

Table A.1. Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (May 14, 2006 through December 11, 2007) (10 pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth (Hz)	Event Duration Time Below 59.95 Hz (hh:mm:ss)
		Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
fevent_2ndset No.	yyyy-mm-dd													
26_june6	2006-06-03	23:07:00	23:07:36	?	?	?	41	129	170	?	?	?	59.945	0:00:10
27_june7	2006-06-05	06:48:00	06:52:13	?	?	?	41	129	170	?	?	?	59.914	0:03:37
28_june8	2006-06-07	11:20:00	11:20:41	40	123	163	41	123	164	97.56	100.00	99.39	59.929	0:00:14
29_june9	2006-06-08	06:17:00	06:18:23	41	123	164	41	123	164	100.00	100.00	100.00	59.947	0:00:11
30_june10	2006-06-09	09:38:00	09:38:48	40	123	163	41	123	164	97.56	100.00	99.39	59.940	0:00:30
31_june11	2006-06-12	06:25:00	06:25:41	9	44	53	41	123	164	21.95	35.77	32.32	59.947	0:00:07
32_june12	2006-06-12	07:04:00	07:04:25	3	13	16	41	123	164	7.32	10.57	9.76	59.948	0:00:03
33_june13	2006-06-12	09:47:00	09:47:33	41	122	163	41	123	164	100.00	99.19	99.39	59.947	0:00:04
34_june14	2006-06-12	10:11:00	10:12:03	40	119	159	41	123	164	97.56	96.75	96.95	59.933	0:00:17
35_june15	2006-06-12	13:46:00	13:48:01	38	121	159	39	123	162	97.44	98.37	98.15	59.942	0:00:10
36a_june16a	2006-06-13	17:08:00	17:31:09	39	120	159	39	123	162	100.00	97.56	98.15	59.935	0:00:07
36b_june16b	2006-06-13	17:08:00	17:31:09	38	119	157	39	123	162	97.44	96.75	96.91	59.946	0:00:03
37_june17	2006-06-14	01:12:00	01:12:31	39	120	159	39	123	162	100.00	97.56	98.15	59.945	0:00:08
38a_june18a	2006-06-15	22:10:00	22:11:15	38	117	155	39	123	162	97.44	95.12	95.68	59.943	0:00:08
38b_june18b	2006-06-15	22:10:00	22:11:15	14	32	46	39	123	162	35.90	26.02	28.40	59.948	0:00:03
39_june19	2006-06-16	08:10:00	08:11:40	14	30	44	39	123	162	35.90	24.39	27.16	59.948	0:00:06
40_june20	2006-06-17	01:50:00	01:54:59	38	122	160	39	123	162	97.44	99.19	98.77	59.829	0:04:30
41_june21	2006-06-17	02:11:00	02:12:05	38	128	166	39	130	169	97.44	98.46	98.22	59.944	0:00:13
42_june22	2006-06-18	00:05:00	00:12:39	38	122	160	39	123	162	97.44	99.19	98.77	59.920	0:00:40
43_june23	2006-06-18	14:25:00	14:25:18	38	123	161	39	123	162	97.44	100.00	99.38	59.945	0:00:05
44_june24	2006-06-18	16:04:00	16:04:59	38	120	158	39	123	162	97.44	97.56	97.53	59.935	0:00:09
45a_june25a	2006-06-22	13:16:00	13:48:56	40	119	159	40	123	163	100.00	96.75	97.55	59.946	0:00:10
45b_june25b	2006-06-22	13:16:00	13:48:56	9	22	31	40	123	163	22.50	17.89	19.02	59.947	0:00:06
46_june26	2006-06-23	00:10:00	00:11:03	39	117	156	40	123	163	97.50	95.12	95.71	59.937	0:00:15
47_june27	2006-06-24	02:37:00	02:38:14	40	122	162	40	123	163	100.00	99.19	99.39	59.903	0:01:02
48_june28	2006-06-26	09:46:00	09:46:42	40	130	170	40	130	170	100.00	100.00	100.00	59.942	0:00:11
49a_june29a	2006-06-28	11:42:00	11:43:07	39	121	160	40	123	163	97.50	98.37	98.16	59.941	0:00:03

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Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth	Event Duration
		Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
fevent_2ndset No.	yyyy-mm-dd													
49b_june29b	2006-06-28	11:42:00	11:43:07	40	123	163	40	123	163	100.00	100.00	100.00	59.918	0:00:24
50_june30	2006-06-29	08:37:00	08:42:03	40	118	158	40	123	163	100.00	95.93	96.93	59.900	0:04:20
51_june31	2006-06-30	01:38:00	01:40:32	39	121	160	40	123	163	97.50	98.37	98.16	59.982	0:02:06
52_june32	2006-06-30	09:03:00	09:13:01	39	118	157	40	123	163	97.50	95.93	96.32	59.875	0:07:15
53_july1	2006-07-01	14:20:00	14:31:52	40	123	163	40	123	163	100.00	100.00	100.00	59.887	0:00:40
54_july2	2006-07-01	19:29:00	19:30:17	39	127	166	40	130	170	97.50	97.69	97.65	59.907	0:00:17
55_july3	2006-07-02	01:04:00	01:05:00	39	130	169	40	130	170	97.50	100.00	99.41	59.944	0:00:08
56_july4	2006-07-02	04:00:00	04:00:28	39	130	169	40	130	170	97.50	100.00	99.41	59.944	0:00:08
57_july5	2006-07-02	17:03:00	17:04:46	39	123	162	40	123	163	97.50	100.00	99.39	59.905	0:00:25
58_july6	2006-07-02	20:18:00	20:18:50	39	123	162	40	123	163	97.50	100.00	99.39	59.944	0:00:07
59_july7	2006-07-03	07:45:00	07:45:53	39	118	157	40	123	163	97.50	95.93	96.32	59.944	0:00:07
60_july8	2006-07-03	11:33:00	11:33:40	13	37	50	40	123	163	32.50	30.08	30.67	59.948	0:00:07
61_july9	2006-07-03	12:03:00	12:33:00	39	118	157	40	123	163	97.50	95.93	96.32	59.894	0:01:00
62_july10	2006-07-03	17:11:00	17:11:20	5	18	23	40	123	163	12.50	14.63	14.11	59.949	0:00:03
63_july11	2006-07-04	07:48:00	07:50:45	39	117	156	40	123	163	97.50	95.12	95.71	59.941	0:00:20
64_july12	2006-07-04	23:05:00	23:07:53	39	121	160	40	123	163	97.50	98.37	98.16	59.917	0:00:50
65_july13	2006-07-05	13:35:00	13:35:41	39	119	158	40	123	163	97.50	96.75	96.93	59.945	0:00:04
66_july14	2006-07-06	22:09:00	22:10:46	40	123	163	40	123	163	100.00	100.00	100.00	59.937	0:00:30
67_july15	2006-07-06	23:11:00	23:11:58	0	14	14	40	123	163	0.00	11.38	8.59	59.949	0:00:00
68_july16	2006-07-07	00:08:00	00:18:10	40	123	163	40	123	163	100.00	100.00	100.00	59.945	0:00:20
69_july17	2006-07-07	07:03:00	07:04:14	40	120	160	40	123	163	100.00	97.56	98.16	59.921	0:00:34
70_july18	2006-07-09	00:58:00	00:58:10	35	102	137	40	123	163	87.50	82.93	84.05	59.947	0:00:05
71_july19	2006-07-10	00:08:00	00:11:54	40	130	170	40	130	170	100.00	100.00	100.00	59.946	0:00:02
72_july20	2006-07-11	13:37:00	13:37:58	39	130	169	40	130	170	97.50	100.00	99.41	59.938	0:00:11
73a_july21a	2006-07-13	08:13:00	08:36:27	39	130	169	40	130	170	97.50	100.00	99.41	59.930	0:00:10
73b_july21b	2006-07-13	08:13:00	08:36:27	39	127	166	40	130	170	97.50	97.69	97.65	59.918	0:00:16
74_july22	2006-07-13	16:15:00	16:19:45	39	130	169	40	130	170	97.50	100.00	99.41	59.883	0:01:44

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Table A.1. Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (May 14, 2006 through December 11, 2007) (10 pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"		Percent Response			Frequency Depth	Event Duration
Event 2ndset No.	yyyy-mm-dd	Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer Total	Water Heater (%)	Dryer (%)	Total (%)	(Hz)	Time Below 59.95 Hz (hh:mm:ss)
75_july23	2006-07-15	07:39:00	07:39:56	33	114	147	40	123	82.50	92.68	90.18	59.947	0:00:06
76_july24	2006-07-17	07:37:00	07:37:35	39	125	164	40	130	97.50	96.15	96.47	59.940	0:00:06
77_july25	2006-07-21	09:51:00	09:51:58	40	130	170	40	130	100.00	100.00	100.00	59.921	0:00:19
78_july26	2006-07-22	13:09:00	13:09:49	40	127	167	40	130	100.00	97.69	98.24	59.931	0:00:11
79_july27	2006-07-22	17:03:00	17:03:59	1	11	12	40	130	2.50	8.46	7.06	59.949	0:00:00
80_july28	2006-07-23	06:56:00	06:56:21	40	130	170	40	130	100.00	100.00	100.00	59.937	0:00:11
81a_july29a	2006-07-24	07:53:00	07:53:59	40	130	170	41	130	97.56	100.00	99.42	59.922	0:00:26
81b_july29b	2006-07-24	07:53:00	07:53:59	20	44	64	41	130	48.78	33.85	37.43	59.948	0:00:03
82_july30	2006-07-24	10:37:00	10:38:13	39	124	163	41	130	95.12	95.38	95.32	59.924	0:00:14
83_july31	2006-07-24	11:25:00	11:25:17	40	129	169	41	130	97.56	99.23	98.83	59.929	0:00:18
84_july32	2006-07-24	12:24:00	12:24:21	40	130	170	41	130	97.56	100.00	99.42	59.934	0:00:10
85a_july33a	2006-07-24	15:29:00	15:41:05	41	130	171	41	130	100.00	100.00	100.00	59.826	0:01:58
85b_july33b	2006-07-24	15:29:00	15:41:05	41	130	171	41	130	100.00	100.00	100.00	59.935	0:00:40
85c_july33c	2006-07-24	15:29:00	15:41:05	39	130	169	41	130	95.12	100.00	98.83	59.917	0:00:30
86a_july34a	2006-07-25	21:29:00	21:35:19	40	124	164	41	130	97.56	95.38	95.91	59.945	0:00:09
86b_july34b	2006-07-25	21:29:00	21:35:19	41	125	166	41	130	100.00	96.15	97.08	59.928	0:00:20
87_july35	2006-07-26	00:03:00	00:11:44	40	130	170	41	130	97.56	100.00	99.42	59.935	0:01:10
88_july36	2006-07-26	01:14:00	01:15:20	41	130	171	41	130	100.00	100.00	100.00	59.927	0:00:30
89_july37	2006-07-26	07:34:00	07:36:47	41	130	171	41	130	100.00	100.00	100.00	59.868	0:01:24
90_july38	2006-07-26	15:18:00	15:18:42	41	127	168	41	130	100.00	97.69	98.25	59.942	0:00:07
91_july39	2006-07-28	00:28:00	00:28:45	37	93	130	41	130	90.24	71.54	76.02	59.946	0:00:05
92_july40	2006-07-29	13:11:14	13:11:14	?	?	?	41	130	?	?	?	59.941	0:00:00
93_july41	2006-07-29	23:13:00	23:13:17	40	130	170	41	130	97.56	100.00	99.42	59.943	0:00:10
94a_july42a	2006-07-30	00:12:00	00:49:14	40	121	161	41	123	97.56	98.37	98.17	59.943	0:00:35
94b_july42b	2006-07-30	00:12:00	00:49:14	40	121	161	41	123	97.56	98.37	98.17	59.941	0:00:06
95_july43	2006-07-30	01:55:00	01:55:08	5	12	17	41	123	12.20	9.76	10.37	59.949	0:00:01
96a_aub1a	2006-08-01	00:10:00	00:21:54	28	79	107	41	123	68.29	64.23	65.24	59.947	0:00:05

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Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth (Hz)	Event Duration Time Below 59.95 Hz (hh:mm:ss)
		Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
fevent 2ndset No.	yyyy-mm-dd													
96b_aug1b	2006-08-01	00:10:00	00:21:54	40	121	161	41	123	164	97.56	98.37	98.17	59.944	0:00:14
97_aug2	2006-08-02	16:13:00	16:13:43	41	123	164	41	123	164	100.00	100.00	100.00	59.929	0:00:14
98_aug3	2006-08-02	19:58:00	20:00:00	39	117	156	41	123	164	95.12	95.12	95.12	59.934	0:00:13
99_aug4	2006-08-02	20:00:00	20:10:44	40	125	165	41	125	166	97.56	100.00	99.40	59.907	0:10:12
100_aug5	2006-08-04	12:50:00	12:50:12	7	30	37	41	123	164	17.07	24.39	22.56	59.948	0:00:02
101_aug6	2006-08-04	13:44:35	13:44:36	4	19	23	41	123	164	9.76	15.45	14.02	59.948	0:00:01
102_aug7	2006-08-06	04:12:00	04:12:49	38	122	160	39	123	162	97.44	99.19	98.77	59.946	0:00:04
103_aug8	2006-08-06	05:11:00	05:11:06	3	23	26	39	123	162	7.69	18.70	16.05	59.949	0:00:00
104_aug9	2006-08-06	06:48:00	06:48:27	39	119	158	39	123	162	100.00	96.75	97.53	59.947	0:00:05
105a_aug10a	2006-08-06	07:30:00	07:49:27	39	130	169	39	130	169	100.00	100.00	100.00	59.944	0:00:10
105b_aug10b	2006-08-06	07:30:00	07:49:27	39	128	167	39	130	169	100.00	98.46	98.82	59.947	0:00:05
106_aug11	2006-08-06	08:45:00	08:45:36	5	12	17	39	130	169	12.82	9.23	10.06	59.949	0:00:00
107_aug12	2006-08-06	21:20:00	21:20:33	38	127	165	39	130	169	97.44	97.69	97.63	59.918	0:00:14
108_aug13	2006-08-09	06:33:00	06:33:00	7	?	?	?	?	?	?	?	?	59.929	0:00:00
109_aug14	2006-08-11	23:27:25	23:27:33	38	130	168	39	130	169	97.44	100.00	99.41	59.940	0:00:07
110_aug15	2006-08-11	00:09:05	00:09:11	22	39	61	39	130	169	56.41	30.00	36.09	59.948	0:00:03
111_aug16	2006-08-11	01:25:15	01:25:29	39	129	168	39	130	169	100.00	99.23	99.41	59.941	0:00:13
112_aug17	2006-08-11	22:06:34	22:06:37	39	130	169	39	130	169	100.00	100.00	100.00	59.949	0:00:00
113_aug18	2006-08-12	17:26:24	17:26:41	39	130	169	39	130	169	100.00	100.00	100.00	59.903	0:00:16
114_aug19	2006-08-13	06:05:24	06:05:25	?	?	?	?	?	?	?	?	?	59.930	0:00:00
115_aug20	2006-08-15	14:36:18	14:36:27	39	130	169	39	130	169	100.00	100.00	100.00	59.943	0:00:08
116_aug21	2006-08-18	23:11:04	23:11:04	0	2	2	39	130	169	0.00	1.54	1.18	59.949	0:00:00
117_aug22	2006-08-19	23:07:04	23:46:21	39	130	169	39	130	169	100.00	100.00	100.00	59.925	0:00:14
118_aug23	2006-08-20	07:15:38	07:16:15	38	129	167	39	130	169	97.44	99.23	98.82	59.935	0:00:31
119_aug24	2006-08-21	12:41:01	12:41:12	39	130	169	39	130	169	100.00	100.00	100.00	59.939	0:00:09
120_aug25	2006-08-22	13:10:10	13:15:10	39	128	167	39	130	169	100.00	98.46	98.82	59.937	0:00:00
121_aug26	2006-08-22	22:06:06	22:06:09	0	13	13	39	130	169	0.00	10.00	7.69	59.949	0:00:00

