
137	Installation Cost (\$): Calculated based on the purchased equipment cost in lieu of I31 - I36 using fractional correlations developed by EPA in the respective cost algorithms or by EER using engineering judgement.																			= 0.25 * I30 for 12M; = 0.3 * I30 for 8M, 9M, 10M, 13M; 0.56 * I30 for 2M
147	Total Installation Cost (\$): Calculated as the sum of the installation costs.																			= Sum (I31 - I46)
148	Total Installation Cost with Retrofit Factor (\$): Calculated as the total installation cost multiplied by the retrofit factor, selectively applied to each model.																			= I47 * E5
149	Total Direct Installation Cost (\$): Equal to either the total installation cost or total installation cost with retrofit factor, as applicable.																			= I48; or if I48 not calculated = I47
150	Total Direct Cost (\$): Calculated as the sum of the purchased equipment cost and the direct installation cost.																			= I49 + I30
J. Indirect Costs																				
J1	Engineering (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990; or developed by EER using engineering judgement.																			= 0.05 * I30 for 2M, 10M; 0.1 * I30 for 2M, 4M, 11M, 12M, 15M, 16M, 17M, 18M; = 0.2 * I30 for 1M, 3M, 8M, 9M, 13M
J2	Construction and Field Expense (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990; or developed by EER using engineering judgement.																			= 0.06 * I30 for 17M, 18M; = 0.092593 * I30 for 12M; = 0.1 * I30 for 10M, 11M, 15M, 16M; = 0.16 * I30 for 2M; = 0.2 * I30 for 1M, 3M, 4M, 8M, 9M, 13M
J3	Contractor Fees (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.																			= 0.10 * I30
J4	Start-up (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.																			= 0.01 * I30
J5	Performance Test (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.																			= 0.01 * I30
J6	Model Study (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.																			= 0.02 * I30
J7	Contingencies (\$): Calculated based on the purchased equipment cost using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.																			= 0.03 * I30

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
J8 Total Indirect Cost (\$): Calculated as the sum of the indirect costs.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= SUM (J1 - J7)		
K. Direct Annual Costs																				
K1 Operator Labor (\$/yr): Calculated independently of source/size category; based on operator labor rate and annual hours of operation using estimated hours per shift from the OAQPS Control Cost Manual, January 1990 and engineering judgement.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= 0.5 * 3(shifts/day) * C5 / 24(hrs/day) * E6 for 2M, 3M, 18M; = 2 * 3(shifts/day) * C5 / 24(hrs/day) * E6 for 1M, 4M, 6M, 8M, 9M, 10M, 11M, 12M, 13M, 15M, 16M, 17M = 0.15 * K1		
K2 Supervisor Labor (\$): Calculated based on the operator labor using a fractional correlation from the OAQPS Control Cost Manual, January, 1990.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= 0.125 * 3(shifts/day) * C5 / 24(hrs/day) * E7 for 3M; = 0.5 * 3(shifts/day) * C5 / 24(hrs/day) * E7 for 1M, 2M, 6M, 8M, 9M, 10M, 13M, 18M; = 1 * 3(shifts/day) * C5 / 24(hrs/day) * E7 for 4M, 11M, 12M, 15M, 16M, 17M.		
K3 Maintenance Labor (\$/yr): Calculated independently of source/size category; based on operator labor rate and annual hours of operation using estimated hours per shift from the OAQPS Control Cost Manual, January 1990 and engineering judgement.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= 0.01 * I30 for 1M, 3M, 4M, 10M, 12M, 15M, 16M, 17(b)M; = 0.03 * I30 for 13M; = 0.05 * I30 for 8M, 9M; = 0.01 * B1 for 2M, 6M; = K3 for 11M, 17(a)M, 18M		
K4 Maintenance material (\$): Calculated based on the purchased equipment cost, total capital investment, or maintenance labor cost using correlations from the OAQPS Control Cost Manual, January 1990, and engineering judgement.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= 0.000181 * D2 * C1 * C5 * E8 for 4M, 6M, 17M, 18M; = (0.000181 * D2 * C1 + 0.00194 * G1) * C5 * E8 for 1M, 3M; = (0.000181 * D2 * C1 + D37 * G2 / 3960 / 1.34 / 0.9) * C5 * E8 for 2M; = (0.000181 * D2 * C1 + D37 * G24 / 3960 / 1.34 / 0.9) * C5 * E8 for 10M;		
K5 Electricity	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	= D17 / 1.34 / 0.9 * C5 * E8 for 8M, 9M, 13M; = 0.000181 D2 * C1 + D37 * G13 / 3960 / 1.34 / 0.9) * C5 * E8 for 11M, 12M; = 0.000181 * C1 * D23 * D25 + D37 * G13 / 3960 / 1.34 / 0.9) * C5 * E8 for 16M;		

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17a	17b			18
K6																					$= 0.000181 * C1 * D23 * D25 + D37 * G13 / 3960 / 1.34 / 0.9 + D22 * C1 / 1000 * C5 * E8$ for 15M;
K6																					$= G2 * 60(\text{min/hr}) * C5 * E9 / 1000$ for 2M; $= G24 * 60(\text{min/hr}) * C5 * E9 / 1000$ for 10M; $= G14 * 60(\text{min/hr}) * C5 * E9 / 1000$ for 11M, 12M, 15M, 16M.
K7																					$= G16 * C5 * E10 / 1000$
K8																					$= (D10 * G7 + H9) * E12$
K9																					$= G10 * D11$ for 6M; $= G11 * C5 * D11$ for 8M, 9M
K10																					$= G15 * C5 * D21 / 2000$
K11																					$= G15 * C5 * D24 / 2000$
K12																					$= G25 * C5 * D32$ for 17(a)M; $= G26 * 60 * C5 * D27 / 1000$ for 17(b)M, 18M
K13																					$= (F1 - F2) / 7000(\text{grain/lb}) * C2 * 60(\text{min/hr}) * C5 * E11 / 2000(\text{lb/ton})$ for 1M, 3M, 4M; $= G10 / 2000(\text{lb/ton}) * E11$ for 6M; $= G11 * C5 / 2000(\text{lb/ton}) * E11$ for 8M, 9M; $= G15 * C5 / 2000(\text{lb/ton}) * E11$ for 10M, 13M.
K15																					$= \text{SUM}(K1 - K14)$
L. Indirect Annual Costs																					
L1																					$= 0.6 * \text{SUM}(K1 - K4)$
L2																					$= 0.02 * B1$

Overhead (\$/yr): Calculated based on the Direct Labor (Operating, Supervisory, and Maintenance) and Maintenance Materials using a fractional correlation presented in the OAQPS Control Cost Manual, January, 1990.

Administrative Charges (\$/yr): Calculated based on the Total Capital Investment using a correlation presented in the OAQPS Control Cost Manual, January, 1990.

TABLE E-10. COST MODELS KEY

Parameter	Cost Model																		Input	Calculated
	1	2	3	4	6	8	9	10	11	12	13	15	16	17a	17b	18				
L3 Property Taxes (\$/yr): Calculated based on the Total Capital Investment using a correlation presented in the OAQPS Control Cost Manual, January, 1990.	= 0.01 * B1		
L4 Insurance (\$/yr): Calculated based on the Total Capital Investment using a correlation presented in the OAQPS Control Cost Manual, January, 1990.	= 0.01 * B1		
L5 Capital Recovery (\$/yr): Calculated based on the Total Capital Investment and the capital recovery factor.	= E4 * B1; or = E4 * (B1 - K8 / E12) for 4M		
L6 Total Indirect Annual Costs (\$/yr): Calculated as the sum of indirect annual costs.	= SUM (L1 - L5)		

TABLE E-11. COST MODEL IM: INSTALLATION OF AN ESP

	Source Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M		S	M	L	M	L	
Annual Costs											
Total Annual Costs	A1	\$641,790	\$1,351,412	\$306,132	\$117,551	\$225,957	\$381,078				
Annual Operating Cost	A2	\$300,533	\$608,277	\$154,767	\$82,706	\$122,460	\$185,750				
Annualized Capital Cost	A3	\$341,258	\$743,135	\$151,365	\$34,845	\$103,497	\$195,328				
Capital Investment											
Total Capital Investment	B1	\$2,905,318	\$6,326,730	\$1,288,653	\$296,653	\$881,126	\$1,662,934				
Model Plant Input Parameters											
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800				
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300				
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000				
Control Option Design Input Parameters											
Specific Collection Area	D1	400	400	400	400	400	400				
Increased Pressure Drop (in H2O)	D2	3	3	3	3	3	3				
Economic Factors											
Projected Equipment Life (years)	E1	20	20	20	20	20	20				
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%				
Equipment Capital Recovery Factor (CRFe)	E4	0.1175	0.1175	0.1175	0.1175	0.1175	0.1175				
Retrofit Factor (RF)	E5	1.25	1.25	1.25	1.25	1.25	1.25				
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00				
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00				
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048				
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20				
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80				
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00				
Emissions Levels											
Existing PM stack emissions, (gr/dscf)	F1	0.08	0.08	0.08	0.08	0.08	0.08				
Desired stack emissions, (gr/dscf)	F2	0.015	0.015	0.015	0.015	0.015	0.015				

TABLE E-11. COST MODEL IM: INSTALLATION OF AN ESP

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Model Plant Calculated Parameters							
ESP Total Collection Area (sq ft)	G1	58,800	148,000	16,200	1,560	8,840	24,320
Direct Cost							
Purchased Equipment Cost							
ESP + Auxiliary Equipment	I1	\$880,797	\$1,918,056	\$390,677	\$89,936	\$267,128	\$504,147
Total Equipment	I23	\$880,797	\$1,918,056	\$390,677	\$89,936	\$267,128	\$504,147
Instrumentation	I24	\$88,080	\$191,806	\$39,068	\$8,994	\$26,713	\$50,415
Sales Tax	I25	\$26,424	\$57,542	\$11,720	\$2,698	\$8,014	\$15,124
Freight	I26	\$44,040	\$95,903	\$19,534	\$4,497	\$13,356	\$25,207
Purchased Equipment with Tax and Freight	I27	\$1,039,340	\$2,263,307	\$460,999	\$106,124	\$315,211	\$594,893
Purchased Equipment with Escalation	I28	\$1,206,778	\$2,627,925	\$535,266	\$123,221	\$365,992	\$690,731
Total Purchased Equipment Cost	I30	\$1,206,778	\$2,627,925	\$535,266	\$123,221	\$365,992	\$690,731
Direct Installation Costs							
Foundation and Supports (0.04*PEC)	I31	\$48,271	\$105,117	\$21,411	\$4,929	\$14,640	\$27,629
Handling and Erection (0.5*PEC)	I32	\$603,389	\$1,313,963	\$267,633	\$61,610	\$182,996	\$345,365
Electrical (.08*PEC)	I33	\$96,542	\$210,234	\$42,821	\$9,858	\$29,279	\$55,258
Piping (.01*PEC)	I34	\$12,068	\$26,279	\$5,353	\$1,232	\$3,660	\$6,907
Insulation for Ductwork (.02*PEC)	I35	\$24,136	\$52,559	\$10,705	\$2,464	\$7,320	\$13,815
Painting (.02*PEC)	I36	\$24,136	\$52,559	\$10,705	\$2,464	\$7,320	\$13,815
Total Installation Cost	I47	\$808,541	\$1,760,710	\$358,628	\$82,558	\$245,215	\$462,790
Total Installation Cost with Retrofit Factor	I48	\$1,010,677	\$2,200,887	\$448,285	\$103,197	\$306,518	\$578,487
Total Direct Installation Cost	I49	\$1,010,677	\$2,200,887	\$448,285	\$103,197	\$306,518	\$578,487
Total Direct Cost	I50	\$2,217,455	\$4,828,813	\$983,551	\$226,418	\$672,510	\$1,269,218
Indirect Cost							
Engineering (0.2*PEC)	J1	\$241,356	\$525,585	\$107,053	\$24,644	\$73,198	\$138,146
Construction and Field Expense (0.2*PEC)	J2	\$241,356	\$525,585	\$107,053	\$24,644	\$73,198	\$138,146
Contractor Fees (0.1*PEC)	J3	\$120,678	\$262,793	\$53,527	\$12,322	\$36,599	\$69,073
Start-up (.01*PEC)	J4	\$12,068	\$26,279	\$5,353	\$1,232	\$3,660	\$6,907
Performance Test (.01*PEC)	J5	\$12,068	\$26,279	\$5,353	\$1,232	\$3,660	\$6,907

