APPENDIX E

Health and Safety - Shadow Flicker

Contents

Exhibit 1: Table E1, Summary of Shadow Flicker Analysis Results
Exhibit 2: WindPRO Shadow Flicker Output

APPENDIX E
TABLE E1
Summary of Shadow Flicker Analysis Results

SF Receptor	Theoretical Maximum Possible Shadow Flicker Time [hr/year]	Theoretical Maximum Number of Shadow Flicker Days [days/year]	Theoretical Maximum Shadow Flicker Hours in 1 Day [hr/day]	Expected Shadow Flicker Time [hr/year]
SF001N	16:22	53	0:26	5:44
SF001S	33:36	76	0:38	9:08
SF001W	50:04	123	0:38	14:52
SF002N	10:08	64	0:16	3:42
SF002S	27:48	82	0:38	6:35
SF002W	38:14	147	0:38	10:17
SF003N	19:08	97	0:20	6:50
SF003S	82:54	104	0:58	6:40
SF003W	102:16	203	0:58	12:04
SF004N	17:58	95	0:20	6:26
SF004S	82:20	115	0:56	7:38
SF004W	100:32	212	0:56	12:51
SF005N	0:00	0	0:00	0:00
SF005S	6:02	50	0:14	0:34
SF005W	6:06	50	0:14	0:35
SF006E	58:02	120	0:48	13:07
SF006N	0:00	0	0:00	0:00
SF006S	166:44	142	2:18	22:10
SF006W	108:54	109	1:30	9:52
SF007E	18:58	72	0:26	3:10
SF007N	0:00	0	0:00	0:00
SF007S	49:56	71	0:54	5:34
SF007W	34:38	71	0:40	2:45
SF008E	22:56	42	0:42	3:12
SF008N	0:00	0	0:00	0:00
SF008S	96:26	109	1:38	10:10
SF008W	73:42	109	0:58	6:48
SF009E	0:00	0	0:00	0:00
SF009N	0:00	0	0:00	0:00
SF009S	6:30	41	0:18	0:58
SF009W	6:34	41	0:18	0:58
SF010E	14:52	72	0:24	3:33
SF010N	19:12	110	0:24	6:53
SF010S	51:26	147	1:12	11:15
SF010W	66:06	216	0:52	16:23
SF011E	60:26	200	0:30	15:51
SF011N	105:16	169	1:18	37:58
SF011S	104:44	192	1:02	21:00
SF011W	151:04	260	1:08	42:33
SF012E	39:10	126	0:28	10:55
SF012N	64:52	160	0:38	20:35
SF012S	58:18	98	0:54	16:58
SF012W	84:38	189	0:56	26:44
SF013E	0:00	0	0:00	0:00
SF013N	20:34	82	0:28	8:06
SF013W	20:50	83	0:28	8:13
SF014E	4:26	54	0:06	1:08
SF014N	4:24	54	0:06	1:07
SF014S	0:00	0	0:00	0:00
SF014W	0:00	0	0:00	0:00

APPENDIX E
TABLE E1
Summary of Shadow Flicker Analysis Results

	Theoretical Maximum Possible Shadow Flicker Time	Theoretical Maximum Number of Shadow Flicker Days	Theoretical Maximum Shadow Flicker Hours in 1 Day	Expected Shadow Flicker Time
SF015E	0:00	0	0:00	0:00
SF015N	27:18	97	0:26	10:41
SF015W	27:22	97	0:26	10:43
SF016E	0:00	0	0:00	0:00
SF016N	18:56	78	0:24	7:15
SF016W	19:08	78	0:24	7:19
SF017E	0:00	0	0:00	0:00
SF017N	27:52	95	0:26	10:40
SF017W	28:02	96	0:26	10:44
SF018E	0:00	0	0:00	0:00
SF018N	9:14	65	0:14	3:34
SF018W	9:18	65	0:14	3:35
SF019E	12:38	66	0:20	3:13
SF019N	80:02	91	1:10	29:15
SF019S	35:28	59	0:46	8:25
SF019W	103:38	150	0:52	34:17
SF020E	0:00	0	0:00	0:00
SF020N	0:00	0	0:00	0:00
SF020W	0:00	0	0:00	0:00
SF021E	0:00	0	0:00	0:00
SF021N	0:00	0	0:00	0:00
SF021W	0:00	0	0:00	0:00
SF022E	10:50	67	0:16	2:41
SF022N	23:26	101	0:34	7:13
SF022W	17:00	83	0:18	5:49
SF023E	14:56	83	0:16	3:49
SF023N	38:08	129	0:34	12:07
SF023S	9:20	47	0:20	2:23
SF023W	32:40	127	0:26	10:38
SF024E	30:40	93	0:30	8:26
SF024N	108:20	147	1:18	37:37
SF024S	49:44	153	0:32	8:51
SF024W	128:54	255	0:52	37:28
SF025E	40:18	141	0:28	11:28
SF025N	31:26	107	0:36	9:30
SF025S	67:02	181	1:06	15:12
SF025W	74:14	193	1:02	15:47
SF026E	7:16	44	0:18	1:57
SF026N	26:32	92	0:32	9:09
SF026S	7:34	49	0:18	2:03
SF026W	26:58	93	0:32	9:18
SF027E	29:58	106	0:30	6:54
SF027N	0:00	0	0:00	0:00
SF027S	29:52	106	0:30	6:52
SF028E	13:52	56	0:22	4:01
SF028N	25:24	97	0:26	8:12
SF028W	17:02	66	0:26	5:53
SF029E	35:58	100	0:34	9:25
SF029N	84:02	138	1:06	27:11
SF029W	51:24	139	0:40	18:45
SF030E	14:08	56	0:24	4:21

APPENDIX E
TABLE E1
Summary of Shadow Flicker Analysis Results

	Theoretical Maximum Possible Shadow Flicker Time	Theoretical Maximum Number of Shadow Flicker Days	Theoretical Maximum Shadow Flicker Hours in 1 Day	Expected Shadow Flicker Time
SF030S	91:50	203	0:52	17:50
SF030W	83:18	182	0:46	15:19
SF031E	2:52	18	0:12	0:47
SF031N	2:52	18	0:12	0:47
SF031S	0:00	0	0:00	0:00
SF032E	4:38	24	0:16	1:16
SF032N	4:38	24	0:16	1:16
SF032S	0:00	0	0:00	0:00
SF032W	0:00	0	0:00	0:00
SF033E	45:02	101	0:50	14:42
SF033N	6:32	39	0:22	2:02
SF033S	41:12	80	0:48	13:35
SF033W	3:22	31	0:10	1:09
SF034E	9:28	44	0:20	2:47
SF034N	6:32	41	0:14	1:50
SF101E	0:00	0	0:00	0:00
SF101N	9:04	60	0:16	3:22
SF101W	9:12	60	0:16	3:25
SF102E	0:00	0	0:00	0:00
SF102N	5:34	32	0:16	2:08
SF102W	5:36	32	0:16	2:09
SF103E	0:00	0	0:00	0:00
SF103N	6:02	49	0:14	2:14
SF103W	6:10	50	0:14	2:17
SF104E	0:00	0	0:00	0:00
SF104N	9:50	72	0:12	3:49
SF104W	10:08	72	0:12	3:55
SF105E	0:00	0	0:00	0:00
SF105N	0:00	0	0:00	0:00
SF105W	0:00	0	0:00	0:00
SF106E	0:00	0	0:00	0:00
SF106N	0:00	0	0:00	0:00
SF106W	0:00	0	0:00	0:00
SF107E	0:00	0	0:00	0:00
SF107N	0:00	0	0:00	0:00
SF107W	0:00	0	0:00	0:00
SF108E	8:26	52	0:14	2:07
SF108N	8:20	51	0:14	2:05
SF108W	0:00	0	0:00	0:00
SF109E	25:30	116	0:24	7:07
SF109N	81:06	99	1:18	25:46
SF109S	35:00	98	0:50	7:04
SF109W	95:14	160	1:04	26:26
SF110E	55:12	105	0:56	15:46
SF110S	37:22	62	0:56	10:19
SF111S	40:24	131	0:40	4:16
SF111W	33:36	86	0:40	2:51
SF112E	20:34	105	0:20	4:32
SF112S	20:24	105	0:20	4:29
SF113E	13:20	69	0:18	3:05
SF113S	13:20	69	0:18	3:05

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TABLE E1
Summary of Shadow Flicker Analysis Results

	Theoretical Maximum Possible Shadow Flicker Time	Theoretical Maximum Number of Shadow Flicker Days	Theoretical Maximum Shadow Flicker Hours in 1 Day	Expected Shadow Flicker Time
SF114E	2:44	28	0:10	0:40
SF114N	0:00	0	0:00	0:00
SF114W	0:00	0	0:00	0:00
SF118E	21:56	90	0:24	5:34
SF118N	21:50	90	0:24	5:33
SF119E	7:44	56	0:16	1:58
SF119N	7:44	56	0:16	1:58
SF120E	12:24	66	0:16	3:06
SF120N	12:18	66	0:16	3:05
SF121E	5:34	42	0:14	1:26
SF121N	5:34	42	0:14	1:26
SF122E	4:08	47	0:10	1:02
SF122N	4:08	47	0:10	1:02
SF123E	2:26	28	0:08	0:37
SF123N	2:26	28	0:08	0:37
SF124E	1:18	14	0:08	0:19
SF124N	1:16	14	0:08	0:18
SF125E	6:16	58	0:10	1:33
SF125N	6:12	58	0:10	1:32
SF126E	6:46	65	0:12	1:39
SF126N	6:44	65	0:12	1:39
SF127E	1:42	21	0:06	0:25
SF127N	1:42	21	0:06	0:25
SF128E	0:00	0	0:00	0:00
SF128N	0:00	0	0:00	0:00
SF129E	0:00	0	0:00	0:00
SF129N	0:00	0	0:00	0:00
SF130E	0:00	0	0:00	0:00
SF130N	0:00	0	0:00	0:00
SF131E	0:00	0	0:00	0:00
SF131N	0:00	0	0:00	0:00
SF132E	0:00	0	0:00	0:00
SF132N	0:00	0	0:00	0:00
SF133E	0:00	0	0:00	0:00
SF133N	0:00	0	0:00	0:00
SF134E	0:00	0	0:00	0:00
SF134N	0:00	0	0:00	0:00
SF135E	0:00	0	0:00	0:00
SF135N	0:00	0	0:00	0:00
SF135W	0:00	0	0:00	0:00
SF136E	0:00	0	0:00	0:00
SF136N	7:54	35	0:20	2:50
SF136W	7:56	35	0:20	2:51
SF137E	5:08	30	0:14	1:18
SF137N	5:06	30	0:14	1:18
SF137S	0:00	0	0:00	0:00
SF137W	0:00	0	0:00	0:00
SF138E	20:12	76	0:22	5:09
SF138N	20:02	76	0:22	5:06
SF138S	0:00	0	0:00	0:00
SF138W	0:00	0	0:00	0:00

APPENDIX E
TABLE E1
Summary of Shadow Flicker Analysis Results

	Theoretical Maximum Possible Shadow Flicker Time	Theoretical Maximum Number of Shadow Flicker Days	Theoretical Maximum Shadow Flicker Hours in 1 Day	Expected Shadow Flicker Time
SF139E	7:36	42	0:16	2:03
SF139N	7:30	41	0:16	2:01
SF139S	0:00	0	0:00	0:00
SF140E	30:46	126	0:22	8:22
SF140N	30:24	126	0:22	8:16
SF140S	0:00	0	0:00	0:00
SF141E	19:56	85	0:20	5:43
SF141N	17:34	79	0:20	4:59
SF141S	2:06	18	0:10	0:39
SF142E	30:54	126	0:24	8:14
SF142N	30:42	126	0:22	8:11
SF142S	0:00	0	0:00	0:00
SF143E	25:06	104	0:22	6:31
SF143N	25:02	104	0:22	6:30
SF143S	0:00	0	0:00	0:00
SF144E	30:56	120	0:22	8:08
SF144N	30:38	119	0:22	8:03
SF144S	0:00	0	0:00	0:00
SF145E	0:00	0	0:00	0:00
SF145N	0:00	0	0:00	0:00
SF145S	6:42	51	0:12	0:31
SF145W	6:42	51	0:12	0:31
SF146E	0:00	0	0:00	0:00
SF146N	0:00	0	0:00	0:00
SF146S	5:02	41	0:14	0:29
SF146W	5:02	41	0:14	0:29
SF147E	0:00	0	0:00	0:00
SF147N	0:00	0	0:00	0:00
SF147S	5:26	38	0:16	0:33
SF147W	5:26	38	0:16	0:33

Note: Highlight shows windows with 20 hours or more per year.

Exhibit 2
WindPRO Shadow Flicker Output

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 05 - North, South and West windows
Turbines 013 through 018 and 027 through 035
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

Printed/Page
07/25/2004 23:00 / 1

Licensed user:
Wind Engineers, Inc.
7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/25/2004 22:04/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 05, tubines 013-018, 027-035

Assumptions for shadow calculations

Maximum distance for influence	1,500	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

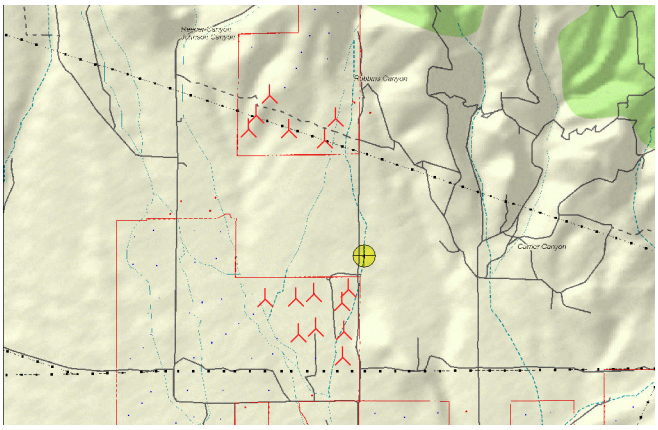
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10 East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
013	682,232	5,224,844	863	013	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
014	683,114	5,224,561	846	014	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
015	682,061	5,224,572	825	015	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
016	682,499	5,224,392	819	016	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
017	681,965	5,224,388	803	017	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
018	682,979	5,224,272	826	018	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
027	682,253	5,222,153	705	027	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
028	682,664	5,222,171	709	028	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
029	682,712	5,221,699	690	029	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
030	682,901	5,222,242	715	030	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
031	682,937	5,221,783	695	031	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
032	683,278	5,222,135	714	032	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
033	683,318	5,221,753	697	033	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
034	683,306	5,221,415	685	034	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
035	683,360	5,222,311	722	035	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Shadow Receptor-Input

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF005	SF005N	683,552	5,222,758	744	1.0	1.0	1.0	180.0	90.0
SF005	SF005S	683,552	5,222,758	744	1.0	1.0	1.0	0.0	90.0
SF005	SF005W	683,552	5,222,758	744	1.0	1.0	1.0	90.0	90.0

Calculation Results

No	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
SF005	SF005N	0:00	0	0:00	0:00
SF005	SF005S	6:02	50	0:14	0:34
SF005	SF005W	6:06	50	0:14	0:35

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 05 - North, South and West windows
Turbines 013 through 018 and 027 through 035
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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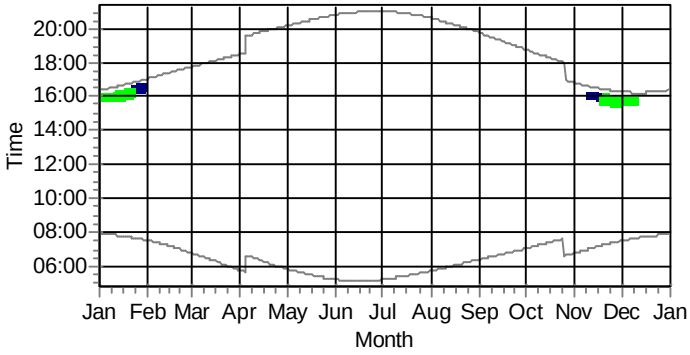
Licensed user:
Wind Engineers, Inc.
7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/25/2004 22:04/2.3.0.216

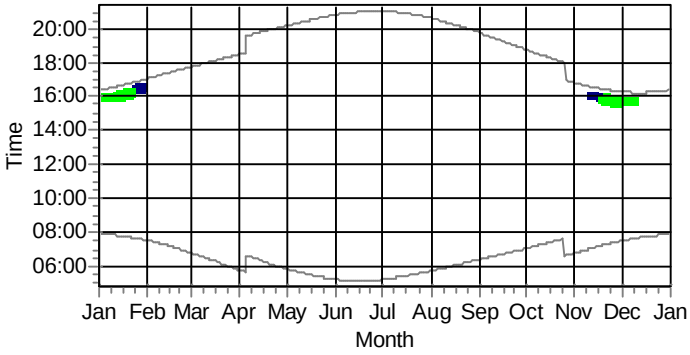
SHADOW - Calendar, graphical

Calculation: 040725 SF 05, tubines 013-018, 027-035

SF005W



SF005S



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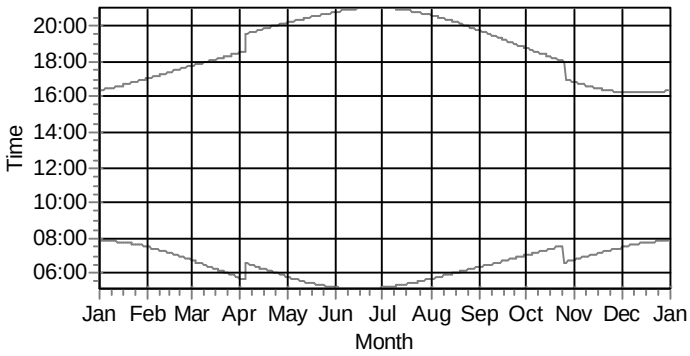