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Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth	Event Duration
		Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
sevent 2ndset No.	yyyy-mm-dd													Time Below 59.95 Hz (hh:mm:ss)
122_aug27	2006-08-23	00:20:03	00:20:09	36	130	166	37	130	167	97.30	100.00	99.40	59.944	0:00:05
123_aug28	2006-08-24	08:45:36	08:45:36	0	1	1	37	130	167	0.00	0.77	0.60	59.949	0:00:00
124_aug29	2006-08-25	22:04:35	22:05:03	25	57	82	37	130	167	67.57	43.85	49.10	59.947	0:00:06
125_aug30	2006-08-26	01:35:58	01:36:00	39	130	169	39	130	169	100.00	100.00	100.00	59.947	0:00:02
126_aug31	2006-08-26	14:30:40	14:30:46	39	130	169	39	130	169	100.00	100.00	100.00	59.945	0:00:04
127_aug32	2006-08-27	19:31:24	19:53:25	38	128	166	39	130	169	97.44	98.46	98.22	59.942	0:00:10
128a_aug33a	2006-08-28	00:06:54	00:27:48	34	123	157	35	123	158	97.14	100.00	99.37	59.920	0:02:43
128b_aug33b	2006-08-28	00:06:54	00:27:48	34	123	157	35	123	158	97.14	100.00	99.37	59.945	0:00:10
128c_aug33c	2006-08-28	00:06:54	00:27:48	34	102	136	35	123	158	97.14	82.93	86.08	59.947	0:00:07
128d_aug33d	2006-08-28	00:06:54	00:27:48	35	98	133	35	123	158	100.00	79.67	84.18	59.947	0:00:03
129_aug34	2006-08-29	10:35:48	10:35:48	1	2	3	35	123	158	2.86	1.63	1.90	59.948	0:00:00
130_aug35	2006-08-29	20:31:48	20:31:53	35	118	153	35	123	158	100.00	95.93	96.84	59.945	0:00:03
131_aug36	2006-08-29	22:03:01	22:03:32	35	121	156	35	123	158	100.00	98.37	98.73	59.941	0:00:16
132_aug37	2006-08-30	00:08:55	00:09:26	0	1	1	35	123	158	0.00	0.81	0.63	59.948	0:00:01
133_aug38	2006-08-31	02:05:19	02:05:21	?	?	?	35	123	158	?	?	?	59.948	0:00:00
134_sept1	2006-09-01	07:01:22	07:03:11	?	?	?	35	123	158	?	?	?	59.945	0:00:17
135_sept2	2006-09-03	14:02:27	14:02:45	?	?	?	35	123	158	?	?	?	59.915	0:00:17
136_sept3	2006-09-03	22:32:46	22:33:04	38	129	167	39	130	169	97.44	99.23	98.82	59.943	0:00:17
137_sept4	2006-09-04	23:43:21	23:44:32	39	126	165	39	130	169	100.00	96.92	97.63	59.907	0:00:41
138_sept5	2006-09-04	05:28:52	05:28:52	23	69	92	39	130	169	58.97	53.08	54.44	59.942	0:00:00
139a_sept6a	2006-09-04	15:29:08	15:38:04	37	130	167	37	130	167	100.00	100.00	100.00	59.939	0:01:20
139b_sept6b	2006-09-04	15:29:08	15:38:04	37	128	165	37	130	167	100.00	98.46	98.80	59.944	0:01:22
139c_sept6c	2006-09-04	15:29:08	15:38:04	36	127	163	37	130	167	97.30	97.69	97.60	59.945	0:00:18
140_sept7	2006-09-05	03:03:36	03:03:59	39	130	169	39	130	169	100.00	100.00	100.00	59.941	0:00:14
141_sept8	2006-09-05	04:15:00	04:15:47	36	118	154	37	123	160	97.30	95.93	96.25	59.930	0:00:33
142_sept9	2006-09-07	17:44:05	17:44:25	36	118	154	37	123	160	97.30	95.93	96.25	59.914	0:00:19
143_sept10	2006-09-08	11:03:34	11:03:34	?	?	?	37	123	160	?	?	?	59.933	0:00:00

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Table A.1. Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (May 14, 2006 through December 11, 2007) (10 pages)

Event Number	Event Date	Event Time Stamp	Response			"Available"			Percent Response			Frequency Depth	Event Duration
event_2ndset No.	yyyy-mm-dd	Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer Total	Water Heater (%)	Dryer (%)	Total (%)	(Hz)	Time Below 59.95 Hz (hh:mm:ss)
144_sept11	2006-09-08	13:45:20	13:45:24	1	0	1	37	123	2.70	0.00	0.63	59.947	0:00:00
145_sept12	2006-09-09	00:47:03	00:47:21	36	123	159	37	123	97.30	100.00	99.38	59.927	0:00:18
146_sept13	2006-09-09	04:18:00	04:18:17	37	121	158	37	123	100.00	98.37	98.75	59.939	0:00:16
147_sept14	2006-09-10	07:00:18	07:00:50	36	122	158	37	123	97.30	99.19	98.75	59.942	0:00:20
148a_sept15a	2006-09-11	02:59:40	02:59:48	36	123	159	36	123	100.00	100.00	100.00	59.940	0:00:02
148b_sept15b	2006-09-11	02:59:40	02:59:48	36	119	155	36	123	100.00	96.75	97.48	59.947	0:00:04
149_sept16	2006-09-11	03:00:04	03:04:19	36	123	159	36	123	100.00	100.00	100.00	59.940	0:00:43
150_sept17	2006-09-11	04:29:26	04:44:55	36	123	159	36	123	100.00	100.00	100.00	59.943	0:00:22
151_sept18	2006-09-11	05:22:15	05:26:26	36	130	166	36	130	100.00	100.00	100.00	59.946	0:00:09
152_sept19	2006-09-16	04:06:01	04:06:02	0	3	3	36	130	?	?	?	59.949	0:00:00
153_sept20	2006-09-17	08:13:35	08:14:47	36	128	164	36	130	100.00	98.46	98.80	59.919	0:01:03
154_sept21	2006-09-19	00:51:35	00:51:45	36	126	162	36	130	100.00	96.92	97.59	59.944	0:00:08
155_sept22	2006-09-19	02:56:05	02:56:33	36	123	159	36	130	100.00	100.00	100.00	59.940	0:00:25
156_sept23	2006-09-19	22:16:23	22:16:26	1	10	11	36	123	2.78	8.13	6.92	59.948	0:00:00
157_sept24	2006-09-21	08:01:37	08:01:37	?	?	?	38	123	?	?	?	59.945	0:00:00
158a_sept25a	2006-09-27	11:28:21	11:34:26	38	128	166	38	130	100.00	98.46	98.81	59.921	0:00:22
158b_sept25b	2006-09-27	11:28:21	11:34:26	38	127	165	38	130	100.00	97.69	98.21	59.942	0:00:30
159_sept26	2006-09-27	13:35:01	13:35:03	1	4	5	38	130	2.63	3.08	2.98	59.948	0:00:01
160_sept27	2006-09-28	02:02:42	02:04:40	38	127	165	38	130	100.00	97.69	98.21	59.895	0:01:45
161_sept28	2006-09-28	12:29:07	12:29:41	38	124	162	38	130	100.00	95.38	96.43	59.937	0:00:11
162_sept29	2006-09-30	07:18:05	07:45:04	6	44	50	38	130	15.79	33.85	29.76	59.947	0:00:02
163_sept30	2006-09-30	08:51:36	08:51:52	38	126	164	38	130	100.00	96.92	97.62	59.946	0:00:06
164a_oct1a	2006-10-02	06:02:42	06:07:26	21	39	60	41	130	51.22	30.00	35.09	59.947	0:00:02
164b_oct1b	2006-10-02	06:02:42	06:07:26	39	127	166	41	130	95.12	97.69	97.08	59.929	0:01:00
164c_oct1c	2006-10-02	06:02:42	06:07:26	39	130	169	41	130	95.12	100.00	98.83	59.944	0:00:10
165_oct2	2006-10-02	09:47:40	09:47:49	41	130	171	41	130	100.00	100.00	100.00	59.939	0:00:08
166_oct3	2006-10-03	12:03:35	12:03:48	40	130	170	41	130	97.56	100.00	99.42	59.940	0:00:12

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Table A.1. Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (May 14, 2006 through December 11, 2007) (10 pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth	Event Duration
fevent_2ndset No.	yyyy-mm-dd	Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)	(Hz)	Time Below 59.95 Hz (hh:mm:ss)
167	2006-10-03	22:08:35	22:08:35	?	?	?	41	130	171	?	?	?	59.944	0:00:18
168	2006-10-05	06:07:02	06:07:04	12	28	40	41	130	171	29.27	21.54	23.39	59.949	0:00:00
169	2006-10-05	12:46:44	12:46:53	40	127	167	41	130	171	97.56	97.69	97.66	59.942	0:00:08
170	2006-10-05	17:11:23	17:15:27	40	128	168	41	130	171	97.56	98.46	98.25	59.865	0:02:52
171	2006-10-06	06:50:26	06:50:37	38	126	164	39	126	165	97.44	100.00	99.39	59.934	0:00:11
172	2006-10-07	01:31:44	01:34:31	39	124	163	39	126	165	100.00	98.41	98.79	59.898	0:01:14
173	2006-10-07	03:54:23	03:55:12	38	124	162	39	126	165	97.44	98.41	98.18	59.943	0:00:30
174a	2006-10-07	05:14:11	05:17:13	39	124	163	39	126	165	100.00	98.41	98.79	59.945	0:00:09
174b	2006-10-07	05:14:11	05:17:13	39	123	162	39	126	165	100.00	97.62	98.18	59.945	0:00:09
175	2006-10-09	01:00:56	01:01:15	39	124	163	39	126	165	100.00	98.41	98.79	59.938	0:00:18
176	2006-10-10	07:31:22	07:31:35	40	126	166	41	130	171	97.56	96.92	97.08	59.923	0:00:12
177	2006-10-11	15:14:14	15:14:52	41	130	171	41	130	171	100.00	100.00	100.00	59.895	0:00:27
178	2006-10-11	20:33:50	20:34:06	40	125	165	41	130	171	97.56	96.15	96.49	59.922	0:00:15
179	2006-10-12	09:40:16	09:40:25	41	128	169	41	130	171	100.00	98.46	98.83	59.943	0:00:08
180	2006-10-12	15:32:57	15:33:06	41	128	169	41	130	171	100.00	98.46	98.83	59.942	0:00:08
181	2006-10-12	16:58:05	16:58:10	41	127	168	41	130	171	100.00	97.69	98.25	59.946	0:00:04
182	2006-10-12	17:02:05	17:02:36	15	60	75	41	130	171	36.59	46.15	43.86	59.948	0:00:02
183	2006-10-18	00:17:03	00:18:05	41	126	167	41	130	171	100.00	96.92	97.66	59.892	0:00:59
184a	2006-10-19	11:46:56	11:53:45	39	129	168	40	130	170	97.50	99.23	98.82	59.848	0:01:30
184b	2006-10-19	11:46:56	11:53:45	39	128	167	40	130	170	97.50	98.46	98.24	59.941	0:31:00
185	2006-10-21	15:49:41	15:54:02	39	127	166	40	130	170	97.50	97.69	97.65	59.828	0:03:41
186	2006-10-22	00:09:38	00:09:51	39	127	166	40	130	170	97.50	97.69	97.65	59.944	0:00:10
187	2006-10-24	00:06:51	00:35:48	2	6	8	40	130	170	5.00	4.62	4.71	59.949	0:00:00
188	2006-10-24	02:41:52	02:42:37	39	124	163	40	130	170	97.50	95.38	95.88	59.943	0:00:42
189a	2006-10-24	03:16:51	03:39:33	39	126	165	40	127	167	97.50	99.21	98.80	59.945	0:00:09
189b	2006-10-24	03:16:51	03:39:33	39	123	162	40	127	167	97.50	96.85	97.01	59.946	0:00:04
190	2006-10-24	04:12:47	04:12:51	4	8	12	40	127	167	10.00	6.30	7.19	59.948	0:00:02