TABLE E-11. COST MODEL IM: INSTALLATION OF AN ESP

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator	
		S	L	M		S	M	L	
Model Study (.02*PEC)	J6	\$24,136	\$52,559	\$10,705	\$2,464	\$7,320	\$13,815		
Contingencies (.03*PEC)	J7	\$36,203	\$78,838	\$16,058	\$3,697	\$10,980	\$20,722		
Total Indirect Cost	J8	\$687,863	\$1,497,917	\$305,102	\$70,236	\$208,615	\$393,717		
Direct Annual Cost									
Operating Labor	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000		
Operator Labor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200		
Supervisor Labor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000		
Maintenance	K4	\$12,068	\$26,279	\$5,353	\$1,232	\$3,660	\$6,907		
Maintenance Labor	K5	\$74,455	\$187,404	\$20,513	\$1,975	\$11,194	\$30,795		
Maintenance Material (.01*PEC)	K13	\$24,637	\$59,837	\$8,223	\$973	\$4,245	\$11,466		
Utilities	K15	\$152,360	\$314,720	\$75,289	\$45,380	\$60,299	\$90,368		
Electricity	L1	\$31,961	\$40,488	\$27,932	\$25,459	\$26,916	\$28,864		
Solid Waste Disposal	L2	\$58,106	\$126,535	\$25,773	\$5,933	\$17,623	\$33,259		
Total Direct Annual Cost	L3	\$29,053	\$63,267	\$12,887	\$2,967	\$8,811	\$16,629		
	L4	\$29,053	\$63,267	\$12,887	\$2,967	\$8,811	\$16,629		
	L5	\$341,258	\$743,135	\$151,365	\$34,845	\$103,497	\$195,328		
	L6	\$489,431	\$1,036,692	\$230,842	\$72,170	\$165,658	\$290,709		
Indirect Annual Cost									
Overhead	L1	\$31,961	\$40,488	\$27,932	\$25,459	\$26,916	\$28,864		
Administrative Charges	L2	\$58,106	\$126,535	\$25,773	\$5,933	\$17,623	\$33,259		
Property Taxes	L3	\$29,053	\$63,267	\$12,887	\$2,967	\$8,811	\$16,629		
Insurance	L4	\$29,053	\$63,267	\$12,887	\$2,967	\$8,811	\$16,629		
Capital Recovery	L5	\$341,258	\$743,135	\$151,365	\$34,845	\$103,497	\$195,328		
Total Indirect Annual Cost	L6	\$489,431	\$1,036,692	\$230,842	\$72,170	\$165,658	\$290,709		

TABLE E-12. COST MODEL 2M: INSTALLATION OF WATER QUENCH DOM ESP SMALL

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	S	M	L	
Annual Costs											
Total Annual Costs	A1	\$157,869	\$275,028	\$96,388	\$69,610	\$84,420	\$109,542				
Annual Operating Cost	A2	\$87,841	\$155,130	\$53,977	\$40,563	\$47,854	\$61,328				
Annualized Capital Cost	A3	\$70,028	\$119,898	\$42,411	\$29,047	\$36,566	\$48,214				
Capital Investment											
Total Capital Investment	B1	\$532,637	\$911,953	\$322,580	\$220,937	\$278,127	\$366,721				
Model Plant Input Parameters											
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800				
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300				
Flue gas moisture (%)	C4	24%	25%	13%	16%	30%	28%				
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000				
Control Option Design Input Parameters											
Increased Pressure drop (in H2O)	D2	2	2	2	2	2	2				
Water Quench Temperature Drop (°F)	D3	400	400	400	400	400	400				
Flue Gas Density @STP (lb/ft^3)	D33	0.074	0.074	0.074	0.074	0.074	0.074				
Specific Heat of Flue gas (Btu/lb°F)	D34	0.240	0.240	0.240	0.240	0.240	0.240				
Pump Head Loss (ft)	D37	200	200	200	200	200	200				
New duct length (ft)	D38	125	125	125	125	125	125				
Economic Factors											
Projected Equipment Life (years)	E1	15	15	15	15	15	15				
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%				
Equipment Capital Recovery Factor (CRF)	E4	0.1315	0.1315	0.1315	0.1315	0.1315	0.1315				
Retrofit Factor (RF)	E5	1.20	1.20	1.20	1.20	1.20	1.20				
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00				
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00				
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048				

TABLE E-12. COST MODEL 2M: INSTALLATION OF WATER QUENCH DOM ESP SMALL

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Model Plant Calculated Parameters											
WQ Water Requirement (gpm)	G2	92	226	27	3	17	45				
Direct Costs											
Purchased Equipment Costs (PEC)											
Humid. chamber & pump equipment cost	I3	\$136,335	\$240,030	\$86,813	\$69,794	\$78,257	\$96,252				
Ductwork	I4	\$52,565	\$83,394	\$27,591	\$8,562	\$20,381	\$33,805				
Total Equipment	I23	\$188,900	\$323,424	\$114,403	\$78,355	\$98,638	\$130,057				
Sales Tax	I25	\$5,667	\$9,703	\$3,432	\$2,351	\$2,959	\$3,902				
Freight	I26	\$9,445	\$16,171	\$5,720	\$3,918	\$4,932	\$6,503				
Purchased Equipment with Tax and Freight	I27	\$204,011	\$349,298	\$123,555	\$84,624	\$106,529	\$140,462				
Purchased Equipment with Escalation	I28	\$232,389	\$397,885	\$140,742	\$96,395	\$121,347	\$160,000				
Purchased Equipment with Retrofit Factor	I29	\$278,867	\$477,462	\$168,890	\$115,674	\$145,616	\$192,000				
Total Purchased Equipment Cost	I30	\$278,867	\$477,462	\$168,890	\$115,674	\$145,616	\$192,000				
Direct Installation Costs											
Installation Cost	I37	\$156,166	\$267,379	\$94,579	\$64,777	\$81,545	\$107,520				
Total Installation Cost	I47	\$156,166	\$267,379	\$94,579	\$64,777	\$81,545	\$107,520				
Total Direct Installation Cost	I49	\$156,166	\$267,379	\$94,579	\$64,777	\$81,545	\$107,520				
Total Direct Costs	I50	\$435,033	\$744,841	\$263,469	\$180,451	\$227,161	\$299,520				
Indirect Costs											
Engineering (=0.05*PEC)	J1	\$13,943	\$23,873	\$8,445	\$5,784	\$7,281	\$9,600				
Construction and Field Expense (=0.16*PEC)	J2	\$44,619	\$76,394	\$27,022	\$18,508	\$23,299	\$30,720				
Contractor Fees (=0.1*PEC)	J3	\$27,887	\$47,746	\$16,889	\$11,567	\$14,562	\$19,200				
Start-up (=0.01*PEC)	J4	\$2,789	\$4,775	\$1,689	\$1,157	\$1,456	\$1,920				
Contingencies (=0.03*PEC)	J7	\$8,366	\$14,324	\$5,067	\$3,470	\$4,368	\$5,760				
Total Indirect Costs (TIC)	J8	\$97,604	\$167,112	\$59,112	\$40,486	\$50,966	\$67,200				

TABLE E-12. COST MODEL 2M: INSTALLATION OF WATER QUENCH DOM ESP SMALL

	Source Category:	CK	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	M	S	M	L	L
Direct Annual Costs									
Operating Labor									
Operator Labor	K1	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000
Supervisor Labor	K2	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050
Maintenance									
Maintenance Labor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
Maintenance Material	K4	\$5,326	\$9,120	\$3,226	\$3,226	\$2,209	\$2,781	\$3,667	\$3,667
Utilities									
Electricity Cost	K5	\$21,912	\$55,070	\$6,061	\$6,061	\$595	\$3,349	\$9,178	\$9,178
Water Cost	K6	\$8,821	\$21,711	\$2,572	\$2,572	\$315	\$1,650	\$4,334	\$4,334
Total Direct Annual Costs, TDAC	K15	\$53,110	\$102,950	\$28,909	\$28,909	\$20,169	\$24,830	\$34,228	\$34,228
Indirect Annual Costs									
Overhead (OH)	L1	\$13,426	\$15,702	\$12,165	\$12,165	\$11,556	\$11,899	\$12,430	\$12,430
Administrative, (0.02*TCI)	L2	\$10,653	\$18,239	\$6,452	\$6,452	\$4,419	\$5,563	\$7,334	\$7,334
Property Taxes, (0.01*TCI)	L3	\$5,326	\$9,120	\$3,226	\$3,226	\$2,209	\$2,781	\$3,667	\$3,667
Insurance, (0.01*TCI)	L4	\$5,326	\$9,120	\$3,226	\$3,226	\$2,209	\$2,781	\$3,667	\$3,667
Capital Recovery (CR)	L5	\$70,028	\$119,898	\$42,411	\$42,411	\$29,047	\$36,566	\$48,214	\$48,214
Total Indirect Annual Cost, TIAC	L6	\$104,759	\$172,078	\$67,480	\$67,480	\$49,441	\$59,590	\$75,313	\$75,313

TABLE E-13. COST MODEL 3M: DOM ESP MODERATE (ADDITION OF ESP FIELD)

	Source Category:	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	S	M	L	L
Annual Costs								
Total Annual Costs	A1	\$379,813	\$699,001	\$171,304	\$50,285	\$120,020	\$218,567	
Annual Operating Cost	A2	\$148,778	\$286,645	\$68,429	\$26,603	\$49,679	\$85,813	
Annualized Capital Cost	A3	\$231,035	\$412,357	\$102,875	\$23,682	\$70,341	\$132,754	
Capital Investment								
Total Capital Investment	B1	\$1,757,272	\$3,136,418	\$782,473	\$180,129	\$535,021	\$1,009,737	
Model Plant Input Parameters								
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800	
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300	
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000	
Control Option Design Input Parameters								
Existing ESP Specific Collection Area	D4	400	400	400	400	400	400	
Number of Existing ESP Fields	D5	3	3	3	3	3	3	
Number of Additional ESP Fields Desired	D6	1	1	1	1	1	1	
Incremental Pressure Drop per Additional ESP Field (in I	D7	1	1	1	1	1	1	
Economic Factors								
Projected Equipment Life (years)	E1	15	15	15	15	15	15	
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%	
Equipment Capital Recovery Factor (CRF)	E4	0.1315	0.1315	0.1315	0.1315	0.1315	0.1315	
Retrofit Factor (RF)	E5	1.30	1.30	1.30	1.30	1.30	1.30	
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	
Emissions Levels								

TABLE E-13. COST MODEL 3M: DOM ESP MODERATE (ADDITION OF ESP FIELD)

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Existing PM stack emissions (gr/dscf)	F1	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800
Desired PM stack emissions (gr/dscf)	F2	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
Model Plant Calculated Parameters											
ESP Existing Collection Area (sq. ft.)	G3	58,800	148,000	16,200	1,560	8,840	24,320				
ESP Existing Collection Area per Field (sq ft)	G4	19,600	49,333	5,400	520	2,947	8,107				
ESP Additional Collection Area In New Fields (sq ft)	G5	19,600	49,333	5,400	520	2,947	8,107				
ESP Additional Pressure Drop (in H2O)	G6	1	1	1	1	1	1				
Direct Costs											
Purchased Equipment Costs											
ESP Additional field(s) & auxiliary equipment	I1	\$440,298	\$785,853	\$196,054	\$45,133	\$134,054	\$252,997				
Total Equipment	I23	\$440,298	\$785,853	\$196,054	\$45,133	\$134,054	\$252,997				
Instrumentation	I24	\$44,030	\$78,585	\$19,605	\$4,513	\$13,405	\$25,300				
Sales Tax	I25	\$13,209	\$23,576	\$5,882	\$1,354	\$4,022	\$7,590				
Freight	I26	\$22,015	\$39,293	\$9,803	\$2,257	\$6,703	\$12,650				
Purchased Equipment with Tax and Freight	I27	\$519,551	\$927,307	\$231,344	\$53,256	\$158,183	\$298,537				
Purchased Equipment with Escalation	I28	\$603,459	\$1,077,067	\$268,706	\$61,857	\$183,730	\$346,751				
Purchased Equipment with Retrofit Factor	I29	\$784,496	\$1,400,187	\$349,318	\$80,415	\$238,849	\$450,776				
Total Purchased Equipment Cost	I30	\$784,496	\$1,400,187	\$349,318	\$80,415	\$238,849	\$450,776				
Direct Installation Costs											
Foundations and supports (.04*PEC)	I31	\$31,380	\$56,007	\$13,973	\$3,217	\$9,554	\$18,031				
Handling and erection (.5*PEC)	I32	\$392,248	\$700,093	\$174,659	\$40,207	\$119,424	\$225,388				
Electrical (.08*PEC)	I33	\$62,760	\$112,015	\$27,945	\$6,433	\$19,108	\$36,062				
Piping (.01*PEC)	I34	\$7,845	\$14,002	\$3,493	\$804	\$2,388	\$4,508				
Insulation for ductwork (.02*PEC)	I35	\$15,690	\$28,004	\$6,986	\$1,608	\$4,777	\$9,016				
Painting (.02*PEC)	I36	\$15,690	\$28,004	\$6,986	\$1,608	\$4,777	\$9,016				
Total Installation Cost	I47	\$525,613	\$938,125	\$234,043	\$53,878	\$160,029	\$302,020				
Total Direct Installation Cost	I49	\$525,613	\$938,125	\$234,043	\$53,878	\$160,029	\$302,020				
Total Direct Cost	I50	\$1,310,109	\$2,338,312	\$583,362	\$134,292	\$398,878	\$752,795				