WTGs

028

030

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 05 - North, South and West windows
Turbines 013 through 018 and 027 through 035
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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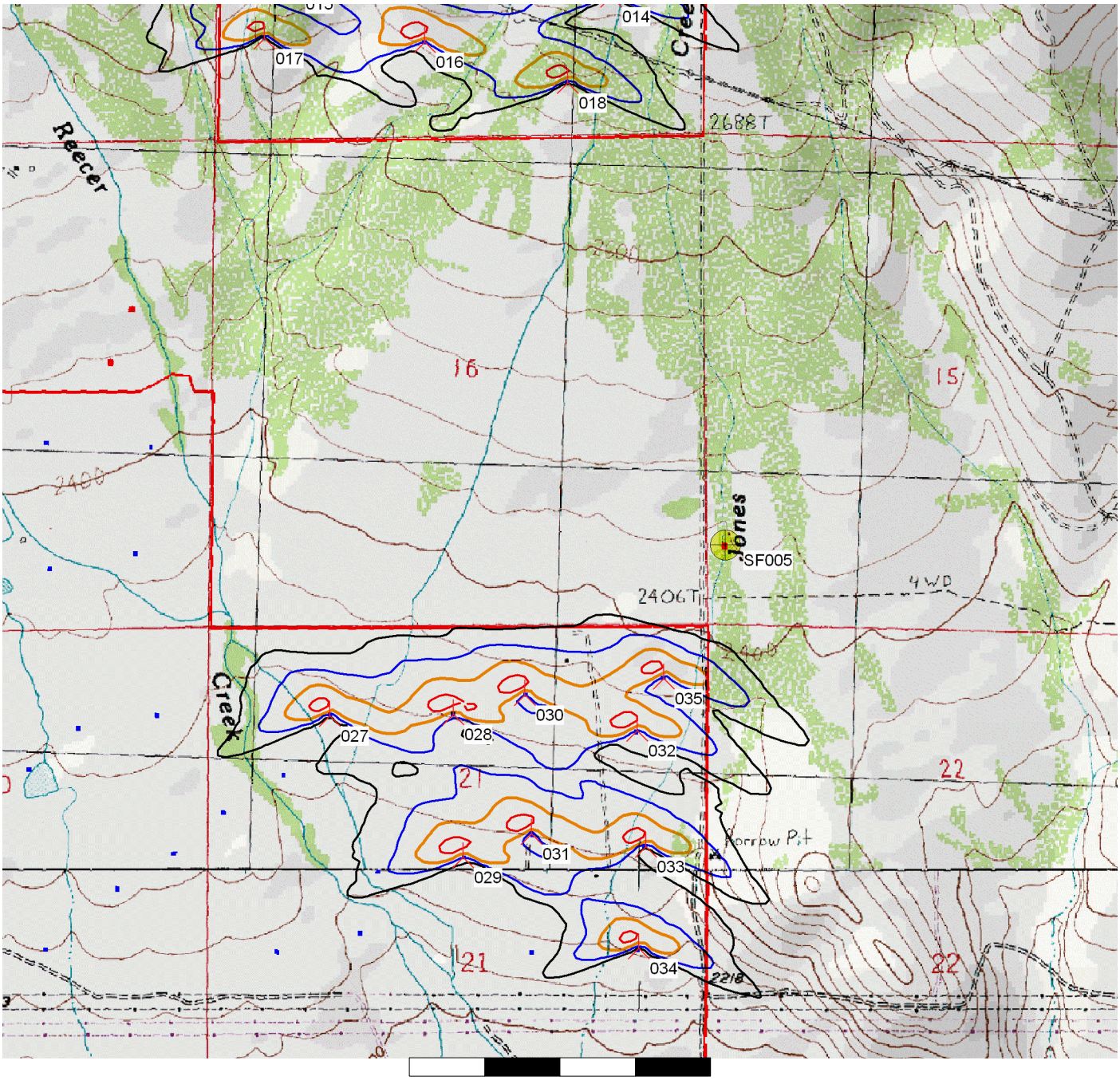
Wind Engineers, Inc.
7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/25/2004 22:04/2.3.0.216

SHADOW - 040711 DCWPP USGS, z13, 31250, overlays

Calculation: 040725 SF 05, tubines 013-018, 027-035 **File:** 040711 DCWPP USGS, z13, 34375, overlays.bmi



0 250 500 750 1000m

Map: 040711 DCWPP USGS, z13, 31250, overlays , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 682,940 North: 5,222,727

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 001 through 004 - all windows
Turbines 001 through 018
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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07/25/2004 22:38 / 1

Licensed user:
Wind Engineers, Inc.
7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/25/2004 13:09/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 001-004, tubines 001-018

Assumptions for shadow calculations

Maximum distance for influence	1,500	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

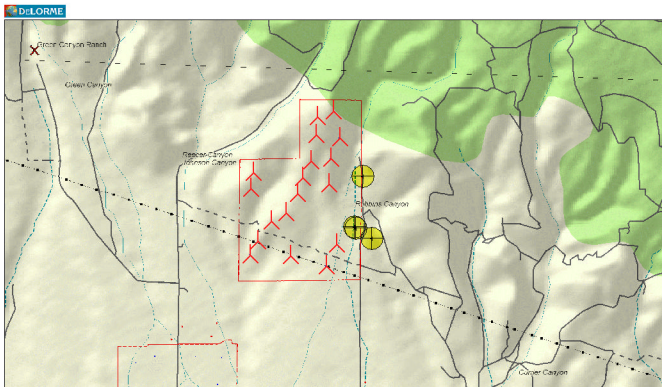
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10 East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
001	683,014	5,226,319	1,110	001	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
002	682,804	5,226,234	1,074	002	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
003	682,791	5,226,001	1,025	003	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
004	683,105	5,225,970	1,025	004	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
005	682,740	5,225,651	961	005	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
006	682,994	5,225,693	980	006	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
007	681,975	5,225,474	920	007	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
008	682,634	5,225,428	927	008	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
009	682,981	5,225,355	923	009	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
010	681,946	5,225,268	900	010	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
011	682,569	5,225,217	900	011	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
012	682,426	5,224,961	880	012	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
013	682,232	5,224,844	863	013	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
014	683,114	5,224,561	846	014	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
015	682,061	5,224,572	825	015	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
016	682,499	5,224,392	819	016	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
017	681,965	5,224,388	803	017	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
018	682,979	5,224,272	826	018	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Shadow Receptor-Input

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF001	SF001S	683,428	5,225,473	919	1.0	1.0	1.0	0.0	90.0
SF001	SF001N	683,428	5,225,473	919	1.0	1.0	1.0	180.0	90.0
SF001	SF001W	683,428	5,225,473	919	1.0	1.0	1.0	90.0	90.0
SF002	SF002S	683,575	5,224,656	856	1.0	1.0	1.0	0.0	90.0
SF002	SF002N	683,575	5,224,656	856	1.0	1.0	1.0	180.0	90.0
SF002	SF002W	683,575	5,224,656	856	1.0	1.0	1.0	90.0	90.0
SF003	SF003S	683,340	5,224,798	863	1.0	1.0	1.0	0.0	90.0
SF003	SF003N	683,340	5,224,798	863	1.0	1.0	1.0	180.0	90.0
SF003	SF003W	683,340	5,224,798	863	1.0	1.0	1.0	90.0	90.0
SF004	SF004S	683,362	5,224,784	863	1.0	1.0	1.0	0.0	90.0
SF004	SF004N	683,362	5,224,784	863	1.0	1.0	1.0	180.0	90.0
SF004	SF004W	683,362	5,224,784	863	1.0	1.0	1.0	90.0	90.0

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 001 through 004 - all windows
Turbines 001 through 018
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/25/2004 13:09/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 001-004, tubines 001-018

Calculation Results

		Shadow, worst case			Shadow, expected values
No	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
SF001	SF001S	33:36	76	0:38	9:08
SF001	SF001N	16:22	53	0:26	5:44
SF001	SF001W	50:04	123	0:38	14:52
SF002	SF002S	27:48	82	0:38	6:35
SF002	SF002N	10:08	64	0:16	3:42
SF002	SF002W	38:14	147	0:38	10:17
SF003	SF003S	82:54	104	0:58	6:40
SF003	SF003N	19:08	97	0:20	6:50
SF003	SF003W	102:16	203	0:58	12:04
SF004	SF004S	82:20	115	0:56	7:38
SF004	SF004N	17:58	95	0:20	6:26
SF004	SF004W	100:32	212	0:56	12:51

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 001 through 004 - all windows
Turbines 001 through 018
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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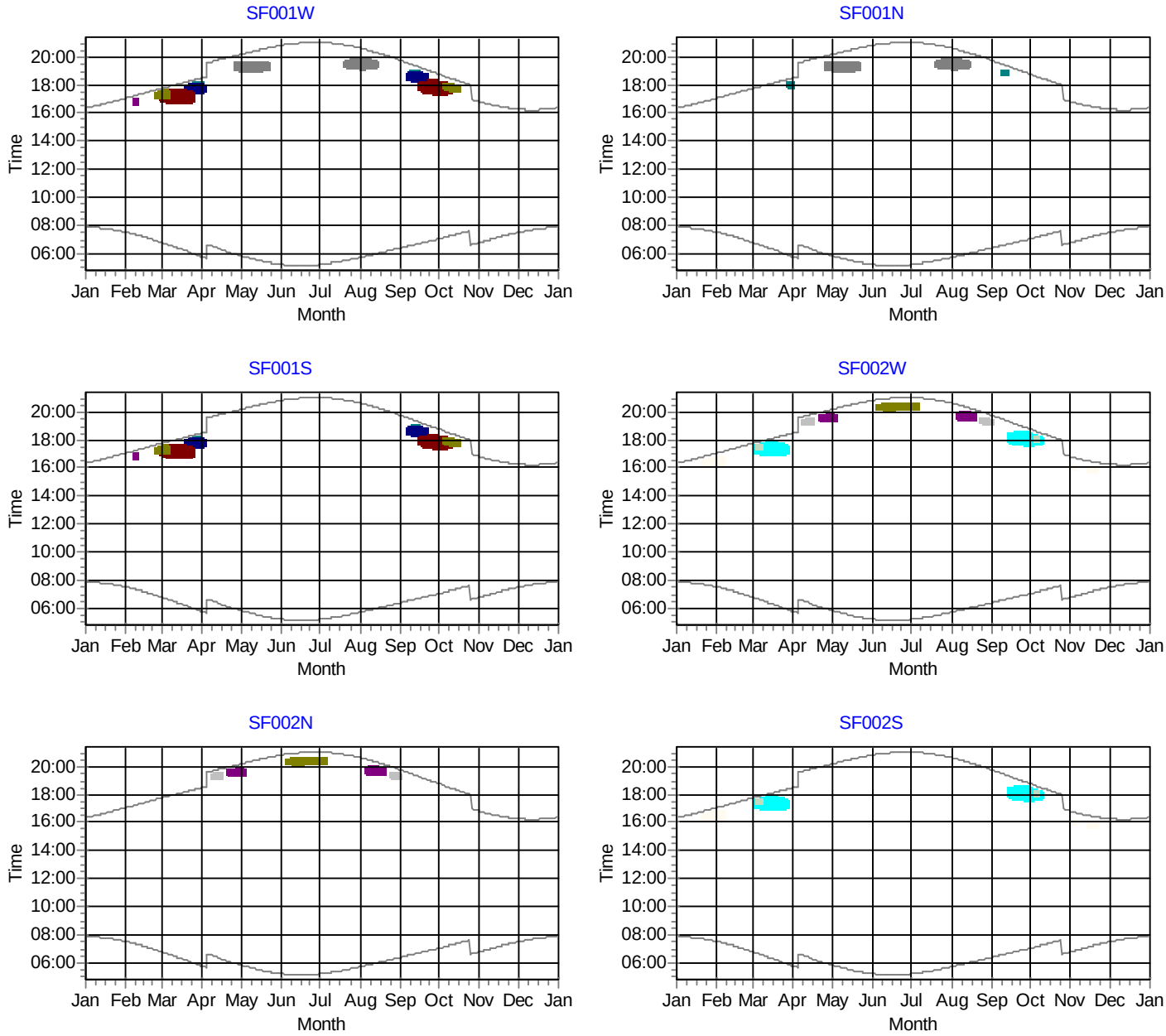
SHADOW - Calendar, graphical

Calculation: 040725 SF 001-004, tubines 001-018



WTGs

005	008	011	013	016
007	009	012	014	018

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 001 through 004 - all windows
Turbines 001 through 018
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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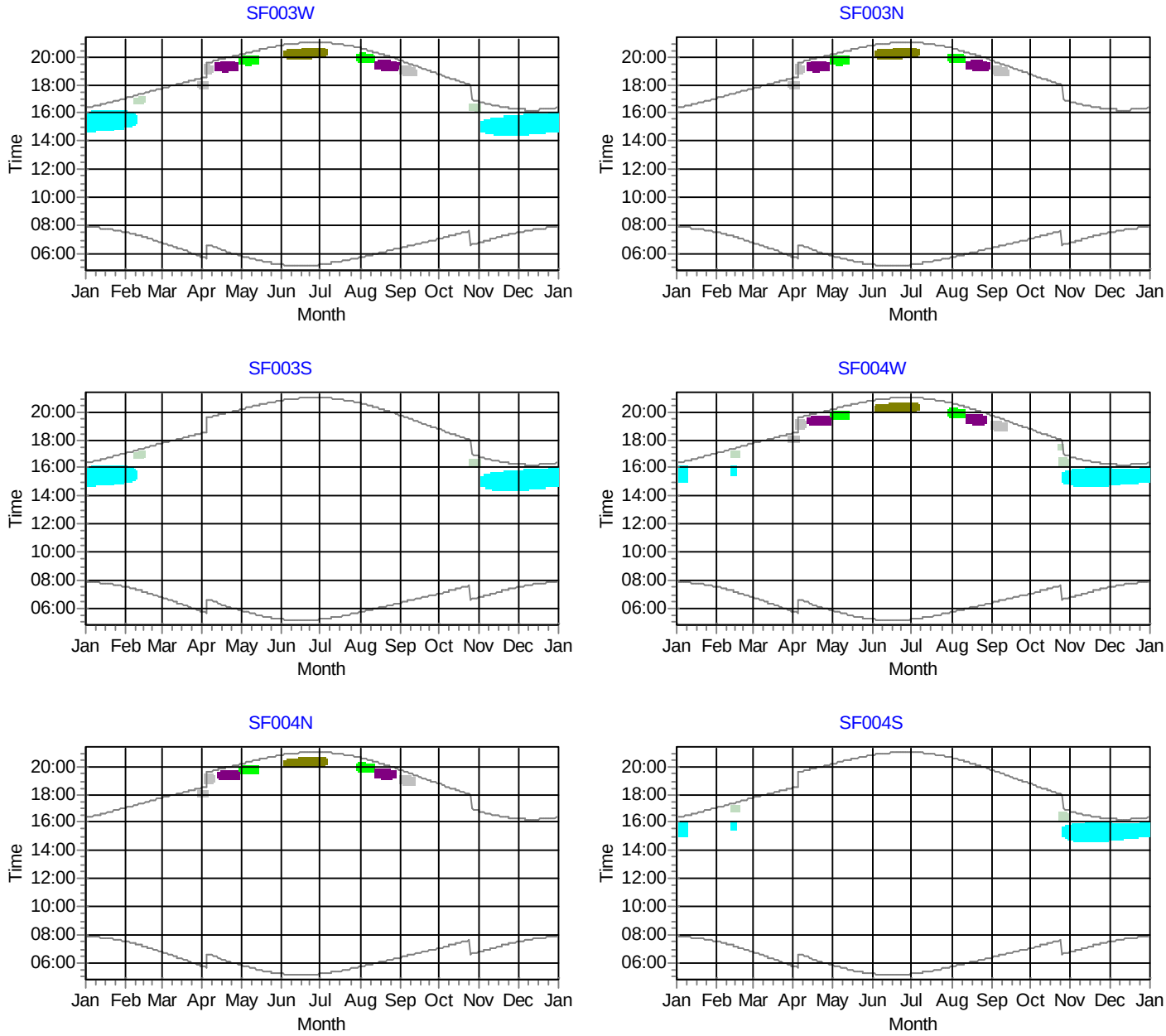
SHADOW - Calendar, graphical