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Table A.1. Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (May 14, 2006 through December 11, 2007) (10 pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth (Hz)	Event Duration Time Below 59.95 Hz (hh:mm:ss)
		Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
fevent_2ndset No.	yyyy-mm-dd													
191	2006-10-28	01:45:07	01:46:24	40	125	165	40	127	167	100.00	98.43	98.80	59.943	0:00:26
192	2006-10-28	03:16:02	03:25:35	40	126	166	40	127	167	100.00	99.21	99.40	59.942	0:00:16
193a	2006-10-28	04:07:25	04:26:55	40	124	164	40	127	167	100.00	97.64	98.20	59.945	0:00:10
193b	2006-10-28	04:07:25	04:26:55	40	125	165	40	127	167	100.00	98.43	98.80	59.944	0:00:07
194	2006-10-29	01:08:30	01:09:02	?	?	?	40	127	167	?	?	?	59.946	0:00:06
195	2006-10-29	02:03:14	02:06:20	38	124	162	38	125	163	100.00	99.20	99.39	59.934	0:00:35
196	2006-10-30	04:30:22	04:30:37	37	122	159	38	125	163	97.37	97.60	97.55	59.944	0:00:14
197	2006-10-31	04:45:28	04:46:58	37	123	160	38	125	163	97.37	98.40	98.16	59.873	0:01:30
198a	2006-10-31	09:06:06	09:08:22	37	123	160	38	125	163	97.37	98.40	98.16	59.939	0:00:12
198b	2006-10-31	09:06:06	09:08:22	24	82	106	38	125	163	63.16	65.60	65.03	59.947	0:00:03
199	2006-11-02	10:49:34	10:49:58	38	122	160	38	125	163	100.00	97.60	98.16	59.903	0:00:24
200	2006-11-03	05:40:11	05:40:11	err	err	err	38	125	163	err	err	err	59.917	0:00:00
201	2006-11-03	22:08:48	22:10:51	40	120	160	40	125	165	100.00	96.00	96.97	59.947	0:00:14
202	2006-11-04	00:34:11	00:34:19	39	124	163	40	125	165	97.50	99.20	98.79	59.945	0:00:07
203	2006-11-04	10:40:20	10:40:31	37	123	160	38	125	163	97.37	98.40	98.16	59.932	0:00:10
204	2006-11-05	00:40:14	00:40:23	18	65	83	38	125	163	47.37	52.00	50.92	59.948	0:00:04
205	2006-11-06	20:52:43	20:52:59	37	123	160	38	125	163	97.37	98.40	98.16	59.940	0:00:11
206	2006-11-07	02:45:45	02:45:45	err	err	err	38	125	163	err	err	err	59.931	0:00:00
207	2006-11-08	09:49:31	09:49:50	37	120	157	38	121	159	97.37	99.17	98.74	59.919	0:00:19
208	2006-11-09	22:06:52	22:07:42	37	120	157	38	121	159	97.37	99.17	98.74	59.946	0:00:22
209	2006-11-10	06:02:52	06:03:02	?	?	?	38	121	159	err	err	err	59.947	0:00:06
210	2006-11-12	03:56:23	03:56:36	37	116	153	38	118	156	97.37	98.31	98.08	59.934	0:00:13
211	2006-11-13	08:19:44	08:20:10	37	116	153	38	118	156	97.37	98.31	98.08	59.902	0:00:21
212	2006-11-14	00:07:10	00:07:52	37	116	153	38	116	154	97.37	100.00	99.35	59.935	0:00:42
213	2006-11-14	03:05:51	03:05:58	37	114	151	38	116	154	97.37	98.28	98.05	59.946	0:00:06
214	2006-11-14	04:02:53	04:48:09	37	116	153	38	116	154	97.37	100.00	99.35	59.934	0:01:31
215	2006-11-14	09:37:24	09:37:32	37	116	153	38	116	154	97.37	100.00	99.35	59.946	0:00:04



Table A.1. Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (May 14, 2006 through December 11, 2007) (10 pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Frequency Depth	Event Duration
		Start (hh:mm:ss)	End (hh:mm:ss)	Water Heater	Dry	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
fevent 2ndset No.	yyyy-mm-dd												(Hz)	Time Below 59.95 Hz (hh:mm:ss)
216 nov18	2006-11-15	06:59:04	06:59:23	38	115	153	38	116	154	100.00	99.14	99.35	59.892	0:00:19
217 nov19	2006-11-15	07:02:35	07:02:37	?	?	?	38	116	154	?	?	?	59.947	0:00:01
218 nov20	2006-11-16	22:10:17	22:10:20	err	err	err	38	116	154	err	err	err	59.949	0:00:00
219 nov21	2006-11-18	00:09:56	00:10:07	35	116	151	35	116	151	100.00	100.00	100.00	59.942	0:00:10
220 nov22	2006-11-18	16:43:51	16:44:08	35	116	151	35	116	151	100.00	100.00	100.00	59.925	0:00:17
221 nov23	2006-11-19	06:46:27	06:46:36	34	113	147	35	116	151	97.14	97.41	97.35	59.946	0:00:08
222 nov24	2006-11-20	21:07:26	21:08:55	35	116	151	35	116	151	100.00	100.00	100.00	59.921	0:00:33
223 nov25	2006-11-22	10:24:02	10:24:11	35	113	148	35	116	151	100.00	97.41	98.01	59.939	0:00:08
224a nov26a	2006-11-29	04:38:22	04:41:25	35	114	149	35	116	151	100.00	98.28	98.68	59.937	0:00:21
224b nov26b	2006-11-29	04:38:22	04:41:25	35	112	147	35	116	151	100.00	96.55	97.35	59.945	0:00:20
225 nov27	2006-11-29	16:47:48	16:47:51	err	err	err	35	116	151	err	err	err	59.948	0:00:00
226 nov28	2006-11-30	05:18:35	05:20:43	35	113	148	35	116	151	100.00	97.41	98.01	59.900	0:01:06
227a dec1a	2006-12-01	03:33:17	03:37:42	35	114	149	35	116	151	100.00	98.28	98.68	59.926	0:00:35
227b dec1b	2006-12-01	03:33:17	03:37:42	35	113	148	35	116	151	100.00	97.41	98.01	59.940	0:00:15
228 dec2	2006-12-01	09:51:42	09:51:56	35	109	144	35	110	145	100.00	99.09	99.31	59.932	0:00:13
229 dec3	2006-12-03	03:47:55	03:48:09	35	105	140	35	110	145	100.00	95.45	96.55	59.942	0:00:10
230 dec4	2006-12-04	23:11:47	23:11:47	err	err	err	36	110	146	err	err	err	59.812	0:00:00
231 dec5	2006-12-04	09:33:43	09:34:00	?	?	?	37	110	147	?	?	?	59.913	0:00:16
232 dec6	2006-12-07	09:49:18	09:49:36	34	106	140	35	110	145	97.14	96.36	96.35	59.924	0:00:17
233 dec7	2006-12-11	00:18:56	00:19:08	35	110	145	35	110	145	100.00	100.00	100.00	59.944	0:00:08
234 dec8	2006-12-11	02:43:09	02:43:33	22	63	85	35	110	145	62.86	57.27	58.62	59.947	0:00:05
235 dec9	2006-12-12	12:40:17	12:40:37	35	110	145	35	110	145	100.00	100.00	100.00	59.923	0:00:19
236 dec10	2006-12-14	00:30:06	00:30:22	35	108	143	35	110	145	100.00	98.18	98.62	59.943	0:00:11

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Table A.2. A list of Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (December 12, 2006 through March 31, 2007) (four pages)

Event Number	Event Date yyyy-mm-dd	Event Time Stamp		Response			"Available"			Percent Response		Event Depth (Hz)	Event Duration Time Below 59.95Hz (hh:mm:ss)
		First Recorded (hh:mm:ss)	Last Recorded (hh:mm:ss)	Water Heater	Dryer	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)		
1	_dec9	12:40:17	12:40:37	35	110	145	35	110	145	100.00	100.00	59.923	0:00:20
2	_dec10	00:30:06	00:30:22	35	108	143	35	110	145	100.00	98.18	59.943	0:00:16
3	_dec11	21:26:02	21:26:02	30	100	130	30	100	130	100.00	100.00	59.932	0:00:00
4	_dec12	01:53:59	01:54:00	29	86	115	30	100	130	96.67	86.00	59.948	0:00:01
5	_dec13	02:31:46	02:32:03	30	100	130	30	100	130	100.00	100.00	59.944	0:00:17
6	_dec14	04:52:48	04:59:33	29	98	127	30	100	130	96.67	98.00	59.848	0:06:45
7	_dec15	05:12:06	05:51:12	29	96	125	30	100	130	96.67	96.00	59.942	0:00:54
8	_dec16	16:47:48	16:47:55	30	100	130	30	100	130	100.00	100.00	59.946	0:00:07
9	_dec17	23:40:51	23:40:59	30	97	127	30	100	130	100.00	97.00	59.940	0:00:08
10	_dec18	11:41:51	11:42:08	30	100	130	30	100	130	100.00	100.00	59.915	0:00:17
11	_dec19	13:08:05	13:08:19	30	100	130	30	100	130	100.00	100.00	59.915	0:00:14
12	_dec20	15:37:34	15:37:34	0	0	0	0	0	0	0.00	0.00	59.949	0:00:00
13	_dec21	01:54:32	01:54:50	30	100	130	30	100	130	100.00	100.00	59.929	0:00:18
14	_jan1	12:31:09	12:31:20	29	99	128	30	100	130	96.67	99.00	59.940	0:00:11
15	_jan2	16:22:53	16:48:49	29	100	129	29	97	126	96.67	100.00	59.945	0:00:11
16	_jan3	18:34:16	18:34:25	29	97	126	29	97	126	96.67	97.00	59.942	0:00:09
17	_jan4	19:38:21	19:38:36	29	97	126	29	97	126	96.67	97.00	59.923	0:00:15
18	_jan5	00:32:54	00:33:11	29	98	127	29	98	127	96.67	98.00	59.911	0:00:17
19	_jan6	09:03:28	09:05:22	29	100	129	29	100	130	96.67	100.00	59.924	0:00:16
20	_jan7	23:05:14	23:08:28	29	98	127	29	98	127	96.67	98.00	59.927	0:00:12
21	_jan8	05:59:10	06:04:18	30	100	130	30	100	130	100.00	100.00	59.939	0:00:28
22	_jan9	09:13:03	09:13:16	30	97	127	30	100	130	100.00	97.00	59.918	0:00:13
23	_jan10	19:21:59	19:22:06	30	96	126	30	100	130	100.00	96.00	59.947	0:00:07
24	_jan11	06:06:38	06:06:42	9	15	24	30	100	130	30.00	15.00	59.948	0:00:05
25	_jan12	02:31:18	02:31:32	30	100	130	30	100	130	100.00	100.00	59.933	0:00:14
26	_jan13	10:50:48	10:50:57	30	100	130	30	100	130	100.00	100.00	59.941	0:00:09
27	_jan14	10:10:19	10:11:01	30	100	130	30	100	130	100.00	100.00	59.901	0:00:42

A.11

**Table A.2.** A list of Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (December 12, 2006 through March 31, 2007) (four pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Event Depth	Event Duration
		First Recorded (hh:mm:ss)	Last Recorded (hh:mm:ss)	Water Heater	Dryer	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
28	2007-01-17	22:54:46	22:55:33	30	99	129	30	100	130	100.00	99.00	99.23	59.926	0:00:17
29	2007-01-18	11:08:27	11:09:43	30	100	130	30	100	130	100.00	100.00	100.00	59.909	0:00:23
30	2007-01-18	21:05:24	21:05:33	30	98	128	30	100	130	100.00	98.00	98.46	59.944	0:00:09
31	2007-01-19	06:03:58	06:04:05	30	100	130	30	100	130	100.00	100.00	100.00	59.938	0:00:07
32	2007-01-20	09:19:29	09:19:45	30	100	130	30	100	130	100.00	100.00	100.00	59.918	0:00:16
33	2007-01-23	13:46:14	13:55:18	30	100	130	30	100	130	100.00	100.00	100.00	59.765	0:09:04
34	2007-01-25	00:51:14	00:51:17	3	22	25	30	100	130	10.00	22.00	19.23	59.948	0:00:01
35	2007-01-25	13:48:03	13:48:12	30	100	130	30	100	130	100.00	100.00	100.00	59.941	0:00:09
36	2007-01-29	15:12:27	15:12:46	30	100	130	30	100	130	100.00	100.00	100.00	59.900	0:00:19
37	2007-01-30	17:50:14	17:50:15	8	18	26	30	100	130	26.67	18.00	20.00	59.949	0:00:01
38	2007-02-01	05:30:49	05:49:24	35	105	140	35	106	141	100.00	99.06	99.29	59.894	0:05:12
39	2007-02-01	11:13:42	11:21:50	35	103	138	35	106	141	100.00	97.17	97.87	59.880	0:03:11
40	2007-02-02	03:23:21	03:24:17	34	106	140	35	106	141	97.14	100.00	99.29	59.902	0:00:56
41	2007-02-02	16:48:32	16:50:50	35	106	141	35	106	141	100.00	100.00	100.00	59.869	0:02:18
42	2007-02-04	13:44:56	13:45:05	35	106	141	35	106	141	100.00	100.00	100.00	59.938	0:00:09
43	2007-02-04	16:39:25	16:48:29	22	63	85	35	106	141	62.86	59.43	60.28	59.947	0:00:04
44	2007-02-04	19:01:37	19:01:48	35	106	141	35	106	141	100.00	100.00	100.00	59.942	0:00:11
45	2007-02-07	00:58:28	01:05:03	35	106	141	35	106	141	100.00	100.00	100.00	59.838	0:02:32
46	2007-02-10	05:58:44	05:59:39	35	106	141	35	106	141	100.00	100.00	100.00	59.911	0:00:29
47	2007-02-10	06:00:25	06:03:46	35	106	141	35	106	141	100.00	100.00	100.00	59.904	0:01:00
48	2007-02-11	02:34:03	02:36:18	35	106	141	35	106	141	100.00	100.00	100.00	59.895	0:01:18
49	2007-02-12	07:48:50	07:49:42	35	106	141	35	106	141	100.00	100.00	100.00	59.926	0:00:52
50	2007-02-12	19:22:58	19:23:08	35	106	141	35	106	141	100.00	100.00	100.00	59.938	0:00:10
51	2007-02-14	01:37:12	01:37:25	34	104	138	35	106	141	97.14	98.11	97.87	59.933	0:00:13
52	2007-02-16	06:46:46	06:46:58	35	104	139	35	106	141	100.00	98.11	98.58	59.941	0:00:12
53	2007-02-16	22:10:35	22:10:41	35	104	139	35	106	141	100.00	98.11	98.58	59.946	0:00:06
54	2007-02-17	03:12:28	03:12:35	34	104	138	35	106	141	97.14	98.11	97.87	59.945	0:00:07

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Table A.2. A list of Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (December 12, 2006 through March 31, 2007) (four pages)

