Appendix 5.1C
Dispersion Modeling Data and Climate Information

APPENDIX 5.1C

Dispersion Modeling and Climate Information

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Rice Solar Energy Project
Table 5.1C-1
Salt Commissioning Source Parameters for ISCST3/SCREEN3 Input
October 2009

Point Sources

Source Name	Activity Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
STACK1	Salt Melting	702320	3771231	243.8	9.14	630	14.8	0.61
STACK2	Salt Heating	702330	3771229	243.8	15.2	630	9.56	0.46
STACK3	Salt Conditioning	702386	3771268	243.8	15.2	322	15.2	0.34

Area Sources

Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Length (m)	Width (m)	Angle from North
PILES	702312	3771093	242.9	1	200	200	0

Volume Sources

Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)
HELV1	702017	3772583	277.8	4.6	46.51	2.13
HELV2	702417	3772583	276.9	4.6	46.51	2.13
HELV3	702817	3772583	275.9	4.6	46.51	2.13
HELV4	701817	3772383	274	4.6	46.51	2.13
HELV5	702217	3772383	272.8	4.6	46.51	2.13
HELV6	702617	3772383	271.1	4.6	46.51	2.13
HELV7	703017	3772383	270.1	4.6	46.51	2.13
HELV8	701617	3772183	269.5	4.6	46.51	2.13
HELV9	702017	3772183	268.4	4.6	46.51	2.13
HELV10	702417	3772183	267	4.6	46.51	2.13
HELV11	702817	3772183	266.5	4.6	46.51	2.13
HELV12	703217	3772183	265.7	4.6	46.51	2.13
HELV13	701417	3771983	264.7	4.6	46.51	2.13
HELV14	701817	3771983	264.7	4.6	46.51	2.13
HELV15	702217	3771983	263.9	4.6	46.51	2.13
HELV16	702617	3771983	262.8	4.6	46.51	2.13
HELV17	703017	3771983	260.8	4.6	46.51	2.13
HELV18	703417	3771983	261.1	4.6	46.51	2.13
HELV19	701617	3771783	260.1	4.6	46.51	2.13
HELV20	702017	3771783	260	4.6	46.51	2.13
HELV21	702417	3771783	259.3	4.6	46.51	2.13
HELV22	702817	3771783	257	4.6	46.51	2.13
HELV23	703217	3771783	256.5	4.6	46.51	2.13
HELV24	701417	3771583	256.4	4.6	46.51	2.13
HELV25	701817	3771583	255.5	4.6	46.51	2.13
HELV26	702217	3771583	254.9	4.6	46.51	2.13
HELV27	702617	3771583	253.4	4.6	46.51	2.13
HELV28	703017	3771583	250.4	4.6	46.51	2.13
HELV29	703417	3771583	252.1	4.6	46.51	2.13

Volume Sources

Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)
HELV30	701217	3771383	252.7	4.6	46.51	2.13
HELV31	701617	3771383	250.9	4.6	46.51	2.13
HELV32	702017	3771383	249.7	4.6	46.51	2.13
HELV33	702417	3771383	249.1	4.6	46.51	2.13
HELV34	702817	3771383	248.8	4.6	46.51	2.13
HELV35	703217	3771383	247.8	4.6	46.51	2.13
HELV36	703617	3771383	247.8	4.6	46.51	2.13
HELV37	701417	3771183	247.5	4.6	46.51	2.13
HELV38	701817	3771183	246.8	4.6	46.51	2.13
HELV39	702217	3771183	246	4.6	46.51	2.13
HELV40	702617	3771183	245.2	4.6	46.51	2.13
HELV41	703017	3771183	244.2	4.6	46.51	2.13
HELV42	703417	3771183	244.1	4.6	46.51	2.13
HELV43	701617	3770983	243.3	4.6	46.51	2.13
HELV44	702017	3770983	242	4.6	46.51	2.13
HELV45	702417	3770983	241.5	4.6	46.51	2.13
HELV46	702817	3770983	241.4	4.6	46.51	2.13
HELV47	703217	3770983	241.1	4.6	46.51	2.13
HELV48	701417	3770783	239.7	4.6	46.51	2.13
HELV49	701817	3770783	239	4.6	46.51	2.13
HELV50	702217	3770783	237	4.6	46.51	2.13
HELV51	702617	3770783	238.7	4.6	46.51	2.13
HELV52	703017	3770783	237.8	4.6	46.51	2.13
HELV53	703417	3770783	237.1	4.6	46.51	2.13
HELV54	701617	3770583	235.1	4.6	46.51	2.13
HELV55	702017	3770583	235	4.6	46.51	2.13
HELV56	702417	3770583	235	4.6	46.51	2.13
HELV57	702817	3770583	234.2	4.6	46.51	2.13
HELV58	703217	3770583	234.2	4.6	46.51	2.13
HELV59	701817	3770383	232.3	4.6	46.51	2.13
HELV60	702217	3770383	231.4	4.6	46.51	2.13
HELV61	702617	3770383	231.4	4.6	46.51	2.13
HELV62	703017	3770383	232	4.6	46.51	2.13
HELV63	702417	3770183	229.8	4.6	46.51	2.13
CREW1	702186	3772874	284.5	2.4384	39.1	1.11
CREW2	702354	3772874	283.4	2.4384	39.1	1.11
CREW3	702522	3772874	282.8	2.4384	39.1	1.11
CREW4	702681	3772874	282.4	2.4384	39.1	1.11
LAY1	701633	3772856	284.9	2.4384	23.25	1.11
LAY2	701733	3772856	284.9	2.4384	23.25	1.11
LAY3	701633	3772756	282.4	2.4384	23.25	1.11
LAY4	701733	3772756	282.4	2.4384	23.25	1.11

Rice Solar Energy Project
Table 5.1C-2
Salt Commissioning Modeling Parameters - Emission Rates
October 2009

Emission Rates for 1-hr, 3-hr, 8-hr, and 24-hr Modeling

Source ID	1-hr NO_2		1-hr CO		8-hr CO		1-hr SO_2		3-hr SO_2		24-hr SO_2		24-hr PM_{10}		24-hr $PM_{2.5}$	
	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
STACK1	7.38E-02	5.86E-01	7.10E-01	5.64E+00	7.10E-01	5.64E+00	1.42E-01	1.13E+00	1.42E-01	1.13E+00	1.42E-01	1.13E+00	6.63E-02	5.26E-01	6.63E-02	5.26E-01
STACK2	2.69E-02	2.13E-01	2.58E-01	2.05E+00	2.58E-01	2.05E+00	5.16E-02	4.10E-01	5.16E-02	4.10E-01	5.16E-02	4.10E-01	2.41E-02	1.91E-01	2.41E-02	1.91E-01
STACK3	1.37E+00	1.09E+01	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PILES	-	-	-	-	-	-	-	-	-	-	-	-	5.53E-02	4.39E-01	1.15E-02	9.13E-02
HELV1-63	4.27E-02	3.39E-01	2.53E-02	2.01E-01	2.53E-02	2.01E-01	5.50E-05	4.36E-04	5.50E-05	4.36E-04	1.53E-05	1.21E-04	1.53E-02	1.21E-01	1.75E-03	1.39E-02
CREW1-4	5.17E-02	4.11E-01	2.19E-02	1.74E-01	2.19E-02	1.74E-01	1.33E-04	1.06E-03	1.33E-04	1.06E-03	1.82E-04	1.44E-03	3.47E-03	2.75E-02	3.09E-03	2.45E-02
LAY1-4	4.28E-02	3.40E-01	1.95E-02	1.55E-01	1.95E-02	1.55E-01	8.84E-05	7.01E-04	8.84E-05	7.01E-04	7.76E-05	6.16E-04	1.66E-03	1.32E-02	1.48E-03	1.17E-02

The maximum predicted monthly NOx, SOx, and CO emissions during the overlap of construction and commissioning activities would occur during month 18. The maximum predicted overlap of monthly PM10, and PM2.5 emissions would occur during month 19.

The modeled 1-, 3-, and 8-hour emission rates for the on-site construction sources were calculated by multiplying the number of equipment by the hourly equipment emission factor for the month with the highest monthly emissions for the total construction project. For example, the 1-hour CREW1-4 NOx value represents (3-173 HP engine operating in month 18 * 0.55 lb/hr NOx emission rate / 4 modeled volume sources = 0.41 lb/hr per source) The on-site truck trips were calculated by dividing the daily truck emissions during the maximum month by 8 hours per day.