Indirect Costs

TABLE E-13. COST MODEL 3M: DOM ESP MODERATE (ADDITION OF ESP FIELD)

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	S	M	L	
Engineering (0.2*PEC)	J1	\$156,899	\$280,037	\$69,864	\$16,083	\$47,770	\$90,155				
Construction and Field Expense (0.2*PEC)	J2	\$156,899	\$280,037	\$69,864	\$16,083	\$47,770	\$90,155				
Contractor Fees (0.1*PEC)	J3	\$78,450	\$140,019	\$34,932	\$8,041	\$23,885	\$45,078				
Start-up (.01*PEC)	J4	\$7,845	\$14,002	\$3,493	\$804	\$2,388	\$4,508				
Performance Test (.01*PEC)	J5	\$7,845	\$14,002	\$3,493	\$804	\$2,388	\$4,508				
Model Study (.02*PEC)	J6	\$15,690	\$28,004	\$6,986	\$1,608	\$4,777	\$9,016				
Contingencies (.03*PEC)	J7	\$23,535	\$42,006	\$10,480	\$2,412	\$7,165	\$13,523				
Total Indirect Costs (TIC)	J8	\$447,163	\$798,106	\$199,111	\$45,836	\$136,144	\$256,942				
Direct Annual Costs											
Operating Labor											
Operator	K1	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000				
Supervisor	K2	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050				
Maintenance											
Labor	K3	\$2,250	\$2,250	\$2,250	\$2,250	\$2,250	\$2,250				
Material (.01*PEC)	K4	\$7,845	\$14,002	\$3,493	\$804	\$2,388	\$4,508				
Utilities											
Electricity	K5	\$24,818	\$62,468	\$6,838	\$658	\$3,731	\$10,265				
Solid Waste Disposal	K13	\$24,637	\$59,837	\$8,223	\$973	\$4,245	\$11,466				
Total Direct Annual Cost (TDAC)	K15	\$67,600	\$146,607	\$28,854	\$12,735	\$20,665	\$36,539				
Indirect Annual Costs											
Overhead	L1	\$10,887	\$14,581	\$8,276	\$6,662	\$7,613	\$8,885				
Administrative charges	L2	\$35,145	\$62,728	\$15,649	\$3,603	\$10,700	\$20,195				
Property taxes	L3	\$17,573	\$31,364	\$7,825	\$1,801	\$5,350	\$10,097				
Insurance	L4	\$17,573	\$31,364	\$7,825	\$1,801	\$5,350	\$10,097				
Capital recovery (CR)	L5	\$231,035	\$412,357	\$102,875	\$23,682	\$70,341	\$132,754				
Total Indirect Annual Costs (TIAC)	L6	\$312,213	\$552,395	\$142,450	\$37,550	\$99,355	\$182,028				

TABLE E-14. COST MODEL 4M: INSTALLATION OF A FABRIC FILTER

	Source Category:	CK	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	S	M	L	M	L
Annual Costs									
Total Annual Costs	A1	\$596,500	\$1,325,480	\$235,688	\$98,443	\$154,132	\$304,577		
Annual Operating Cost	A2	\$354,732	\$754,055	\$160,699	\$89,090	\$120,882	\$197,797		
Annualized Capital Cost	A3	\$241,768	\$571,426	\$74,990	\$9,353	\$33,250	\$106,780		
Capital Investment									
Total Capital Investment (TCI) (=DC+TIC)	B1	\$2,140,583	\$5,071,957	\$661,099	\$81,808	\$295,441	\$943,104		
Model Plant Input Parameters									
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800		
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300		
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000		
Control Option Design Input Parameters									
Increased Pressure Drop (in. H2O)	D2	10.0	10.0	10.0	10.0	10.0	10.0		
FF Bag Material Cost (\$/sq. ft.)	D8	\$0.76	\$0.76	\$0.76	\$0.76	\$0.76	\$0.76		
FF Gas-to-Cloth Ratio (aft/min)	D9	2.0	2.0	2.0	2.0	2.0	2.0		
FF Bag Replacement Labor Rate (\$/sq.ft.)	D10	\$0.16	\$0.16	\$0.16	\$0.16	\$0.16	\$0.16		
Economic Factors									
Projected FF Equipment Life (years)	E1	20	20	20	20	20	20		
Projected FF Bag Life (years)	E2	2	2	2	2	2	2		
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%		
Equipment Capital Recovery Factor (CRFe)	E4	0.1175	0.1175	0.1175	0.1175	0.1175	0.1175		
Retrofit Factor (RF)	E5	1.25	1.25	1.25	1.25	1.25	1.25		
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00		
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00		
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048		
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20		
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80		
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00		
FF Bag Capital Recovery Factor (CRFb)	E12	0.5762	0.5762	0.5762	0.5762	0.5762	0.5762		

TABLE E-14. COST MODEL 4M: INSTALLATION OF A FABRIC FILTER

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Emissions Levels							
Existing PM stack emissions, (gr/dscf)	F1	0.0800	0.0800	0.0800	0.0800	0.0800	0.0800
Desired stack emissions, (gr/dscf)	F2	0.0150	0.0150	0.0150	0.0150	0.0150	0.0150
Model Plant Calculated Parameters							
FF Required Cloth Area (sq. ft.)	G7	73,500	185,000	20,250	1,950	11,050	30,400
Estimating Equipment Cost based on FF Size							
Standard Design Pulse Jet (for area 4k to 15k sq. ft.)							
Cost without bags	H1	FALSE	FALSE	FALSE	\$20,514	\$71,038	FALSE
Insulation add-on	H2	FALSE	FALSE	FALSE	\$3,243	\$11,716	FALSE
Standard Design Reverse Air (for area 15k to 100k sq. ft.)							
Cost without bags	H3	\$544,635	FALSE	\$171,246	FALSE	FALSE	\$242,418
Insulation add-on	H4	\$59,930	FALSE	\$17,330	FALSE	FALSE	\$25,450
Custom-built Reverse Air (for area 100k to 400k sq. ft.)							
Cost without bags	H5	FALSE	\$1,246,200	FALSE	FALSE	FALSE	FALSE
Insulation add-on	H6	FALSE	\$178,029	FALSE	FALSE	FALSE	FALSE
Bare baghouse cost (baghouse + insulation)	H7	\$604,565	\$1,424,229	\$188,576	\$23,758	\$82,753	\$267,868
Bag Cost	H8	\$55,860	\$140,600	\$15,390	\$1,482	\$8,398	\$23,104
Bag Cost (with escalation, tax, and freight)	H9	\$70,515	\$177,488	\$19,428	\$1,871	\$10,601	\$29,166
Direct Costs							
Purchased Equipment Costs							
Fabric Filter (baghouse and bags)	I5	\$660,425	\$1,564,829	\$203,966	\$25,240	\$91,151	\$290,972
Total Equipment	I23	\$660,425	\$1,564,829	\$203,966	\$25,240	\$91,151	\$290,972
Instrumentation (=0.1*equipment)	I24	\$66,043	\$156,483	\$20,397	\$2,524	\$9,115	\$29,097
Sales Taxes (=0.03*equipment)	I25	\$19,813	\$46,945	\$6,119	\$757	\$2,735	\$8,729
Freight (=0.05*equipment)	I26	\$33,021	\$78,241	\$10,198	\$1,262	\$4,558	\$14,549
Purchased Equipment with Tax and Freight	I27	\$779,302	\$1,846,498	\$240,680	\$29,783	\$107,558	\$343,347
Purchased Equipment with Escalation	I28	\$910,887	\$2,158,279	\$281,319	\$34,812	\$125,720	\$401,321
Total Purchased Equipment Cost	I30	\$910,887	\$2,158,279	\$281,319	\$34,812	\$125,720	\$401,321

TABLE E-14. COST MODEL 4M: INSTALLATION OF A FABRIC FILTER

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Direct Installation Costs							
Foundations and supports (=0.04*PEC)	I31	\$36,435	\$86,331	\$11,253	\$1,392	\$5,029	\$16,053
Handling and erection (=0.5*PEC)	I32	\$455,443	\$1,079,140	\$140,659	\$17,406	\$62,860	\$200,660
Electrical (=0.08*PEC)	I33	\$72,871	\$172,662	\$22,505	\$2,785	\$10,058	\$32,106
Piping (=0.01*PEC)	I34	\$9,109	\$21,583	\$2,813	\$348	\$1,257	\$4,013
Insulation for ductwork (=0.07*PEC)	I35	\$63,762	\$151,080	\$19,692	\$2,437	\$8,800	\$28,092
Painting (=0.02*PEC)	I36	\$18,218	\$43,166	\$5,626	\$696	\$2,514	\$8,026
Total Installation Costs	I47	\$655,838	\$1,553,961	\$202,549	\$25,065	\$90,518	\$288,951
Total Installation Costs with Retrofit Factor	I48	\$819,798	\$1,942,452	\$253,187	\$31,331	\$113,148	\$361,189
Total Direct Installation Cost	I49	\$819,798	\$1,942,452	\$253,187	\$31,331	\$113,148	\$361,189
Total Direct Cost (DC) (=PEC+DIC*RF)	I50	\$1,730,684	\$4,100,731	\$534,505	\$66,143	\$238,867	\$762,510
Indirect Installation Costs							
Engineering (=0.1*PEC)	J1	\$91,089	\$215,828	\$28,132	\$3,481	\$12,572	\$40,132
Construction and Field Expense (=0.2*PEC)	J2	\$182,177	\$431,656	\$56,264	\$6,962	\$25,144	\$80,264
Contractor Fees (=0.1*PEC)	J3	\$91,089	\$215,828	\$28,132	\$3,481	\$12,572	\$40,132
Start-up (=0.01*PEC)	J4	\$9,109	\$21,583	\$2,813	\$348	\$1,257	\$4,013
Performance Test (=0.01*PEC)	J5	\$9,109	\$21,583	\$2,813	\$348	\$1,257	\$4,013
Contingencies (=0.03*PEC)	J7	\$27,327	\$64,748	\$8,440	\$1,044	\$3,772	\$12,040
Total Indirect Costs (TIC)	J8	\$409,899	\$971,226	\$126,593	\$15,665	\$56,574	\$180,594
Direct Annual Costs							
Operating Labor	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
Operator	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Supervisor	K3	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000
Maintenance	K4	\$9,109	\$21,583	\$2,813	\$348	\$1,257	\$4,013
Labor	K5	\$102,171	\$257,165	\$28,149	\$2,711	\$15,360	\$42,258
Material (.01*PEC)	K8	\$47,406	\$119,322	\$13,061	\$1,258	\$7,127	\$19,607
Utilities	K13	\$24,637	\$59,837	\$8,223	\$973	\$4,245	\$11,466
Electricity							
Replacement Parts, bags							
Solid Waste Disposal							

TABLE E-14. COST MODEL 4M: INSTALLATION OF A FABRIC FILTER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		
		S	L	M	S	M	L			
Total Direct Annual Cost (TDAC)	K15	\$233,523	\$508,107	\$102,447	\$55,489	\$78,190	\$127,545			
Indirect Annual Costs										
Overhead (=0.6*TDAC)	L1	\$35,585	\$43,070	\$31,808	\$30,329	\$30,874	\$32,528			
Administrative charges (=0.02*TCI)	L2	\$42,812	\$101,439	\$13,222	\$1,636	\$5,909	\$18,862			
Property taxes (=0.01*TCI)	L3	\$21,406	\$50,720	\$6,611	\$818	\$2,954	\$9,431			
Insurance (=0.01*TCI)	L4	\$21,406	\$50,720	\$6,611	\$818	\$2,954	\$9,431			
Capital recovery of baghouse, excluding bags (CR)	L5	\$241,768	\$571,426	\$74,990	\$9,353	\$33,250	\$106,780			
Total Indirect Costs (TIAC)	L6	\$362,977	\$817,374	\$133,242	\$42,954	\$75,941	\$177,032			