Event Number	Event Date	Event Time Stamp		Response		"Available"		Percent Response		Event Depth	Event Duration
		First Recorded (hh:mm:ss)	Last Recorded (hh:mm:ss)	Water Heater	Dryer	Total	Water Heater	Dryer	Total		
Event 2ndset No.	yyyy-mm-dd										
55	2007-02-17	10:13:45	10:13:46	2	5	7	35	106	141	59.949	0:00:01
56	2007-02-19	00:29:49	00:29:56	34	106	140	35	106	141	59.942	0:00:07
57	2007-02-19	06:33:15	06:33:32	34	106	140	35	106	141	59.909	0:00:17
58	2007-02-20	03:56:45	03:57:20	34	106	140	35	106	141	59.918	0:00:35
59	2007-02-22	17:49:55	17:49:58	2	9	11	35	106	141	59.949	0:00:03
60	2007-03-01	13:49:30	13:49:58	35	99	134	35	100	135	59.927	0:00:16
61	2007-03-04	01:23:55	01:24:08	35	100	135	35	100	135	59.943	0:00:15
62	2007-03-04	03:10:45	03:10:57	34	98	132	35	100	135	59.928	0:00:12
63	2007-03-04	12:14:23	12:14:35	34	98	132	35	100	135	59.927	0:00:12
64	2007-03-06	12:58:23	12:58:37	34	97	131	35	100	135	59.928	0:00:14
65	2007-03-06	16:52:35	16:53:35	35	99	134	35	100	135	59.891	0:00:34
66	2007-03-08	05:52:35	05:53:09	34	96	130	35	100	135	59.946	0:00:09
67	2007-03-10	05:15:37	05:15:44	34	98	132	35	100	135	59.945	0:00:07
68	2007-03-11	11:17:47	11:17:57	34	98	132	35	100	135	59.940	0:00:10
69	2007-03-11	16:06:07	16:06:28	35	98	133	35	100	135	59.914	0:00:21
70	2007-03-11	19:33:46	19:34:08	35	99	134	35	100	135	59.898	0:00:22
71	2007-03-13	07:19:15	07:19:22	35	99	134	35	100	135	59.940	0:00:07
72	2007-03-15	05:36:35	05:36:53	35	98	133	35	100	135	59.927	0:00:18
73	2007-03-15	12:33:16	12:33:34	35	98	133	35	100	135	59.920	0:00:18
74	2007-03-15	14:32:45	14:32:45	0	16	16	35	100	135	59.949	0:00:00
75	2007-03-16	01:13:53	01:18:03	35	95	130	35	95	130	59.871	0:02:43
76	2007-03-18	19:03:18	19:03:23	35	95	130	35	95	130	59.946	0:00:05
77	2007-03-21	07:40:31	07:40:46	30	93	123	31	95	126	59.930	0:00:15
78	2007-03-21	10:39:41	10:39:52	30	93	123	31	95	126	59.937	0:00:11
79	2007-03-21	13:32:42	13:32:55	30	93	123	31	95	126	59.916	0:00:13
80	2007-03-21	16:05:24	16:05:35	31	93	124	31	95	126	59.924	0:00:11
81	2007-03-22	08:52:55	08:53:08	31	93	124	31	95	126	59.924	0:00:13

**Table A.2.** A list of Grid Friendly Demonstration Underfrequency Events and Corresponding Appliance Controller Responses (December 12, 2006 through March 31, 2007) (four pages)

Event Number	Event Date	Event Time Stamp		Response			"Available"			Percent Response			Event Depth	Event Duration
		First Recorded (hh:mm:ss)	Last Recorded (hh:mm:ss)	Water Heater	Dryer	Total	Water Heater	Dryer	Total	Water Heater (%)	Dryer (%)	Total (%)		
82 _mar23	2007-03-22	15:11:20	15:11:29	31	91	122	31	91	122	100.00	100.00	100.00	59.941	0:00:09
83 _mar24	2007-03-22	16:41:12	16:41:27	31	91	122	31	91	122	100.00	100.00	100.00	59.915	0:00:15
84 _mar25	2007-03-23	05:40:14	05:40:25	31	91	122	31	91	122	100.00	100.00	100.00	59.944	0:00:11
85 _mar26	2007-03-24	05:04:20	05:04:30	22	51	73	31	91	122	70.97	56.04	59.84	59.947	0:00:10
86 _mar27	2007-03-26	02:09:11	02:09:18	31	89	120	31	91	122	100.00	97.80	98.36	59.946	0:00:07
87 _mar28	2007-03-26	17:57:23	17:59:20	31	91	122	31	91	122	100.00	100.00	100.00	59.932	0:01:10
88 _mar29	2007-03-26	18:00:07	18:12:44	31	91	122	31	91	122	100.00	100.00	100.00	59.893	0:10:58
89 _mar30	2007-03-26	21:18:13	21:18:06	31	90	121	31	91	122	100.00	98.90	99.18	59.921	0:03:52
90 _mar31	2007-03-27	06:07:09	06:37:50	31	91	122	31	91	122	100.00	100.00	100.00	59.936	0:00:17
91 _mar32	2007-03-28	08:37:10	08:48:20	31	90	121	31	91	122	100.00	98.90	99.18	59.921	0:00:20
92 _mar33	2007-03-28	21:10:48	21:13:28	31	91	122	31	91	122	100.00	100.00	100.00	59.921	0:01:54
93 _mar34	2007-03-28	22:40:51	22:40:58	31	91	122	31	91	122	100.00	100.00	100.00	59.939	0:00:07
94 _mar35	2007-03-29	09:41:27	09:41:37	31	91	122	31	91	122	100.00	100.00	100.00	59.934	0:00:10

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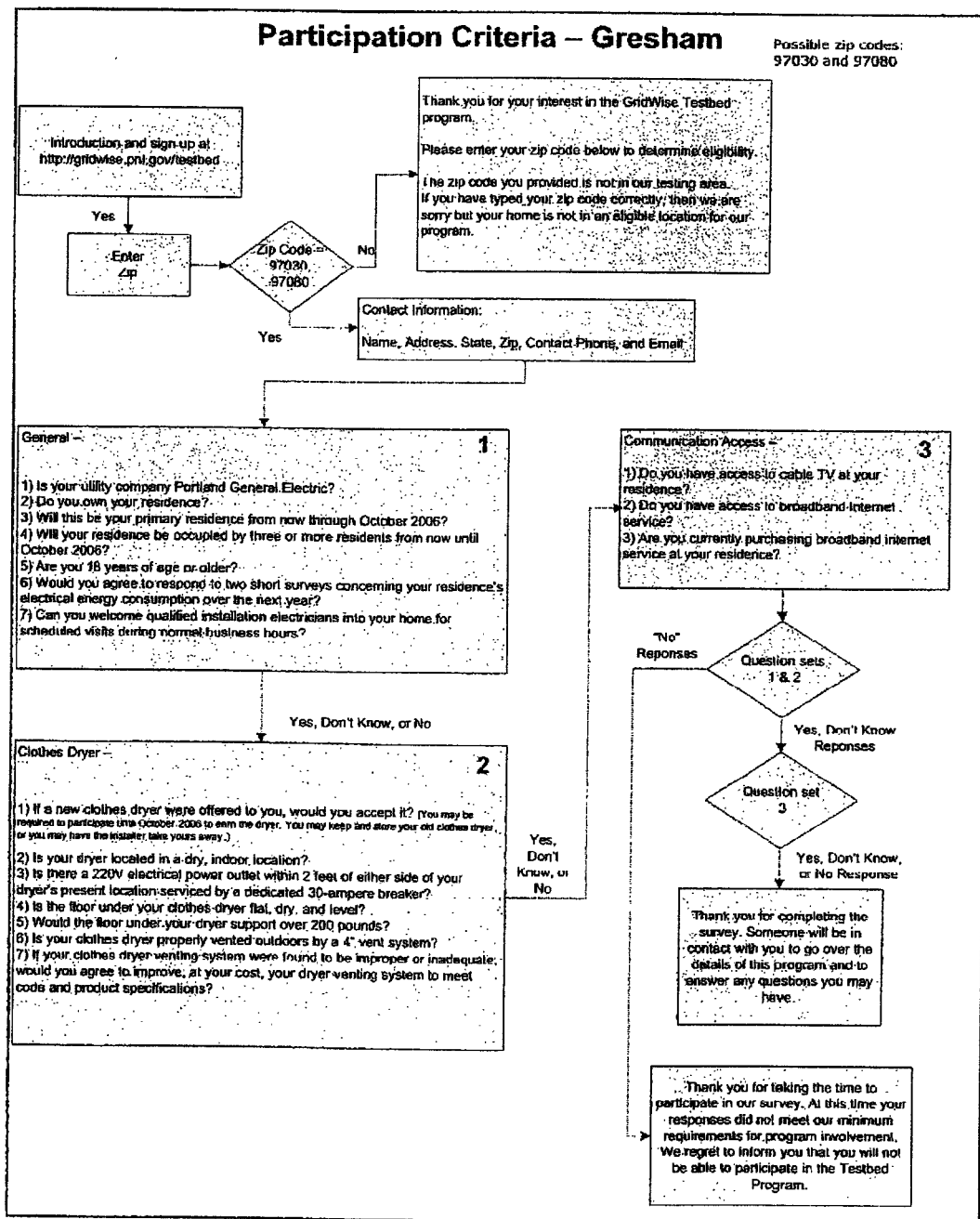


Figure A.1. Example Automated Qualification Flow Chart

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**Table A.3. Preliminary Survey Text Example**

Name (First Last); Address; City, State, Zip; Home Phone; Work Phone; Email (Answers not retained)

What type of system do you use the most for heating your home? (Check one)

- 25% - Electric, central forced air
- 3% - Electric baseboard
- 37% - Electric heat pump, central forced air
- 2% - Electric radiant heating
- 0% - Portable electric heater(s)
- 31% - Gas, oil, or propane central forced air
- 1% - Woodstove or fireplace
- 1% - Other

235 - Sample size

Do you have a second heating system for your home? (Check all that apply)

- 3% - Electric, central forced air
- 4% - Electric baseboard
- 0% - Electric heat pump, forced air
- 1% - Electric radiant heating
- 11% - Portable electric heater(s)
- 2% - Gas, oil, or propane central forced air
- 45% - Woodstove or fireplace
- 6% - Other

235 - Sample size (total responses)

During the winter my thermostat setting during the daytime is usually

<u>daytime</u>	<u>nighttime</u>	<u>range (°F)</u>
1%	8%	<56
0%	3%	56-58
3%	17%	58-60
4%	9%	60-62
6%	9%	62-64
13%	18%	64-66
32%	21%	66-68
25%	9%	68-70
12%	4%	70-72
3%	2%	72-74
0%	0%	74-76
0%	0%	>76

My home's temperature in the winter time is (Check one)

- 3% - Too warm
- 70% - Just right
- 28% - Too cool

236 - Sample size

My home has a programmable thermostat (Circle one)

- 69% - Yes
- 28% - No
- 3% - Not sure

239 - Sample size

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The month I usually start heating my home is \_\_\_\_ The month I usually stop heating my home is \_\_\_\_

<u>start</u>	<u>stop</u>	<u>month</u>	231 / 222 - Sample sizes
1%	0%	January	
0%	1%	February	
0%	12%	March	
0%	32%	April	
0%	34%	May	
0%	16%	June	
0%	3%	July	
0%	0%	August	
14%	0%	September	
60%	0%	October	
23%	0%	November	
0%	1%	December	

How many thermostats do you have in your home? (Check one)

91% - 1	235 - Sample size
4% - 2	
4% - More than 2	

Where is the location of the thermostat(s)? (Main floor, hallway, second floor hallway, basement, etc.)

Answers varied greatly to this open-ended question.

What type of air conditioning do you have, if any? (Check one)

25% - None	238 - Sample size
39% - Heat pump	
24% - Central forced air	
11% - Wall or window unit(s)	
0% - Other	

During the summer, I use my air conditioner (Check one)

9% - Never	240 - Sample size
42% - Occasionally	
28% - Routinely	
21% - Don't have one	

During the summer, my thermostat setting during the daytime is usually \_\_\_\_°F; nighttime is usually \_\_\_\_°F

<u>daytime</u>	<u>nighttime</u>	<u>range (°F)</u>	171 / 154 - Sample sizes
9%	12%	<56	
1%	1%	56-58	
6%	10%	58-60	
1%	3%	60-62	
2%	3%	62-64	
5%	8%	64-66	
10%	6%	66-68	
14%	16%	68-70	
14%	10%	70-72	
10%	10%	72-74	



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12%	11%	74-76
16%	9%	76-78
5%	5%	78-80
3%	4%	> 80

My home's temperature in the summer time is (check one)

22% - Too warm	240 - Sample size
76% - Just right	
2% - Too cool	

What is the approximate square footage of your home? (Check one)

3% - Less than 1000 sq. ft.	238 - Sample size
19% - 1,000 - 1,499 sq. ft.	
32% - 1,500-1,999 sq. ft.	
24% - 2,000-2,499 sq. ft.	
14% - 2,500-2,999 sq. ft.	
5% - 3,000-3,499 sq. ft.	
3% - More than 3,500 sq. ft.	

What year was your home built? (Check one)

14% - Before 1950	237 - Sample size
9% - 1950s	
6% - 1960s	
18% - 1970-1978	
20% - 1978-1989	
25% - 1990s	
8% - 2000s	

How many of the following appliances are in your home?

242 - Sample size

	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
Refrigerators	2%	73%	24%	2%	-	-
Freezers	33%	65%	2%	-	-	-
Clothes washers	2%	98%	-	-	-	-
Clothes Dryers	2%	98%	-	-	-	-
Dishwashers	7%	93%	-	-	-	-
Stoves/ranges	2%	93%	5%	-	-	-
Microwave ovens	2%	94%	4%	-	-	-
Personal computers	2%	65%	23%	7%	2	1%
Large screen TVs	65%	33%	2%	-	-	-
Regular TVs	5%	53%	24%	10%	6%	2%
Hot tubs/spas	78%	22%	-	-	-	-
Swimming pools	93%	7%	-	-	-	-

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I would consider changing the times we use these appliances to save money (Check all that apply)

Dishwasher	92% - Yes	Large screen TV	22% - Yes
	4% - No		53% - No
	4% - Not sure		25% - Not sure
Stove/range	35% - Yes	Regular TV	34% - Yes
	45% - No		45% - No
	20% - Not sure		21% - Not sure
Microwave oven	34% - Yes	Hot tub/spa	66% - Yes
	48% - No		20% - No
	17% - Not sure		14% - Not sure
Personal computer	27% - Yes		
	54% - No		
	18% - Not sure		

How many loads of laundry per week do you do at home? (Check one)

0% - None	238 - Sample size
25% - 1-3	
45% - 4-6	
16% - 7-9	
13% - 10 or more	

What temperature settings are used most often when washing clothes? (Check one)

27% - Cold / Cold	237 - Sample size
68% - Warm / Cold	
4% - Warm / Hot	
0% - Hot / Hot	

We usually do our laundry. (check one)

10% - At the same time of day	237 - Sample size
90% - At various times	

I would consider changing our laundry schedule to save money. (Circle one)

86% - Yes	238 - Sample size
2% - No	
12% - Not sure	

How many total showers or baths does your household take at home in a typical week? (Check one)

10% - 0-5	237 - Sample size
26% - 6-10	
27% - 11-15	
15% - 16-20	
21% - 20 or more	

Are your showers equipped with a low-flow shower head? (Circle one)

49% - Yes	238 - Sample size
24% - No	
27% - Not sure	

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I would consider changing the times we shower or bathe to save money. (Circle one)

34% - Yes

239 - Sample size

37% - No

29% - Not sure

Our water heater has a timer that turns it off when we're not home. (Circle one)

3% - Yes

239 - Sample size

79% - No

18% - Not sure

The amount of hot water I have is (Check one)

91% - Usually sufficient

234 - Sample size

6% - Sometimes sufficient

3% - Not usually sufficient

My water heater is set (Check one)

7% - As hot as possible (160°F or more)

230 - Sample size

45% - For the dishwasher/clothes washer (about 140°F)

45% - To prevent scalding (about 120°F)

3% - To wash hands comfortably (less than 120°F)

How many water heaters do you have in your home? (Check one)

94% - 1

234 - Sample size

6% - 2

0% - more than 2

Where is the location of your water heater(s)? (Garage, basement, etc.)