The modeled 24-hour emission rates for the on-site construction equipment sources were calculated by dividing the equipment maximum monthly emissions by the number of work days per month divided by the number of hours per day. For example, the 24-hour CREW1-4 PM10 value represents (79.3 lb/month in month 19 / 30 days/month / 24 hours/day / 4 modeled volume sources = 0.0275 lb/hr). The on-site truck trips were calculated based on the daily emissions during the month with the overall maximum emissions.

CREW1-4 represents the maximum monthly emissions from the construction trailer living area generators (i.e., the 98 hp generators) divided by the four volume sources.

LAY1-4 represents the maximum monthly emissions from the construction trailer generators (i.e., the 173 hp and 2-25 hp generators) divided by the four volume sources.

HELV1-63 reflects the maximum monthly emissions from the remaining combustion sources used to install the power block and heliostat field, including onsite construction and vehicle sources and

PILES reflects the maximum monthly emissions from the material stock piles.

Rice Solar Energy Project
Table 5.1C-3
Salt Commissioning Modeling Results Summary
October 2009

Source	NO_2 (µg/m^3)	CO (µg/m^3)		SO_2 (µg/m^3)			PM_{10} (µg/m^3)	$PM_{2.5}$ (µg/m^3)
	1-hr	1-hr	8-hr	1-hr	3-hr	24-hr	24-hr	24-hr
All	307	217	152	32	29	13	23.2	8.0
Stack 1	12	117	82	23	21	9.3	4.4	4.4
Stack 2	4.5	43	30	8.6	8	3.5	1.6	1.6
Stack 3	124	-	-	-	-	-	-	-
Piles	-	-	-	-	-	-	6.4	1.3
Helio	133	79	55	0.17	0.15	0.019	19	2.2
Crew	165	70	49	0.43	0.38	0.23	4.4	3.9
Laydown	217	99	69	0.45	0.40	0.16	3.4	3.0

Rice Solar Energy Project
Table 5.1C-4
Stack Parameters for ISCST3/SCREEN3 Input
October 2009

Point Sources

Source Name	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Stack Height (m)	Temperature (K)	Exit Velocity (m/s)	Stack Diameter (m)
STACK4	Backup Generator 1	702342	3771116	243.8	6.10	768	30.8	0.61
STACK5	Backup Generator 2	702338	3771111	243.8	6.10	768	30.8	0.61
STACK6	Firewater Engine 1	702439	3771178	243.8	4.27	729	54.6	0.20
STACK7	Firewater Engine 2	702515	3771161	243.8	4.27	729	54.6	0.20
WSAC1	WSAC1	702314	3771160	243.8	3.86	293	7.19	2.88
WSAC2	WSAC2	702316	3771160	243.8	3.86	293	7.19	2.88
WSAC3	WSAC3	702319	3771160	243.8	3.86	293	7.19	2.88
WSAC4	WSAC4	702322	3771160	243.8	3.86	293	7.19	2.88

Rice Solar Energy Project
Table 5.1C-5
Building Parameters for ISCST3/SCREEN3 Input
October 2009

Building Name	Number of Tiers	Tier Number	Base Elevation (m)	Tier Height (m)	Number of Corners	Corner 1 East (X) (m)	Corner 1 North (Y) (m)	Corner 2 East (X) (m)	Corner 2 North (Y) (m)	Corner 3 East (X) (m)	Corner 3 North (Y) (m)	Corner 4 East (X) (m)	Corner 4 North (Y) (m)	Corner 5 East (X) (m)	Corner 5 North (Y) (m)	Corner 6 East (X) (m)	Corner 6 North (Y) (m)
STMGEN	1	1	243.8	45.7	6	702384	3771267	702443	3771267	702432	3771254.99	702431.86	3771224.65	702394.69	3771224.65	702394.69	3771254.99
ACC	1	1	243.8	34.1	4	702410	3771153	702479	3771153	702479	3771101.08	702409.918	3771101.08				
WTREAT	1	1	243.8	9.1	4	702471	3771182	702508	3771182	702508	3771163.69	702470.924	3771163.69				
CONTROL	1	1	243.8	4.0	4	702312	3771216	702331	3771216	702331	3771187.47	702311.508	3771187.47				
ELEC	1	1	243.8	4.0	4	702382	3771159	702393	3771159	702393	3771130.62	702382.309	3771130.62				
WSACB	1	1	243.8	3.9	4	702313	3771155	702313	3771165	702323	3771164.74	702323.066	3771155				

Tank Name	Base Elevation (m)	Center East (X) (m)	Center North (Y) (m)	Tank Height (m)	Tank Diameter (m)
HOTSALT	243.8	702360	3771243	19.7	50.9
COLDSALT	243.8	702463	3771243	19.4	48.5
DEMIN	243.8	702460	3771173	7.6	16.5
RAWH2O	243.8	702500	3771146	7.6	24.4
RECEIV	243.8	702413	3771193	192	35.1

Rice Solar Energy Project
Table 5.1C-6
Operational Modeling Parameters - Emission Rates
October 2009

Emission Rates for 1-hr, 3-hr, 8-hr, and 24-hr Modeling

Source ID	1-hr NO_2		1-hr CO		8-hr CO		1-hr SO_2		3-hr SO_2		24-hr SO_2		24-hr PM_{10}		24-hr $PM_{2.5}$	
	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
STACK4	2.53E+00	2.01E+01	2.05E-01	1.63E+00	2.57E-02	2.04E-01	2.31E-03	1.83E-02	7.70E-04	6.11E-03	9.62E-05	7.64E-04	7.51E-04	5.96E-03	7.51E-04	5.96E-03
STACK5	2.53E+00	2.01E+01	2.05E-01	1.63E+00	2.57E-02	2.04E-01	2.31E-03	1.83E-02	7.70E-04	6.11E-03	9.62E-05	7.64E-04	7.51E-04	5.96E-03	7.51E-04	5.96E-03
STACK6	2.40E-01	1.91E+00	4.66E-02	3.70E-01	5.83E-03	4.63E-02	4.18E-04	3.32E-03	1.39E-04	1.11E-03	1.74E-05	1.38E-04	3.68E-04	2.92E-03	3.68E-04	2.92E-03
STACK7	2.40E-01	1.91E+00	4.66E-02	3.70E-01	5.83E-03	4.63E-02	4.18E-04	3.32E-03	1.39E-04	1.11E-03	1.74E-05	1.38E-04	3.68E-04	2.92E-03	3.68E-04	2.92E-03
WSAC1	-	-	-	-	-	-	-	-	-	-	-	-	4.77E-03	3.79E-02	4.77E-03	3.79E-02
WSAC2	-	-	-	-	-	-	-	-	-	-	-	-	4.77E-03	3.79E-02	4.77E-03	3.79E-02
WSAC3	-	-	-	-	-	-	-	-	-	-	-	-	4.77E-03	3.79E-02	4.77E-03	3.79E-02
WSAC4	-	-	-	-	-	-	-	-	-	-	-	-	4.77E-03	3.79E-02	4.77E-03	3.79E-02

Emission Rates for Annual Modeling

Source ID	Annual NO_2		Annual SO_2		Annual PM_{10}		Annual $PM_{2.5}$	
	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)
STACK4	1.50E-02	5.22E-01	1.37E-05	4.76E-04	1.07E-04	3.72E-03	1.07E-04	3.72E-03
STACK5	1.50E-02	5.22E-01	1.37E-05	4.76E-04	1.07E-04	3.72E-03	1.07E-04	3.72E-03
STACK6	1.42E-03	4.95E-02	2.48E-06	8.63E-05	5.24E-05	1.82E-03	5.24E-05	1.82E-03
STACK7	1.42E-03	4.95E-02	2.48E-06	8.63E-05	5.24E-05	1.82E-03	5.24E-05	1.82E-03
WSAC1	-	-	-	-	2.40E-03	8.33E-02	2.40E-03	8.33E-02
WSAC2	-	-	-	-	2.40E-03	8.33E-02	2.40E-03	8.33E-02
WSAC3	-	-	-	-	2.40E-03	8.33E-02	2.40E-03	8.33E-02
WSAC4	-	-	-	-	2.40E-03	8.33E-02	2.40E-03	8.33E-02

Rice Solar Energy Project
Table 5.1C-7
Operational Modeling Results Summary
October 2009

Source	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)				PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	Annual	24-hr	Annual	24-hr	Annual
ALL	-	0.27	-	4.5	-	0.17	0.0093	2.66E-04	1.1	0.10	1.1	0.10
GEN1	309	-	30	-	0.32	-	-	-	-	-	-	-
GEN2	311	-	31	-	0.32	-	-	-	-	-	-	-
STACK4	261	0.12	21	1.9	0.24	0.071	0.0039	1.12E-04	0.031	8.82E-04	0.03	8.82E-04
STACK5	263	0.13	21	1.9	0.24	0.072	0.0040	1.14E-04	0.031	8.92E-04	0.03	8.92E-04
STACK6	29	0.014	5.7	0.50	0.051	0.015	0.0008	2.40E-05	0.018	5.12E-04	0.02	5.12E-04
STACK7	37	0.018	7.2	0.63	0.065	0.020	0.0011	3.12E-05	0.023	6.50E-04	0.02	6.50E-04
WSAC	-	-	-	-	-	-	-	-	0.99	9.92E-02	0.99	9.92E-02

*GEN1 refers all equipment except backup generator 2 (STACK5), GEN2 refers to all equipment except backup generator 1 (STACK4).