TABLE E-15. COST MODEL 6M: INSTALLATION OF A CARBON BED

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Model Plant Calculated Parameters							
Carbon Bed Pressure Drop (in H2O)	G8	3	3	3	3	3	3
Carbon Bed Volume (ft^3)	G9	7,470	18,801	2,058	198	1,123	3,089
Annual Carbon Consumption (lb)	G10	358,537	902,439	98,780	9,512	53,902	148,293
Direct Costs							
Carbon Bed Installed Cost	I7	\$6,872,509	#####	\$2,477,081	\$340,244	\$1,339,393	\$3,374,381
Direct Annual Costs							
Operating Labor							
Operator	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
Supervisor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Maintenance							
Labor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
Material (=0.01 TCI)	K4	\$68,725	\$156,864	\$24,771	\$3,402	\$13,394	\$33,744
Utilities							
Electricity cost (\$/yr)	K5	\$30,651	\$77,149	\$8,445	\$813	\$4,608	\$12,678
Carbon Cost (\$/yr)	K9	\$179,268	\$451,220	\$49,390	\$4,756	\$26,951	\$74,146
Solid Waste Disposal	K13	\$26,890	\$67,683	\$7,409	\$713	\$4,043	\$11,122
Total Direct Annual Costs (TDAC)	K15	\$346,735	\$794,116	\$131,214	\$50,885	\$90,196	\$172,890
Indirect Annual Costs							
Overhead	L1	\$65,955	\$118,839	\$39,582	\$26,761	\$32,756	\$44,966
Administrative charges (=0.02 TCI)	L2	\$137,450	\$313,728	\$49,542	\$6,805	\$26,788	\$67,488
Property tax (=0.01 TCI)	L3	\$68,725	\$156,864	\$24,771	\$3,402	\$13,394	\$33,744
Insurance (=0.01 TCI)	L4	\$68,725	\$156,864	\$24,771	\$3,402	\$13,394	\$33,744
Capital recovery (CR)	L5	\$903,555	\$2,062,353	\$325,671	\$44,733	\$176,095	\$443,643
Total Indirect Annual Cost (TIAC)	L6	\$1,244,410	\$2,808,648	\$464,337	\$85,104	\$262,427	\$623,584

TABLE E-16. COST MODEL 8M: INSTALLATION OF A CARBON INJECTION SYSTEM (with existing SI or SD)

	Source Category:		LWAK		Incinerator		Incinerator		Incinerator	
	Size	Category:	M	S	M	S	M	S	M	L
Annual Costs										
Total Annual Costs	A1	\$386,728	\$206,809	\$127,237	\$163,173	\$242,365				
Annual Operating Cost	A2	\$348,626	\$175,298	\$98,694	\$133,278	\$209,544				
Annualized Capital Cost	A3	\$38,102	\$31,511	\$28,543	\$29,895	\$32,820				
Capital Investment										
Total Capital Investment	B1	\$289,810	\$239,679	\$217,097	\$227,385	\$249,634				
Model Plant Input Parameters										
Flue Gas Flow Rate (acfm)	C1	147,000	40,500	3,900	22,100	60,800				
Flue gas flow rate (dscfm)	C2	73,700	24,600	2,910	12,700	34,300				
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000				
Control Option Design Input Parameters										
Cost of carbon (\$/lb)	D11	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50				
Carbon injection rate (mg/dscm)	D16	200	200	200	200	200				
Injection Blower fan power, HP	D17	15	15	15	15	15				
Economic Factors										
Projected Equipment Life (years)	E1	15	15	15	15	15				
Interest Rate (%)	E3	10%	10%	10%	10%	10%				
Equipment Capital Recovery Factor (CRF)	E4	0.1315	0.1315	0.1315	0.1315	0.1315				
Retrofit Factor (RF)	E5	1.15	1.15	1.15	1.15	1.15				
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00				
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00				
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048				
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20				
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80				
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00				
Model Plant Calculated Parameters										
Carbon feed rate (lbs/hr)	G11	55.2	134.1	18.4	9.5	25.7				

TABLE E-16. COST MODEL 8M: INSTALLATION OF A CARBON INJECTION SYSTEM (with existing SI or SD)

	Source Category: Size Category:	G12	CK		2011	LWAK		Incinerator		33	Incinerator		385
			S	L		M	S	M	L				
Silo storage volume (cf)													
Direct Costs													
Purchased Equipment Costs													
Storage Silo cost		I8	\$99,643	\$139,395	\$81,107	\$72,919	\$76,614	\$84,769					
Feed bin		I9	\$1,066	\$1,838	\$543	\$146	\$362	\$666					
Gravimetric feeders		I10	\$9,532	\$9,556	\$9,521	\$9,517	\$9,519	\$9,524					
Total Equipment		I23	\$110,241	\$150,789	\$91,171	\$82,581	\$86,495	\$94,958					
Sales Tax		I25	\$3,307	\$4,524	\$2,735	\$2,477	\$2,595	\$2,849					
Freight		I26	\$5,512	\$7,539	\$4,559	\$4,129	\$4,325	\$4,748					
Purchased Equipment with Tax and Freight		I27	\$119,060	\$162,852	\$98,465	\$89,188	\$93,415	\$102,555					
Purchased Equipment with Escalation		I28	\$134,764	\$184,332	\$111,453	\$100,952	\$105,736	\$116,082					
Purchased Equipment with Retrofit Factor		I29	\$154,979	\$211,982	\$128,170	\$116,095	\$121,596	\$133,494					
Total Purchased Equipment Cost		I30	\$154,979	\$211,982	\$128,170	\$116,095	\$121,596	\$133,494					
Direct Installation Costs													
Installation Cost		I37	\$46,494	\$63,595	\$38,451	\$34,828	\$36,479	\$40,048					
Total Installation Costs		I47	\$46,494	\$63,595	\$38,451	\$34,828	\$36,479	\$40,048					
Total Direct Installation Cost		I49	\$46,494	\$63,595	\$38,451	\$34,828	\$36,479	\$40,048					
Total Direct Costs (DC) (=DIC+PEC)		I50	\$201,472	\$275,577	\$166,622	\$150,923	\$158,075	\$173,543					
Indirect Costs													
Engineering (=0.2*PEC)		J1	\$30,996	\$42,396	\$25,634	\$23,219	\$24,319	\$26,699					
Construction and Field Expense (=0.2*PEC)		J2	\$30,996	\$42,396	\$25,634	\$23,219	\$24,319	\$26,699					
Contractor Fees (=0.1*PEC)		J3	\$15,498	\$21,198	\$12,817	\$11,609	\$12,160	\$13,349					
Start-up (=0.01*PEC)		J4	\$1,550	\$2,120	\$1,282	\$1,161	\$1,216	\$1,335					
Performance Test (=0.01*PEC)		J5	\$1,550	\$2,120	\$1,282	\$1,161	\$1,216	\$1,335					
Model Study (=0.02*PEC)		J6	\$3,100	\$4,240	\$2,563	\$2,322	\$2,432	\$2,670					
Contingencies (=0.03*PEC)		J7	\$4,649	\$6,359	\$3,845	\$3,483	\$3,648	\$4,005					
Total Indirect Costs (TIC)		J8	\$88,338	\$120,830	\$73,057	\$66,174	\$69,310	\$76,092					
Direct Annual Costs													
Operating Labor													

TABLE E-17. COST MODEL 9M: INSTALLATION OF A CARBON INJECTION SYSTEM

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Annual Costs							
Total Annual Costs	A1	\$425,466	\$813,043	\$243,868	\$162,197	\$199,453	\$279,873
Annual Operating Cost	A2	\$363,593	\$735,977	\$189,616	\$112,202	\$147,295	\$224,036
Annualized Capital Cost	A3	\$61,873	\$77,066	\$54,252	\$49,995	\$52,158	\$55,837
Capital Investment							
Total Capital Investment	B1	\$470,613	\$586,167	\$412,641	\$380,267	\$396,715	\$424,697
Model Plant Input Parameters							
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000
Control Option Design Input Parameters							
Cost of carbon (\$/lb)	D11	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50	\$0.50
Carbon injection rate (mg/dscm)	D16	200	200	200	200	200	200
Injection Blower fan power, HP	D17	15	15	15	15	15	15
Economic Factors							
Projected Equipment Life (years)	E1	15	15	15	15	15	15
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%
Equipment Capital Recovery Factor (CRF)	E4	0.1315	0.1315	0.1315	0.1315	0.1315	0.1315
Retrofit Factor (RF)	E5	1.15	1.15	1.15	1.15	1.15	1.15
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Model Plant Calculated Parameters							
Carbon feed rate (lbs/hr)	G11	55.2	134.1	18.4	2.2	9.5	25.7

TABLE E-17. COST MODEL 9M: INSTALLATION OF A CARBON INJECTION SYSTEM

	Source Category: Size Category:	G12	828	2011	LWAK M	Incinerator			385
						CK S	CK L	Incinerator M	
Silo storage volume (cf)					276	33	143		
Direct Costs									
Purchased Equipment Costs									
Storage Silo cost		I8	\$99,643	\$139,395	\$81,107	\$72,919	\$76,614	\$84,769	
Feed bin		I9	\$1,066	\$1,838	\$543	\$146	\$362	\$666	
Gravimetric feeders		I10	\$9,532	\$9,556	\$9,521	\$9,517	\$9,519	\$9,524	
Pneumatic conveyor		I11	\$45,385	\$48,676	\$42,456	\$38,755	\$41,087	\$43,244	
Injection ports		I12	\$23,391	\$23,507	\$23,337	\$23,313	\$23,324	\$23,348	
Total Equipment		I23	\$179,016	\$222,972	\$156,965	\$144,650	\$150,906	\$161,550	
Sales Tax		I25	\$5,370	\$6,689	\$4,709	\$4,339	\$4,527	\$4,847	
Freight		I26	\$8,951	\$11,149	\$7,848	\$7,232	\$7,545	\$8,078	
Purchased Equipment with Tax and Freight		I27	\$193,338	\$240,810	\$169,522	\$156,222	\$162,979	\$174,474	
Purchased Equipment with Escalation		I28	\$218,839	\$272,572	\$191,882	\$176,827	\$184,476	\$197,488	
Purchased Equipment with Retrofit Factor		I29	\$251,665	\$313,458	\$220,664	\$203,351	\$212,147	\$227,111	
Total Purchased Equipment Cost		I30	\$251,665	\$313,458	\$220,664	\$203,351	\$212,147	\$227,111	
Direct Installation Costs									
Installation Cost		I37	\$75,499	\$94,037	\$66,199	\$61,005	\$63,644	\$68,133	
Total Installation Costs		I47	\$75,499	\$94,037	\$66,199	\$61,005	\$63,644	\$68,133	
Total Direct Installation Cost		I49	\$75,499	\$94,037	\$66,199	\$61,005	\$63,644	\$68,133	
Total Direct Costs (DC) (=DIC+PEC)		I50	\$327,164	\$407,496	\$286,863	\$264,357	\$275,791	\$295,244	
Indirect Costs									
Engineering (=0.2*PEC)		J1	\$50,333	\$62,692	\$44,133	\$40,670	\$42,429	\$45,422	
Construction and Field Expense (=0.2*PEC)		J2	\$50,333	\$62,692	\$44,133	\$40,670	\$42,429	\$45,422	
Contractor Fees (=0.1*PEC)		J3	\$25,166	\$31,346	\$22,066	\$20,335	\$21,215	\$22,711	
Start-up (=0.01*PEC)		J4	\$2,517	\$3,135	\$2,207	\$2,034	\$2,121	\$2,271	
Performance Test (=0.01*PEC)		J5	\$2,517	\$3,135	\$2,207	\$2,034	\$2,121	\$2,271	
Model Study (=0.02*PEC)		J6	\$5,033	\$6,269	\$4,413	\$4,067	\$4,243	\$4,542	
Contingencies (=0.03*PEC)		J7	\$7,550	\$9,404	\$6,620	\$6,101	\$6,364	\$6,813	
Total Indirect Costs (TIC)		J8	\$143,449	\$178,671	\$125,778	\$115,910	\$120,924	\$129,453	

TABLE E-17. COST MODEL 9M: INSTALLATION OF A CARBON INJECTION SYSTEM

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Direct Annual Costs							
Operating Labor							
Operator	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
Supervisor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Maintenance							
Labor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
Material (=0.05 PEC)	K4	\$12,583	\$15,673	\$11,033	\$10,168	\$10,607	\$11,356
Utilities							
Electricity cost	K5	\$4,776	\$4,776	\$4,776	\$4,776	\$4,776	\$4,776
Carbon cost (\$/yr)	K9	\$220,816	\$536,311	\$73,705	\$8,719	\$38,051	\$102,768
Solid Waste Disposal	K13	\$33,122	\$80,447	\$11,056	\$1,308	\$5,708	\$15,415
Total Direct Annual Costs (TDAC)	K15	\$312,498	\$678,407	\$141,770	\$66,170	\$100,342	\$175,515
Indirect Annual Costs							
Overhead	L1	\$32,270	\$34,124	\$31,340	\$30,821	\$31,084	\$31,533
Administrative charges (=0.02 TCI)	L2	\$9,412	\$11,723	\$8,253	\$7,605	\$7,934	\$8,494
Property tax (=0.01 TCI)	L3	\$4,706	\$5,862	\$4,126	\$3,803	\$3,967	\$4,247
Insurance (=0.01 TCI)	L4	\$4,706	\$5,862	\$4,126	\$3,803	\$3,967	\$4,247
Capital recovery (CR) (=CRF*TIC)	L5	\$61,873	\$77,066	\$54,252	\$49,995	\$52,158	\$55,837
Total Indirect Annual Cost (TIAC)	L6	\$112,968	\$134,636	\$102,097	\$96,026	\$99,111	\$104,358