Answers to this open-ended question varied greatly.

Including yourself, how many people have lived in the household at least half of the last 12 months? (Age No. Person)

7% - 0-11

571 - Sample population

12% - 12-18

8% - 18-25

9% - 26-35

12% - 36-45

25% - 46-55

15% - 55-65

13% - 66 or older

What is the total combined income for your household before taxes? (Check one)

2% - Up to \$19,000

216 - Sample size

14% - \$20,000 to \$39,999

25% - \$40,000 to \$59,999

28% - \$60,000 to \$79,999

13% - \$80,000 to \$99,999

17% - \$100,000 or more

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The last questions refer to the occupant responsible for participating in the demonstration program:

(Check one)

43% - Female

238 Sample size

57% - Male

Age (Check one)

0% - 18-25

238 - Sample size

8% - 26-35

18% - 36-45

33% - 46-55

22% - 55-65

18% - 66 or older

Highest level of education completed (Check one)

0% - Never attended

238 - Sample size

0% - Elementary school

0% - Junior high school

3% - Some high school

6% - High school

6% - Trade or technical school

30% - Some college

32% - Graduated college

24% - Graduate college/professional school

Comfort level using the internet (Check one)

0% - Never use it

237 - Sample size

1% - Not comfortable

14% - A little comfortable

85% - Very comfortable

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**Table A.4. Final Survey Summary**

I received sufficient information to understand the project goals and my part in the GridWise Testbed Program.

44% - Strongly agree	151 - Sample size
50% - Agree	4.4 - Average on scale of 5
3% - Neutral	0.67 - Standard deviation on scale of 5
0% - Disagree	
0% - Strongly disagree	

Regarding your personal experience with the new clothes dryer, how satisfied were you with the installation of your dryer?

83% - Very satisfied	139 - Sample size
14% - Somewhat satisfied	4.8 - Average on scale of 5
1% - Neither satisfied nor dissatisfied	0.56 - Standard deviation on scale of 5
2% - Somewhat dissatisfied	
0% - Very dissatisfied	

How acceptable was it to have your clothes dryer cycle run a few minutes longer, occasionally, in response to power grid needs?

79% - Very acceptable, we didn't notice any change	139 - Sample size
11% - Somewhat acceptable	4.7 - Average on scale of 5
7% - Acceptable	0.74 - Standard deviation on scale of 5
3% - Somewhat unacceptable	
0% - Unacceptable	

Which of these conditions, if any, did you observe on your clothes dryer? (Check all that apply)

37% - "Pr" (Price Response) signal on appliance	227 - Sample size (total responses)
38% - Had to push start button twice to start the dryer	
25% - Audible signal (beep) with the "Pr" (Price Response)	

Assume you are planning to purchase a new clothes dryer. Which of the following would most strongly influence your decision to purchase a Grid Friendly clothes dryer instead of a standard model? (Check all that apply)

23% - Help the environment	349 - Sample size (total responses)
36% - Reduce my electrical costs	
20% - Help the electric power grid	
18% - Price	
3% - Other (please explain)	

What is the likelihood that you would purchase a Grid Friendly clothes dryer?

28% - Definitely would	139 - Sample size
47% - Probably would	4.0 - Average on scale of 5
22% - Might or might not	0.80 - Standard deviation on scale of 5
2% - Probably would not	
1% - Definitely would not	

PNNL-17079

What do you believe would be a reasonable purchase price increase or reduction for a Grid Friendly clothes dryer? How much more (positive) or less (negative) would you expect to pay for a Grid Friendly clothes dryer?

9% - (\$100)	139 - Sample size
6% - (\$50)	\$19 - Average
2% - (\$25)	
0% - (\$10)	
0% - (\$5)	
27% - \$0	
0% - \$5	
1% - \$10	
13% - \$25	
30% - \$50	
12% - \$100	

Which of the following organizations, if any, do you believe would provide you the most reliable information about a Grid Friendly clothes dryer?

53% - Utility company	139 - Sample size
13% - Appliance manufacturer	
5% - Government	
7% - Retail store	
2% - Local service organizations	
12% - Environmental organizations	
5% - None	
3% - Other (please explain)	

How much did your participation in the GridWise Testbed Program impact your loyalty toward the dryer manufacturer?

22% - Increased greatly	139 - Sample size
26% - Increased some what	3.7 - Average on scale of 5
50% - Did not make a difference	0.83 - Standard deviation on scale of 5
2% - Decreased some what	
0% - Decreased greatly	

In your opinion, how should the Grid Friendly feature be added to a clothes dryer?

29% - Added option at time of purchase	139 - Sample size
3% - Added option after purchase	
62% - Standard on all appliances	
0% - Should not be offered for clothes dryers	
2% - Other (please explain)	
4% - Don't know	

PNNL-17079

Occasionally there are hours of the day when cost increases because energy demand exceeds available lower-cost energy supply. This is referred to as "on-peak" demand. In the future, home devices or appliances could be modified to respond to "on peak" demand to reduce costs and to respond to help the grid during a grid emergency. Assume you incur no installation cost, and the cost of your appliance remains the same. Also assume your benefits for participation are relative to the extent of control you permit or exercise. In which one of the following programs would you most likely participate?"

- 19% - The utility occasionally sends control signals directly to certain appliances; no action is needed on my part.
- 14% - The utility sends me an alert message when electric prices are high; I will be responsible for reducing electric usage as I see appropriate.
- 66% - The utility sends a price signal directly to my appliances; my appliances reduce my electrical energy costs for me; no action is needed on my part, but I may override the appliance's decision at anytime.
- 1% - The utility sends no signals; no action is needed on my part, because I elect to pay a premium for electricity (~10% more) for the right to use electricity whenever I choose.

How likely are you to participate in a program like this again if it were offered by your local electric company?

- 63% - Extremely likely
- 26% - Very likely
- 9% - Likely
- 1% - Unlikely
- 1% - Very unlikely
- 0% - Extremely unlikely

How satisfied were you with the installation of your Invensys GoodWatts (load control modules, thermostats & internet connection) equipment?

- 67% - Very satisfied
- 25% - Somewhat satisfied
- 3% - Neither satisfied nor dissatisfied
- 5% - Somewhat dissatisfied
- 1% - Very dissatisfied

Did you experience any technical issues or problems with GoodWatts equipment?

- 52% - Yes
- 46% - No
- 2% - Do not remember

My home temperature in the winter is:

- 3% - Too warm
- 69% - Just right
- 28% - Too cool

My home temperature in the summer is:

- 26% - Too warm
- 72% - Just right
- 2% - Too cool

PNNL-17079

How willing are you to consider changing the times you use each of the appliances listed below if you knew it would reduce your energy costs?

150 - Sample size

Dishwasher	89% - Yes 1% - No 10% - Maybe	Computer	17% - Yes 57% - No 27% - Maybe
Washer	75% - Yes 3% - No 21% - Maybe	Large TV	21% - Yes 47% - No 33% - Maybe
Dryer	77% - Yes 3% - No 20% - Maybe	Small TV	27% - Yes 39% - No 33% - Maybe
Dehumidifier	44% - Yes 19% - No 37% - Maybe	Pool (pool heater or pump)	44% - Yes 19% - No 37% - Maybe
range or Oven	25% - Yes 44% - No 31% - Maybe	Hot tub	44% - Yes 20% - No 36% - Maybe
Microwave	19% - Yes 58% - No 23% - Maybe		

What is the likelihood that you would consider changing your laundry schedule to save money on energy costs?

35% - Definitely would	150 - Sample size
43% - Probably would	4.1 - Average on scale of 5 (w/o last response)
15% - Might or might not	0.83 - Standard deviation on scale of 5
3% - Probably would not	
1% - Definitely would not	
3% - We already changed schedules to save energy	

What is the likelihood that you would consider changing the times you shower or bathe to save money on energy cost?

7% - Definitely would	150 - Sample size
25% - Probably would	3.0 - Average on scale of 5 (w/o last response)
29% - Might or might not	1.09 - Standard deviation on scale of 5
27% - Probably would not	
9% - Definitely would not	
2% - We already changed schedules to save energy	

The amount of hot water I have available for household use is:

87% - Usually sufficient	150 - Sample size
9% - Sometimes sufficient	2.8 - Average on scale of 3
4% - Not usually sufficient	0.47 - Standard deviation on scale of 3



PNNL-17079

How acceptable was it to you when the water heater turned off for a few minutes in response to power grid needs?

77% - Very acceptable, we didn't notice when the water heater turned off	
5% - Somewhat acceptable	43 - Sample size
12% - Acceptable	4.5 - Average on scale of 5
2% - Somewhat unacceptable	1.09 - Standard deviation on scale of 5
5% - Unacceptable	

How much more (positive) or less (negative) would you expect to pay for a Grid Friendly water heater?

5% - (\$100)	43 - Sample size
9% - (\$50)	\$18 - Average
0% - (\$25)	
0% - (\$10)	
0% - (\$5)	
28% - \$0	
0% - \$5	
7% - \$10	
16% - \$25	
26% - \$50	
9% - \$100	

In your opinion, how should the Grid Friendly feature be added to a water heater?

33% - Added option at time of purchase	43 - Sample size
5% - Added option after purchase	
58% - Standard on all water heaters	
0% - Should not be offered for water heaters	
0% - Other (please explain)	
5% - Don't know	

Which of the following organizations, if any, do you believe would give you reliable information about a Grid Friendly water heater?

2% - Government	43 - Sample size
0% - Retail store	
53% - Utility company	
2% - Local service organizations	
9% - Environmental organizations	
16% - Water heater manufacturer	
12% - Plumber / Builder / Installer	
0% - None	
5% - Other (please explain)	

PNNL-17079

How satisfied were you with the installation of the Grid Friendly control device on your water heater?

72% - Very satisfied	43 - Sample size
16% - Somewhat satisfied	4.5 - Average on scale of 5
7% - Neither satisfied nor dissatisfied	0.90 - Standard deviation on scale of 5
2% - Somewhat dissatisfied	
2% - Very dissatisfied	

Approximately how many times over the course of the program did you log into the GoodWatts Website to review or modify your comfort settings?

0% - Never	59 - Sample size
0% - 1	
20% - 2-5	
20% - 6-10	
27% - 11-20	
32% - More than 20	

How many times over the course of the program did you log into the program Website to review your program account?

0% - Never	57 - Sample size
4% - 1	
19% - 2-5	
19% - 6-10	
23% - 11-20	
35% - More than 20	

To what degree did the Project incentive money influence your energy consumption habits?

5% - To a great degree	63 - Sample size
10% - To a significant degree	2.4 - Average on scale of 5
35% - To some degree	1.11 - Standard deviation on scale of 5
25% - Just a little bit	
25% - Not at all	

To which type of contract were you assigned as part of the GridWise Testbed Program?

27% - Control	63 - Sample size
8% - Fixed	
6% - Time of use (TOU)	
8% - Real-time pricing (RTP)	
51% - Do not remember	

If you were to participate again, which contract would you prefer to be part of?

22% - Control	63 - Sample size
11% - Fixed	
27% - Time of use (TOU)	
40% - Real-time pricing (RTP)	

PNNL-17079

With respect to the money you earned during this experiment, which of the following most closely represents your experience?

- |                                                            |                  |
|------------------------------------------------------------|------------------|
| 29% - The money I received was well worth the effort.      | 63 - Sample size |
| 27% - The money I received was worth the effort            |                  |
| 32% - The money I received was about right for the effort. |                  |
| 3% - The money I received was not worth the effort.        |                  |
| 10% - I have no idea how much money I made.                |                  |

What is the current thermostat configuration setting for your home?

- |                           |                  |
|---------------------------|------------------|
| 3% - No Price Reaction    | 63 - Sample size |
| 0% - Maximum comfort      |                  |
| 13% - Balanced comfort    |                  |
| 37% - Economical comfort  |                  |
| 10% - Comfortable economy |                  |
| 11% - Balanced economy    |                  |
| 8% - Maximum economy      |                  |
| 19% - Do not know         |                  |

How well did you like using your home computer to control energy consumption?

- |                                        |                                         |
|----------------------------------------|-----------------------------------------|
| 51% - I really liked it.               | 63 - Sample size                        |
| 29% - I liked it.                      | 4.3 - Average on scale of 5             |
| 19% - I neither liked nor disliked it. | 0.82 - Standard deviation on scale of 5 |
| 2% - I disliked it.                    |                                         |
| 0% - I really disliked it              |                                         |

SCHEDULE VI  
SAP AMERICA, INC.

SAP America, Inc. Maintenance Schedule Addendum for Extended Maintenance Service Agreement with CenterPoint Energy, dated September 29, 2006 (redacted)

Appendix 24 to SAP America, Inc. R/3 Software End-User License Agreement with CenterPoint Energy, dated March 22, 2007 (redacted)

The unredacted copy of this schedule is confidential and is being filed under seal. To make arrangements to receive a copy of this material pursuant to the protective order in this docket, please contact Ms. Linda Johnston in Houston at (713) 207-5218.

# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 1 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

## CONTRACT

Contract Number: 4600000679

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

Valid From: 01/13/2005  
Valid End: 12/30/2010

Freight Terms: Not Applicable  
Payment Terms: Pay Immediately  
Target Value: ██████████ USD

Attn: Brian Jones  
Email: brian.jones@sap.com

Internal Client: Patricia Graham

\* \* Please include WF00021615 on the invoice to ensure prompt payment.

### Supplement #11

This supplement is issued to provide additional software in accordance with the attached documents:

#### Attachment:

- Maintenance Schedule Addendum for Extended Maintenance Service.
- Appendix 18
- Appendix 19
- Appendix 20
- Appendix 21
- Appendix 22
- Appendix 23
- Electronic Delivery of mySAP.com -- Access to the SW Center acknowledgement document


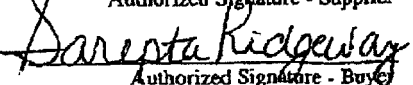
All other prices, terms and conditions of the original agreement and all prior supplements shall remain unchanged and in full force and effect.

+++++ End Supplement #11 +++++

#### Other Instructions:

- The Contract number must be shown on all invoices, shipping papers, packages, and correspondence pertaining to order.
  - Invoice must separate materials from labor/services and must include make, model, and serial number of all installed equipment.
- THIS ORDER IS PLACED SUBJECT TO CONDITIONS ATTACHED.