Calculation: 040725 SF 001-004, tubines 001-018



WTGs

010 011 012 013 014 016

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 001 through 004 - all windows
Turbines 001 through 018
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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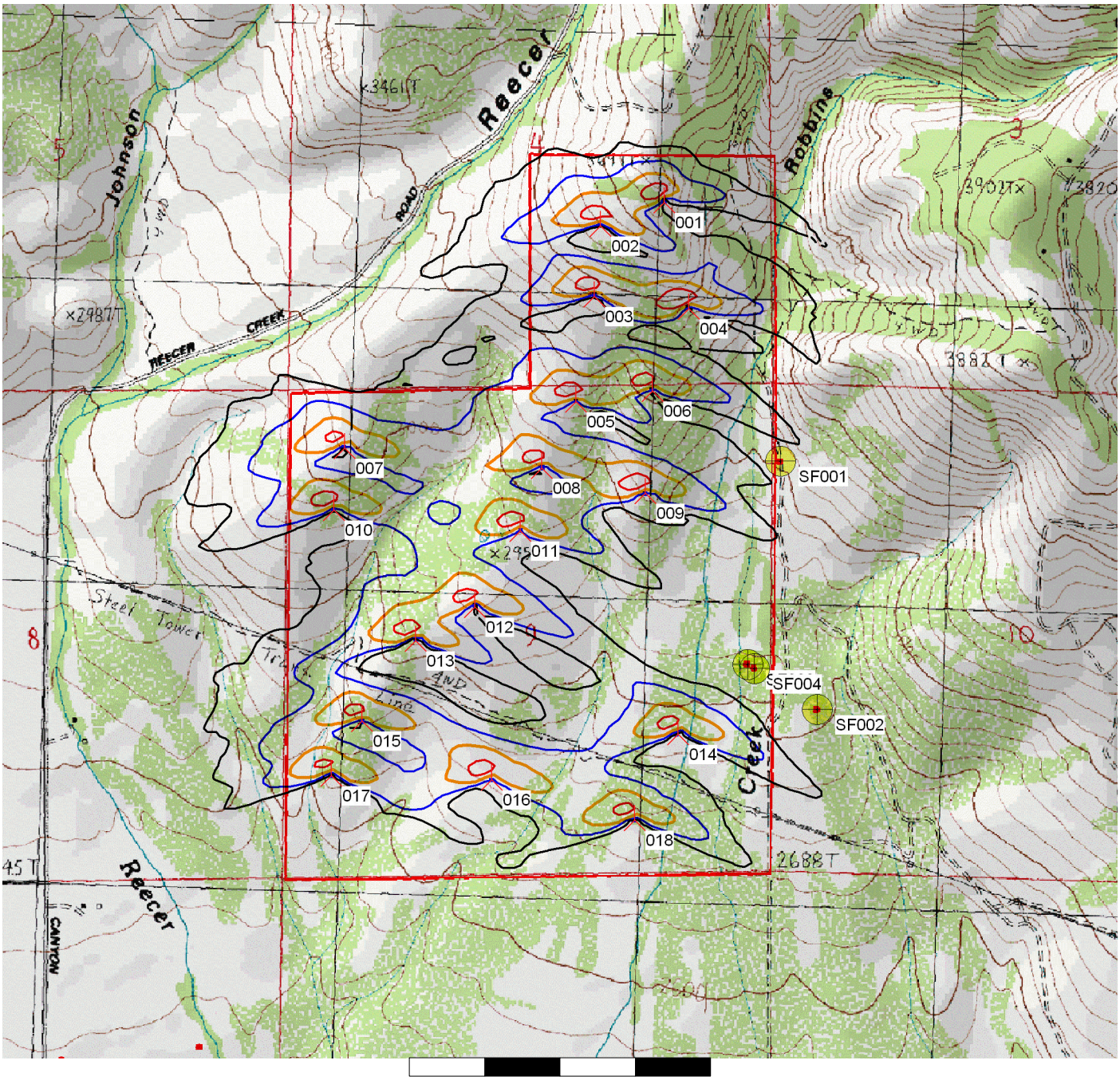
SHADOW - 040711 DCWPP USGS, z13, 31250, overlays

Calculation: 040725 SF 001-004, tubines 001-018 **File:** 040711 DCWPP USGS, z13, 34375, overlays.bmi



0 250 500 750 1000m

Map: 040711 DCWPP USGS, z13, 31250, overlays , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 682,640 North: 5,225,160

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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CA-92506 Riverside, USA

Calculated:
07/25/2004 15:26/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

Assumptions for shadow calculations

Maximum distance for influence	1,500	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

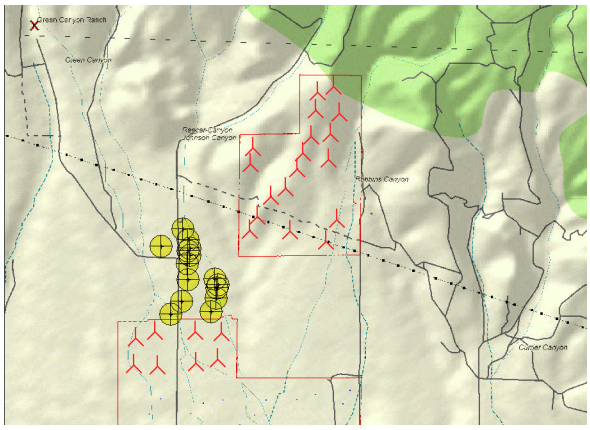
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10 East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
001	683,014	5,226,319	1,110	001	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
002	682,804	5,226,234	1,074	002	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
003	682,791	5,226,001	1,025	003	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
004	683,105	5,225,970	1,025	004	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
005	682,740	5,225,651	961	005	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
006	682,994	5,225,693	980	006	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
007	681,975	5,225,474	920	007	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
008	682,634	5,225,428	927	008	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
009	682,981	5,225,355	923	009	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
010	681,946	5,225,268	900	010	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
011	682,569	5,225,217	900	011	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
012	682,426	5,224,961	880	012	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
013	682,232	5,224,844	863	013	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
014	683,114	5,224,561	846	014	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
015	682,061	5,224,572	825	015	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
016	682,499	5,224,392	819	016	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
017	681,965	5,224,388	803	017	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
018	682,979	5,224,272	826	018	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
019	681,632	5,223,025	731	019	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
020	680,746	5,223,014	742	020	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
021	681,284	5,223,026	737	021	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
022	680,495	5,222,921	743	022	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
023	681,306	5,222,614	723	023	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
024	680,481	5,222,564	729	024	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
025	681,589	5,222,672	721	025	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
026	680,800	5,222,554	728	026	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Shadow Receptor-Input

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF006	SF006E	680,958	5,223,243	747	1.0	1.0	1.0	-90.0	90.0
SF006	SF006N	680,958	5,223,243	747	1.0	1.0	1.0	180.0	90.0
SF006	SF006S	680,958	5,223,243	747	1.0	1.0	1.0	0.0	90.0
SF006	SF006W	680,958	5,223,243	747	1.0	1.0	1.0	90.0	90.0
SF007	SF007E	681,096	5,223,419	753	1.0	1.0	1.0	-90.0	90.0

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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CA-92506 Riverside, USA

Calculated:
07/25/2004 15:26/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF007	SF007N	681,096	5,223,419	753	1.0	1.0	1.0	180.0	90.0
SF007	SF007S	681,096	5,223,419	753	1.0	1.0	1.0	0.0	90.0
SF007	SF007W	681,096	5,223,419	753	1.0	1.0	1.0	90.0	90.0
SF008	SF008E	681,486	5,223,297	743	1.0	1.0	1.0	-90.0	90.0
SF008	SF008N	681,486	5,223,297	743	1.0	1.0	1.0	180.0	90.0
SF008	SF008S	681,486	5,223,297	743	1.0	1.0	1.0	0.0	90.0
SF008	SF008W	681,486	5,223,297	743	1.0	1.0	1.0	90.0	90.0
SF009	SF009E	681,551	5,223,473	749	1.0	1.0	1.0	-90.0	90.0
SF009	SF009N	681,551	5,223,473	749	1.0	1.0	1.0	180.0	90.0
SF009	SF009S	681,551	5,223,473	749	1.0	1.0	1.0	0.0	90.0
SF009	SF009W	681,551	5,223,473	749	1.0	1.0	1.0	90.0	90.0
SF137	SF137N	681,166	5,223,712	764	1.0	1.0	1.0	180.0	90.0
SF137	SF137E	681,166	5,223,712	764	1.0	1.0	1.0	-90.0	90.0
SF137	SF137W	681,166	5,223,712	764	1.0	1.0	1.0	90.0	90.0
SF137	SF137S	681,166	5,223,712	764	1.0	1.0	1.0	0.0	90.0
SF138	SF138N	681,154	5,223,921	772	1.0	1.0	1.0	180.0	90.0
SF138	SF138E	681,154	5,223,921	772	1.0	1.0	1.0	-90.0	90.0
SF138	SF138W	681,154	5,223,921	772	1.0	1.0	1.0	90.0	90.0
SF138	SF138S	681,154	5,223,921	772	1.0	1.0	1.0	0.0	90.0
SF139	SF139N	680,798	5,224,135	780	1.0	1.0	1.0	180.0	90.0
SF139	SF139E	680,798	5,224,135	780	1.0	1.0	1.0	-90.0	90.0
SF139	SF139S	680,798	5,224,135	780	1.0	1.0	1.0	0.0	90.0
SF140	SF140N	681,149	5,224,236	782	1.0	1.0	1.0	180.0	90.0
SF140	SF140E	681,149	5,224,236	782	1.0	1.0	1.0	-90.0	90.0
SF140	SF140S	681,149	5,224,236	782	1.0	1.0	1.0	0.0	90.0
SF141	SF141S	681,078	5,224,377	792	1.0	1.0	1.0	0.0	90.0
SF141	SF141E	681,078	5,224,377	792	1.0	1.0	1.0	-90.0	90.0
SF141	SF141N	681,078	5,224,377	792	1.0	1.0	1.0	180.0	90.0
SF142	SF142S	681,179	5,224,127	779	1.0	1.0	1.0	0.0	90.0
SF142	SF142E	681,179	5,224,127	779	1.0	1.0	1.0	-90.0	90.0
SF142	SF142N	681,179	5,224,127	779	1.0	1.0	1.0	180.0	90.0
SF143	SF143S	681,182	5,224,034	776	1.0	1.0	1.0	0.0	90.0
SF143	SF143E	681,182	5,224,034	776	1.0	1.0	1.0	-90.0	90.0
SF143	SF143N	681,182	5,224,034	776	1.0	1.0	1.0	180.0	90.0
SF144	SF144S	681,159	5,224,089	778	1.0	1.0	1.0	0.0	90.0
SF144	SF144E	681,159	5,224,089	778	1.0	1.0	1.0	-90.0	90.0
SF144	SF144N	681,159	5,224,089	778	1.0	1.0	1.0	180.0	90.0
SF145	SF145E	681,529	5,223,732	760	1.0	1.0	1.0	-90.0	90.0
SF145	SF145S	681,529	5,223,732	760	1.0	1.0	1.0	0.0	90.0
SF145	SF145N	681,529	5,223,732	760	1.0	1.0	1.0	180.0	90.0
SF145	SF145W	681,529	5,223,732	760	1.0	1.0	1.0	90.0	90.0
SF146	SF146E	681,569	5,223,657	756	1.0	1.0	1.0	-90.0	90.0
SF146	SF146W	681,569	5,223,657	756	1.0	1.0	1.0	90.0	90.0
SF146	SF146N	681,569	5,223,657	756	1.0	1.0	1.0	180.0	90.0
SF146	SF146S	681,569	5,223,657	756	1.0	1.0	1.0	0.0	90.0
SF147	SF147S	681,556	5,223,614	754	1.0	1.0	1.0	0.0	90.0
SF147	SF147W	681,556	5,223,614	754	1.0	1.0	1.0	90.0	90.0
SF147	SF147N	681,556	5,223,614	754	1.0	1.0	1.0	180.0	90.0
SF147	SF147E	681,556	5,223,614	754	1.0	1.0	1.0	-90.0	90.0

Calculation Results

No	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
SF006	SF006E	58:02	120	0:48	13:07
SF006	SF006N	0:00	0	0:00	0:00
SF006	SF006S	166:44	142	2:18	22:10
SF006	SF006W	108:54	109	1:30	9:52

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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Calculated:
07/25/2004 15:26/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

		Shadow, worst case			Shadow, expected values
No	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
SF007	SF007E	18:58	72	0:26	3:10
SF007	SF007N	0:00	0	0:00	0:00
SF007	SF007S	49:56	71	0:54	5:34
SF007	SF007W	34:38	71	0:40	2:45
SF008	SF008E	22:56	42	0:42	3:12
SF008	SF008N	0:00	0	0:00	0:00
SF008	SF008S	96:26	109	1:38	10:10
SF008	SF008W	73:42	109	0:58	6:48
SF009	SF009E	0:00	0	0:00	0:00
SF009	SF009N	0:00	0	0:00	0:00
SF009	SF009S	6:30	41	0:18	0:58
SF009	SF009W	6:34	41	0:18	0:58
SF137	SF137N	5:06	30	0:14	1:18
SF137	SF137E	5:08	30	0:14	1:18
SF137	SF137W	0:00	0	0:00	0:00
SF137	SF137S	0:00	0	0:00	0:00
SF138	SF138N	20:02	76	0:22	5:06
SF138	SF138E	20:12	76	0:22	5:09
SF138	SF138W	0:00	0	0:00	0:00
SF138	SF138S	0:00	0	0:00	0:00
SF139	SF139N	7:30	41	0:16	2:01
SF139	SF139E	7:36	42	0:16	2:03
SF139	SF139S	0:00	0	0:00	0:00
SF140	SF140N	30:24	126	0:22	8:16
SF140	SF140E	30:46	126	0:22	8:22
SF140	SF140S	0:00	0	0:00	0:00
SF141	SF141S	2:06	18	0:10	0:39
SF141	SF141E	19:56	85	0:20	5:43
SF141	SF141N	17:34	79	0:20	4:59
SF142	SF142S	0:00	0	0:00	0:00
SF142	SF142E	30:54	126	0:24	8:14
SF142	SF142N	30:42	126	0:22	8:11
SF143	SF143S	0:00	0	0:00	0:00
SF143	SF143E	25:06	104	0:22	6:31
SF143	SF143N	25:02	104	0:22	6:30
SF144	SF144S	0:00	0	0:00	0:00
SF144	SF144E	30:56	120	0:22	8:08
SF144	SF144N	30:38	119	0:22	8:03
SF145	SF145E	0:00	0	0:00	0:00
SF145	SF145S	6:42	51	0:12	0:31
SF145	SF145N	0:00	0	0:00	0:00
SF145	SF145W	6:42	51	0:12	0:31
SF146	SF146E	0:00	0	0:00	0:00
SF146	SF146W	5:02	41	0:14	0:29
SF146	SF146N	0:00	0	0:00	0:00
SF146	SF146S	5:02	41	0:14	0:29
SF147	SF147S	5:26	38	0:16	0:33
SF147	SF147W	5:26	38	0:16	0:33
SF147	SF147N	0:00	0	0:00	0:00
SF147	SF147E	0:00	0	0:00	0:00

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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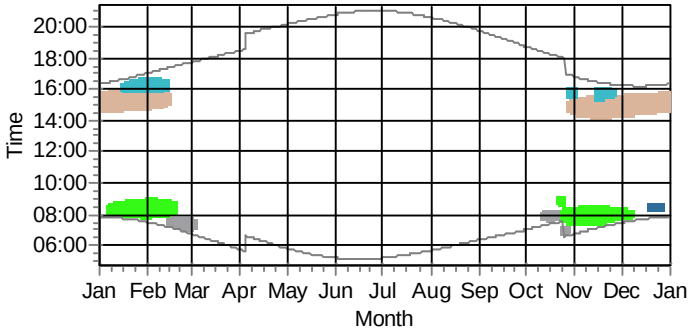
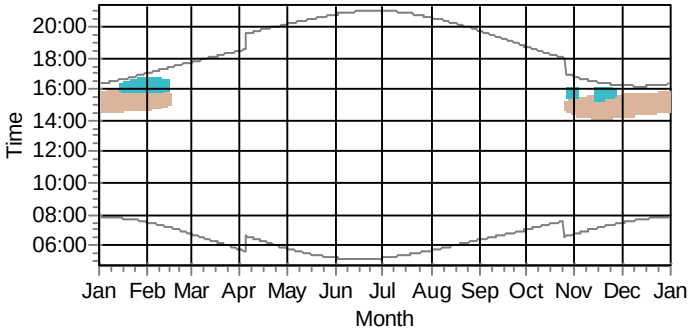
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

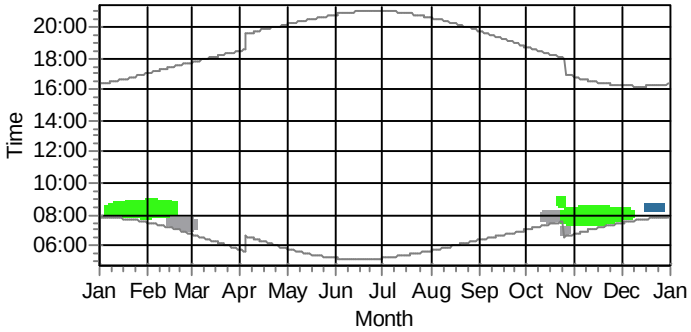
SF006S



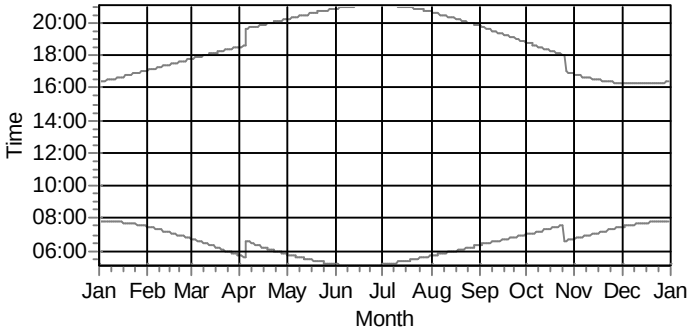
SF006W



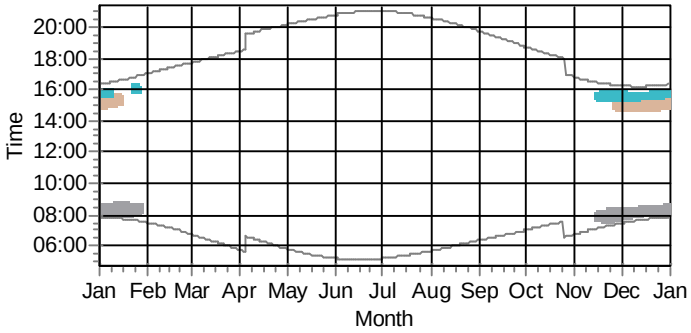
SF006E



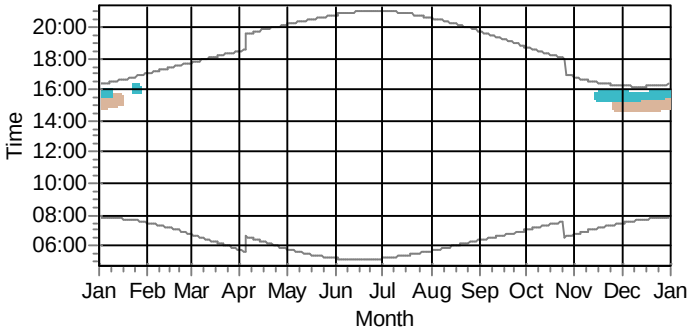
SF006N



SF007S



SF007W



WTGs

019 020 021 022 025

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
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Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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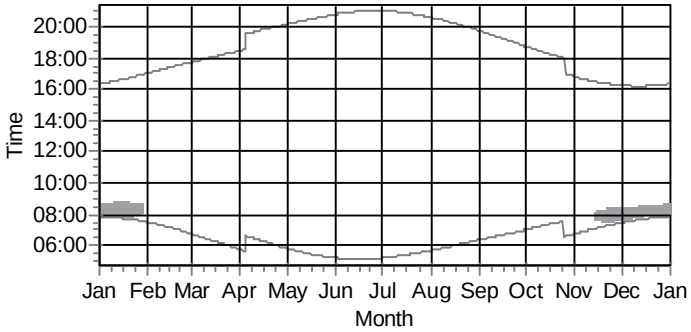
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