Rice Solar Energy Project
Table 5.1C-8
Construction Source Parameters for ISCST3/SCREEN3 Input
October 2009

Area Sources

Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Length (m)	Width (m)	Angle from North
PILES	702312	3771093	242.9	1	200	200	0

Volume Sources

Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)
HELV1	702017	3772583	277.8	4.6	46.51	2.13
HELV2	702417	3772583	276.9	4.6	46.51	2.13
HELV3	702817	3772583	275.9	4.6	46.51	2.13
HELV4	701817	3772383	274	4.6	46.51	2.13
HELV5	702217	3772383	272.8	4.6	46.51	2.13
HELV6	702617	3772383	271.1	4.6	46.51	2.13
HELV7	703017	3772383	270.1	4.6	46.51	2.13
HELV8	701617	3772183	269.5	4.6	46.51	2.13
HELV9	702017	3772183	268.4	4.6	46.51	2.13
HELV10	702417	3772183	267	4.6	46.51	2.13
HELV11	702817	3772183	266.5	4.6	46.51	2.13
HELV12	703217	3772183	265.7	4.6	46.51	2.13
HELV13	701417	3771983	264.7	4.6	46.51	2.13
HELV14	701817	3771983	264.7	4.6	46.51	2.13
HELV15	702217	3771983	263.9	4.6	46.51	2.13
HELV16	702617	3771983	262.8	4.6	46.51	2.13
HELV17	703017	3771983	260.8	4.6	46.51	2.13
HELV18	703417	3771983	261.1	4.6	46.51	2.13
HELV19	701617	3771783	260.1	4.6	46.51	2.13
HELV20	702017	3771783	260	4.6	46.51	2.13
HELV21	702417	3771783	259.3	4.6	46.51	2.13
HELV22	702817	3771783	257	4.6	46.51	2.13
HELV23	703217	3771783	256.5	4.6	46.51	2.13
HELV24	701417	3771583	256.4	4.6	46.51	2.13
HELV25	701817	3771583	255.5	4.6	46.51	2.13
HELV26	702217	3771583	254.9	4.6	46.51	2.13
HELV27	702617	3771583	253.4	4.6	46.51	2.13
HELV28	703017	3771583	250.4	4.6	46.51	2.13
HELV29	703417	3771583	252.1	4.6	46.51	2.13
HELV30	701217	3771383	252.7	4.6	46.51	2.13
HELV31	701617	3771383	250.9	4.6	46.51	2.13
HELV32	702017	3771383	249.7	4.6	46.51	2.13
HELV33	702417	3771383	249.1	4.6	46.51	2.13
HELV34	702817	3771383	248.8	4.6	46.51	2.13
HELV35	703217	3771383	247.8	4.6	46.51	2.13
HELV36	703617	3771383	247.8	4.6	46.51	2.13

Volume Sources

Source ID	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Horizontal Dimension (m)	Vertical Dimension (m)
HELV37	701417	3771183	247.5	4.6	46.51	2.13
HELV38	701817	3771183	246.8	4.6	46.51	2.13
HELV39	702217	3771183	246	4.6	46.51	2.13
HELV40	702617	3771183	245.2	4.6	46.51	2.13
HELV41	703017	3771183	244.2	4.6	46.51	2.13
HELV42	703417	3771183	244.1	4.6	46.51	2.13
HELV43	701617	3770983	243.3	4.6	46.51	2.13
HELV44	702017	3770983	242	4.6	46.51	2.13
HELV45	702417	3770983	241.5	4.6	46.51	2.13
HELV46	702817	3770983	241.4	4.6	46.51	2.13
HELV47	703217	3770983	241.1	4.6	46.51	2.13
HELV48	701417	3770783	239.7	4.6	46.51	2.13
HELV49	701817	3770783	239	4.6	46.51	2.13
HELV50	702217	3770783	237	4.6	46.51	2.13
HELV51	702617	3770783	238.7	4.6	46.51	2.13
HELV52	703017	3770783	237.8	4.6	46.51	2.13
HELV53	703417	3770783	237.1	4.6	46.51	2.13
HELV54	701617	3770583	235.1	4.6	46.51	2.13
HELV55	702017	3770583	235	4.6	46.51	2.13
HELV56	702417	3770583	235	4.6	46.51	2.13
HELV57	702817	3770583	234.2	4.6	46.51	2.13
HELV58	703217	3770583	234.2	4.6	46.51	2.13
HELV59	701817	3770383	232.3	4.6	46.51	2.13
HELV60	702217	3770383	231.4	4.6	46.51	2.13
HELV61	702617	3770383	231.4	4.6	46.51	2.13
HELV62	703017	3770383	232	4.6	46.51	2.13
HELV63	702417	3770183	229.8	4.6	46.51	2.13
CREW1	702186	3772874	284.5	2.4384	39.1	1.11
CREW2	702354	3772874	283.4	2.4384	39.1	1.11
CREW3	702522	3772874	282.8	2.4384	39.1	1.11
CREW4	702681	3772874	282.4	2.4384	39.1	1.11
LAY1	701633	3772856	284.9	2.4384	23.25	1.11
LAY2	701733	3772856	284.9	2.4384	23.25	1.11
LAY3	701633	3772756	282.4	2.4384	23.25	1.11
LAY4	701733	3772756	282.4	2.4384	23.25	1.11

Rice Solar Energy Project
Table 5.1C-9
Construction Modeling Parameters - Emission Rates
October 2009

Emission Rates for 1-hr, 3-hr, 8-hr, and 24-hr Modeling

Source ID	1-hr NO_2		1-hr CO		8-hr CO		1-hr SO_2		3-hr SO_2		24-hr SO_2		24-hr PM_{10}		24-hr $PM_{2.5}$	
	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)	(lb/hr)
PILES	-	-	-	-	-	-	-	-	-	-	-	-	5.53E-02	4.39E-01	1.15E-02	9.13E-02
HELV1-63	0.096	0.76	0.044	0.35	0.044	0.35	1.05E-04	8.35E-04	1.05E-04	8.35E-04	1.04E-04	8.26E-04	2.28E-02	1.81E-01	4.69E-03	3.72E-02
CREW1-4	0.017	0.14	0.007	0.06	0.007	0.06	4.45E-05	3.53E-04	4.45E-05	3.53E-04	6.06E-05	4.81E-04	1.16E-03	9.17E-03	1.03E-03	8.16E-03
LAY1-4	0.021	0.17	0.011	0.08	0.011	0.08	3.80E-05	3.02E-04	3.80E-05	3.02E-04	3.75E-05	2.98E-04	1.66E-03	1.32E-02	1.01E-03	8.05E-03

The maximum overall monthly NOx, SOx, and CO emissions predicted for the construction period would occur during month 3. The maximum overall monthly PM10, and PM2.5 emissions predicted for the construction project would occur during month 5.

The modeled 1-, 3-, and 8-hour emission rates for the on-site construction sources were calculated by multiplying the number of equipment by the hourly equipment emission factor for the month with the highest monthly emissions for the total construction project. For example, the 1-hour CREW1-4 source represents (1-173 HP engine operating in month 3 * 0.55 lb/hr NOx emission rate / 4 modeled volume sources = 0.14 lb/hr per source) The on-site truck trips were calculated by dividing the daily truck emissions during the maximum month by 8 hours per day.