Page 1 of 8

9/29  
  
Authorized Signature - Supplier  
  
Authorized Signature - Buyer  
9/29/06

# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 2 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

## CONTRACT

Contract Number:	4600000679
------------------	------------

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

## Supplement #10

This supplement is issued to provide for additional Services for SAP/CCS Strategy and Planning Support - Document #2005-140 to provide support to ensure that, strategically, CenterPoint is implementing the SAP Utilities Solutions appropriately and leveraging them fully, all in accordance with the following:

### Attachment:

- Statement of Work issued July 8, 2005 to Professional Services Agreement ("Agreement") between SAP Public Services, Inc. ("SAP") and CenterPoint Energy ("Licensee")

- Schedule A to Statement of Work issued July 8, 2005 ("SOW") between SAP Public Services, Inc. ("SAP") and CenterPoint Energy ("Licensee")

All other prices, terms and conditions of the original agreement and all prior supplements shall remain unchanged and in full force and effect.

+++++ End Supplement #10 +++++

Attn: Amy Phelps  
Cell#: 512-970-9057  
Email: amy.phelps@sap.com

Internal Client: Stuart Ingram

**\*\* Please include WF00021329 on the invoice to ensure prompt payment.**

## Supplement #9

This supplement is issued to provide for additional Services for SAP e-Recruiting Strategy and Planning Support - Document #2005-142 to assist in development of an implementation strategy and plan to address CenterPoint's e-Recruiting requirements, and knowledge transfer related to the e-Recruiting product, all in accordance with the following:

# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 3 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

Contract Number: 4600000679

## CONTRACT

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

### Attachment:

- Statement of Work issued July 13, 2005 to Professional Services Agreement ("Agreement") between SAP Public Services, Inc. ("SAP") and CenterPoint Energy ("Licensee")

- Schedule A to Statement of Work issued July 13, 2005

All other prices, terms and conditions of the original agreement and all prior supplements shall remain unchanged and in full force and effect.

+++++ End Supplement #9 +++++

Attn: Amy Phelps  
Cell#: 512-970-9057  
Email: amy.phelps@sap.com

Internal Client: Glenn Gallia

## Supplement #8

This supplement is issued to incorporate the following attachments into the original master agreement:

### Attachments:

- Appendix 17 - Issued June 14, 2005 to SAP America, Inc. ("SAP") - R3 Software End-User License Agreement effective September 30, 1997 ("Agreement") with CenterPoint Energy Services Company, LLC ("Licensee")

- Schedule 1 to Appendix 17 effective June 14, 2005

All other prices, terms and conditions of the original master agreement and all prior supplements shall remain unchanged.

+++++ End Supplement #8 +++++

# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 4 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

Contract Number: 4600000679

## CONTRACT

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

Attn: Michael Tran  
Fax: 713-917-5201

Internal Client: Rachelle O'Connor

## Supplement #8

This supplement is issued to incorporate the attached Appendix 16 to the original master agreement between CenterPoint Energy, Inc. and SAP America, Inc.

All other prices, terms and conditions of the original master agreement and all prior supplements shall remain unchanged.

----- End Supplement #8  
-----

## Supplement #7

This supplement is issued to incorporate the attached Appendix 15 to the original master agreement.

All other prices, terms and conditions of the original master agreement and all prior supplements shall remain unchanged.

+++++ End Supplement #7 +++++

## Supplement No. 6

This supplement is issued to incorporate the attached Amendment 8, Appendix 13 and Appendix 14 to the Contract.

### Attachments:

- \* Amendment 8 - issued October 6, 2003 and executed October 8, 2003
- \* Appendix 13 - issued October 6, 2003 and executed October 8, 2003
- \* Appendix 14 - issued October 6, 2003 and executed October 8, 2003



# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 5 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

## CONTRACT

Contract Number: 4600000679

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

These documents provide CenterPoint Energy, Inc. with the mySAP Business Suite upgrade, which consists of the mySAP Business Suite products at a cost Net Cost of [REDACTED] and changes CNP's maintenance base to [REDACTED] per year. The mySAP Business Suite consists of the following products:

mySAP Customer Relationship Management (mySAP CRM)  
mySAP Supply Chain Management (mySAP SCM)  
mySAP Supplier Relationship Management (mySAP SRM)  
mySAP Product Lifecycle Management (mySAP PLM)  
mySAP Human Resources (mySAP HR)  
mySAP Financials  
mySAP Business Intelligence (mySAP BI) (BW&SEM)  
mySAP Enterprise Portals (mySAP EP)

All other terms and conditions remain in full force and effect.

### Supplement No. 5

This supplement is issued to incorporate the attached Three Way License Agreement for assignment.

Attachment: License Agreement Assignment (executed 3/6/03)

### Supplement No. 4

**THIS IS NOT AN ORDER - DO NOT DUPLICATE SHIPMENT OF THESE PRODUCTS. THIS IS A PARTIAL ASSIGNMENT ONLY.**

On July 27, 2000, Reliant Energy, Incorporated (REI) announced its intent to separate its regulated and unregulated businesses. An initial public offering of slightly less than twenty percent of the common stock of its unregulated operations was offered on May 1, 2001.

The purpose of this supplement is to do a partial assignment of products under this contract from Reliant Energy, Incorporated to Reliant Resources, Inc. (RRI). Products shown on the attachment to this Supplement shall remain under Reliant Energy, Incorporated and remaining products shall be assigned under a new contract number.

CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 6 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

CONTRACT

Contract Number: 4600000679

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

All future invoices should reference the Contract Number indicated at the right hand top corner of this document and should be mailed to the address indicated above. Failure to reference this number may result in delay in payment.

Please sign in the space below titled AUTHORIZED SIGNATURE - SUPPLIER and return to Teresa West via fax at 713-207-9032 within three (3) working days.

Questions regarding this assignment should be directed to Teresa West at (713) 207-6927.

----- End of Supplement -----

Reliant Energy, Incorporated  
Supplement #3

This supplement is issued to incorporate Amendment 5 issued January 24, 2001 as an integral part of the contract document.

All other prices, terms and conditions of the original agreement and prior supplement shall remain unchanged.

----- END OF SUPPLEMENT #3 -----

Reliant Energy, Incorporated  
Supplement #2

This supplement is issued to upgrade OP/TU User SAP U

Increase total order value by .....

All other prices, terms and conditions of the original agreement and prior supplement shall remain unchanged.

+++++ End Supplement #2 +++++

Reliant Energy, Incorporated  
Supplement

# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 7 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

## CONTRACT

Contract Number:	4600000679
------------------	------------

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

This supplement is issued to provide annual maintenance for the software products described below for a one (1) year period of time beginning January 1, 2000 through December 31, 2000.

Previous total order value.....  
Increase this supplement.....  
Revised total order value.....

IS-U/CCS (Consumption based Contr.) mnt  
includes 7.24 Access, Early Watch Alert, 2 Early Watch Sessions or 1 Go Live Check

PA-US Payroll Tax Processing Maint.  
IS-U/FERC Maintenance  
Maintenance R/3  
SAPNet R/3 Front End

Maintenance for R/3

Customer training license

HAHTsite Maintenance

Reference Invoices: 6008011974;6008011967; 6008011979; 6008012639; 6008012640

All other prices, terms, and conditions of the original agreement and previous supplements shall remain unchanged:

+++++ End Supplement +++++

Item	Target Qty	Unit	Material Number	Description	Unit Price	Per	Delivery Date
00010				COMP-SFTWR/LICENSE			

# CenterPoint Energy Houston Electric, LLC

Schedule VI  
Page 8 of 43

P. O. Box 1700  
Houston, TX 77251

Agreement Date: 01/29/1998  
Current Date: 09/29/2006

Contract Number: 4600000679

## CONTRACT

To: SAP AMERICA INC  
P. O. Box 7780-4024  
PHILADELPHIA, PA 19182-4024

### Direct All Correspondence To:

Contact: Teresa West  
Telephone: 713-207-6927  
Fax: 713-207-9032  
Vendor Phone: 610-725-4500  
Vendor Number (HQ): 119634

Ship To: This is a Centralized Contract and  
"Ship To" will be determined at  
Purchase Order Release

Invoice To: P. O. Box 1374  
Houston, TX 77251

Item	Target Unit Qty	Material	Description	Unit Price	Per	Delivery Date
00020			Software Maintenance			
00030			mySAP Business Suite			
00040			mySAP Business Suite Maintenance			
00050			Professional Services			
00060			Training			

**EXTENDED MAINTENANCE SERVICE**

**MAINTENANCE SCHEDULE ADDENDUM for EXTENDED MAINTENANCE SERVICE ("Schedule")**  
to  
**SAP AMERICA, INC. ("SAP")**  
**R/3 SOFTWARE END-USER LICENSE AGREEMENT effective September 30, 1997 ("License Agreement")**  
with  
**CENTERPOINT ENERGY SERVICE COMPANY, LLC ("Licensee")**

This Schedule is hereby annexed to and made a part of the Agreement specified above. In each instance in which provisions of this Schedule contradict or are inconsistent with the provisions of the License Agreement, its Appendices or terms and conditions of Maintenance (together, the "Agreement"), the provisions of this Schedule shall prevail and govern, and the contradicted or inconsistent provisions of the Agreement shall be deemed amended accordingly.

1. SAP represents and Licensee acknowledges that Maintenance (as that term is used in the Agreement) for the Versions of SAP R/3 Release 4.6C shall terminate no later than December 31, 2006 and, other than as set forth herein, SAP shall have no other Maintenance, support or upgrade obligation with respect to the aforementioned Versions of these SAP R/3 Releases.

2. As set forth herein, SAP offers and Licensee accepts Extended Maintenance Service for the installation(s) of SAP R/3 Release 4.6C identified below. Licensee acknowledges that Extended Maintenance Services shall end December 31, 2009, without further notice from SAP and Licensee shall use best efforts to migrate to a supported Release of the Software by this time. Following the termination of Extended Maintenance Services, Licensee may be eligible for SAP's then-current Customer Specific Maintenance program. Contact your SAP representative for further details on this offering. Extended Maintenance Services offered by SAP may be changed by SAP at any time upon three (3) months prior written notice. Extended Maintenance Services may be terminated by either party in writing at any time upon three (3) months' prior written notice and Licensee shall be entitled to a pro-rata refund of prepaid Extended Maintenance Services fees.

3. The Fee for the Extended Maintenance Services for the installations specified herein is [REDACTED]. This Fee does not include federal, state or local taxes and is in addition to the Maintenance Fees set forth in the Agreement. This Fee shall be invoiced upon execution and is payable quarterly. Payment is due thirty (30) days after date of invoice. In order to receive Extended Maintenance Service, Licensee must pay the Maintenance Fees for the Software licensed under and in accordance the Agreement (including SAP Remote connection fees) and comply with all SAP then-current CCC requirements.

4. SAP shall perform Extended Maintenance Services solely for the installation(s) specified below:

Customer Number	Installation Number	SAP R/3 Release	Installation Specific Extended Maintenance Termination Date
204319	820032863	4.6C	December 31, 2007
204319	820051754	4.6C	December 31, 2007

Note: SAP must be notified in writing of any changes related to the above information. Changes may result in an increase to the Maintenance Fee due for the Extended Maintenance Service referenced herein. Notice must be delivered in accordance with section 5 below. For each installation stated above, SAP will perform Extended Maintenance Services for both Productive Use and Non-Productive Use systems that are part of such installation(s).

5. For Software subject to Extended Maintenance Services to be installed on a specific Licensee or Affiliate Designated Unit within the Territory, Licensee shall provide SAP with written notice of the type/model, serial number and location of each Designated Unit. Such notice shall be sent to: SAP Contract Department, Attention: VP of Contracts, 3999 West Chester Pike, Newtown Square, PA 19073.

6. In the event Licensee desires to change the system landscape for either the Productive Use or Non-Productive Use system(s), Licensee shall notify SAP in advance to determine whether any such change will have any impact on delivery of Extended Maintenance Services. Further details on the existing scope and restrictions of Extended Maintenance are described at <http://service.sap.com/maintenance> -> SAP Maintenance Extension -> SAP R/3 Maintenance Extension -> Scope and Restrictions. Extended Maintenance Services is not available for the Software when used in conjunction with certain operating systems, databases, middleware and third party software, as some of these products may no longer be supported by their vendors. Licensee may be required to upgrade to supported versions of the aforementioned products in order to receive Extended Maintenance Service.

7. Extended Maintenance Service includes, support via telephone, remote support/update, SAP Remote connection (formerly known as SAP's Online Software Services (OSS)), the mySAP Services stated in Section 8 below, and may include Software correction packages and Legal Change Packages (subject to Section 6 above). Extended Maintenance Service does not include the delivery of Releases, Versions, or Correction Levels, or the adaptation of any Modifications or Extensions developed by or for Licensee to new Releases or Versions. In order to receive Extended Maintenance Service hereunder, Licensee must make all required remote support and update connections to each Designated Unit, at its expense, as requested by SAP.

EXTENDED MAINTENANCE SERVICE

8. mySAP Services: Provided Licensee is paying standard Maintenance Fees and the Extended Maintenance Fees, Licensee currently receives a choice of one (1) of the following services per live installation per year:

- A. One (1) remote SAP GoingLive™ Check for any new Software or other SAP application implementation;
- B. One (1) SAP GoingLive Functional Upgrade Check for an upgrade to a higher functional Release (e.g. from R/3 4.0 to 4.6); or
- C. One (1) SAP OS/DB Migration Check. This OS/DB Migration Check assists the Licensee in preparing for a migration of an operating system or database. Migration is the responsibility of the Licensee.

In addition to these options, and provided Licensee is paying standard Maintenance Fees and the Extended Maintenance Fees, Licensee is currently entitled to receive up to two (2) remote SAP EarlyWatch Checks for the continual optimization of Licensee's already live system.

To schedule a GoingLive Check, GoingLive Functional Upgrade Check, OS/DB Migration Check, or EarlyWatch Check, Licensee must contact SAP Active Global Support at 800-677-7271 or internationally at 610-661-7241 and choose option 6. To assist Licensee in this, SAP has established the following scheduling pre-requisites:

- A. The customer must provide remote access to its production system.
- B. To receive the GoingLive Check or GoingLive Functional Upgrade Check Licensee must inform SAP at least three (3) months prior to your go live or upgrade date.
- C. To receive the EarlyWatch Check, SAP requests a minimum of three (3) months advanced notification. In addition, Licensee must send the EarlyWatch Alert data to SAP on at least a monthly basis and cooperate with SAP in reviewing the data and determining the proper deployment of the EarlyWatch Check based on the EarlyWatch Alert data.
- D. To receive the OS/DB Migration Check, Licensee must comply with all of the then current pre-Check requirements. These requirements currently include hiring a certified OS/DB migration consultant, proper testing, installation of tools, and advance scheduling. Contact your local SAP Customer Support Representative for more information.

Further information and detail about individual SAP services can be found on the Service Marketplace via: [www.service.sap.com/support](http://www.service.sap.com/support).