SF007E



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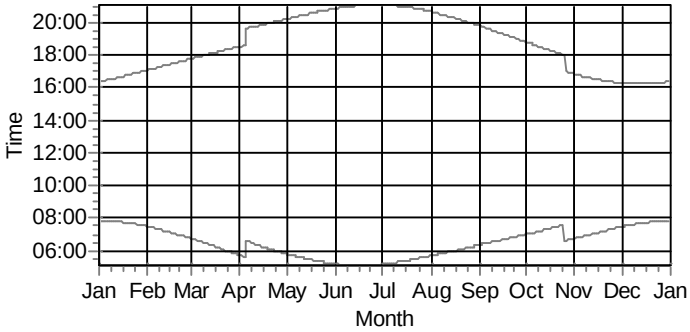
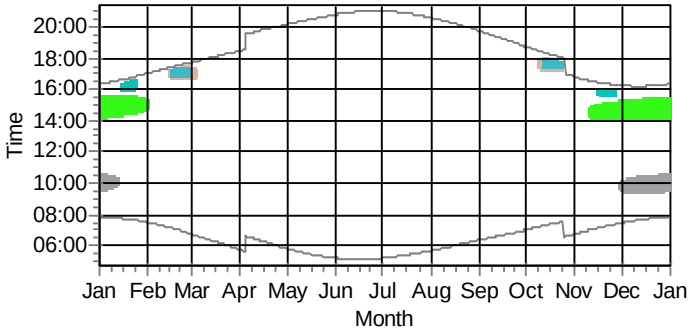


SF008S



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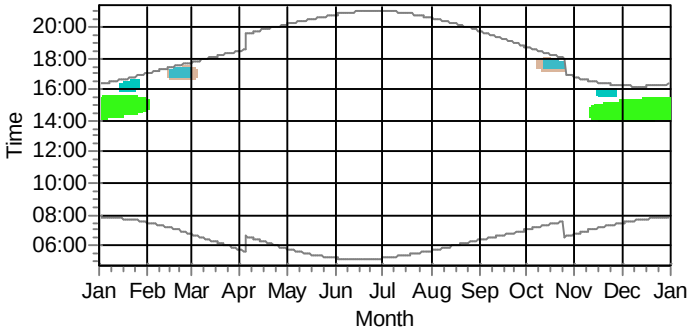
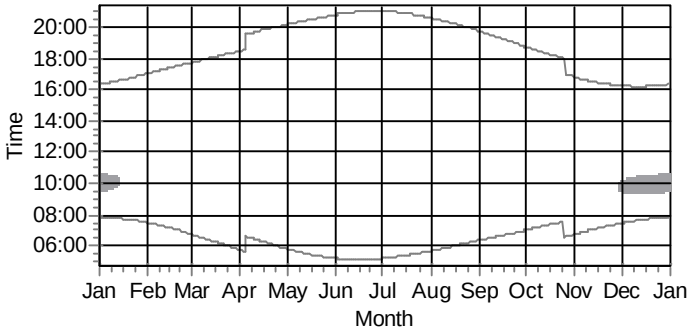


SF008E



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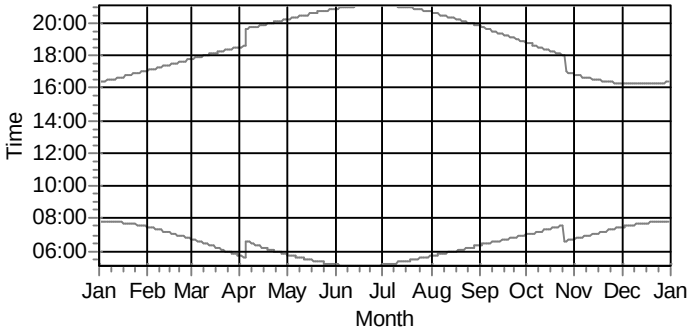

WTGs

019 020 021 022 024

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
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Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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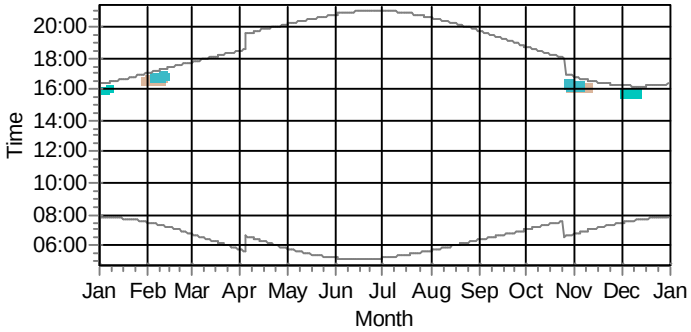
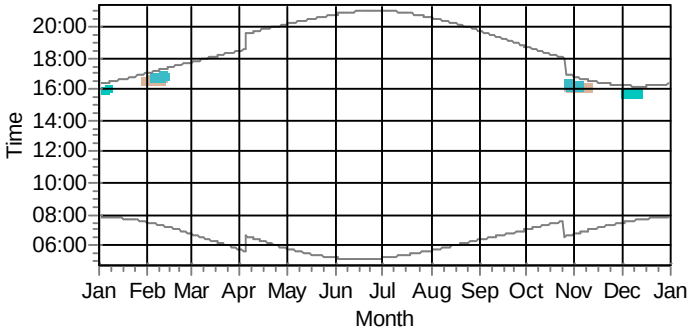
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

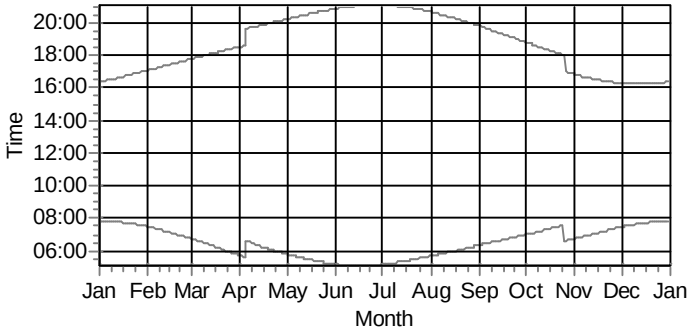
SF009S



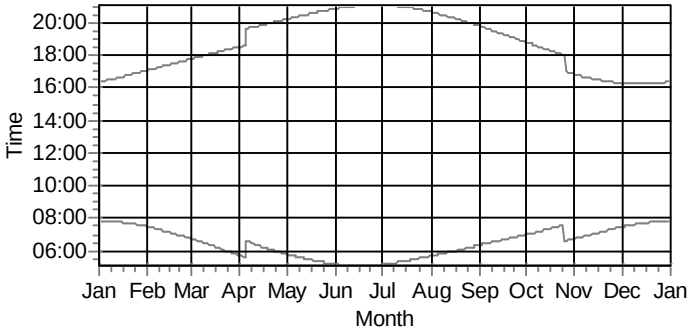
SF009W



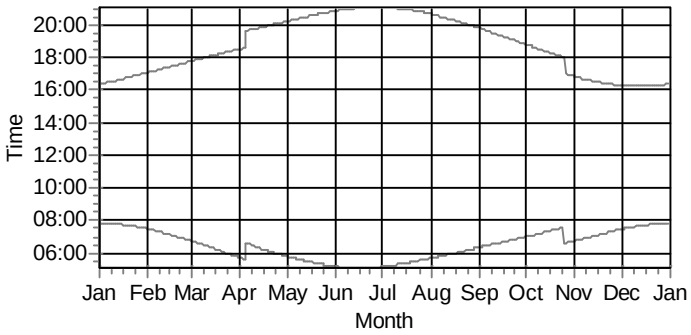
SF009E



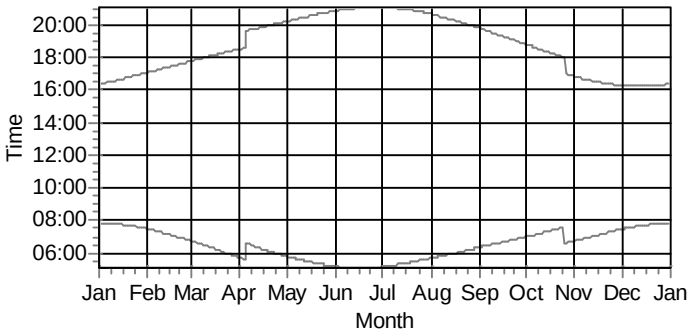
SF009N



SF137W



SF137S



WTGs

020 022 024

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
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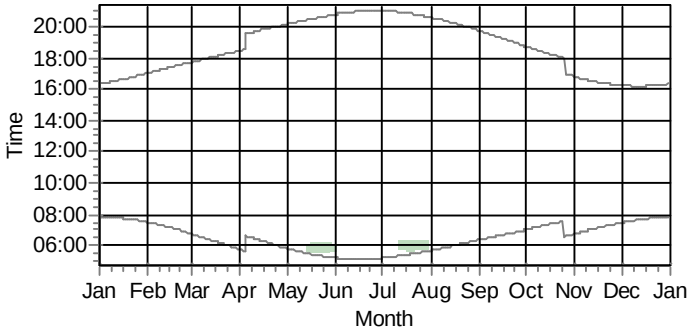
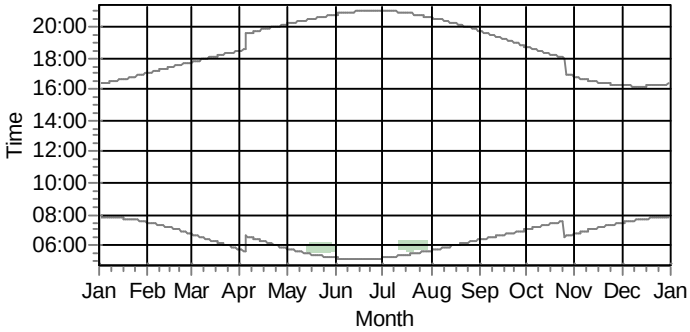
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

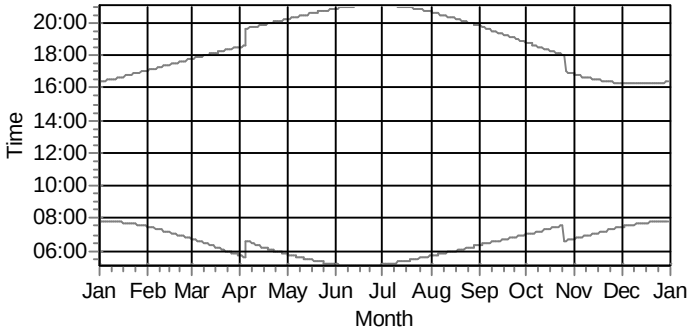
SF137N



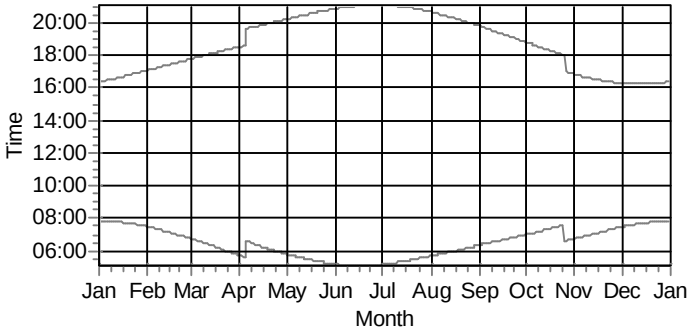
SF137E



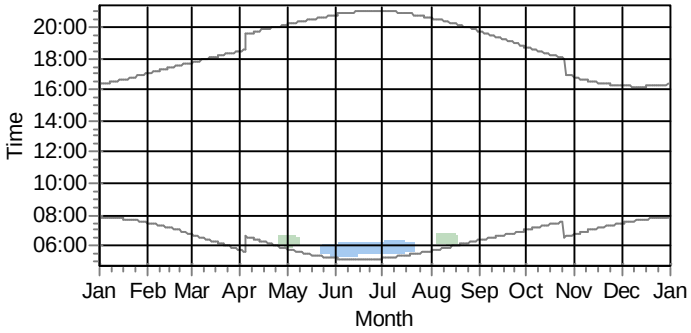
SF138W



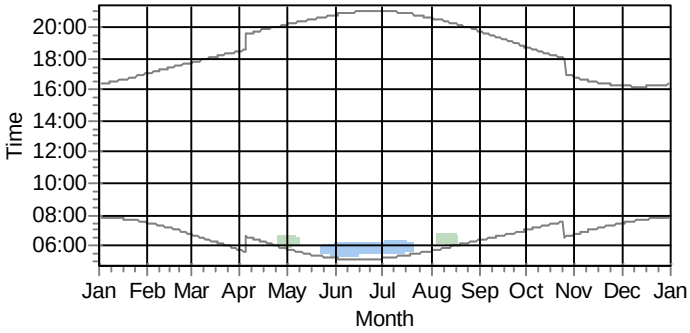
SF138S



SF138N



SF138E



WTGs

016

017

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
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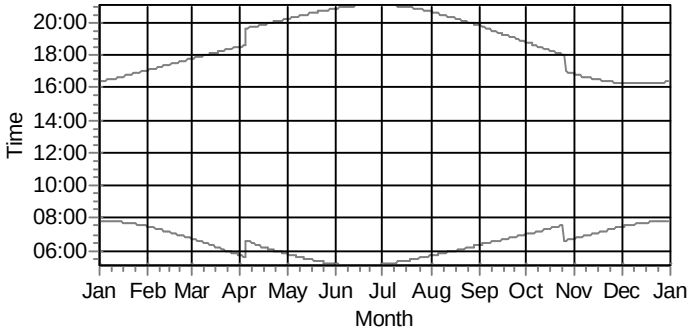
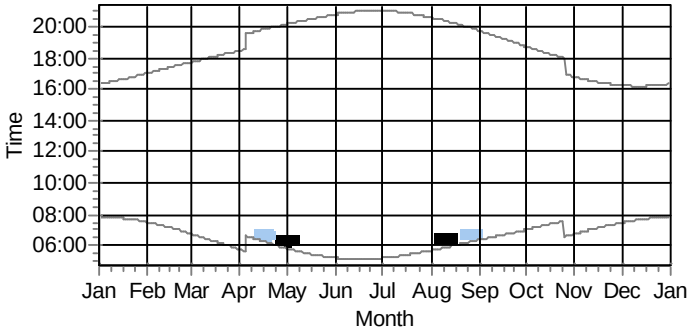
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

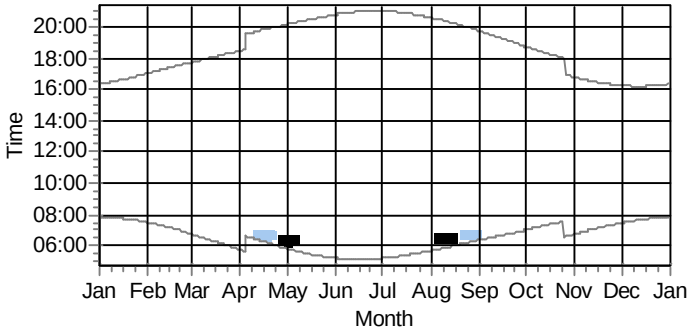
SF139S



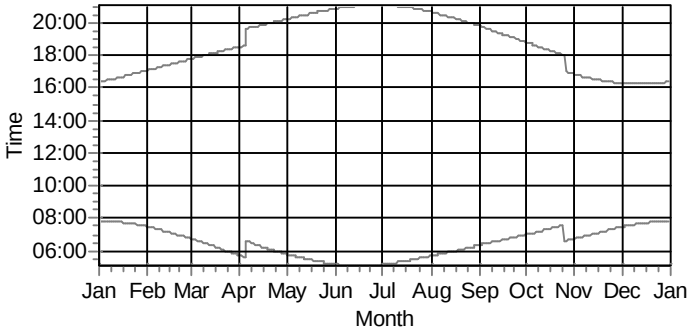
SF139E



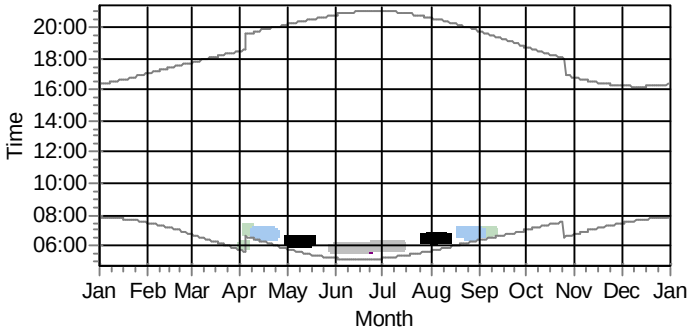
SF139N



SF140S



SF140E



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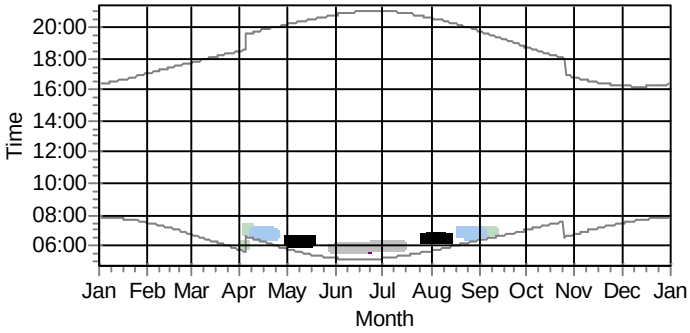