TABLE E-18. COST MODEL 10M: INSTALLATION OF A SPRAY DRYER

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Model Plant Calculated Parameters							
Sorbent use, lb/hr	G15	762	1,850	254	30	131	354
Slurry Flow Rate, lb/hr	G23	7,616	18,497	2,542	301	1,312	3,544
Slurry Water Use (gpm)	G24	14	33	5	1	2	6
Direct Costs							
Purchased Equipment Costs							
Spray dryer equipment cost	I21	\$2,007,662	\$3,069,710	\$1,109,568	\$378,107	\$839,740	\$1,337,581
SD Ductwork	I22	\$118,893	\$188,625	\$62,406	\$19,366	\$46,099	\$76,463
Total Equipment	I23	\$2,126,555	\$3,258,335	\$1,171,974	\$397,472	\$885,840	\$1,414,044
Sales Taxes	I25	\$63,797	\$97,750	\$35,159	\$11,924	\$26,575	\$42,421
Freight	I26	\$106,328	\$162,917	\$58,599	\$19,874	\$44,292	\$70,702
Purchased Equipment with Tax and Freight	I27	\$2,296,679	\$3,519,002	\$1,265,732	\$429,270	\$956,707	\$1,527,168
Purchased Equipment with escalation	I28	\$2,616,147	\$4,008,495	\$1,441,795	\$488,981	\$1,089,785	\$1,739,597
Purchased Equipment with Retrofit Factor	I29	\$3,008,569	\$4,609,769	\$1,658,064	\$562,329	\$1,253,252	\$2,000,536
Total Purchased Equipment Cost (PEC)	I30	\$3,008,569	\$4,609,769	\$1,658,064	\$562,329	\$1,253,252	\$2,000,536
Direct Installation Costs							
Installation Costs	I37	\$902,571	\$1,382,931	\$497,419	\$168,699	\$375,976	\$600,161
Total Installation Costs	I47	\$902,571	\$1,382,931	\$497,419	\$168,699	\$375,976	\$600,161
Total Direct Installation Cost	I49	\$902,571	\$1,382,931	\$497,419	\$168,699	\$375,976	\$600,161
Total Direct Costs (TDC)	I50	\$3,911,140	\$5,992,700	\$2,155,483	\$731,027	\$1,629,228	\$2,600,697
Indirect Installation Costs							
Engineering (=0.05*PEC)	J1	\$150,428	\$230,488	\$82,903	\$28,116	\$62,663	\$100,027
Construction & field expenses (=0.1*PEC)	J2	\$300,857	\$460,977	\$165,806	\$56,233	\$125,325	\$200,054
Contractor fees (=0.1*PEC)	J3	\$300,857	\$460,977	\$165,806	\$56,233	\$125,325	\$200,054
Start-up (=0.01*PEC)	J4	\$30,086	\$46,098	\$16,581	\$5,623	\$12,533	\$20,005
Performance test (=0.01*PEC)	J5	\$30,086	\$46,098	\$16,581	\$5,623	\$12,533	\$20,005
Contingencies (=0.03*PEC)	J7	\$90,257	\$138,293	\$49,742	\$16,870	\$37,598	\$60,016
Total Indirect Costs (TIC)	J8	\$902,571	\$1,382,931	\$497,419	\$168,699	\$375,976	\$600,161

TABLE E-18. COST MODEL 10M: INSTALLATION OF A SPRAY DRYER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator	
		S	L	M	M	S	M	L	
Direct Annual Costs									
Operating Labor									
Operator	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
Supervisor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Maintenance									
Labor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
Material (.01*PEC)	K4	\$30,086	\$46,098	\$16,581	\$5,623	\$12,533	\$20,005	\$20,005	\$20,005
Utilities									
Electricity	K5	\$20,544	\$51,701	\$5,667	\$546	\$3,091	\$8,503	\$8,503	\$8,503
Water Cost	K6	\$1,317	\$3,198	\$439	\$52	\$227	\$613	\$613	\$613
Lime Cost	K10	\$289,403	\$702,891	\$96,598	\$11,427	\$49,870	\$134,688	\$134,688	\$134,688
Solid Waste Disposal	K13	\$456,951	\$1,109,828	\$152,524	\$18,042	\$78,742	\$212,665	\$212,665	\$212,665
Total Direct Annual Costs (TDAC)	K15	\$839,501	\$1,954,915	\$313,009	\$76,891	\$185,662	\$417,674	\$417,674	\$417,674
Indirect Annual Costs									
Overhead (OH)	L1	\$42,771	\$52,379	\$34,668	\$28,094	\$32,240	\$36,723	\$36,723	\$36,723
Administrative charges (AC = 0.02*TCI)	L2	\$96,274	\$147,513	\$53,058	\$17,995	\$40,104	\$64,017	\$64,017	\$64,017
Property tax (PT = 0.01*TCI)	L3	\$48,137	\$73,756	\$26,529	\$8,997	\$20,052	\$32,009	\$32,009	\$32,009
Insurance (I = 0.01*TCI)	L4	\$48,137	\$73,756	\$26,529	\$8,997	\$20,052	\$32,009	\$32,009	\$32,009
Capital recovery (CR)	L5	\$632,877	\$969,702	\$348,787	\$118,290	\$263,632	\$420,829	\$420,829	\$420,829
Total Indirect Annual Cost (TIAC)	L6	\$868,197	\$1,317,106	\$489,572	\$182,373	\$376,079	\$585,586	\$585,586	\$585,586

TABLE E-19. COST MODEL 11M: INSTALLATION OF A VENTURI SCRUBBER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Emissions Levels											
PM Emissions upstream of APCD (gr/dscf)	F1	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
Desired PM stack emissions (gr/dscf)	F2	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Model Plant Calculated Parameters											
Scrubber recirculation rate (gpm)	G13	2,940	7,400	810	78	442	1,216				
Scrubber water makeup rate (gpm)	G14	588	1,480	162	16	88	243				
Sorbent use (lb/hr)	G15	698	1,696	233	28	120	325				
Scrubber blowdown rate (lb/hr)	G16	27,925	67,823	9,321	1,103	4,812	12,996				
Direct Costs											
Purchased Equipment Costs											
Venturi Scrubber Equipment cost (with instrumentation)	I13	\$280,819	\$551,830	\$109,016	\$40,501	\$74,571	\$149,515				
Total Equipment	I23	\$280,819	\$551,830	\$109,016	\$40,501	\$74,571	\$149,515				
Sales tax (=0.03*EC)	I25	\$8,425	\$16,555	\$3,270	\$1,215	\$2,237	\$4,485				
Freight (=0.05*EC)	I26	\$14,041	\$27,591	\$5,451	\$2,025	\$3,729	\$7,476				
Purchased Equipment with Tax and Freight	I27	\$303,284	\$595,976	\$117,737	\$43,741	\$80,537	\$161,476				
Total Purchased Equipment Cost	I30	\$303,284	\$595,976	\$117,737	\$43,741	\$80,537	\$161,476				
Direct Installation Costs											
Foundation and supports (=0.06*PEC)	I31	\$18,197	\$35,759	\$7,064	\$2,624	\$4,832	\$9,689				
Handling and Erection (=0.4*PEC)	I32	\$121,314	\$238,390	\$47,095	\$17,496	\$32,215	\$64,590				
Electrical (=0.01*PEC)	I33	\$3,033	\$5,960	\$1,177	\$437	\$805	\$1,615				
Piping (=0.05*PEC)	I34	\$15,164	\$29,799	\$5,887	\$2,187	\$4,027	\$8,074				
Insulation (=0.03*PEC)	I35	\$9,099	\$17,879	\$3,532	\$1,312	\$2,416	\$4,844				
Painting (=0.01*PEC)	I36	\$3,033	\$5,960	\$1,177	\$437	\$805	\$1,615				
Total Installation Costs	I47	\$169,839	\$333,747	\$65,933	\$24,495	\$45,101	\$90,426				
Total Installation Cost with Retrofit Factor	I48	\$212,299	\$417,183	\$82,416	\$30,619	\$56,376	\$113,033				
Total Direct Installation Cost	I49	\$212,299	\$417,183	\$82,416	\$30,619	\$56,376	\$113,033				
Total Direct Costs	I50	\$515,583	\$1,013,160	\$200,153	\$74,359	\$136,913	\$274,509				

TABLE E-19. COST MODEL I1M: INSTALLATION OF A VENTURI SCRUBBER

	Source Category:	CK	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	S	M	L	M	L
Indirect Installation Costs									
Engineering (=0.1*PEC)	J1	\$30,328	\$59,598	\$11,774	\$4,374	\$8,054	\$16,148		
Construction (=0.1*PEC)	J2	\$30,328	\$59,598	\$11,774	\$4,374	\$8,054	\$16,148		
Contractor fee (=0.1*PEC)	J3	\$30,328	\$59,598	\$11,774	\$4,374	\$8,054	\$16,148		
Start up (=0.01*PEC)	J4	\$3,033	\$5,960	\$1,177	\$437	\$805	\$1,615		
Performance test (=0.01*PEC)	J5	\$3,033	\$5,960	\$1,177	\$437	\$805	\$1,615		
Contingency (=0.03*PEC)	J7	\$9,099	\$17,879	\$3,532	\$1,312	\$2,416	\$4,844		
Total Indirect Installation Cost	J8	\$106,149	\$208,592	\$41,208	\$15,309	\$28,188	\$56,517		
Direct Annual Costs									
Operating Labor	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000		
Operator labor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200		
Supervisory labor	K3	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000		
Maintenance	K4	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000		
Labor	K5	\$534,494	\$1,345,324	\$147,258	\$14,180	\$80,356	\$221,070		
Materials	K6	\$56,448	\$142,080	\$15,552	\$1,498	\$8,486	\$23,347		
Utilities	K7	\$178,719	\$434,066	\$59,654	\$7,057	\$30,797	\$83,176		
Electricity	K10	\$265,286	\$644,317	\$88,549	\$10,475	\$45,714	\$123,464		
Water	K15	\$1,103,146	\$2,633,987	\$379,213	\$101,409	\$233,553	\$519,257		
Wastewater Disposal Cost									
Lime cost									
Total Direct Annual Costs (TDAC)									
Indirect Annual Costs									
Overhead	L1	\$40,920	\$40,920	\$40,920	\$40,920	\$40,920	\$40,920		
Administrative (=0.02*TCI)	L2	\$12,435	\$24,435	\$4,827	\$1,793	\$3,302	\$6,621		
Insurance (=0.01*TCI)	L3	\$6,217	\$12,218	\$2,414	\$897	\$1,651	\$3,310		
Property tax (=0.01*TCI)	L4	\$6,217	\$12,218	\$2,414	\$897	\$1,651	\$3,310		
Capital recovery (CR)	L5	\$101,184	\$198,834	\$39,280	\$14,593	\$26,869	\$53,873		
Total Indirect Annual Costs (TDIC)	L6	\$166,973	\$288,624	\$89,855	\$59,100	\$74,393	\$108,034		