The modeled 24-hour emission rates for the on-site construction equipment sources were calculated by dividing the equipment maximum monthly emissions by the number of work days per month divided by the number of hours per day. For example, the 24-hour CREW1-4 PM10 value represents (26.4 lb/month in Month 5 / 30 days/month / 24 hours/day / 4 modeled volume sources = 0.00917 lb/hr). The on-site truck trips were calculated based on the daily emissions during the month with the overall maximum emissions.

CREW1-4 represents the maximum monthly emissions from the construction trailer living area generators (i.e., the 98 hp generators) divided by the four volume sources.

LAY1-4 represents the maximum monthly emissions from the construction trailer generators (i.e., the 173 hp and 2-25 hp generators) divided by the four volume sources.

HELV1-63 reflects the maximum monthly emissions from the remaining combustion sources used to install the power block and heliostat field, including onsite construction and vehicle sources and fugitive dust sources divided by the 63 volume sources.

PILES reflects the maximum monthly emissions from the material stock piles.

Emission Rates for Annual Modeling

Source ID	Annual NO_2		Annual SO_2		Annual PM_{10}		Annual $PM_{2.5}$	
	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)	(g/s)	(tpy)
PILES	-	-	-	-	1.82E-03	6.32E-02	3.78E-04	1.31E-02
HELV1-63	1.33E-02	0.46	1.50E-05	5.21E-04	1.30E-02	4.53E-01	2.07E-03	7.20E-02
CREW1-4	3.26E-02	1.13	7.31E-05	2.54E-03	2.18E-03	7.59E-02	1.94E-03	6.76E-02
LAY1-4	2.41E-02	0.84	3.83E-05	1.33E-03	1.46E-03	5.07E-02	1.30E-03	4.51E-02

The maximum annual SOx emissions for the construction project occur during months 3-14. The maximum annual NOx, PM10, and PM2.5 emissions for the construction project occur during months 2-13.

CREW1-4 represents the maximum annual emissions from the construction trailer living area generators (i.e., the 98 hp generators) divided by the four volume sources (e.g., 4.53 tpy NOx divided by 4 equals 1.13 tpy)

LAY1-4 represents the maximum annual emissions from the construction trailer generators (i.e., the 173 hp and 2-25 hp generators) divided by the four volume sources (e.g., 3.36 tpy NOx divided by 4 equals 0.84)

HELV1-63 reflects the maximum annual emissions from the remaining combustion sources used to install the power block and heliostat field, including onsite construction and vehicle sources and fugitive dust sources divided by the 63 volume sources.

PILES reflects the maximum annual emissions from the material stock piles.

Rice Solar Energy Project
Table 5.1C-10
Construction Modeling Results
October 2009

Source	NO_2 (µg/m^3)		CO (µg/m3)		SO_2 (µg/m3)				PM_{10} (µg/m3)		$PM_{2.5}$ (µg/m3)	
	1-hr	Annual	1-hr	8-hr	1-hr	3-hr	24-hr	Annual	24-hr	Annual	24-hr	Annual
ALL	297	13	136	95	0.33	0.29	0.14	0.028	28	3.2	5.8	0.77
PILES	-	-	-	-	-	-	-	-	6.4	0.042	1.3	0.0088
HELV	297	3.3	136	95	0.33	0.29	0.13	0.0037	28	3.2	5.8	0.51
CREW	74	11	31	22	0.19	0.17	0.10	0.025	2.0	0.75	1.8	0.67
LAY	93	8.5	47	33	0.17	0.15	0.07	0.014	2.9	0.52	1.8	0.46

Rice Solar Energy Project
Table 5.1C-11
October 2009
Ambient Air Quality Standards Summary

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m^3)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		—	—	—
Lead[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (04/01/08)

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calender year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the EPA.

8. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

BLYTHE CAA AIRPORT, CALIFORNIA (040927)

Period of Record Monthly Climate Summary

Period of Record : 7/ 1/1948 to 12/31/2008

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	66.7	72.0	78.5	86.4	95.2	104.6	108.4	106.6	101.3	89.8	75.9	66.6	87.7
Average Min. Temperature (F)	41.6	45.4	50.2	56.5	64.4	72.7	81.0	80.2	73.0	60.9	48.6	41.2	59.7
Average Total Precipitation (in.)	0.46	0.43	0.35	0.16	0.02	0.02	0.24	0.63	0.36	0.26	0.20	0.40	3.55
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

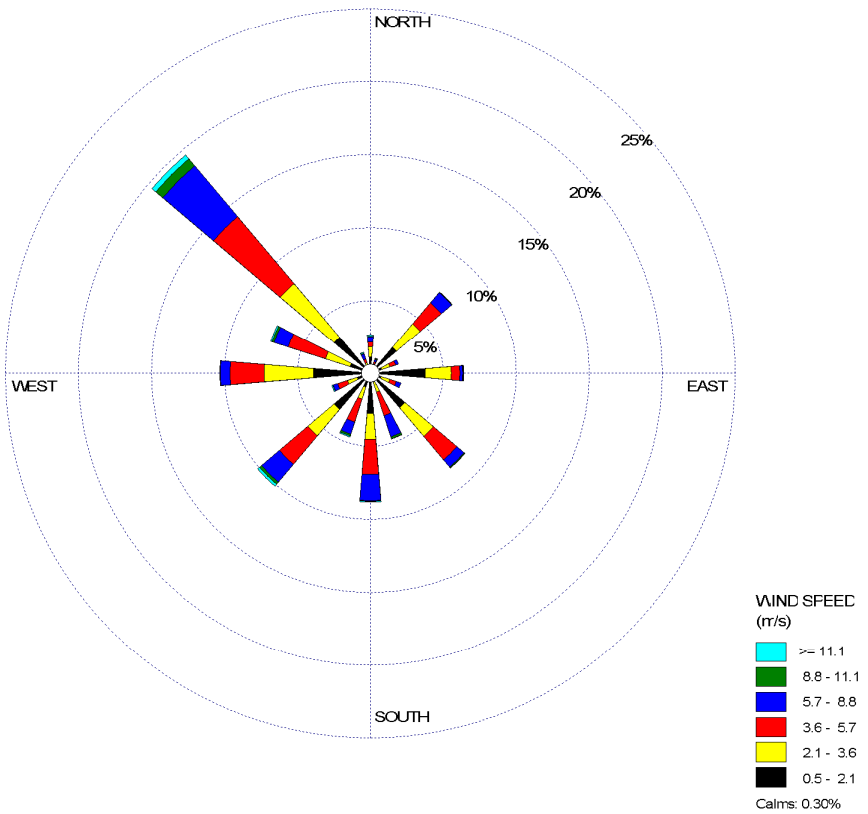
Percent of possible observations for period of record.
Max. Temp.: 98.4% Min. Temp.: 98.5% Precipitation: 98.5% Snowfall: 98.5% Snow Depth: 98.3%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Rice Solar Energy Project
Figure 5.1C-1a - October 2009
Rice AAF Wind Rose
Date Range: June 1943 – March 1944

WIND ROSE PLOT:
Rice AAF
Station ID 749168

DISPLAY:
Wind Speed
Direction (blowing from)



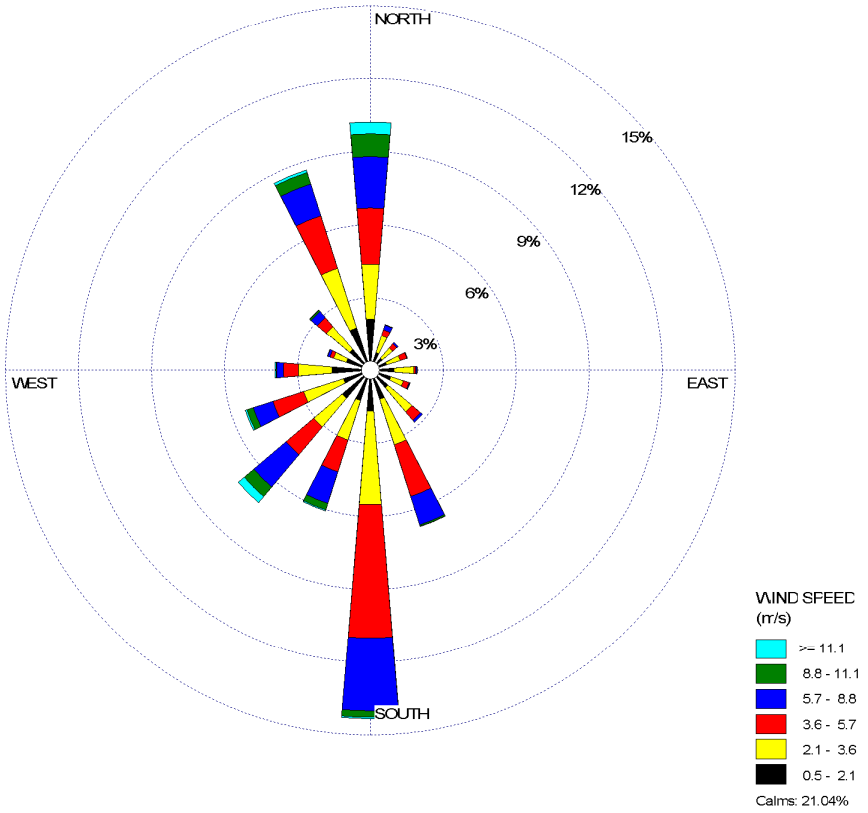
COMMENTS:	DATA PERIOD:		
Direction (wind blowing from)	**1943 1944** **Jan 1 - Dec 31** **00:00 - 23:00**		
	CALM WINDS: **0.30%**	TOTAL COUNT: **5265 hrs.**	
	AVG. WIND SPEED: **3.99 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Rice Solar Energy Project
Figure 5.1C-1b - October 2009
Blythe River Airport Wind Rose
Date Range: June 1943 – March 1944