Accepted by:

SAP America, Inc.  
(SAP)

By: 

Title: SVP & GM

Date: 9/29/2006

Accepted by:

CENTERPOINT ENERGY SERVICE COMPANY, LLC.  
(Licensee)

By: 

Title: Lead Sourcing Specialist

Date: 9/29/06

**Appendix 18**  
**effective September 29, 2008 ("Appendix")**  
**to**  
**SAP AMERICA, INC. ("SAP")**  
**R/3 SOFTWARE END-USER LICENSE AGREEMENT effective September 30, 1997 ("Agreement")**  
**with**  
**CENTERPOINT ENERGY SERVICE COMPANY, LLC ("Licensee")**

This Appendix is hereby annexed to and made a part of the Agreement specified above. In each instance in which provisions of this Appendix contradict or are inconsistent with the provisions of the Agreement, the provisions of this Appendix shall prevail and govern.

**1. NAMED USER DEFINITIONS:**

- 1.1 **"Limited Professional User"** is a Named User who is an employee of Licensee limited to: a) a manager whose access is limited solely to processing workflows, data lookup, and reporting; or b) a field worker whose access is limited solely to entering workflows and meter and time data. If any such Limited Professional User requires the Use of additional Software functionality, Licensee will be required to license such additional usage and pay all applicable additional license fees.

2. **LICENSED SOFTWARE:** The Software licensed to Licensee pursuant to this Appendix consists of the components identified below and specified as being licensed ("Software"). Only individuals licensed as Named Users hereunder are permitted to Use the SAP Software and third party Software licensed herein (including optional Software). Such Use shall be in accordance with their respective Named User type and in accordance with identified licensed Level. At SAP's request, Licensee shall deliver to SAP a report, as defined by SAP, evidencing Licensee's usage of the Software. SAP agrees that the initial request for such report will occur twenty-four (24) months following the effective date of the Agreement or twelve (12) months following the effective date of this Appendix, whichever occurs first, and will continue annually thereafter.

**2.1 mySAP BUSINESS SUITE:**

		Number of Named Users Licensed:			
<u>"X" if Licensed</u>		<u>Limited</u>			
		<u>Professional</u>	<u>Professional</u>	<u>Employee</u>	<u>Developer</u>
X	mySAP Business Suite <sup>(1)</sup>				

(1) Attached hereto is a Bill of Materials

**2.2 OPTIONAL CROSS INDUSTRY SOFTWARE LICENSED:**

<u>"X" if Licensed</u>	<u>Applicable mySAP Solution</u>	<u>Cross Industry Software</u>	<u>License Metric</u>	<u>Licensed Level</u>
X	mySAP ERP	Treasury and Risk Mgmt	Number of Users	
X		In-House Cash	Number of affiliates	
X		Learning Solution	Number of Learners	
X	mySAP SCM	Inventory Collaboration Hub <sup>(1)</sup>	Number of Enterprise Locations Number of Supply Chain Partner Locations	

- (1) Enterprise Location is a location, which is the final receiving point for an inventory shipment (Supplier Managed Inventory (SMI) scenario) or a sourcing location point the inventory is shipped from (responsive replenishment scenario). Supply Chain Partner Location is a location from which inventory is an originating point for an inventory shipment (vendor location in SMI scenario) or it is a location for which inventory is planned for (customer location in responsive replenishment scenario, i.e. a retailers distribution center or store).

**2.3 OPTIONAL INDUSTRY SPECIFIC SOFTWARE LICENSED:**

**Utilities Packages:**

"X" if Licensed	Industry Software	License Metric	Licensed Level
X	SAP Technical Asset Management for Utilities	Number of Points of Deliveries (PODs) (Ten Thousands) Number of Plant Units	[REDACTED]
X	SAP Resource and Supplier Management for Utilities	Annual Spend Volume (Millions) Number of Backends	Up to [REDACTED]
X	SAP Energy Data Management for Utilities	Number of Points of Deliveries (PODs) (Ten Thousands)	[REDACTED]
X	SAP Customer Relationship & Billing for Utilities	Number of Contracts (Ten Thousands)	[REDACTED]
X	SAP Customer Financial Management for Utilities	Number of Contract Accounts (Ten Thousands)	[REDACTED]
x	SAP Collaborative Services Management for Utilities	Number of Points of Deliveries (PODs) (Ten Thousands)	[REDACTED]

**2.4 OPTIONAL SUPPLEMENTARY SOFTWARE LICENSED:**

"X" if Licensed	Supplementary Products	License Metric	Licensed Level
X	SAP NetWeaver	Master Data Management <sup>(1)</sup> Number of Customer Objects Number of Supplier or Other Objects	[REDACTED]
X	mySAP ERP	SAP Test Data Migration Server Database size of Productive System (in gigabytes)	Up to [REDACTED]
X		Exchange Infrastructure (XI) Base Engine <sup>(1)</sup> Number of Gigabyte's per Month	Up to [REDACTED]
X		EDI Adapters Including Industry Specific Mappings (IV)  X Generic EDI by SEEBURGER	Number of Gigabyte's per Month Up to [REDACTED]
X	BI Accelerator	Number of Blades	4
X	SAP xApp	SAP xApp Resource and Portfolio Management (SAP xRPM) Annual Portfolio Budget	Up to [REDACTED]
X		SAP xApp Manufacturing Integration and Intelligence (SAP xMI) Number of Plants <sup>(2)</sup>	[REDACTED]

(1) Exchange Infrastructure Base Engine includes use of the following Standard Technical Protocol Adapters: SAP NetWeaver Adapter for IDOCs, RFCs, File/FTP, Http(s), SOAP, JMS, JDBC, Mail Protocols (pop,imap,smtp), SAP BC Protocol to connect Software, and to non-SAP applications. Additional types of adapters are available for additional license fees.

(2) A plant is defined as an organizational unit for dividing an enterprise according to production, procurement, maintenance or materials planning. A physical site owned or operated by an enterprise may be organized into one or more plants. A plant for xMI licensing purposes will correspond to each unique plant defined in Licensee's SAP system(s) that will be supported by the xMI application.



2.5 DATABASE INTERFACE:   X  

3. **LICENSE FEE AND PAYMENT:** The total Net License Fee to Licensee for the Software specified above is USD [REDACTED], which shall be invoiced on or before September 30, 2006, and which will be due and payable as follows:

USD [REDACTED] due on October 30, 2006

USD [REDACTED] due on March 30, 2007

4. **INSTALLATION:** For Software to be installed on a specific Licensee or Affiliate Designated Unit within the Territory, Licensee shall provide SAP with written notice of the type/model and serial number and location of each Designated Unit and the number of Users allocated to each such Designated Unit prior to such installation. A Designated Unit is an application server and not the terminals and personal computers directly or indirectly networked thereto. Such notice shall be in a form materially similar to Schedule 1 attached hereto and is to be sent to: SAP Contracts Department, Attention: Director of Contracts, 20 Perimeter Summit Blvd., 20<sup>th</sup> Floor, Atlanta, GA 30319 (fax: 404-943-2977).
5. **DELIVERY:** Delivery of the above-specified Software and Documentation is estimated to take place in September, 2006. Physical delivery will be free on board shipping point to the Licensee at the following location: 1111 Louisiana Street, Houston, TX 77251-4567.
6. **MAINTENANCE FEE AND PAYMENT:** Maintenance service offered by SAP is set forth in the Maintenance Schedule to the Agreement. Maintenance at the site(s) specified in the Maintenance Schedule to the Agreement shall commence as of the first day of the month following initial delivery of the Software.

The Maintenance Fee for the Software licensed under this Appendix is priced at the then current factor in effect ( [REDACTED] ) multiplied by the then current Net License Fee for the licensed Software. The current annual Maintenance Fee for the Software licensed under this Appendix is USD [REDACTED]. Maintenance Fees are subject to change once during a calendar year upon ninety (90) days notice to Licensee. SAP agrees however, increases in Maintenance Service Fees per calendar year (if any) for this Appendix shall not be [REDACTED].

Notwithstanding the foregoing, the Maintenance fees associated with the Software licensed herein will not increase before December 31, 2010.

Maintenance fees set forth above do not include federal, state or local taxes. Maintenance Fees are invoiced on an annual basis effective January 1 of a calendar year and payable Net 30 days from receipt of invoice. Any Maintenance Fees due prior to January 1 are invoiced on a pro-rata basis for the given calendar year in effect.

7. **THIRD-PARTY DATABASE:**

The Software licensed hereunder requires a third party database product which has either been integrated or pre-installed as part of the Software, or which must be installed to Use the Software. Third party database product functionality as integrated in the Software may differ from a non-integrated third party database product. Each third party database product is subject to its respective third party vendor License Agreement. This Agreement does not contain a license to use the integrated third party database product. Licensee has no right to use and are not licensed to use the copy of the third party database until Licensee has executed the Agreement, this Appendix and execute a third party database license agreement for the third party database. Upon request, Licensee shall provide to SAP the invoice number and/or license number and corresponding date for the third party database.

SAP makes no representations or warranties as to the terms of any license or the operation of any third-party database or other software obtained directly from a third party supplier by Licensee. Licensee is responsible for support and maintenance of the third-party database and other software licensed from a third party supplier, and SAP has no responsibility in this regard.

8. **SOFTWARE LICENSING OPTION:** Until March 1, 2007, Licensee shall have the right to license: Master Data Management in a quantity of [REDACTED], Technical Asset Management for Utilities in a quantity of [REDACTED], Deliveries (PODs), Energy Data Management for Utilities in a quantity of [REDACTED], Customer Relationship & Billing for Utilities in a quantity of [REDACTED], Customer Financial Management for Utilities in a quantity of 400,000 contract accounts, Collaborative Services Management for Utilities in a quantity of [REDACTED], and Generic EDI by Seeburger (EDI Adapters) in a quantity of 400 gigabytes per month for a total Net License Fee of USD [REDACTED]. After March 1, 2007, the Software shall be at SAP's then current list price less any applicable discount.

9. **NAMED USER/SOFTWARE EXCHANGE OPTION:** If Licensee exercises the option in Section 8 under this Appendix, then until December 31, 2010, Licensee shall have the option, once per calendar year, to exchange any number of the licensed Named Users and/or SAP Software for a credit of the List Price license fees for such licensed Named Users or SAP Software under this Appendix, to be applied towards the licensing of additional Named Users and/or SAP Software that have been delivered and licensed hereunder (excluding non-discountable and third party software and Third Party Database) as set forth in this Appendix based upon the Unit List Price(s) and List Price License Fee(s). In the event SAP Software, other than Named Users is exchanged, Software metric must be exchanged and Licensee shall discontinue Use of such exchanged Software. Upon written notice from Licensee regarding its exercising of such exchange option, SAP will issue an Amendment to this Appendix modifying the Named User count or Software metric. In the event such exchange results in additional Named Users or a Software metric beyond the total quantity of Named Users or Software metric licensed herein such that the total List Price of those Named Users or Software received exceeds the total List Price of the Named Users or SAP Software exchanged or requires the licensing of third-party software, then Licensee shall be responsible for all additional SAP Software and Named User License Fees (including third-party software fees). There shall be no refunds or credits based on such exchanges.
10. **PUBLICITY:** In consideration of the Software discount, Licensee agrees to participate in reference activities for the Software including but not limited to reference calls and stories, press testimonials (which have been previously approved by Licensee's public relations department personnel), site visits, and SAPHIRE participation at times mutually agreeable to the parties. SAP will make reasonable efforts to avoid having the reference services unreasonably interfere with Licensee's business.
11. **VALIDITY OF OFFER:** The validity of this Appendix will expire September 29, 2006, unless sooner executed by Licensee, or extended in writing by SAP.

Accepted by:

SAP America, Inc.  
(SAP)

By:

Title:

Date:

Accepted by:

CENTERPOINT ENERGY SERVICE COMPANY, LLC  
(Licensee)

By:

Title:

Date:

(Appendix 20 mySAP 08-08)

**Schedule 1 to Appendix 18 effective September 29, 2008**

**Designated Unit Information**

1. Name of Licensee or Subsidiary where Designated Unit is located: \_\_\_\_\_
2. Designated Unit(s) to be identified by Licensee to SAP in writing.
  - Type/Model No.: \_\_\_\_\_
  - Serial No.: \_\_\_\_\_
  - Location of Designated Unit: \_\_\_\_\_
  - \_\_\_\_\_
  - Telephone Number: \_\_\_\_\_
  - Software Delivery Contact Person: \_\_\_\_\_

3.

Hardware Information		Operating System		Database*	
Manufacturer	Model	Manufacturer	Release	Manufacturer	Release

\* Note: When Database is licensed from the vendor directly, insert P.O. Number \_\_\_\_\_, Invoice Number \_\_\_\_\_ and Date \_\_\_\_\_

\_\_\_\_\_  
Name Date

\_\_\_\_\_  
Title

\_\_\_\_\_  
(Licensee)

**Schedule A to Appendix 18 effective September 29, 2006**

**Company:** CenterPoint Energy Services Company, LLC

**mySAP BUSINESS SUITE BILL OF MATERIALS:** Attached to this Appendix 1 as Exhibit B is the mySAP Business Suite bill of materials effective as of the Effective date of this Appendix 1. This bill of materials is provided for informational purposes only. It is not a commitment that the listed functionality, in its current form, will be in future Releases and Versions of the Software. SAP may create additional functionality that it may license as a separate product for a separate fee at its sole discretion. For all Software licensed, separately by SAP, including but not limited to Optional Packages and Industry Specific Solutions, the parties agree to execute separate Appendices at mutually agreed upon pricing and terms.