WTGs

012 013 015 016 017

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
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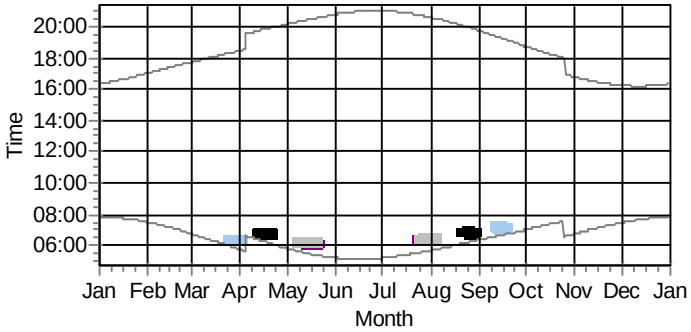
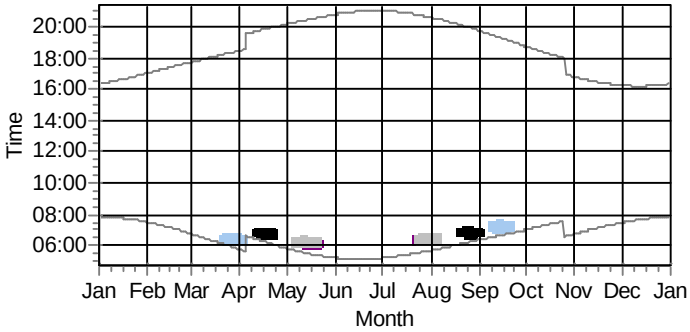
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

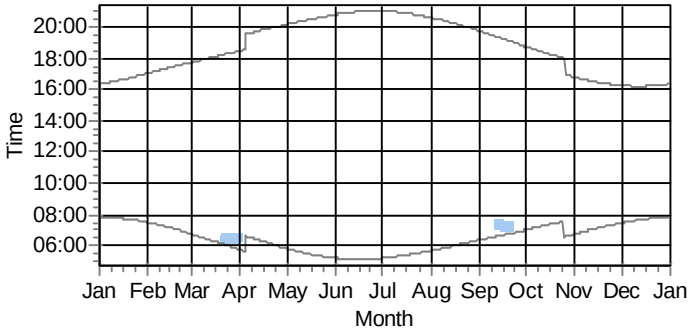
SF141N



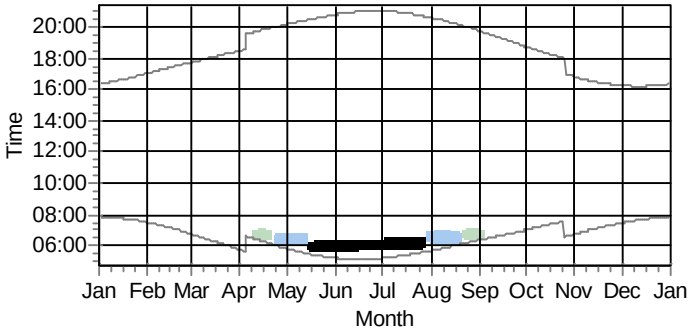
SF141E



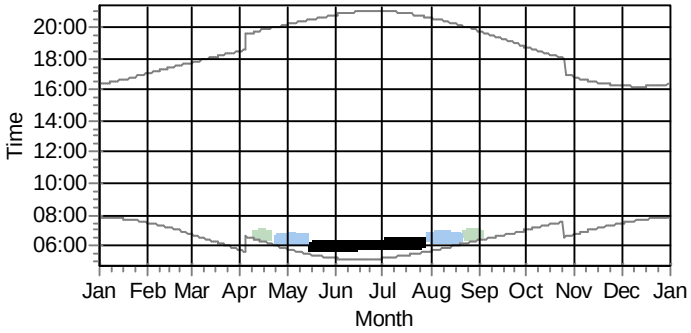
SF141S



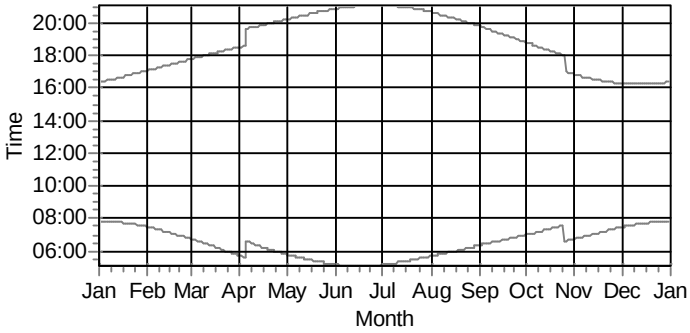
SF142N



SF142E



SF142S



WTGs

012 013 015 016 017

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

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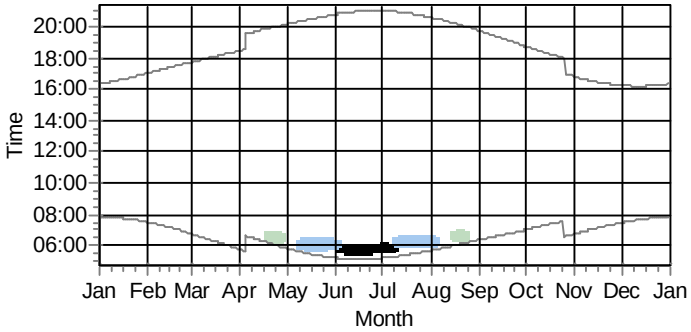
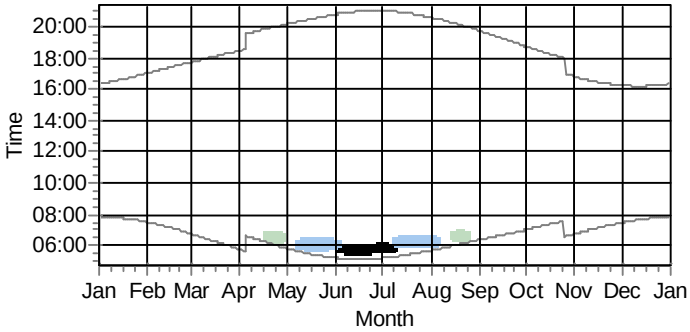
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

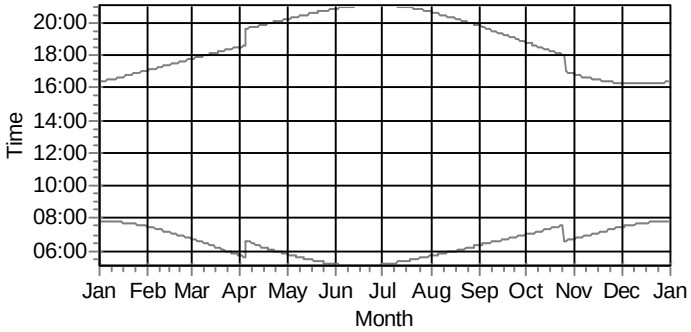
SF143N



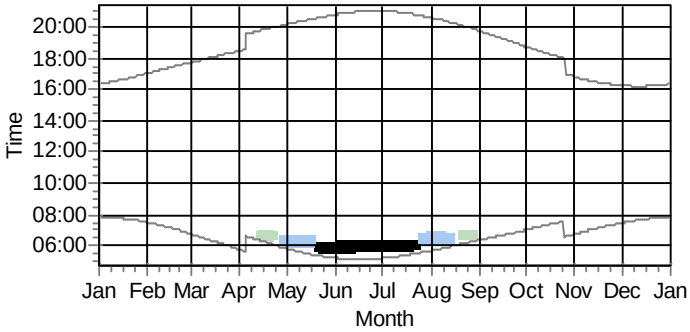
SF143E



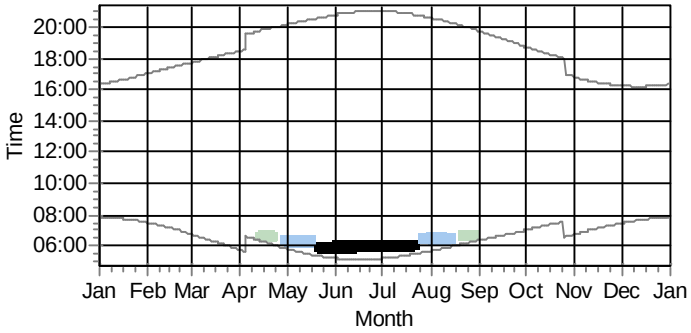
SF143S



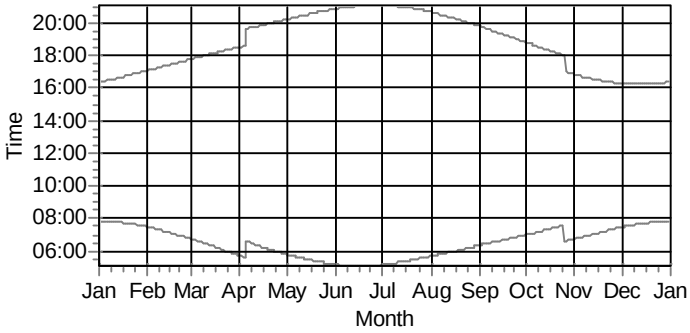
SF144N



SF144E



SF144S



WTGs

015 016 017

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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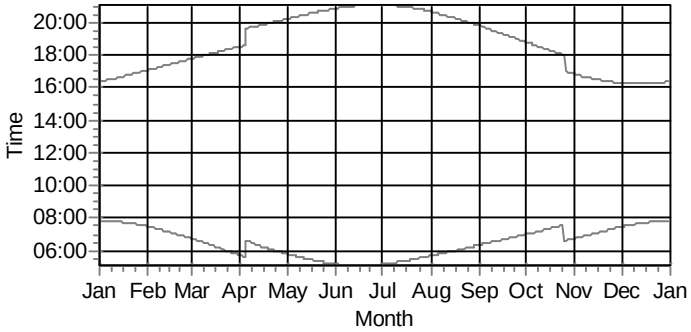
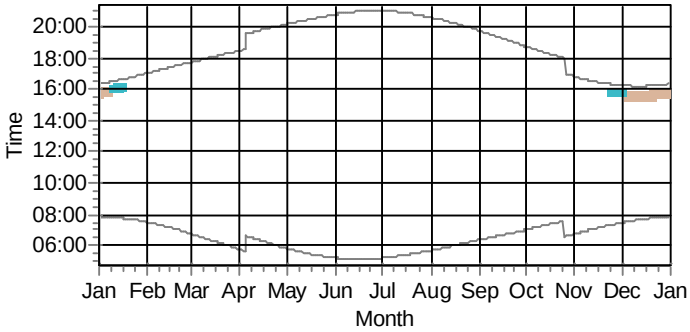
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

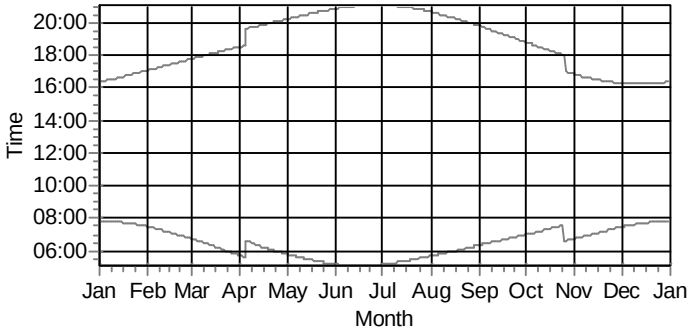
SF145N



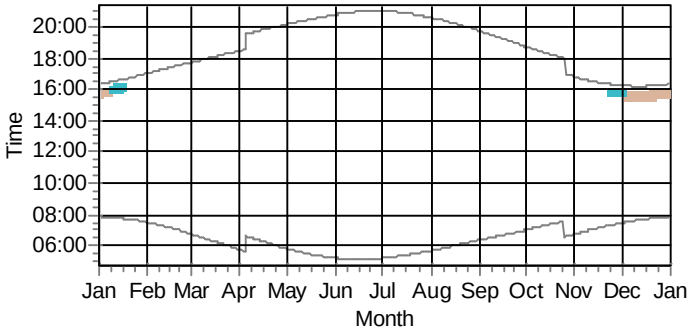
SF145W



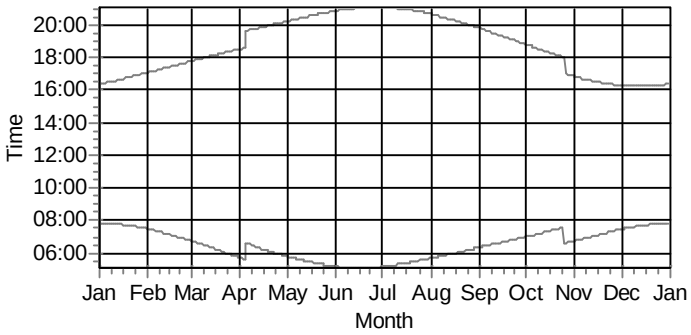
SF145E



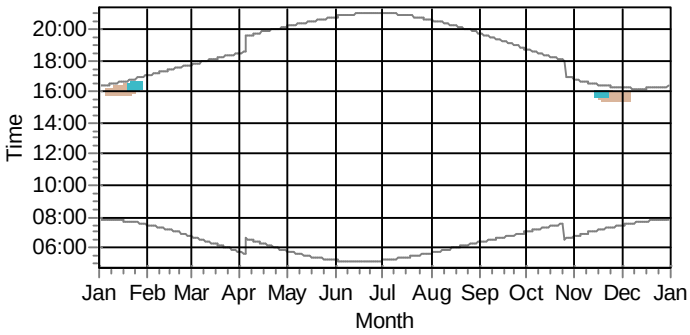
SF145S



SF146N



SF146S



WTGs

020

022

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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CA-92506 Riverside, USA

Calculated:
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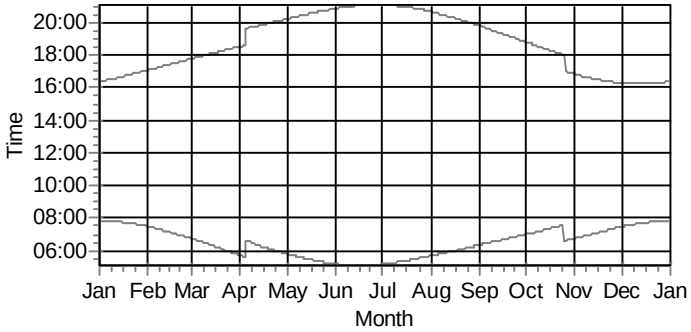
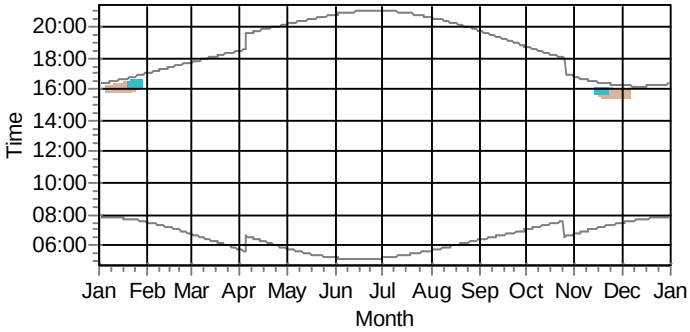
SHADOW - Calendar, graphical