TABLE E-20. COST MODEL 12M: INSTALLATION OF A SPRAY TOWER SCRUBBER

	Source Category:	CK	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	S	M	L	M	L
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Model Plant Calculated Parameters									
Scrubber recirculation rate (gpm)	G13	2,940	7,400	810	78	442	1,216		
Scrubber water makeup rate (gpm)	G14	588	1,480	162	16	88	243		
Sorbent use (lb/hr)	G15	40	96	244	2	7	20		
Scrubber blowdown rate (lb/hr)	G16	1,582	3,843	9,756	68	295	797		
Direct Costs									
Purchased Equipment									
Spray Tower Equipment Cost	I14	\$943,900	\$1,769,000	\$549,850	\$414,430	\$481,770	\$624,960		
Total Equipment	I23	\$943,900	\$1,769,000	\$549,850	\$414,430	\$481,770	\$624,960		
Sales Tax (.03)	I25	\$28,317	\$53,070	\$16,496	\$12,433	\$14,453	\$18,749		
Freight (.05)	I26	\$47,195	\$88,450	\$27,493	\$20,722	\$24,089	\$31,248		
Purchased Equipment with Tax and Freight	I27	\$1,019,412	\$1,910,520	\$593,838	\$447,584	\$520,312	\$674,957		
Purchased Equipment with Retrofit Factor	I29	\$1,274,265	\$2,388,150	\$742,298	\$559,481	\$650,390	\$843,696		
Total Purchased Equipment	I30	\$1,274,265	\$2,388,150	\$742,298	\$559,481	\$650,390	\$843,696		
Direct Installation Cost									
Installation Cost (=0.25*PEC)	I37	\$318,566	\$597,038	\$185,574	\$139,870	\$162,597	\$210,924		
Total Installation Cost	I47	\$318,566	\$597,038	\$185,574	\$139,870	\$162,597	\$210,924		
Total Installation Cost with Retrofit Factor	I48	\$398,208	\$746,297	\$231,968	\$174,838	\$203,247	\$263,655		
Total Direct Installation Cost	I49	\$398,208	\$746,297	\$231,968	\$174,838	\$203,247	\$263,655		
Total Direct Cost (TDC)	I50	\$1,672,473	\$3,134,447	\$974,265	\$734,318	\$853,636	\$1,107,351		
Indirect Installation Costs									
Engineering (=0.1*PEC)	J1	\$127,427	\$238,815	\$74,230	\$55,948	\$65,039	\$84,370		
Construction and Field Expense	J2	\$117,988	\$221,126	\$68,732	\$51,804	\$60,222	\$78,120		

TABLE E-20. COST MODEL 12M: INSTALLATION OF A SPRAY TOWER SCRUBBER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator	
		S	L	M	S	M	L		
Contractor Fees (=0.1*PEC)	J3	\$127,427	\$238,815	\$74,230	\$55,948	\$65,039	\$84,370		
Start-up (=0.01*PEC)	J4	\$12,743	\$23,882	\$7,423	\$5,595	\$6,504	\$8,437		
Performance Test (=0.01*PEC)	J5	\$12,743	\$23,882	\$7,423	\$5,595	\$6,504	\$8,437		
Contingencies (=0.03*PEC)	J7	\$38,228	\$71,645	\$22,269	\$16,784	\$19,512	\$25,311		
Total Indirect Costs (TIC)	J8	\$436,554	\$818,163	\$254,306	\$191,674	\$222,819	\$289,044		
Direct Annual Costs									
Operating Labor									
Operator	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000		
Supervisor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200		
Maintenance									
Labor	K3	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000		
Materials	K4	\$12,743	\$23,882	\$7,423	\$5,595	\$6,504	\$8,437		
Utilities									
Electricity Cost	K5	\$64,508	\$162,366	\$17,773	\$1,711	\$9,698	\$26,681		
Water Cost	K6	\$56,448	\$142,080	\$15,552	\$1,498	\$8,486	\$23,347		
Wastewater Disposal Cost	K7	\$10,127	\$24,597	\$62,438	\$433	\$1,889	\$5,101		
Lime Cost	K10	\$15,033	\$36,511	\$92,681	\$642	\$2,804	\$7,572		
Total Direct Annual Costs (TDAC)	K15	\$209,059	\$439,636	\$246,066	\$60,079	\$79,581	\$121,339		
Indirect Annual Costs									
Overhead (OH)	L1	\$37,766	\$44,449	\$34,574	\$33,477	\$34,022	\$35,182		
Administrative charges (AC=0.02*TIC)	L2	\$42,181	\$79,052	\$24,571	\$18,520	\$21,529	\$27,928		
Property tax (PT = 0.01*TIC)	L3	\$21,090	\$39,526	\$12,286	\$9,260	\$10,765	\$13,964		
Insurance (I=0.01*TIC)	L4	\$21,090	\$39,526	\$12,286	\$9,260	\$10,765	\$13,964		
Capital recovery (CR)	L5	\$343,234	\$643,269	\$199,944	\$150,701	\$175,188	\$227,257		
Total Indirect Annual Cost (TIAC)	L6	\$465,361	\$845,822	\$283,661	\$221,218	\$252,269	\$318,295		

TABLE E-21. COST MODEL 13M: INSTALLATION OF DRY SORBENT INJECTION

	Source Category:	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	S	M	L	M
Annual Costs								
Total Annual Costs	A1	\$1,179,869	\$2,604,386	\$513,848	\$194,117	\$352,913	\$645,680	
Annual Operating Cost	A2	\$1,064,627	\$2,428,168	\$428,229	\$138,576	\$274,151	\$554,038	
Annualized Capital Cost	A3	\$115,242	\$176,218	\$85,619	\$55,541	\$78,762	\$91,642	
Capital Investment								
Total Capital Investment (TCI) (=DC+TIC)	B1	\$876,540	\$1,340,330	\$651,225	\$422,453	\$599,071	\$697,033	
Model Plant Input Parameters								
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800	
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300	
HCl inlet (ppm)	C3	1,500	1,500	1,500	1,500	1,500	1,500	
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000	
Control Option Design Input Parameters								
Injection blower fan power, HP	D17	25	25	25	25	25	25	
Sorbent HCl stoichiometry	D20	1.5	1.5	1.5	1.5	1.5	1.5	
Ca(OH) ₂ cost (\$/ton)	D21	\$95	\$95	\$95	\$95	\$95	\$95	
Economic Factors								
Projected Equipment Life (years)	E1	15	15	15	15	15	15	
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%	
Equipment Capital Recovery Factor (CRF)	E4	0.1315	0.1315	0.1315	0.1315	0.1315	0.1315	
Retrofit Factor (RF)	E5	1.10	1.10	1.10	1.10	1.10	1.10	
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	
Model Plant Calculated Parameters								

TABLE E-21. COST MODEL 13M: INSTALLATION OF DRY SORBENT INJECTION

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Sorbent use (lbs/hr)	G15	952	2,312	318	38	164	443				
Sorbent silo storage volume (cf)	G22	14,280	34,682	4,766	564	2,461	6,646				
Direct Costs											
Purchased Equipment Costs (PEC)											
Storage silo cost	I8	\$246,252	\$409,063	\$170,336	\$90,765	\$154,499	\$185,333				
Feed bin	I9	\$6,130	\$10,576	\$3,124	\$841	\$2,081	\$3,832				
Gravimetric feeders	I10	\$9,798	\$10,200	\$9,610	\$9,527	\$9,565	\$9,647				
Pneumatic conveyor	I11	\$63,234	\$78,831	\$53,278	\$44,246	\$49,596	\$55,648				
Injection ports	I12	\$24,709	\$26,709	\$23,777	\$23,365	\$23,551	\$23,961				
Total Equipment	I23	\$350,124	\$535,379	\$260,125	\$168,744	\$239,292	\$278,422				
Sales Tax	I25	\$10,504	\$16,061	\$7,804	\$5,062	\$7,179	\$8,353				
Freight	I26	\$17,506	\$26,769	\$13,006	\$8,437	\$11,965	\$13,921				
Purchased Equipment with Tax and Freight	I27	\$378,134	\$578,210	\$280,934	\$182,244	\$258,435	\$300,696				
Purchased Equipment with Escalation	I28	\$430,732	\$658,639	\$320,012	\$207,594	\$294,384	\$342,522				
Purchased Equipment with Retrofit Factor	I29	\$473,805	\$724,503	\$352,014	\$228,353	\$323,822	\$376,775				
Total Purchased Equipment Cost	I30	\$473,805	\$724,503	\$352,014	\$228,353	\$323,822	\$376,775				
Direct Installation Costs											
Installation Cost	I37	\$142,142	\$217,351	\$105,604	\$68,506	\$97,147	\$113,032				
Total Installation Costs	I47	\$142,142	\$217,351	\$105,604	\$68,506	\$97,147	\$113,032				
Total Direct Installation Cost	I49	\$142,142	\$217,351	\$105,604	\$68,506	\$97,147	\$113,032				
Total Direct Costs (DC) (=DIC+PEC)	I50	\$615,947	\$941,853	\$457,618	\$296,859	\$420,969	\$489,807				
Indirect Installation Costs											
Engineering (=0.1*PEC)	J1	\$94,761	\$144,901	\$70,403	\$45,671	\$64,764	\$75,355				
Construction and Field Expense (=0.2*PEC)	J2	\$94,761	\$144,901	\$70,403	\$45,671	\$64,764	\$75,355				
Contractor Fees (=0.1*PEC)	J3	\$47,381	\$72,450	\$35,201	\$22,835	\$32,382	\$37,677				
Start-up (=0.01*PEC)	J4	\$4,738	\$7,245	\$3,520	\$2,284	\$3,238	\$3,768				
Performance Test (=0.01*PEC)	J5	\$4,738	\$7,245	\$3,520	\$2,284	\$3,238	\$3,768				
Contingencies (=0.03*PEC)	J7	\$14,214	\$21,735	\$10,560	\$6,851	\$9,715	\$11,303				
Total Indirect Costs (TIC)	J8	\$260,593	\$398,476	\$193,608	\$125,594	\$178,102	\$207,226				

TABLE E-21. COST MODEL 13M: INSTALLATION OF DRY SORBENT INJECTION

	Source Category: Size Category:	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
		S	M	S	M	L	L
Direct Annual Costs							
Operating Labor							
Operator	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
Supervisor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Maintenance							
Labor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
Material (=0.03 PEC)	K4	\$14,214	\$10,560	\$6,851	\$9,715	\$11,303	\$11,303
Utilities							
Electricity cost	K5	\$7,960	\$7,960	\$7,960	\$7,960	\$7,960	\$7,960
Lime cost (\$/yr)	K10	\$361,753	\$120,748	\$14,284	\$62,337	\$168,360	\$168,360
Solid Waste Disposal	K13	\$571,189	\$190,655	\$22,553	\$98,427	\$265,832	\$265,832
Total Direct Annual Costs (TDAC)	K15	\$996,317	\$371,123	\$92,847	\$219,640	\$494,655	\$494,655
Indirect Annual Costs							
Overhead	L1	\$33,248	\$31,056	\$28,830	\$30,549	\$31,502	\$31,502
Administrative charges (=0.02 TCI)	L2	\$17,531	\$13,025	\$8,449	\$11,981	\$13,941	\$13,941
Property tax (=0.01 TCI)	L3	\$8,765	\$6,512	\$4,225	\$5,991	\$6,970	\$6,970
Insurance (=0.01 TCI)	L4	\$8,765	\$6,512	\$4,225	\$5,991	\$6,970	\$6,970
Capital recovery (CR) (=0.10 TCI)	L5	\$115,242	\$85,619	\$55,541	\$78,762	\$91,642	\$91,642
Total Indirect Annual Cost (TIAC)	L6	\$183,552	\$142,724	\$101,270	\$133,274	\$151,025	\$151,025

TABLE E-22. COST MODEL 15M: INSTALLATION OF AN IONIZING WET SCRUBBER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		
		S	L	M	S	M	L			
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	
Model Plant Calculated Parameters										
Scrubber recirculation rate (gpm)	G13	1,470	3,700	405	39	221	608			
Scrubber water makeup rate (gpm)	G14	294	740	81	8	44	122			
Sorbent use (lb/hr)	G15	43	104	264	2	8	22			
Scrubber blowdown rate (lb/hr)	G16	1,711	4,155	10,547	73	319	862			
Direct Costs										
Purchased Equipment Costs										
IWS Equipment Cost	I15	\$1,158,774	\$2,137,891	\$492,641	\$104,269	\$329,601	\$645,065			
Total Equipment	I23	\$1,158,774	\$2,137,891	\$492,641	\$104,269	\$329,601	\$645,065			
Sales Tax	I25	\$34,763	\$64,137	\$14,779	\$3,128	\$9,888	\$19,352			
Freight	I26	\$57,939	\$106,895	\$24,632	\$5,213	\$16,480	\$32,253			
Purchased Equipment with Tax and Freight	I27	\$1,251,476	\$2,308,922	\$532,052	\$112,610	\$355,969	\$696,671			
Total Purchase Equipment Cost (PEC)	I30	\$1,251,476	\$2,308,922	\$532,052	\$112,610	\$355,969	\$696,671			
Direct Installation Costs										
Foundation and supports (=0.06*PEC)	I31	\$75,089	\$138,535	\$31,923	\$6,757	\$21,358	\$41,800			
Erection and supports (=0.4*PEC)	I32	\$500,590	\$923,569	\$212,821	\$45,044	\$142,387	\$278,668			
Electrical (=0.01*PEC)	I33	\$12,515	\$23,089	\$5,321	\$1,126	\$3,560	\$6,967			
Piping (=0.05*PEC)	I34	\$62,574	\$115,446	\$26,603	\$5,631	\$17,798	\$34,834			
Insulation (=0.03*PEC)	I35	\$37,544	\$69,268	\$15,962	\$3,378	\$10,679	\$20,900			
Painting (=0.01*PEC)	I36	\$12,515	\$23,089	\$5,321	\$1,126	\$3,560	\$6,967			
Total Installation Costs	I47	\$700,827	\$1,292,997	\$297,949	\$63,062	\$199,342	\$390,136			
Total Direct Installation Costs	I49	\$700,827	\$1,292,997	\$297,949	\$63,062	\$199,342	\$390,136			
Total Direct Costs	I50	\$1,952,303	\$3,601,919	\$830,001	\$175,672	\$555,311	\$1,086,806			
Indirect Costs										