WIND ROSE PLOT:
Blythe River Airport
Station ID 2323799999

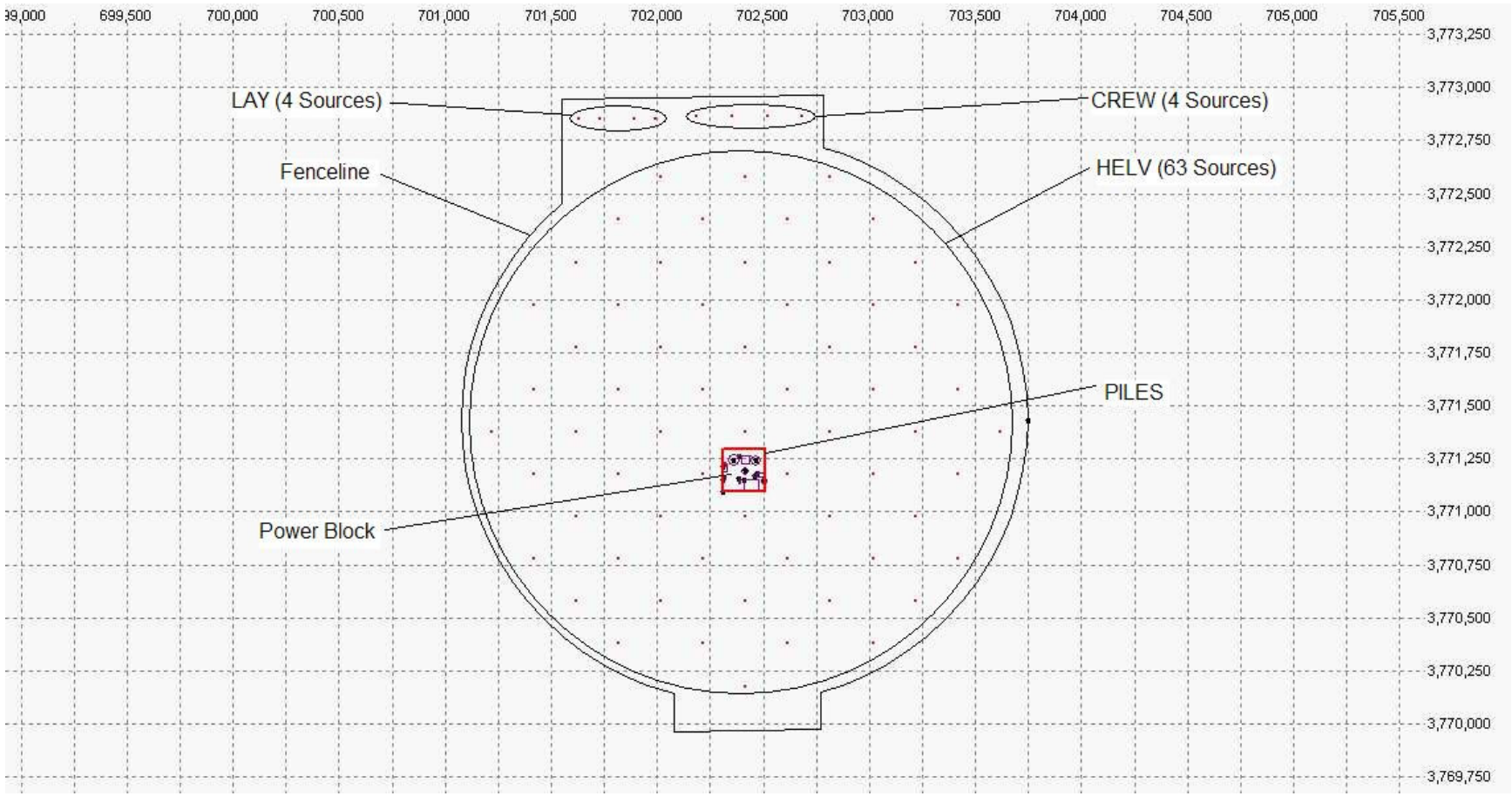
DISPLAY:
Wind Speed
Direction (blowing from)



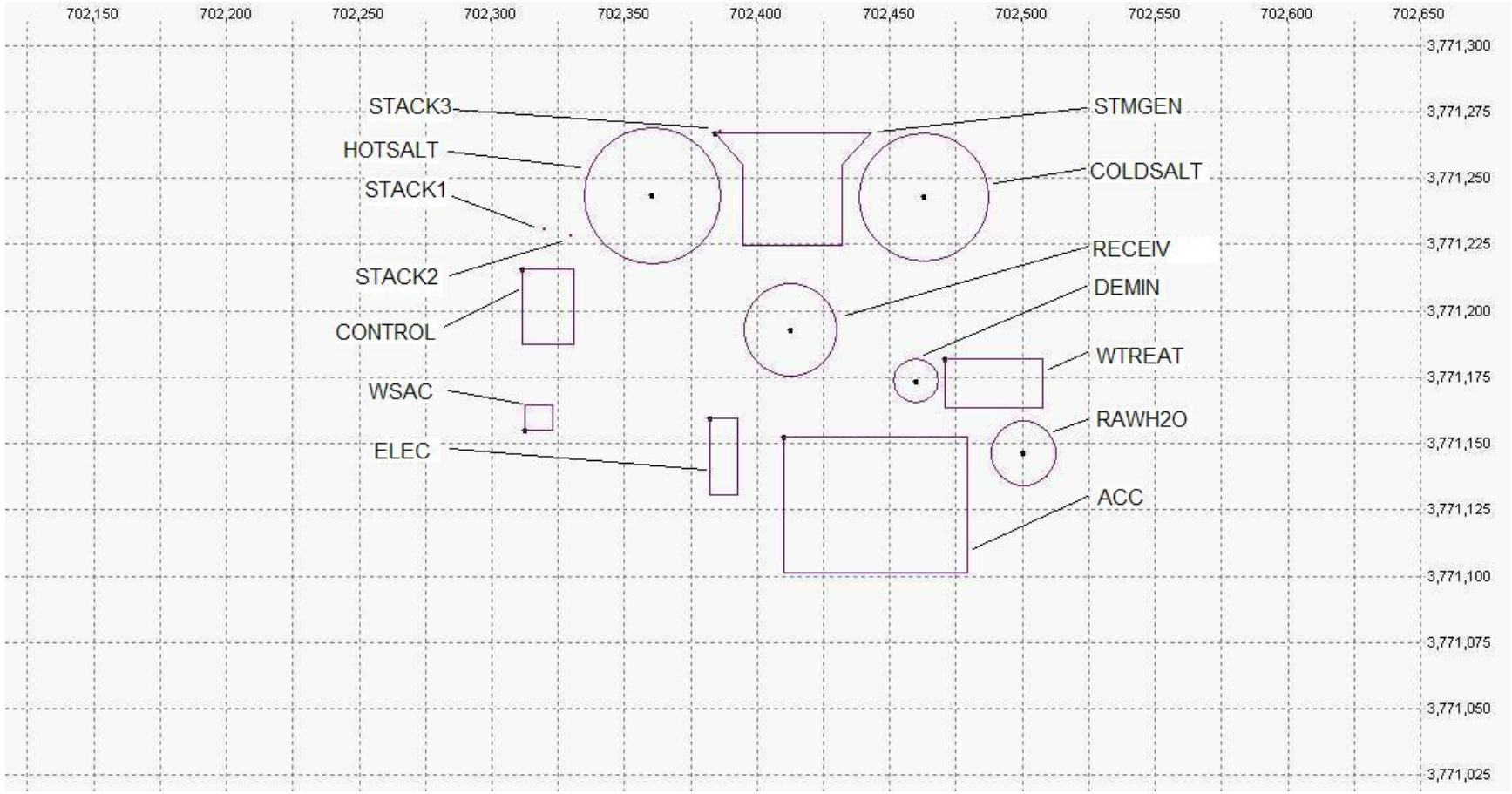
COMMENTS:	DATA PERIOD:		
Direction (wind blowing from)	**2008** **Jan 1 - Dec 31** **00:00 - 23:00**		
	CALM WINDS: **21.04%**	TOTAL COUNT: **8367 hrs.**	
	AVG. WIND SPEED: **3.34 m/s**		PROJECT NO.:

WRPLOT View - Lakes Environmental Software

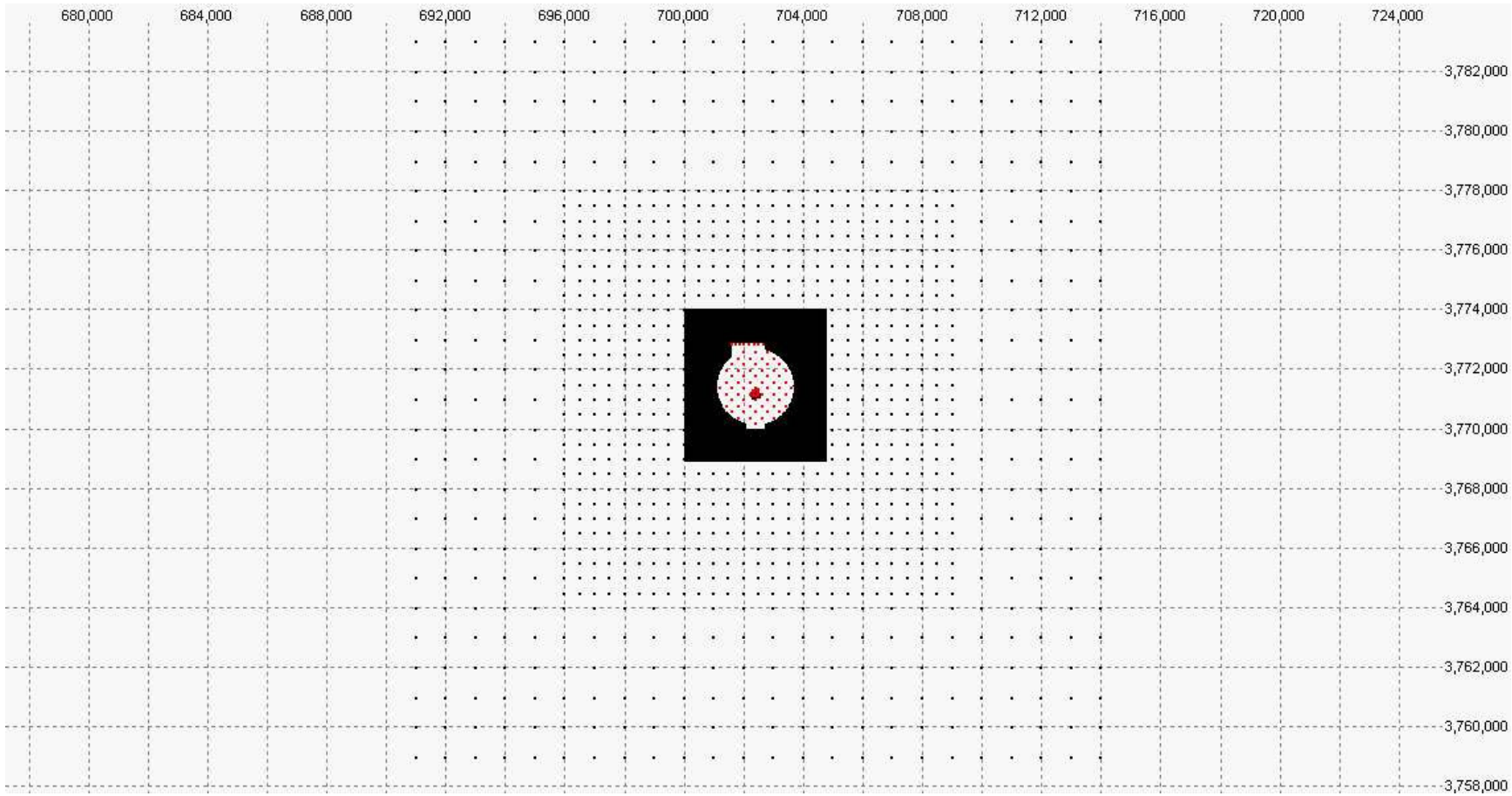
Rice Solar Energy Project
Figure 5.1C-2
October 2009
Salt Commissioning Model Setup



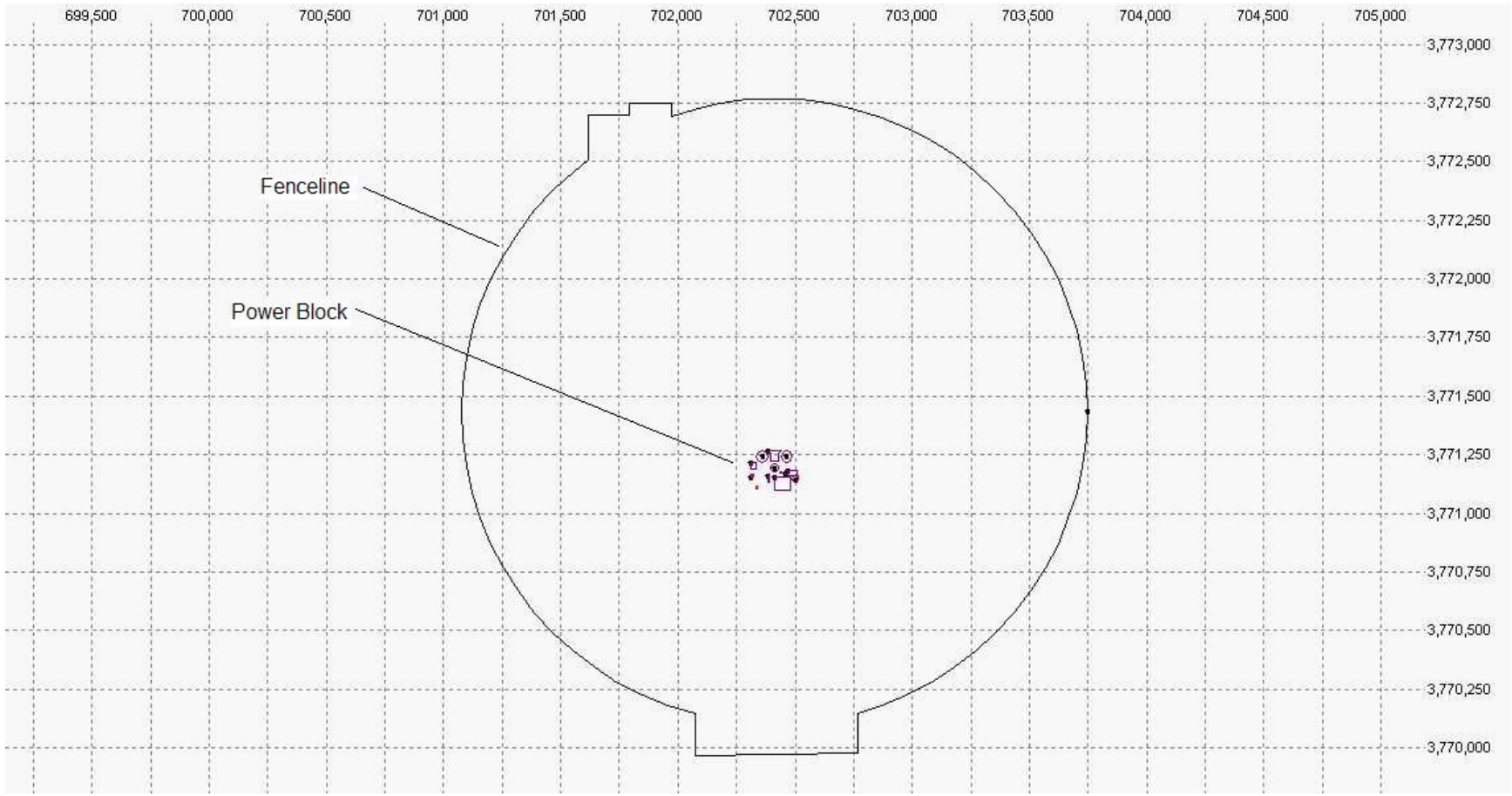
Rice Solar Energy Project
Figure 5.1C-3
October 2009
Salt Commissioning Power Block Setup