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026

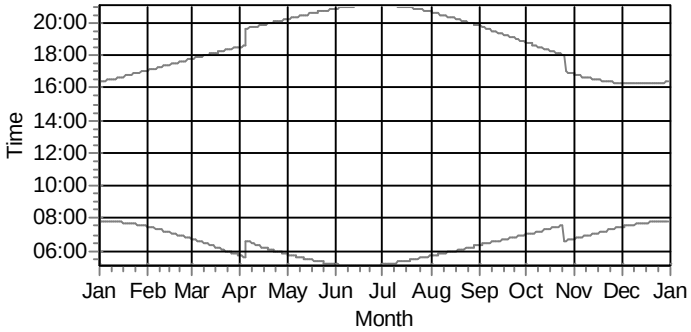
SF146E



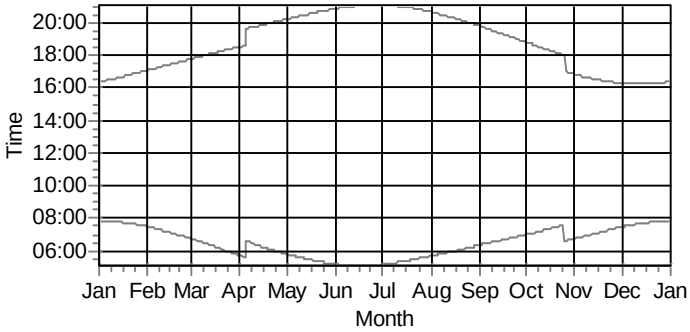
SF146W



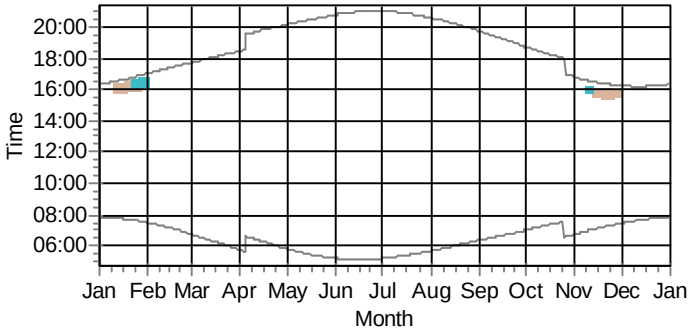
SF147N



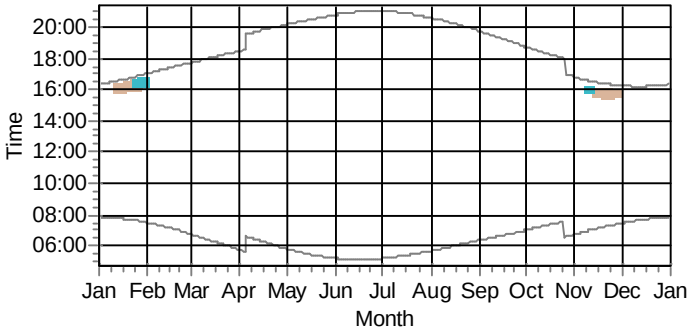
SF147E



SF147S



SF147W



WTGs

020

022

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptors 006-009, 137-147 - all windows
Turbines 001 through 026
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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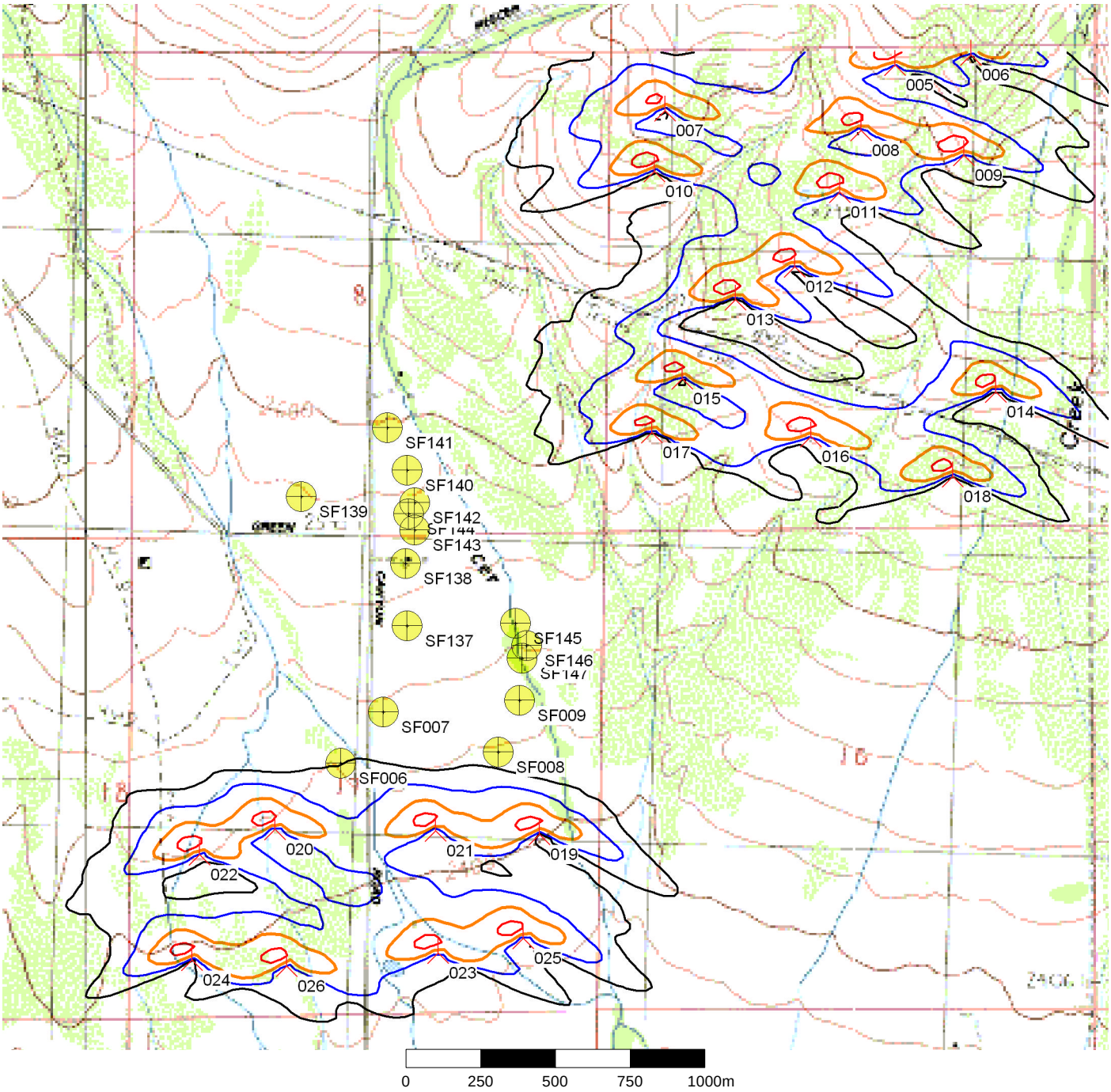
CA-92506 Riverside, USA

Calculated:
07/25/2004 15:26/2.3.0.216

SHADOW - Bitmap map: 030410 Enxco DCWP 24k.bmi

Calculation: 040725 SF 006-009, SF 137-147, tubines 001-026 **File:** 030410 Enxco DCWP 24k.bmi



Map: 030410 Enxco DCWP 24k , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 681,590 North: 5,224,014

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/26/2004 21:12/2.3.0.216

SHADOW - Main Result

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

Assumptions for shadow calculations

Maximum distance for influence	1,500	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

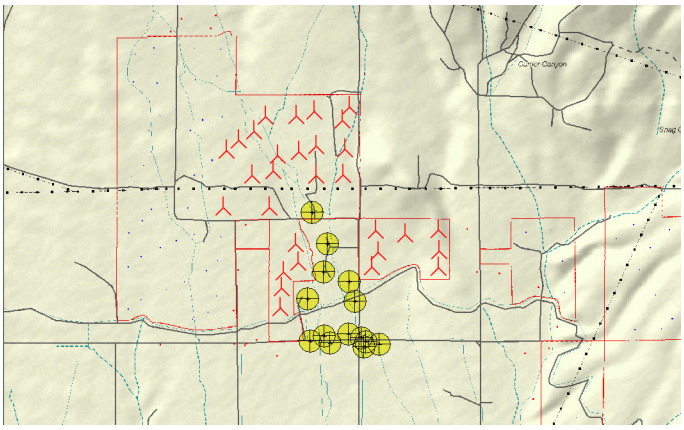
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10				WTG type						
	East	North	Z [m]	Row data/Description	Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
027	682,253	5,222,153	705	027	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
028	682,664	5,222,171	709	028	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
029	682,712	5,221,699	690	029	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
030	682,901	5,222,242	715	030	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
031	682,937	5,221,783	695	031	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
032	683,278	5,222,135	714	032	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
033	683,318	5,221,753	697	033	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
034	683,306	5,221,415	685	034	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
035	683,360	5,222,311	722	035	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
055	682,558	5,220,102	647	055	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
063	682,099	5,221,366	685	063	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
064	682,377	5,221,436	680	064	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
065	682,429	5,221,643	685	065	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
066	682,530	5,219,631	636	066	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
067	682,538	5,219,890	641	067	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
068	682,745	5,220,236	648	068	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
069	682,948	5,221,392	681	069	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
070	683,722	5,220,210	638	070	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
071	683,802	5,220,409	641	071	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
072	683,762	5,220,692	652	072	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
073	684,611	5,220,451	655	073	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
074	684,595	5,220,725	680	074	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
075	684,609	5,220,225	644	075	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
081	682,706	5,220,478	654	081	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
083	684,158	5,220,654	651	083	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
085	681,731	5,220,931	677	085	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
086	682,344	5,220,953	673	086	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
088	682,103	5,221,953	698	088	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
089	681,910	5,221,823	697	089	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
090	681,750	5,221,684	697	090	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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CA-92506 Riverside, USA

Calculated:
07/26/2004 21:12/2.3.0.216

SHADOW - Main Result

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

Shadow Receptor-Input

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF019	SF019E	682,888	5,219,762	635	1.0	1.0	1.0	-90.0	90.0
SF019	SF019N	682,888	5,219,762	635	1.0	1.0	1.0	180.0	90.0
SF019	SF019S	682,888	5,219,762	635	1.0	1.0	1.0	0.0	90.0
SF019	SF019W	682,888	5,219,762	635	1.0	1.0	1.0	90.0	90.0
SF020	SF020N	682,944	5,219,200	621	1.0	1.0	1.0	180.0	90.0
SF020	SF020W	682,944	5,219,200	621	1.0	1.0	1.0	90.0	90.0
SF020	SF020E	682,944	5,219,200	621	1.0	1.0	1.0	-90.0	90.0
SF021	SF021E	683,122	5,219,272	621	1.0	1.0	1.0	-90.0	90.0
SF021	SF021N	683,122	5,219,272	621	1.0	1.0	1.0	180.0	90.0
SF021	SF021W	683,122	5,219,272	621	1.0	1.0	1.0	90.0	90.0
SF022	SF022N	683,517	5,219,743	629	1.0	1.0	1.0	180.0	90.0
SF022	SF022E	683,517	5,219,743	629	1.0	1.0	1.0	-90.0	90.0
SF022	SF022W	683,517	5,219,743	629	1.0	1.0	1.0	90.0	90.0
SF023	SF023W	683,434	5,220,001	636	1.0	1.0	1.0	90.0	90.0
SF023	SF023S	683,434	5,220,001	636	1.0	1.0	1.0	0.0	90.0
SF023	SF023N	683,434	5,220,001	636	1.0	1.0	1.0	180.0	90.0
SF023	SF023E	683,434	5,220,001	636	1.0	1.0	1.0	-90.0	90.0
SF024	SF024W	683,095	5,220,123	641	1.0	1.0	1.0	90.0	90.0
SF024	SF024N	683,095	5,220,123	641	1.0	1.0	1.0	180.0	90.0
SF024	SF024E	683,095	5,220,123	641	1.0	1.0	1.0	-90.0	90.0
SF024	SF024S	683,095	5,220,123	641	1.0	1.0	1.0	0.0	90.0
SF025	SF025E	683,132	5,220,497	651	1.0	1.0	1.0	-90.0	90.0
SF025	SF025W	683,132	5,220,497	651	1.0	1.0	1.0	90.0	90.0
SF025	SF025N	683,132	5,220,497	651	1.0	1.0	1.0	180.0	90.0
SF025	SF025S	683,132	5,220,497	651	1.0	1.0	1.0	0.0	90.0
SF026	SF026N	682,914	5,220,903	663	1.0	1.0	1.0	180.0	90.0
SF026	SF026S	682,914	5,220,903	663	1.0	1.0	1.0	0.0	90.0
SF026	SF026E	682,914	5,220,903	663	1.0	1.0	1.0	-90.0	90.0
SF026	SF026W	682,914	5,220,903	663	1.0	1.0	1.0	90.0	90.0
SF101	SF101E	683,619	5,219,269	617	1.0	1.0	1.0	-90.0	90.0
SF101	SF101W	683,619	5,219,269	617	1.0	1.0	1.0	90.0	90.0
SF101	SF101N	683,619	5,219,269	617	1.0	1.0	1.0	180.0	90.0
SF102	SF102E	683,656	5,219,149	614	1.0	1.0	1.0	-90.0	90.0
SF102	SF102N	683,656	5,219,149	614	1.0	1.0	1.0	180.0	90.0
SF102	SF102W	683,656	5,219,149	614	1.0	1.0	1.0	90.0	90.0
SF103	SF103N	683,680	5,219,214	616	1.0	1.0	1.0	180.0	90.0
SF103	SF103W	683,680	5,219,214	616	1.0	1.0	1.0	90.0	90.0
SF103	SF103E	683,680	5,219,214	616	1.0	1.0	1.0	-90.0	90.0
SF104	SF104N	683,861	5,219,193	614	1.0	1.0	1.0	180.0	90.0
SF104	SF104W	683,861	5,219,193	614	1.0	1.0	1.0	90.0	90.0
SF104	SF104E	683,861	5,219,193	614	1.0	1.0	1.0	-90.0	90.0
SF135	SF135W	683,203	5,219,185	619	1.0	1.0	1.0	90.0	90.0
SF135	SF135N	683,203	5,219,185	619	1.0	1.0	1.0	180.0	90.0
SF135	SF135E	683,203	5,219,185	619	1.0	1.0	1.0	-90.0	90.0
SF136	SF136E	683,448	5,219,314	620	1.0	1.0	1.0	-90.0	90.0
SF136	SF136N	683,448	5,219,314	620	1.0	1.0	1.0	180.0	90.0
SF136	SF136W	683,448	5,219,314	620	1.0	1.0	1.0	90.0	90.0

Calculation Results

No	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
SF019	SF019E	12:38	66	0:20	3:13
SF019	SF019N	80:02	91	1:10	29:15
SF019	SF019S	35:28	59	0:46	8:25
SF019	SF019W	103:38	150	0:52	34:17

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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CA-92506 Riverside, USA

Calculated:
07/26/2004 21:12/2.3.0.216

SHADOW - Main Result

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

		Shadow, worst case			Shadow, expected values
No	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
SF020	SF020N	0:00	0	0:00	0:00
SF020	SF020W	0:00	0	0:00	0:00
SF020	SF020E	0:00	0	0:00	0:00
SF021	SF021E	0:00	0	0:00	0:00
SF021	SF021N	0:00	0	0:00	0:00
SF021	SF021W	0:00	0	0:00	0:00
SF022	SF022N	23:26	101	0:34	7:13
SF022	SF022E	10:50	67	0:16	2:41
SF022	SF022W	17:00	83	0:18	5:49
SF023	SF023W	32:40	127	0:26	10:38
SF023	SF023S	9:20	47	0:20	2:23
SF023	SF023N	38:08	129	0:34	12:07
SF023	SF023E	14:56	83	0:16	3:49
SF024	SF024W	128:54	255	0:52	37:28
SF024	SF024N	108:20	147	1:18	37:37
SF024	SF024E	30:40	93	0:30	8:26
SF024	SF024S	49:44	153	0:32	8:51
SF025	SF025E	40:18	141	0:28	11:28
SF025	SF025W	74:14	193	1:02	15:47
SF025	SF025N	31:26	107	0:36	9:30
SF025	SF025S	67:02	181	1:06	15:12
SF026	SF026N	26:32	92	0:32	9:09
SF026	SF026S	7:34	49	0:18	2:03
SF026	SF026E	7:16	44	0:18	1:57
SF026	SF026W	26:58	93	0:32	9:18
SF101	SF101E	0:00	0	0:00	0:00
SF101	SF101W	9:12	60	0:16	3:25
SF101	SF101N	9:04	60	0:16	3:22
SF102	SF102E	0:00	0	0:00	0:00
SF102	SF102N	5:34	32	0:16	2:08
SF102	SF102W	5:36	32	0:16	2:09
SF103	SF103N	6:02	49	0:14	2:14
SF103	SF103W	6:10	50	0:14	2:17
SF103	SF103E	0:00	0	0:00	0:00
SF104	SF104N	9:50	72	0:12	3:49
SF104	SF104W	10:08	72	0:12	3:55
SF104	SF104E	0:00	0	0:00	0:00
SF135	SF135W	0:00	0	0:00	0:00
SF135	SF135N	0:00	0	0:00	0:00
SF135	SF135E	0:00	0	0:00	0:00
SF136	SF136E	0:00	0	0:00	0:00
SF136	SF136N	7:54	35	0:20	2:50
SF136	SF136W	7:56	35	0:20	2:51

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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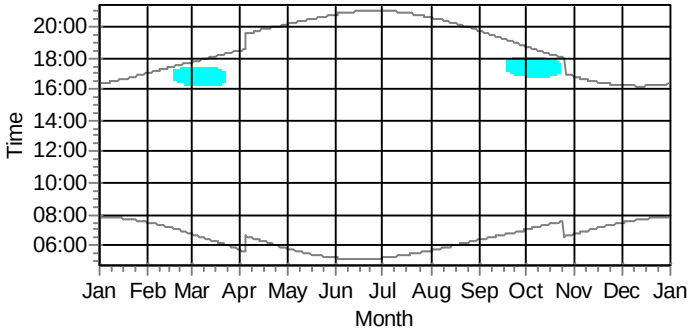
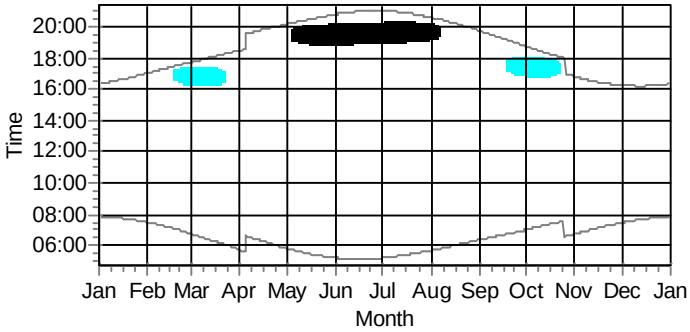
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