TABLE E-22. COST MODEL 15M: INSTALLATION OF AN IONIZING WET SCRUBBER

	Source Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Engineering (=0.1*PEC)	J1	\$125,148	\$230,892	\$53,205	\$11,261	\$35,597	\$69,667				
Construction (=0.1*PEC)	J2	\$125,148	\$230,892	\$53,205	\$11,261	\$35,597	\$69,667				
Contractor fee (=0.1*PEC)	J3	\$125,148	\$230,892	\$53,205	\$11,261	\$35,597	\$69,667				
Start up (=0.01*PEC)	J4	\$12,515	\$23,089	\$5,321	\$1,126	\$3,560	\$6,967				
Performance test (=0.01*PEC)	J5	\$12,515	\$23,089	\$5,321	\$1,126	\$3,560	\$6,967				
Contingency (=0.03*PEC)	J7	\$37,544	\$69,268	\$15,962	\$3,378	\$10,679	\$20,900				
Total Indirect Cost (TIC)	J8	\$438,017	\$808,123	\$186,218	\$39,414	\$124,589	\$243,835				
Direct Annual Costs											
Operating Labor	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000				
Operator labor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200				
Supervisory labor											
Maintenance											
Labor	K3	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000				
Materials	K4	\$12,515	\$23,089	\$5,321	\$1,126	\$3,560	\$6,967				
Utilities											
Electricity	K5	\$69,622	\$175,240	\$19,182	\$1,847	\$10,467	\$28,796				
Water	K6	\$28,224	\$71,040	\$7,776	\$749	\$4,243	\$11,674				
Wastewater Disposal Cost	K7	\$10,949	\$26,591	\$67,500	\$468	\$2,042	\$5,515				
NaOH Cost	K11	\$74,245	\$180,323	\$457,735	\$3,173	\$13,847	\$37,399				
Total Direct Annual Costs (TDAC)	K15	\$245,755	\$526,484	\$607,713	\$57,563	\$84,359	\$140,551				
Indirect Annual Costs											
Overhead	L1	\$37,629	\$43,974	\$33,312	\$30,796	\$32,256	\$34,300				
Administrative (=0.02*TCI)	L2	\$47,806	\$88,201	\$20,324	\$4,302	\$13,598	\$26,613				
Insurance (=0.01*TCI)	L3	\$23,903	\$44,100	\$10,162	\$2,151	\$6,799	\$13,306				
Property tax (=0.01*TCI)	L4	\$23,903	\$44,100	\$10,162	\$2,151	\$6,799	\$13,306				
Capital recovery (CR)	L5	\$389,013	\$717,714	\$165,385	\$35,004	\$110,651	\$216,556				
Total Indirect Annual Costs (TDIC)	L6	\$522,255	\$938,089	\$239,346	\$74,403	\$170,102	\$304,081				

TABLE E-23. COST MODEL 16M: INSTALLATION OF A PACKED TOWER SCRUBBER

	Source Category: Size Category:	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
		S	M	S	M	L	L
Annual Costs							
Total Annual Costs	A1	\$476,223	\$707,233	\$99,264	\$157,449	\$267,032	
Annual Operating Cost	A2	\$329,552	\$654,399	\$89,916	\$124,169	\$194,552	
Annualized Capital Cost	A3	\$146,671	\$52,833	\$9,348	\$33,279	\$72,480	
Capital Investment							
Total Capital Investment	B1	\$901,228	\$324,639	\$57,441	\$204,487	\$445,358	
Model Plant Input Parameters							
Flue Gas Flow Rate (acfm)	C1	147,000	40,500	3,900	22,100	60,800	
Flue gas flow rate (dscfm)	C2	73,700	24,600	2,910	12,700	34,300	
HCl inlet (ppm)	C3	85	1,570	92	92	92	
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	
Control Option Design Input Parameters							
Liquid/gas ratio (gpm/1000 acfm)	D18	20	20	20	20	20	
Water make-up rate (% of recirc rate)	D19	20%	20%	20%	20%	20%	
Sorbent HCl stoichiometry	D20	1.1	1.1	1.1	1.1	1.1	
Scrubber packing depth (ft) (≥ 4)	D23	4	4	4	4	4	
NaOH Cost (\$/ton)	D24	\$434	\$434	\$434	\$434	\$434	
Scrubber Pressure drop (in H ₂ O/ft packing)	D25	1	1	1	1	1	
Scrubber Packing cost (\$/ft ³)	D26	\$50	\$50	\$50	\$50	\$50	
Pump Head Loss (ft)	D37	100	100	100	100	100	
Economic Factors							
Projected Equipment Life (years)	E1	10	10	10	10	10	
Interest Rate (%)	E3	10%	10%	10%	10%	10%	

TABLE E-23. COST MODEL 16M: INSTALLATION OF A PACKED TOWER SCRUBBER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Equipment Capital Recovery Factor (CRF)	E4	0.1627	0.1627	0.1627	0.1627	0.1627	0.1627	0.1627	0.1627	0.1627	0.1627
Retrofit Factor (RF)	E5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Model Plant Calculated Parameters											
Scrubber recirculation rate (gpm)	G13	2,940	7,400	810	78	442	1,216				
Scrubber water makeup rate (gpm)	G14	588	1,480	162	16	88	243				
Sorbent use (lb/hr)	G15	43	104	264	2	8	22				
Scrubber blowdown rate (lb/hr)	G16	1,711	4,155	10,547	73	319	862				
Scrubber diameter (ft)	G17	20	32	11	3	8	13				
Scrubber length (ft)	G18	21	23	17	12	16	18				
Scrubber surface area (ft ²)	G19	1,965	4,008	755	146	489	1,016				
Scrubber packing volume (ft ³)	G20	1,297	3,263	357	34	195	536				
Direct Costs											
Purchased Equipment Costs											
Scrubber Tower cost	I16	\$225,927	\$460,937	\$86,875	\$16,812	\$56,226	\$116,869				
Scrubber Packing cost	I17	\$64,829	\$163,175	\$17,861	\$1,720	\$9,746	\$26,814				
Scrubber Auxiliary Equipment Cost	I18	\$116,302	\$249,645	\$41,894	\$7,413	\$26,389	\$57,473				
Total Equipment	I23	\$407,059	\$873,756	\$146,630	\$25,944	\$92,361	\$201,155				
Sales tax	I25	\$12,212	\$26,213	\$4,399	\$778	\$2,771	\$6,035				
Freight	I26	\$20,353	\$43,688	\$7,331	\$1,297	\$4,618	\$10,058				
Purchased Equipment with Tax and Freight	I27	\$439,623	\$943,657	\$158,360	\$28,020	\$99,750	\$217,248				

TABLE E-23. COST MODEL 16M: INSTALLATION OF A PACKED TOWER SCRUBBER

	Source Category: Size Category:	CK S	CK L	LWAK M	Incinerator S	Incinerator M	Incinerator L
Total Purchase Equipment Cost (PEC)	I30	\$439,623	\$943,657	\$158,360	\$28,020	\$99,750	\$217,248
Direct Installation Costs							
Foundation and supports (=0.06*PEC)	I31	\$26,377	\$56,619	\$9,502	\$1,681	\$5,985	\$13,035
Erection and supports (=0.4*PEC)	I32	\$175,849	\$377,463	\$63,344	\$11,208	\$39,900	\$86,899
Electrical (=0.01*PEC)	I33	\$4,396	\$9,437	\$1,584	\$280	\$997	\$2,172
Piping (=0.05*PEC)	I34	\$21,981	\$47,183	\$7,918	\$1,401	\$4,987	\$10,862
Insulation (=0.03*PEC)	I35	\$13,189	\$28,310	\$4,751	\$841	\$2,992	\$6,517
Painting (=0.01*PEC)	I36	\$4,396	\$9,437	\$1,584	\$280	\$997	\$2,172
Total Installation Costs	I47	\$246,189	\$528,448	\$88,682	\$15,691	\$55,860	\$121,659
Installation Costs with Retrofit Factor	I48	\$307,736	\$660,560	\$110,852	\$19,614	\$69,825	\$152,074
Total Direct Installation Costs	I49	\$307,736	\$660,560	\$110,852	\$19,614	\$69,825	\$152,074
Total Direct Costs (TDC)	I50	\$747,359	\$1,604,217	\$269,213	\$47,634	\$169,574	\$369,321
Indirect Installation Costs							
Engineering (=0.1*PEC)	J1	\$43,962	\$94,366	\$15,836	\$2,802	\$9,975	\$21,725
Construction (=0.1*PEC)	J2	\$43,962	\$94,366	\$15,836	\$2,802	\$9,975	\$21,725
Contractor fee (=0.1*PEC)	J3	\$43,962	\$94,366	\$15,836	\$2,802	\$9,975	\$21,725
Start up (=0.01*PEC)	J4	\$4,396	\$9,437	\$1,584	\$280	\$997	\$2,172
Performance test (=0.01*PEC)	J5	\$4,396	\$9,437	\$1,584	\$280	\$997	\$2,172
Contingency (=0.03*PEC)	J7	\$13,189	\$28,310	\$4,751	\$841	\$2,992	\$6,517
Total Indirect Cost (TIC)	J8	\$153,868	\$330,280	\$55,426	\$9,807	\$34,912	\$76,037
Direct Annual Costs							
Operating Labor	K1	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000	\$28,000
Operator labor	K2	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200	\$4,200
Supervisory labor	K3	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000	\$18,000
Maintenance	K4	\$4,396	\$9,437	\$1,584	\$280	\$997	\$2,172
Labor	K5	\$64,508	\$162,366	\$17,773	\$1,711	\$9,698	\$26,681
Materials	K6	\$56,448	\$142,080	\$15,552	\$1,498	\$8,486	\$23,347
Utilities							
Electricity							
Water							

TABLE E-23. COST MODEL 16M: INSTALLATION OF A PACKED TOWER SCRUBBER

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator	
		S	L	M	S	M	L		
Wastewater Disposal Cost	K7	\$10,949	\$26,591	\$67,500	\$468	\$2,042	\$5,515		
NaOH Cost	K11	\$74,245	\$180,323	\$457,735	\$3,173	\$13,847	\$37,399		
Total Direct Annual Costs (TDAC)	K15	\$260,745	\$570,998	\$610,343	\$57,330	\$85,272	\$145,315		
Indirect Annual Costs									
Overhead	L1	\$32,758	\$35,782	\$31,070	\$30,288	\$30,718	\$31,423		
Administrative (=0.02*TCI)	L2	\$18,025	\$38,690	\$6,493	\$1,149	\$4,090	\$8,907		
Insurance (=0.01*TCI)	L3	\$9,012	\$19,345	\$3,246	\$574	\$2,045	\$4,454		
Property tax (=0.01*TCI)	L4	\$9,012	\$19,345	\$3,246	\$574	\$2,045	\$4,454		
Capital recovery (CR)	L5	\$146,671	\$314,830	\$52,833	\$9,348	\$33,279	\$72,480		
Total Indirect Annual Costs (TDIC)	L6	\$215,477	\$427,992	\$96,889	\$41,934	\$72,177	\$121,718		

TABLE E-24. COST MODEL 17M: INSTALLATION OF AN AFTERBURNER FOR INCINERATORS

	Source Category:	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	M	L	L
Annual Costs					
Total Annual Costs	A1	\$227,366	\$588,308	\$1,346,874	
Annual Operating Cost	A2	\$192,486	\$533,514	\$1,275,527	
Annualized Capital Cost	A3	\$34,880	\$54,794	\$71,347	
Capital Investment					
Total Capital Investment	B1	\$265,300	\$416,767	\$542,673	
Model Plant Input Parameters					
Flue Gas Flow Rate (acfm)	C1	3,900	22,100	60,800	
Flue gas flow rate (dscfm)	C2	2,910	12,700	34,300	
Operational time (hr/yr)	C5	8,000	8,000	8,000	
Control Option Design Input Parameters					
Increased Pressure Drop (in H ₂ O)	D2	1	1	1	
Fuel Cost (\$/1000 ft ³)	D27	\$3.50	\$3.50	\$3.50	
Natural Gas Heating Value (Btu/ft ³)	D28	990	990	990	
Primary Heat Input (Btu/dscf)	D29	50	50	50	
Afterburner/Primary Heat Input Ratio	D30	40%	40%	40%	
Economic Factors					
Projected Equipment Life (years)	E1	15	15	15	
Interest Rate (%)	E3	10%	10%	10%	
Equipment Capital Recovery Factor (CRFe)	E4	0.1315	0.1315	0.1315	
Retrofit Factor (RF)	E5	1.25	1.25	1.25	
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	
Model Plant Calculated Parameters					
Required Fuel Flow (scfm)	G26	58.8	256.6	692.9	
Direct Costs					
Purchased Equipment Costs					
Afterburner Cost	H19	\$114,155	\$179,330	\$233,506	
Total Equipment	I23	\$114,155	\$179,330	\$233,506	
Instrumentation (=0.1*equipment)	I24	\$11,416	\$17,933	\$23,351	
Sales Taxes (=0.03*equipment)	I25	\$3,425	\$5,380	\$7,005	