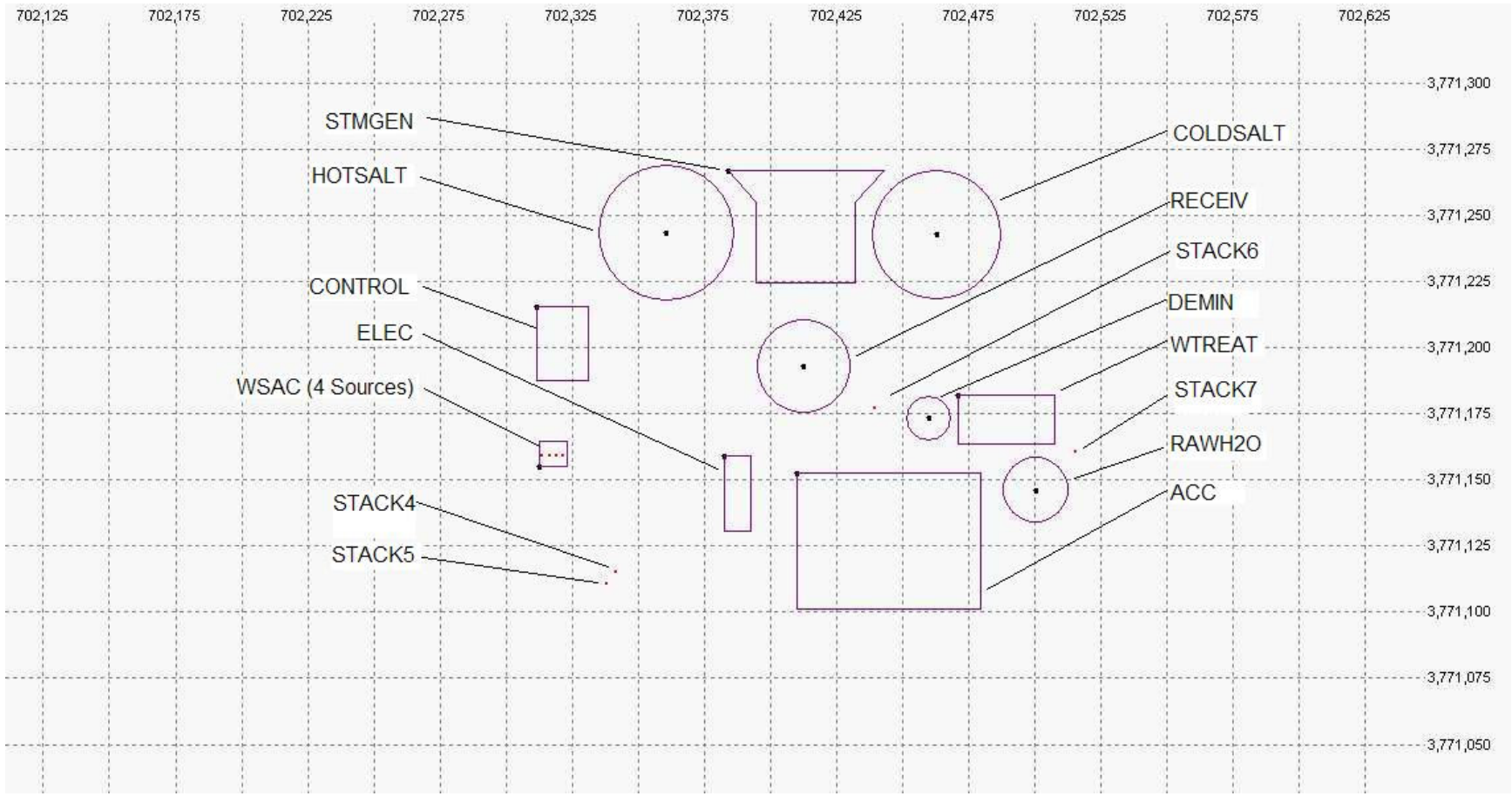
Rice Solar Energy Project
Figure 5.1C-4
October 2009
Salt Commissioning Receptor Grid



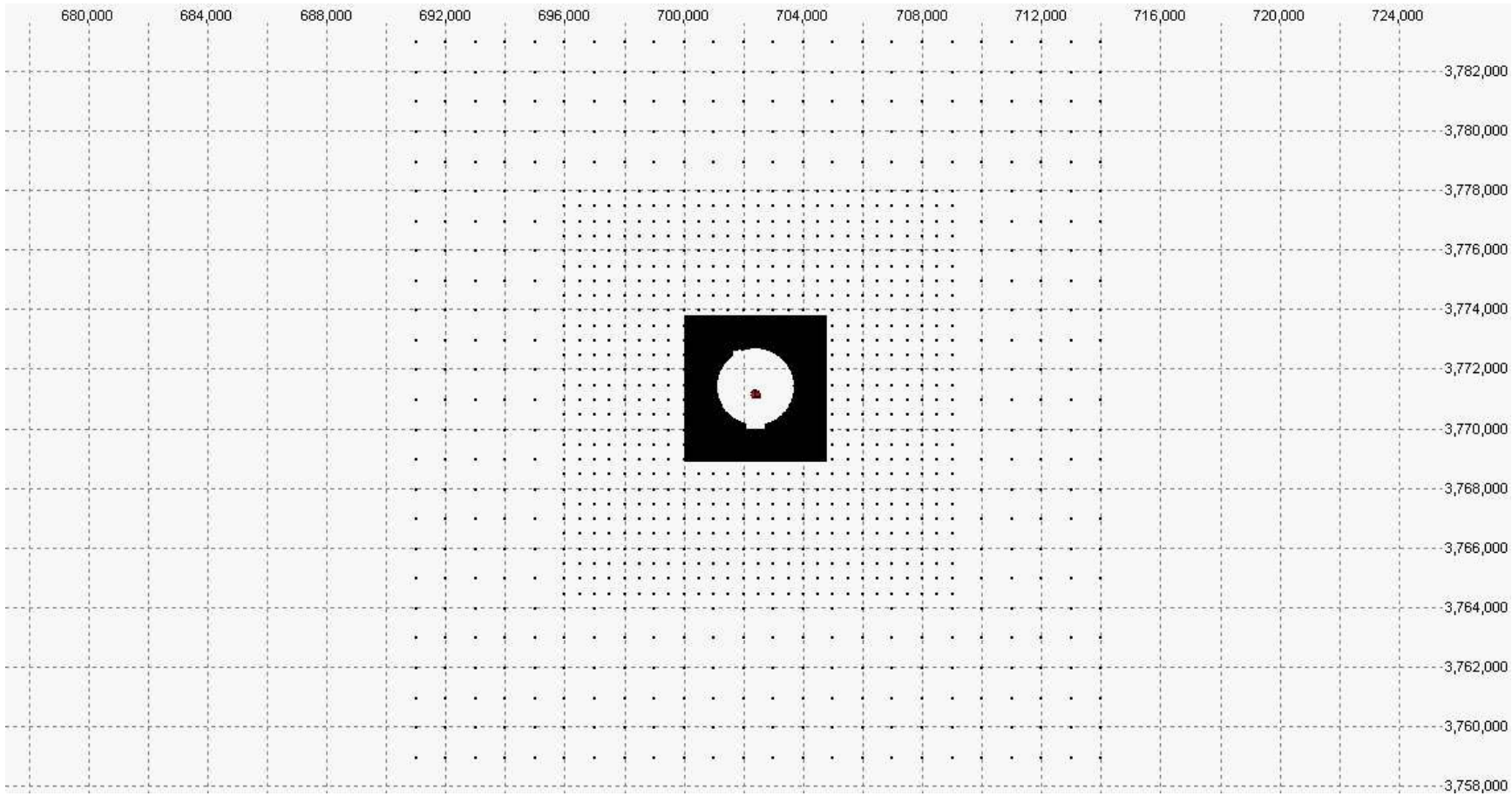
Rice Solar Energy Project
Figure 5.1C-5
October 2009
Operational Model Setup