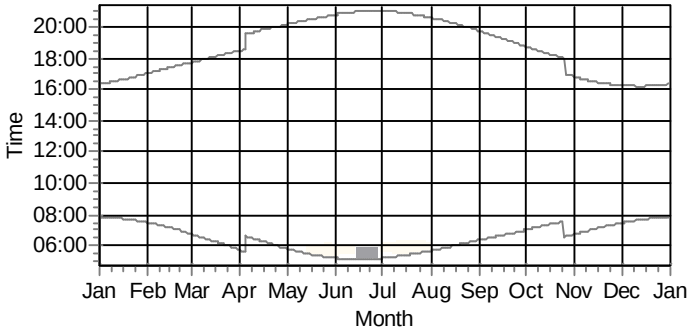
SF019S



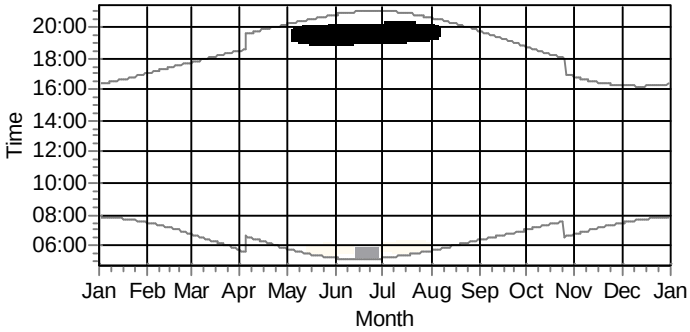
SF019W



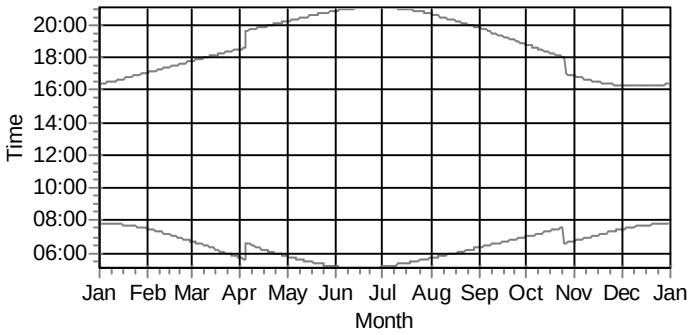
SF019E



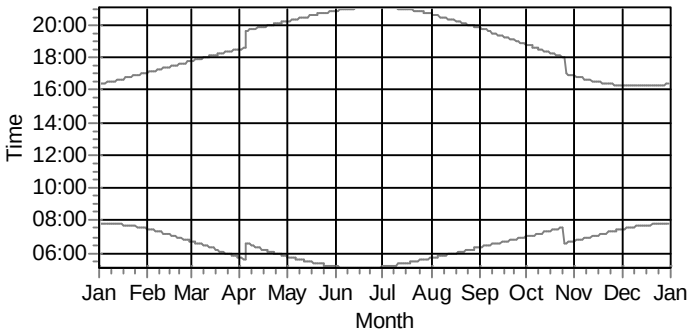
SF019N



SF020N



SF020E



WTGs

066 067 070 071

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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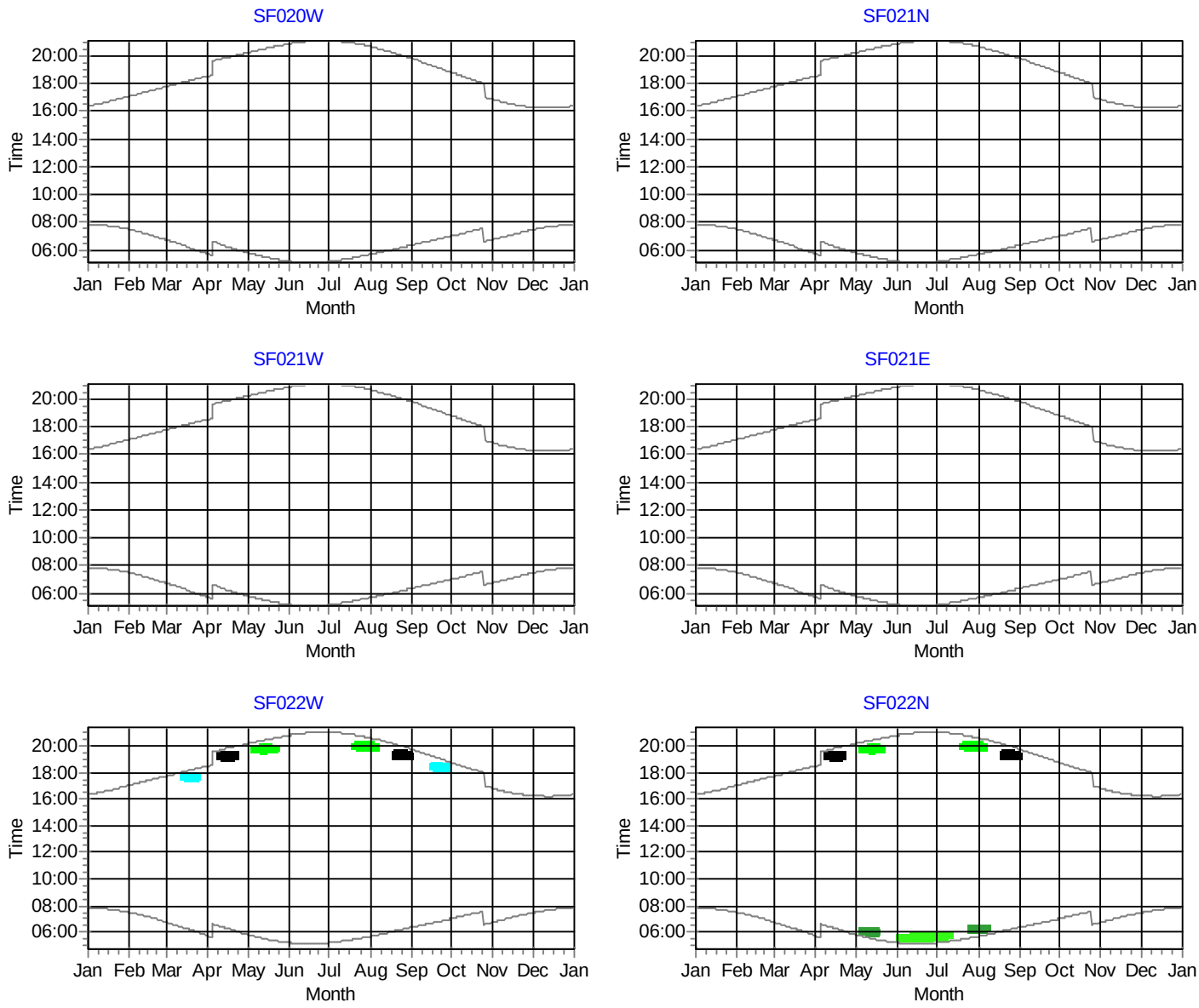
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered



WTGs

055 066 067 073 075

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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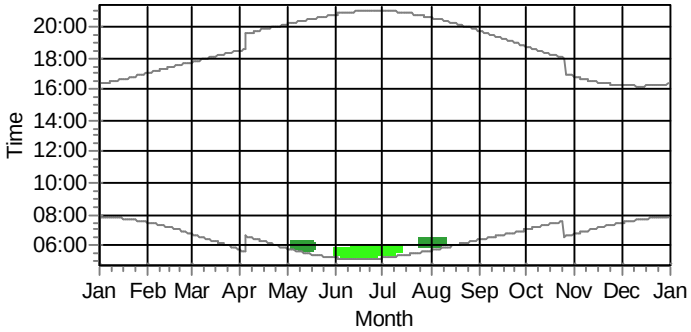
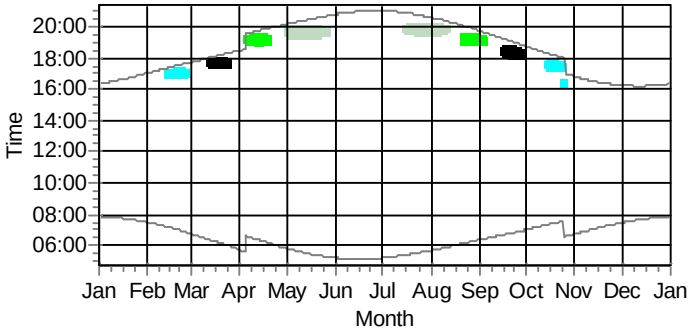
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

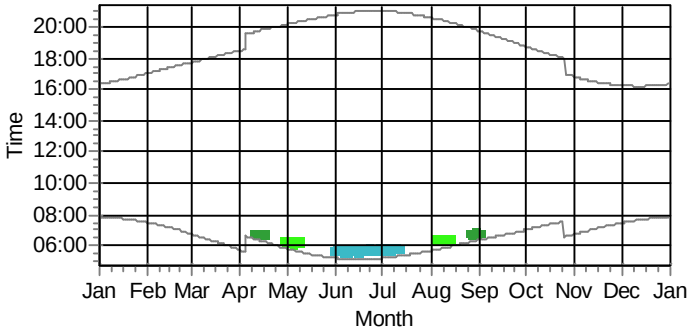
SF022E



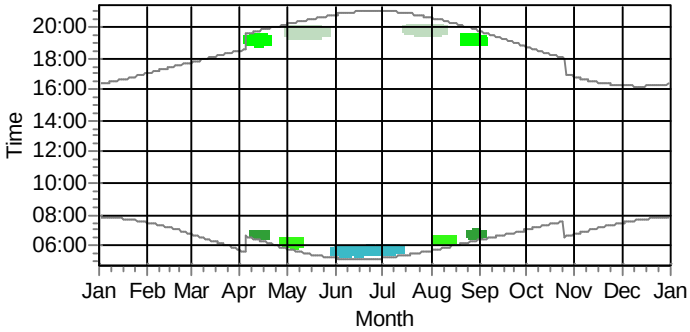
SF023W



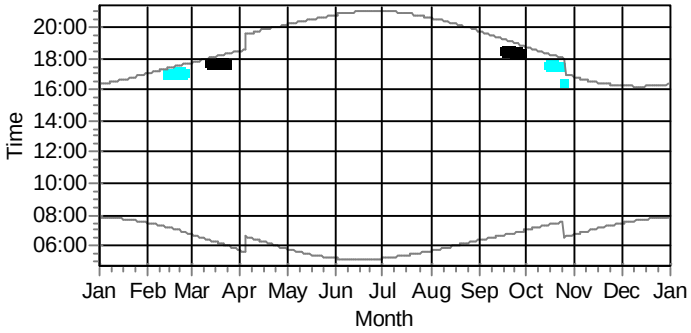
SF023E



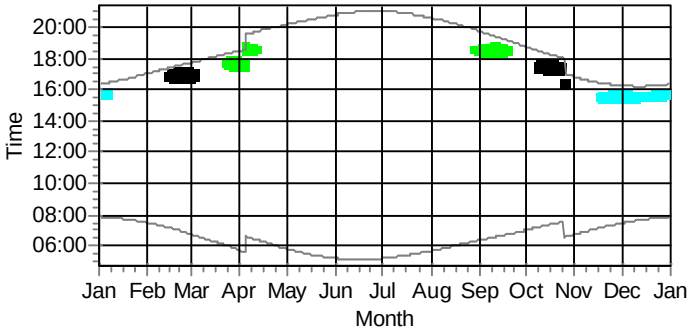
SF023N



SF023S



SF024S



WTGs

055	067	073	075
066	068	074	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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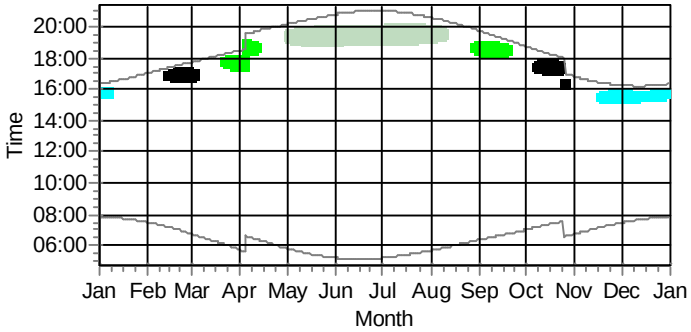
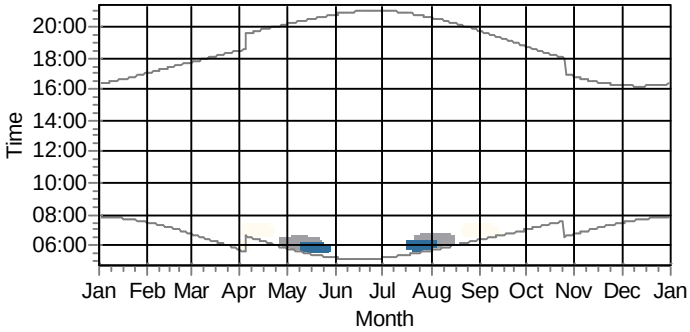
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

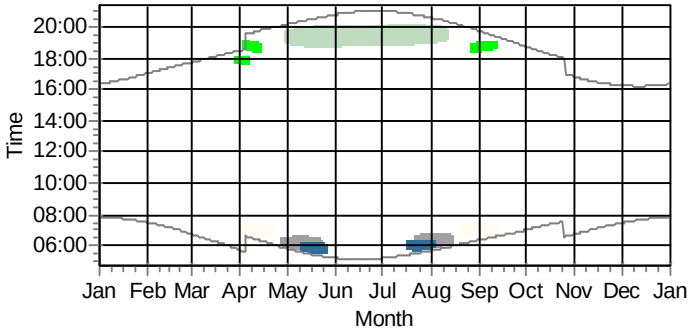
SF024W



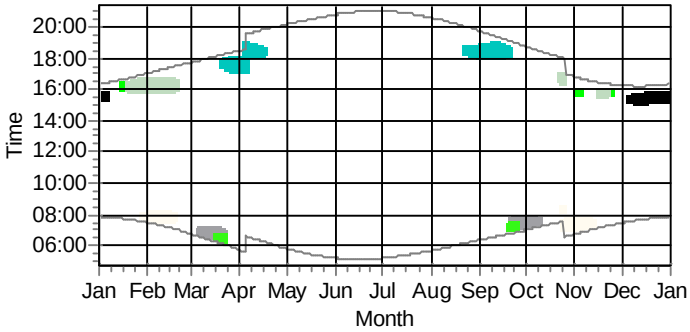
SF024E



SF024N



SF025S



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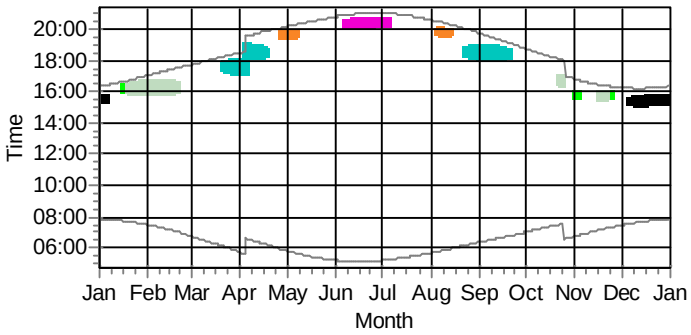

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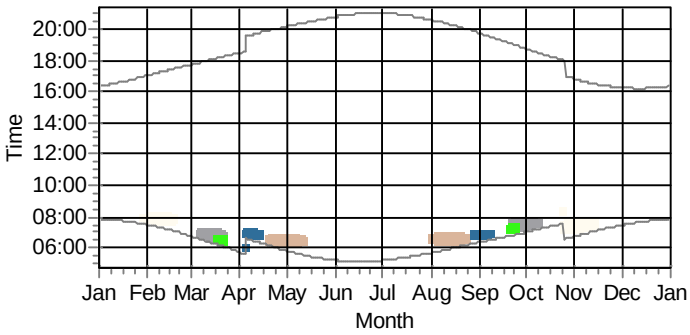

WTGs

055	068	072	081	086
066	070	073	083	
067	071	074	085	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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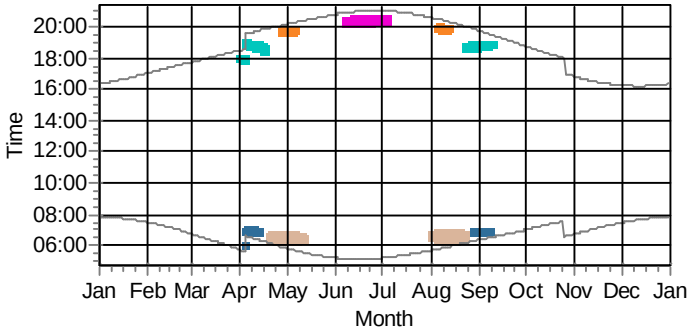
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

SF025N



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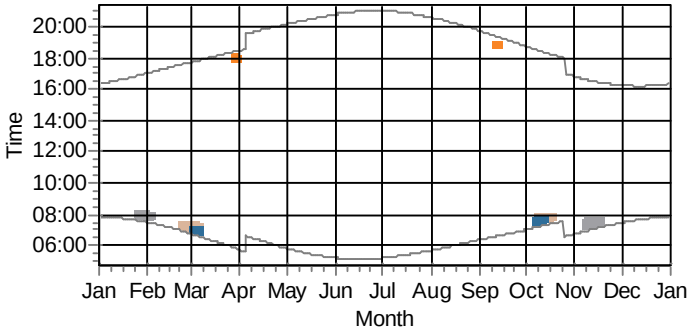
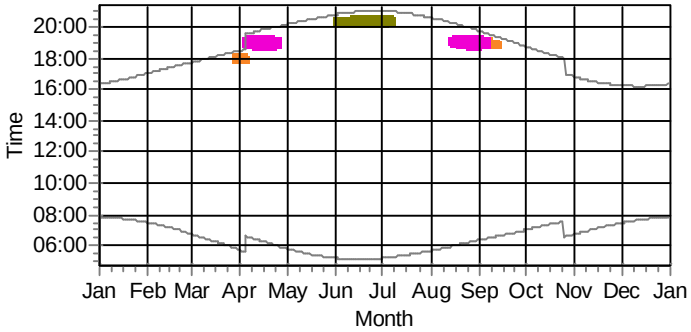
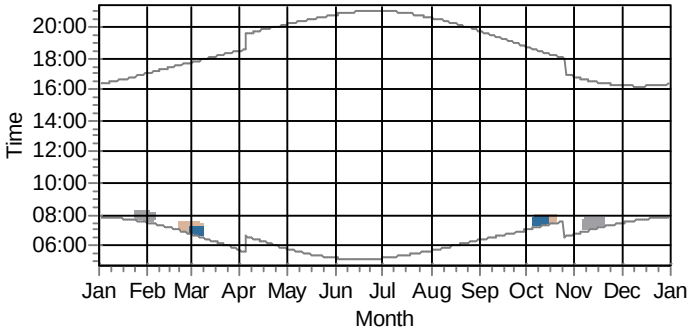