TABLE E-24. COST MODEL 17M: INSTALLATION OF AN AFTERBURNER FOR INCINERATORS

	Source Category:	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	M	L	L
Freight (=0.05*equipment)	I26	\$5,708	\$8,966	\$11,675	\$11,675
Purchased Equipment with Tax and Freight	I27	\$134,703	\$211,609	\$275,537	\$275,537
Purchased Equipment with Escalation	I28	\$157,448	\$247,339	\$322,061	\$322,061
Purchased Equipment Cost (PEC)	I30	\$157,448	\$247,339	\$322,061	\$322,061
Direct Installation Costs					
Foundations and supports (=0.08*PEC)	I31	\$12,596	\$19,787	\$25,765	\$25,765
Handling and erection (=0.14*PEC)	I32	\$22,043	\$34,628	\$45,089	\$45,089
Electrical (=0.04*PEC)	I33	\$6,298	\$9,894	\$12,882	\$12,882
Piping (=0.02*PEC)	I34	\$3,149	\$4,947	\$6,441	\$6,441
Insulation for ductwork (=0.01*PEC)	I35	\$1,574	\$2,473	\$3,221	\$3,221
Painting (=0.01*PEC)	I36	\$1,574	\$2,473	\$3,221	\$3,221
Total Installation Costs	I47	\$47,234	\$74,202	\$96,618	\$96,618
Total Installation Costs with Retrofit Factor	I48	\$59,043	\$92,752	\$120,773	\$120,773
Total Direct Installation Costs	I49	\$59,043	\$92,752	\$120,773	\$120,773
Total Direct Cost	I50	\$216,491	\$340,092	\$442,834	\$442,834
Indirect Installation Costs					
Engineering (=0.1*PEC)	J1	\$15,745	\$24,734	\$32,206	\$32,206
Construction and Field Expense (=0.06*PEC)	J2	\$9,447	\$14,840	\$19,324	\$19,324
Contractor Fees (=0.1*PEC)	J3	\$15,745	\$24,734	\$32,206	\$32,206
Start-up (=0.01*PEC)	J4	\$1,574	\$2,473	\$3,221	\$3,221
Performance Test (=0.01*PEC)	J5	\$1,574	\$2,473	\$3,221	\$3,221
Contingencies (=0.03*PEC)	J7	\$4,723	\$7,420	\$9,662	\$9,662
Total Indirect Costs (TIC)	J8	\$48,809	\$76,675	\$99,839	\$99,839
Direct Annual Costs					
Operating Labor					
Operator	K1	\$28,000	\$28,000	\$28,000	\$28,000
Supervisor	K2	\$4,200	\$4,200	\$4,200	\$4,200
Maintenance					
Labor	K3	\$18,000	\$18,000	\$18,000	\$18,000
Material	K4	\$1,574	\$2,473	\$3,221	\$3,221
Utilities					
Electricity	K5	\$271	\$1,536	\$4,226	\$4,226
Fuel Cost	K12	\$98,764	\$431,030	\$1,164,121	\$1,164,121
Total Direct Annual Cost (TDAC)	K15	\$150,809	\$485,240	\$1,221,768	\$1,221,768
Indirect Annual Costs					
Overhead	L1	\$31,065	\$31,604	\$32,052	\$32,052
Administrative charges (=0.02*TCI)	L2	\$5,306	\$8,335	\$10,853	\$10,853
Property taxes (=0.01*TCI)	L3	\$2,653	\$4,168	\$5,427	\$5,427
Insurance (=0.01*TCI)	L4	\$2,653	\$4,168	\$5,427	\$5,427
Capital recovery	L5	\$34,880	\$54,794	\$71,347	\$71,347
Total Indirect Costs (TIAC)	L6	\$76,557	\$103,069	\$125,106	\$125,106

TABLE E-25. COST MODEL 18M: INSTALLATION OF REHEAT

	Source Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	S	M	L	
Annual Costs											
Total Annual Costs	A1	\$582,814	\$1,319,670	\$220,402	\$80,440	\$154,069	\$291,200				
Annual Operating Cost	A2	\$531,041	\$1,253,800	\$183,417	\$60,356	\$122,490	\$250,079				
Annualized Capital Cost	A3	\$51,772	\$65,870	\$36,985	\$20,084	\$31,579	\$41,121				
Capital Investment											
Total Capital Investment (TCI) (=DC+TIC)	B1	\$393,786	\$501,015	\$281,314	\$152,762	\$240,192	\$312,772				
Model Plant Input Parameters											
Flue Gas Flow Rate (acfm)	C1	147,000	370,000	40,500	3,900	22,100	60,800				
Flue gas flow rate (dscfm)	C2	73,700	179,000	24,600	2,910	12,700	34,300				
Flue gas moisture (%)	C4	24%	25%	13%	16%	30%	28%				
Operational time (hr/yr)	C5	8,000	8,000	8,000	8,000	8,000	8,000				
Control Option Design Input Parameters											
Increased Pressure Drop (in H2O)	D2	2	2	2	2	2	2				
Natural Gas Fuel Cost (\$/1000 ft ³)	D27	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50				
Natural Gas Heating Value (Btu/ft ³)	D28	990	990	990	990	990	990				
Additional Combustion Air Required (ft ³ air/ft ³ fuel)	D31	11.19	11.19	11.19	11.19	11.19	11.19				
Flue Gas Density @STP (lb/ft ³)	D33	0.074	0.074	0.074	0.074	0.074	0.074				
Specific Heat of Flue gas (Btu/lb°F)	D34	0.253	0.253	0.253	0.253	0.253	0.253				
Reheat Increase in Flue Gas Temp (°F)	D36	100	100	100	100	100	100				
Economic Factors											
Projected Equipment Life (years)	E1	15	15	15	15	15	15				
Interest Rate (%)	E3	10%	10%	10%	10%	10%	10%				
Equipment Capital Recovery Factor (CRFe)	E4	0.1315	0.1315	0.1315	0.1315	0.1315	0.1315				
Retrofit Factor (RF)	E5	1.25	1.25	1.25	1.25	1.25	1.25				
Operator Labor (\$/hr)	E6	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00	\$14.00				
Maintenance Labor (\$/hr)	E7	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00	\$18.00				

TABLE E-25. COST MODEL 18M: INSTALLATION OF REHEAT

	Source Category: Size Category:	CK		LWAK		Incinerator		Incinerator		Incinerator	
		S	L	M	S	M	L	M	L		
Electricity Cost (\$/kwh)	E8	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048	\$0.048
Water Cost (\$/1000 gal)	E9	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20	\$0.20
Wastewater Disposal (\$/1000 lb)	E10	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80	\$0.80
Hazardous Waste Disposal Cost (\$/ton)	E11	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Model Plant Calculated Parameters											
Required Fuel Flow (scfm)	G26	270	679	74	7	41	112				
Required Combustion Air (scfm)	G27	3,018	7,598	832	80	454	1,248				
Direct Costs											
Purchased Equipment Costs											
Reheat Burner Cost	I20	\$169,441	\$215,581	\$121,046	\$65,732	\$103,352	\$134,582				
Total Equipment	I23	\$169,441	\$215,581	\$121,046	\$65,732	\$103,352	\$134,582				
Instrumentation (=0.1*equipment)	I24	\$16,944	\$21,558	\$12,105	\$6,573	\$10,335	\$13,458				
Sales Taxes (=0.03*equipment)	I25	\$5,083	\$6,467	\$3,631	\$1,972	\$3,101	\$4,037				
Freight (=0.05*equipment)	I26	\$8,472	\$10,779	\$6,052	\$3,287	\$5,168	\$6,729				
Purchased Equipment with Tax and Freight	I27	\$199,941	\$254,385	\$142,834	\$77,563	\$121,955	\$158,807				
Purchased Equipment with Escalation (3Q86 to 1Q93)	I28	\$233,701	\$297,338	\$166,952	\$90,660	\$142,547	\$185,621				
Purchased Equipment Cost (PEC)	I30	\$233,701	\$297,338	\$166,952	\$90,660	\$142,547	\$185,621				
Direct Installation Costs											
Foundations and supports (=0.08*PEC)	I31	\$18,696	\$23,787	\$13,356	\$7,253	\$11,404	\$14,850				
Handling and erection (=0.14*PEC)	I32	\$32,718	\$41,627	\$23,373	\$12,692	\$19,957	\$25,987				
Electrical (=0.04*PEC)	I33	\$9,348	\$11,894	\$6,678	\$3,626	\$5,702	\$7,425				
Piping (=0.02*PEC)	I34	\$4,674	\$5,947	\$3,339	\$1,813	\$2,851	\$3,712				
Insulation for ductwork (=0.01*PEC)	I35	\$2,337	\$2,973	\$1,670	\$907	\$1,425	\$1,856				
Painting (=0.01*PEC)	I36	\$2,337	\$2,973	\$1,670	\$907	\$1,425	\$1,856				
Total Installation Cost	I47	\$70,110	\$89,201	\$50,086	\$27,198	\$42,764	\$55,686				
Total Installation Cost with Retrofit Factor	I48	\$87,638	\$111,502	\$62,607	\$33,997	\$53,455	\$69,608				
Total Direct Installation Cost	I49	\$87,638	\$111,502	\$62,607	\$33,997	\$53,455	\$69,608				
Total Direct Cost (DC) (=PEC+DIC*RF)	I50	\$321,338	\$408,840	\$229,559	\$124,657	\$196,002	\$255,229				

TABLE E-25. COST MODEL 18M: INSTALLATION OF REHEAT

	Source Category:	CK	CK	CK	LWAK	Incinerator	Incinerator	Incinerator	Incinerator
	Size Category:	S	L	M	M	S	M	L	L
Indirect Installation Costs									
Engineering (=0.1*PEC)	J1	\$23,370	\$29,734	\$16,695	\$9,066	\$14,255	\$18,562		
Construction and Field Expense (=0.06*PEC)	J2	\$14,022	\$17,840	\$10,017	\$5,440	\$8,553	\$11,137		
Contractor Fees (=0.1*PEC)	J3	\$23,370	\$29,734	\$16,695	\$9,066	\$14,255	\$18,562		
Start-up (=0.01*PEC)	J4	\$2,337	\$2,973	\$1,670	\$907	\$1,425	\$1,856		
Performance Test (=0.01*PEC)	J5	\$2,337	\$2,973	\$1,670	\$907	\$1,425	\$1,856		
Contingencies (=0.03*PEC)	J7	\$7,011	\$8,920	\$5,009	\$2,720	\$4,276	\$5,569		
Total Indirect Costs (TIC)	J8	\$72,447	\$92,175	\$51,755	\$28,105	\$44,190	\$57,543		
Direct Annual Costs									
Operating Labor	K1	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000		
Operator	K2	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050	\$1,050		
Supervisor	K3	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000		
Maintenance	K4	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000		
Labor	K5	\$20,434	\$51,433	\$5,630	\$542	\$3,072	\$8,452		
Material	K12	\$453,176	\$1,140,646	\$124,855	\$12,023	\$68,131	\$187,436		
Utilities	K15	\$499,660	\$1,218,129	\$156,534	\$38,615	\$97,253	\$221,938		
Electricity									
Fuel Cost									
Total Direct Annual Cost (TDAC)									
Indirect Annual Costs									
Overhead (=0.6*TDAC)	L1	\$15,630	\$15,630	\$15,630	\$15,630	\$15,630	\$15,630		
Administrative charges (=0.02*TIC)	L2	\$7,876	\$10,020	\$5,626	\$3,055	\$4,804	\$6,255		
Property taxes (=0.01*TIC)	L3	\$3,938	\$5,010	\$2,813	\$1,528	\$2,402	\$3,128		
Insurance (=0.01*TIC)	L4	\$3,938	\$5,010	\$2,813	\$1,528	\$2,402	\$3,128		
Capital recovery	L5	\$51,772	\$65,870	\$36,985	\$20,084	\$31,579	\$41,121		
Total Indirect Costs (TIAC)	L6	\$83,154	\$101,541	\$63,868	\$41,825	\$56,817	\$69,262		