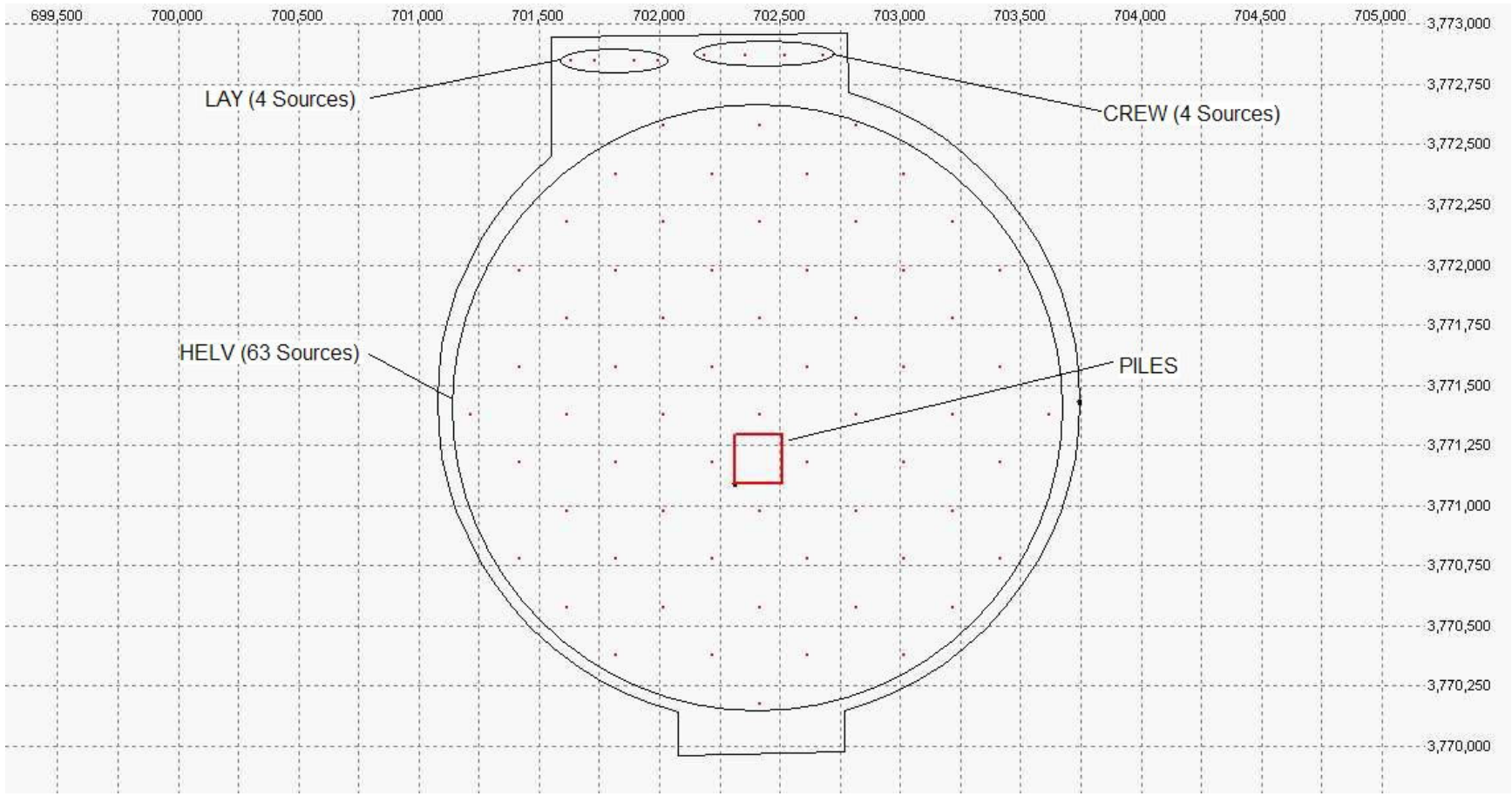
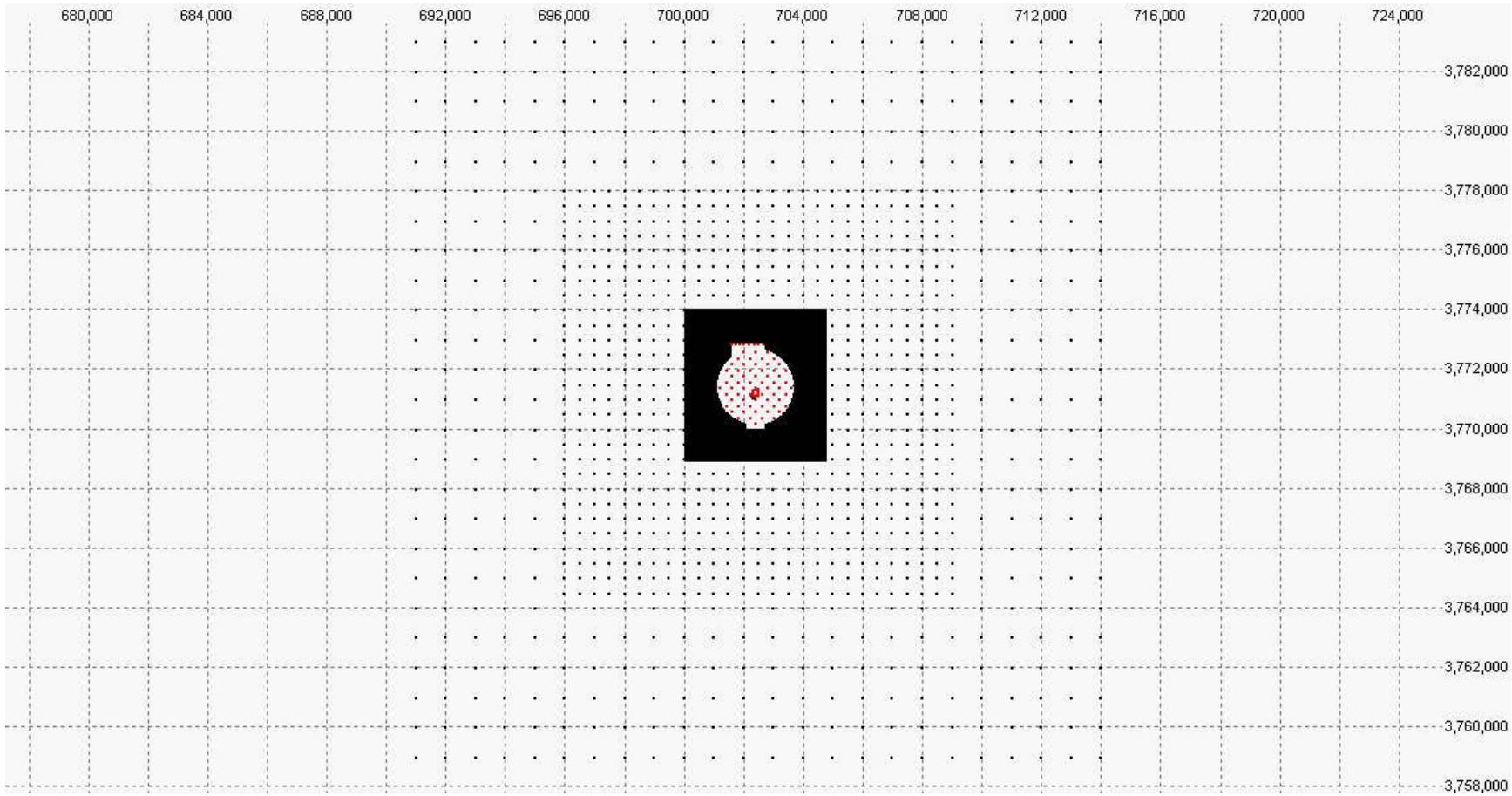
Rice Solar Energy Project
Figure 5.1C-6
October 2009
Operational Power Block Setup



Rice Solar Energy Project
Figure 5.1C-7
October 2009
Operational Receptor Grid



Rice Solar Energy Project
Figure 5.1C-8
October 2009
Construction Model Setup



Rice Solar Energy Project
Figure 5.1C-9
October 2009
Construction Receptor Grid