**mySAP Customer Relationship Mgmt.**

**In the Named User fee the following application areas are included:**

## Marketing

- Marketing Planning
- Customer Segmentation
- Product Management
- Campaign Management
- Lead Management
- Marketing Analytics
- Personalization

## Field Service

- Mobile Service
  - Mobile Service for Handheld
- Field Sales**
- Mobile Sales
  - Mobile Sales for Handheld

## E-Commerce

- E-Selling (Internet Sales) including Internet Pricing & Configuration
- E-Service
- E-Marketing
- Web Analytics

## Sales

- Sales Planning & Forecasting
- Organization & Territory Management
- Account & Contact Management
- Task & Activity Management
- Opportunity Management
- Contract Management
- Quotation & Order Management
- Sales Analytics

## Service

- Service Planning & Forecasting
- Customer Service & Support
- Service Operations Management
- Service Analytics

## CRM Analytics

- Customer Behavior Optimization
- Customer Profitability Optimization
- Product & Pricing Optimization

## Channel Management

- Channel Marketing
- Channel Sales
- Channel Service
- Channel Commerce
- Partner Management & Analytics

## Interaction Center

- Sales
- Service
- Marketing
- Analytics

### **mySAP ERP, Financials**

In the Named User fee the following application areas are included:

- | Strategic Management                                                                                                                                                                                                                       | Enterprise | Accounting                                                                                                                                                                                                                                       | Corporate Services                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Stakeholder Relationship Management</li> <li>• Strategy Management</li> <li>• Performance Measurement</li> <li>• Strategic Planning &amp; Simulation</li> <li>• Business Consolidation</li> </ul> |            | <ul style="list-style-type: none"> <li>• Financial Statements</li> <li>• General Ledger/Subledgers</li> <li>• Revenue &amp; Cost Accounting</li> <li>• Order &amp; Project Planning</li> <li>• Product &amp; Service Cost Calculation</li> </ul> | <ul style="list-style-type: none"> <li>• Real Estate Management (for corporate use only)</li> <li>• Travel Management</li> </ul> |
| <p><b>Business Analytics</b></p> <ul style="list-style-type: none"> <li>• Financial Analytics</li> </ul>                                                                                                                                   |            | <p><b>Self Service</b></p> <ul style="list-style-type: none"> <li>• Financial Manager Self Service</li> </ul>                                                                                                                                    |                                                                                                                                  |

### **mySAP ERP Human Resources**

In the Named User fee the following application areas are included:

- | Transaction Management                                                                                                                                                                                   | Lifecycle Management                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Personnel Administration</li> <li>• Time Management</li> <li>• CATS</li> <li>• Legal &amp; Compliance Reporting</li> <li>• Organizational Management</li> </ul> | <ul style="list-style-type: none"> <li>• Recruiting</li> <li>• Personnel Cost Planning</li> <li>• Compensation Management</li> <li>• Training &amp; Event Management</li> <li>• Personnel Development</li> <li>• Performance Measurement</li> <li>• Management by Objectives</li> </ul> |
| <p><b>Self-Services</b></p> <ul style="list-style-type: none"> <li>• HR Employee Self Service</li> <li>• Expert Finder</li> <li>• HR Manager Self Service</li> <li>• HR Mobile Business</li> </ul>       | <p><b>Analytics</b></p> <ul style="list-style-type: none"> <li>• KPI Reporting</li> <li>• Balanced Scorecard</li> </ul>                                                                                                                                                                 |

### **mySAP Supplier Relationship Management**

In the Named User fee the following application areas are included:

- | Purchasing                                                                                                                                                                                          |                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Self-Service Procurement</li> <li>• Plan Driven Procurement</li> <li>• Purchase Requisitions &amp; Orders</li> <li>• Catalog Content Management</li> </ul> | <ul style="list-style-type: none"> <li>• Service Procurement for Consulting &amp; Temporary Labor</li> <li>• Purchasing Controlling</li> </ul> |

**mySAP Supply Chain Management**

In the Named User fee the following application areas are included:

**Supply Chain Planning**

- Flexible Planning
- Distribution Planning
- Production Planning
- Transportation Planning

**Collaborative Supply Chain Networking**

**Supply Chain Execution**

- Materials Management & Purchasing
- Manufacturing
- Order Promising & Delivery
- Warehouse Management
- Transportation Execution
- Foreign Trade / Legal Services

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**mySAP Product Lifecycle Management**

In the Named User fee the following application areas are included:

**Product-Life-Cycle-Data Management**

- Document Management & SAP Easy Document Management
- Product Structure Management
- Change & Configuration Management
- Design Collaboration (cFolders)

**Enterprise Asset Management**

- Technical Assets Management
- Preventive & Predictive Maintenance
- Maintenance Execution
- Mobile Assets Management
- Asset Service Management
- Maintenance KPI's & Cost Analytics

**Quality Management**

- Audit Management
- Quality Engineering
- Quality Control
- Quality Improvement

**Program & Project Management**

- Program Planning
  - Project Execution
  - Interfaces
  - Program Management
  - Collaborative Project Management (cProjects)
  - Project Information Systems
-

### **SAP Net Weaver - Business Intelligence**

In the Named User fee the following application areas are included:

#### **Business Information Warehouse**

- Business Intelligence Suite (Business Explorer: BEX)
  - BEX Browser
  - BEX Query Designer (Web or Client Side)
  - BEX Analyzer
  - BEX Web-Application Designer (any device PC or Mobile)
  - BEX Web-Reporting
  - View Publishing & Portal/Unifier Integration (Drag & Relate)
  - Functional Support (Alerting, Geographical Analysis, Tabular Reports, Report templates, Slice & Dice Analysis, Report Distribution, Reporting & Analysis)

#### **Data Warehousing**

- Extraction, Transformation and Loading
- Data Flow Modeling
- Transformation Toolbox
- Data Aging (Archiving, Near-line Storage)
- Data/Business Modeling (For Multi-dimensional and Relational data)
- Document Integration
- Warehouse Management (Metadata Repository, Administration, Scheduling and Automation)

#### **Business Intelligence Platform**

- OLAP Engine
- Data Mining (Behavior & Value Modeling)
- Intelligent Agent (Alerting, Conditions)

#### **Business Content (Cross Industry, Solution and Data Source)**

- Extractors (DataSources, InfoSources)
- Data Models (InfoCubes, Operational Data Store Objects, Persistent Staging Area)
- Queries and Reports
- MetaData (InfoObjects, Attributes)
- Analytical Applications

#### **Planning**

- Modeling
- Planning Framework
- Process Coordination

---

### **SAP NetWeaver - Enterprise Portal**

In the Named User fee the following application areas are included:

#### **Portal Platform**

- User and role management
- Application Integration
- Single Sign On

- Drag & relate from and to mySAP solutions
- 

#### **Knowledge Management**

- Content Management
- Retrieval & Classification

### **Net Weaver Technology**

#### **Exchange Infrastructure**

- WebAS
- XI connector

#### **XI Integration Adapters**

- SAP SOAP      SAP HTTP
- SAP JMS      SAP IDOCs
- SAP File/FTP      SAP RFCs
- Mail Protocols (pop,imap, smtp)
- SAP JDBC      SAP BC Protocol

Appendix 19  
effective September 29, 2006 ("Appendix")  
to  
SAP AMERICA, INC. ("SAP")  
R/3 SOFTWARE END-USER LICENSE AGREEMENT effective September 30, 1997 ("Agreement")  
with  
CENTERPOINT ENERGY SERVICE COMPANY, LLC ("Licensee")

This Appendix is hereby annexed to and made a part of the Agreement specified above. The following Articles and Provisions of the Agreement are specifically incorporated herein by reference: 1 (Definitions), 2 (License Grant), 4 (Price and Payment), 5 (Term and Termination), 6.1 (SAP Proprietary Information), 6.2 (Protection of Proprietary Information), 7.4 (Express Disclaimer), 10 (Limitations of Liability), 11 (Assignment) and 13 (General Provisions). Unless stated otherwise herein, all other provisions of the Agreement are specifically excluded with respect to this Appendix. In each instance in which provisions of this Appendix contradict or are inconsistent with the incorporated provisions of the Agreement, the provisions of this Appendix shall prevail and govern.

1. **LICENSE GRANT:**

1.1 Software licensed by Licensee from SAP hereunder ("RWD software") is as follows:

SAP Productivity Pak by RWD and SAP Productivity Pak Help Launchpad by RWD

	<b><u>LICENSED:</u></b>	
	<b><u>NUMBER of LICENSED SAP USERS</u></b>	
	<b><u>Professional and</u></b>	<b><u>Employee Users</u></b>
	<b><u>Limited Professional Users</u></b>	
SAP Productivity Pak by RWD	<b>[REDACTED]</b>	<b>[REDACTED]</b>
SAP Productivity Pak Help Launchpad by RWD	<b>[REDACTED]</b>	<b>[REDACTED]</b>

DATABASE INTERFACE:   X  

2. **LICENSE FEE AND PAYMENT:** The Net License Fee to Licensee for the RWD software licensed in Item 1 above is USD **[REDACTED]** which shall be invoiced on or before September 30, 2006, and which will be due and payable as follows:

USD **[REDACTED]** due on October 30, 2006

USD **[REDACTED]** due on March 30, 2007

In the event Licensee exceeds the License Grant specified herein, and/or Licensee desires to expand the License Grant specified herein to include additional Affiliates, divisions or business units not identified herein Licensee agrees to provide written notice to SAP. SAP reserves the right to modify the Agreement to reflect such increase in the License Grant, recalculate the Net License Fee and Maintenance Fee accordingly and invoice Licensee for such increased license and maintenance fees based on SAP's then current pricing in effect, subject to any applicable discounts, if any.

Upon SAP's reasonable request, Licensee shall deliver to SAP a report, as defined by SAP, evidencing Licensee's usage of the RWD software licensed under this Agreement.

3. **INSTALLATION:** For the RWD software to be installed at a specific Licensee and/or Affiliate site within the Territory, Licensee shall provide SAP with written notice of the type/model and serial number and location of each Designated Unit and the number of Users, licensed in Item 1, allocated to each such Designated Unit prior to such installation. A Designated Unit is an application server and not the terminals and personal computers directly or indirectly networked thereto. Such notice shall be sent to: SAP Contracts Department, Attention: Director of Contracts, 20 Perimeter Summit Blvd., 20<sup>th</sup> Floor, Atlanta, GA 30319 (fax: 404-943-2977). Licensee shall be responsible for installation of the RWD software.

4. **DELIVERY:** Delivery of the above-specified RWD software is by download only through the SAP Service Marketplace website and estimated to be available to Licensee through the website on September, 2006. Initial delivery of the above specified Software will be to the following location: 1111 Louisiana Street, Houston, TX 77251-4567.

5. **MAINTENANCE FEE AND PAYMENT:**

5.1 To the degree RWD makes such maintenance services generally available to SAP, Licensee may request and SAP shall provide maintenance service ("Maintenance") with respect to the RWD software, so long as Licensee is subscribing for and paying for Maintenance. Maintenance currently includes the delivery of releases and versions of the RWD software made available to SAP, support via telephone, coordination of defect correction with RWD, and SAP's Online Software Services. Maintenance, from SAP, for the RWD software licensed hereunder is limited to the United States sites previously identified in the

**SAP CONFIDENTIAL & SUBJECT TO NON-DISCLOSURE**



Agreement and related Appendices. Notwithstanding anything to the contrary in the Agreement, Licensee acknowledges RWD's standard hours of maintenance service are Monday through Friday, 8:30 a.m. to 5:30 p.m., eastern standard time, except for holidays as observed by RWD; further, Licensee acknowledges that for each release, RWD will offer maintenance services through SAP only for the most recent version and the version immediately prior thereto. After a new release becomes commercially available, RWD will provide maintenance services through SAP only for such new release and, until a new version of the new release becomes available, for the latest version of the prior release. In order to receive Maintenance hereunder, Licensee must make all required remote support connections to each Designated Unit, at its expense, as requested by SAP.

Licensee shall appoint no more than 5 individuals who are knowledgeable in the operation of the RWD software to serve as primary contacts in the event that Licensee needs to contact RWD for support. The identification and number of Key Users will be specified in Schedule 1 to this Appendix. All of Licensee's support inquiries shall be initiated solely through these Key Users. Licensee shall have the right to appoint substitute individuals to serve as Key Users provided the names of the new individuals and the individuals being substituted are communicated to SAP in writing. Licensee shall have the right to appoint additional individuals to serve as Key Users upon mutual agreement of the Licensee and SAP.

5.2 Maintenance at such United States site(s) shall commence October, 2006. Maintenance Fees for the software licensed under this Appendix, for the total number of Users specified above, is USD [REDACTED] of USD [REDACTED] per year. Maintenance fees are subject to change upon ninety (90) days notice to Licensee. Maintenance fees set forth above do not include federal, state or local taxes. Maintenance Fees are invoiced on an annual basis effective January 1 of a calendar year and payable Net thirty (30) days from date of invoice. Any Maintenance Fees due prior to January 1 are invoiced on a pro-rata basis for the given calendar year in effect.

5.3 In the event Licensee elects not to commence Maintenance upon the first day of the month following initial delivery of the RWD software, or Maintenance is otherwise declined for some period of time, and is subsequently requested or reinstated, SAP will invoice Licensee the accrued maintenance service fees associated with such time period.

6. **LIMITATION OF LIABILITY:** In no event shall, SAP's total liability for damages of any kind or nature in any way arising from or related to the RWD software licensed hereunder exceed an amount equal to the Net License Fee identified in Item 2 hereof.

7. **THIRD-PARTY DATABASE:**

The software licensed hereunder requires a third party database product which has either been integrated or pre-installed as part of the software, or which must be installed to use the software. Third party database product functionality as integrated in the software may differ from a non-integrated third party database product. Each third party database product is subject to its respective third party vendor License Agreement. This Agreement does not contain a license to use the integrated third party database product. Licensee has no right to use and are not licensed to use the copy of the third party database until Licensee has executed the Agreement, this Appendix and execute a third party database license agreement for the third party database. Upon request, Licensee shall provide to SAP the invoice number and/or license number and corresponding date for the third party database.

SAP makes no representations or warranties as to the terms of any license or the operation of any third-party database obtained directly from a third party supplier by Licensee. Licensee is responsible for support and maintenance of the third-party database licensed from a third party supplier, and SAP has no responsibility in this regard.

8. **VALIDITY OF OFFER:** The validity of this Appendix will expire September 29, 2006, unless sooner executed by Licensee, or extended in writing by SAP.

Accepted by:

SAP America, Inc.  
SAP

By: [Signature]

Title: SAP 3 GM

Date: 9/29/2006

Accepted by:

CENTERPOINT ENERGY SERVICE COMPANY, LLC  
Licensee

By: [Signature]

Title: Lead Sourcing Specialist

Date: 9/29/06

**Schedule 1**  
**to Appendix 19 effective September 29, 2006**

**Software and User Allocation**

*Licensee -- please assist with inserting this information*

**Contact Data**

Customer Name: <b>CENTERPOINT ENERGY</b>	
*Shipping Address: <b>1111 LOUISIANA ST.</b>	
City/State/Zip: <b>HOUSTON, TX 77002</b>	
Contact Name: <b>SAREPTA RIDGEWAY</b>	
Contact Phone Number: <b>713 207-6395</b>	Contact Fax Number: <b>713 207-9032</b>
Contact E-Mail Address: <b>Sarepta.ridgeway@centerpointenergy.com</b>	

\* Shipping address must be a street address, PO Box is not sufficient.

**Products Licensed:**

	NUMBER of LICENSED SAP Professional and Limited Professional USERS	NUMBER of LICENSED SAP Employee USERS
SAP Productivity Pak by RWD		
SAP Productivity Pak Help		
Launchpad by RWD		

Account Executive Name: <b>BRIAN JONES</b>		Phone No.: <b>991 8726-0338</b>	
Date Form Completed: <b>9/29/2006</b>		Fax No.: <b></b>	
Contract Start Date: <b>9/29/2006</b>		Maint. Start Date: <b>10/1/2006</b>	
		Maint Fee: <b></b>	

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