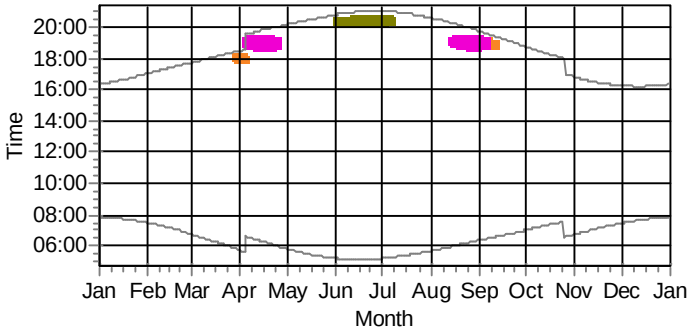
SF026W



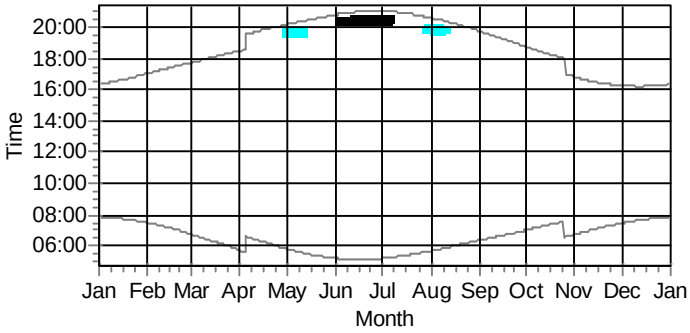
SF026E



SF026N



SF101N



WTGs

063	067	072	081	085
066	071	074	083	086

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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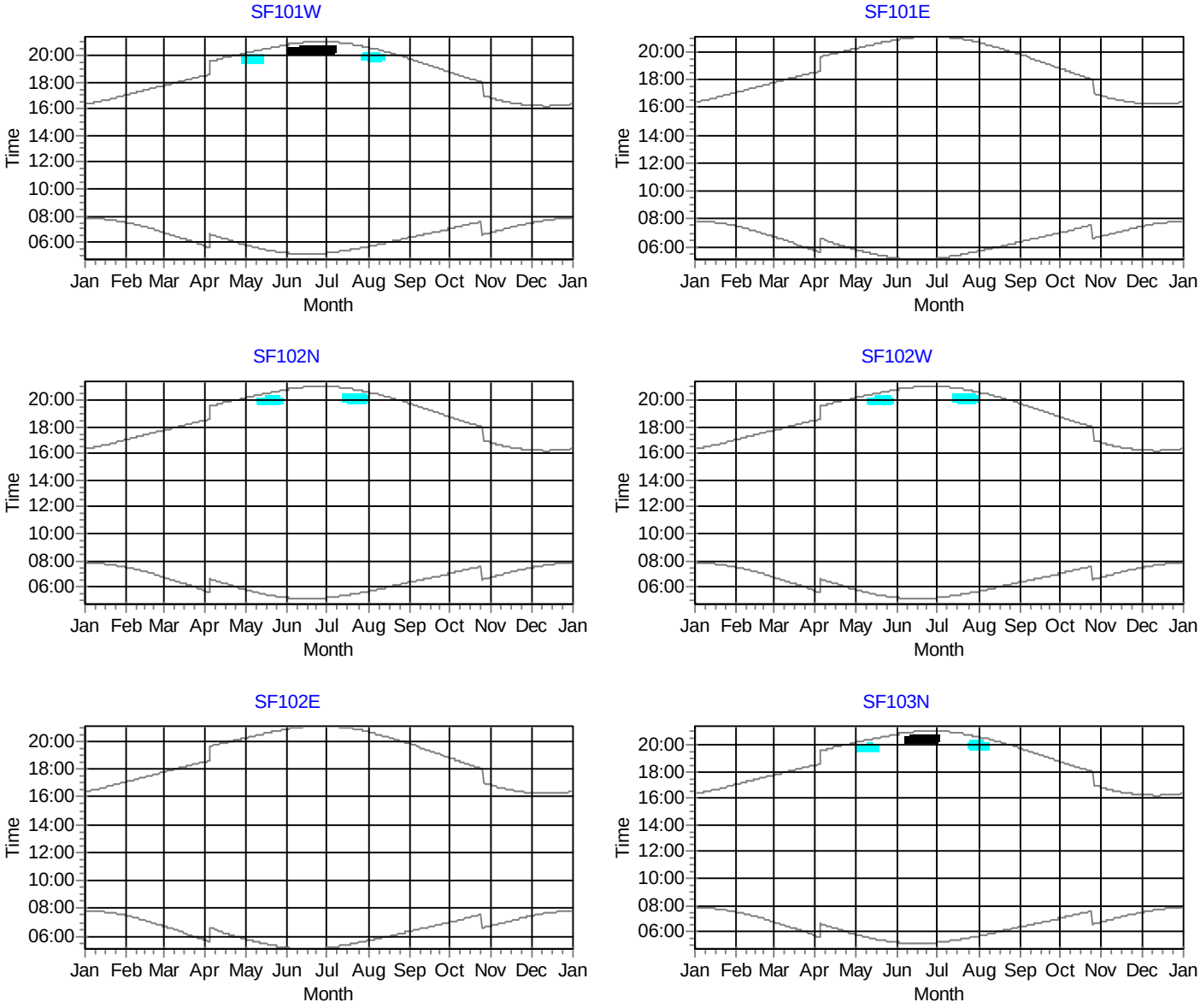
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered



WTGs

066 067

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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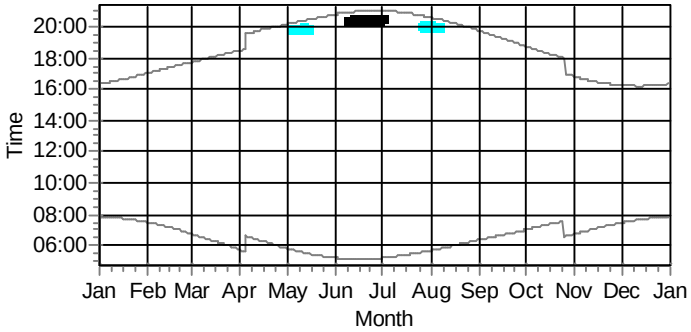
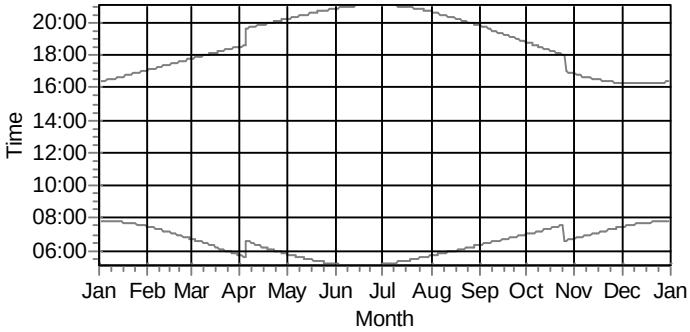
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

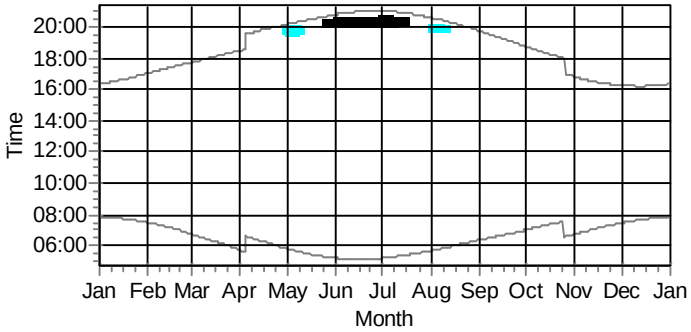
SF103W



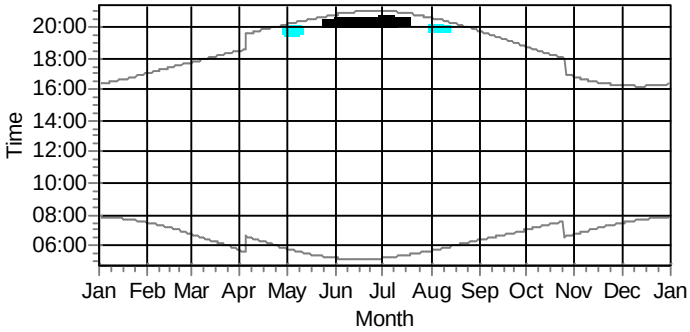
SF103E



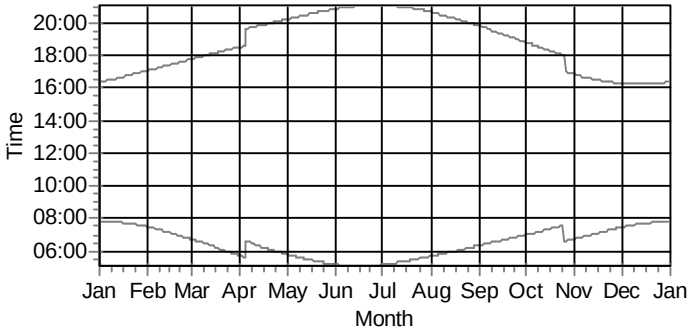
SF104N



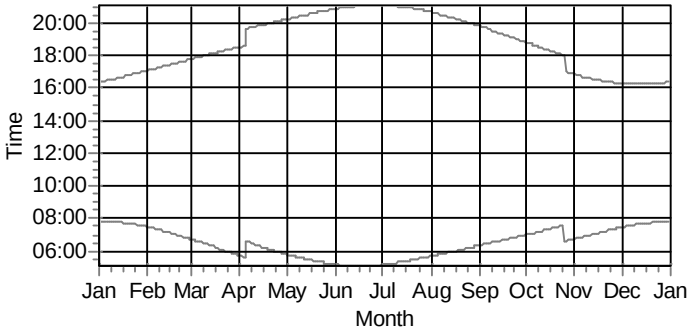
SF104W



SF104E



SF135N



WTGs

066 067

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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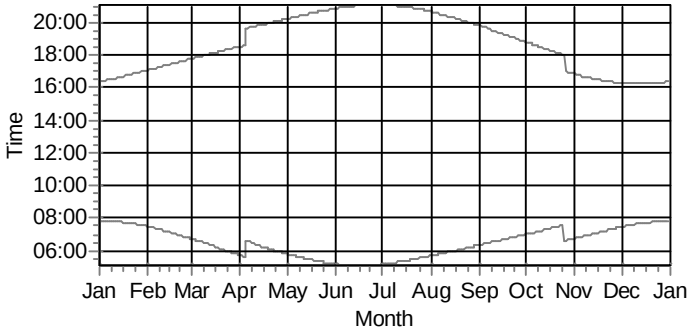
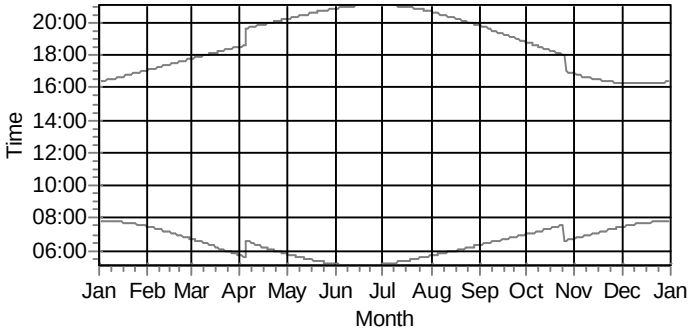
SHADOW - Calendar, graphical

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered

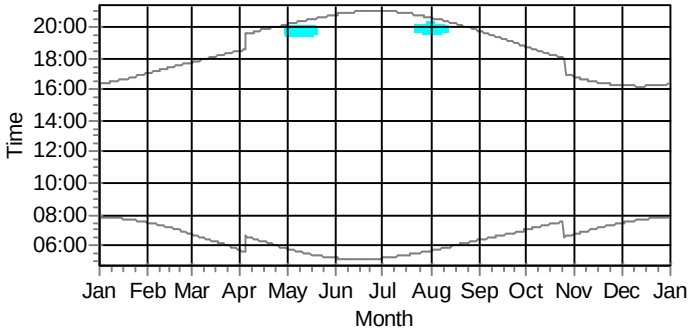
SF135W



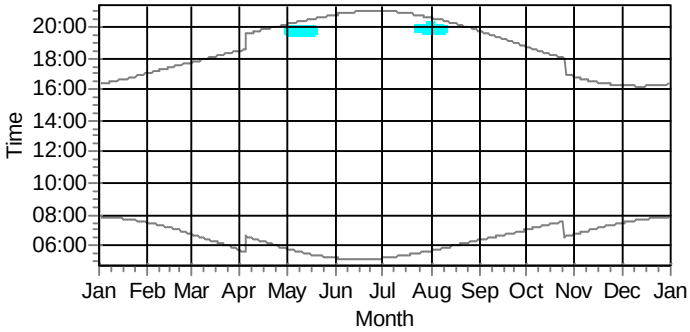
SF135E



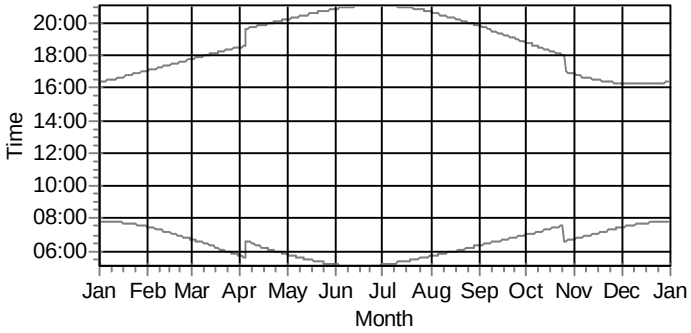
SF136N



SF136W



SF136E



WTGs

066

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 019 through 026, 101 through 104, 135, 136 - selected windows
Turbines 027-035, 055, 063-075, 081, 083, 085, 086, 088-090
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow distance applied

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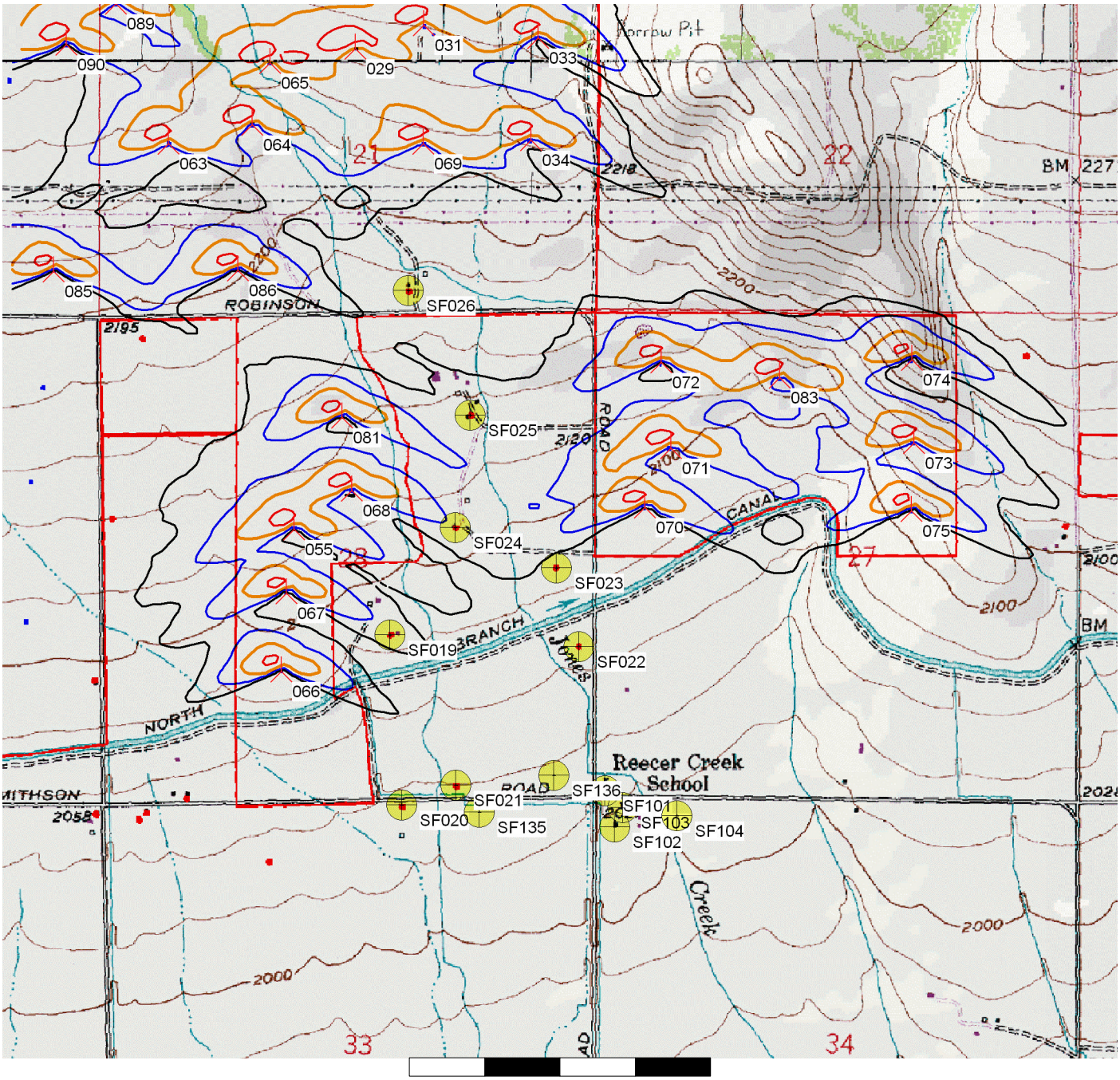
SHADOW - 040711 DCWPP USGS, z13, 31250, overlays

Calculation: 040726 SF 019-026, 101-104, 135-136, tubines scattered **File:** 040711 DCWPP USGS, z13, 34375, overlays.bmi



0 250 500 750 1000m

Map: 040711 DCWPP USGS, z13, 31250, overlays , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 683,382 North: 5,220,063

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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Wind Engineers, Inc.
7660 Whitegate Avenue
CA-92506 Riverside, USA

Calculated:
07/26/2004 15:36/2.3.0.216

SHADOW - Main Result

Calculation: 040726 SF 027-034, 105-114, tubines skattered

Assumptions for shadow calculations

Maximum distance for influence	1,500	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

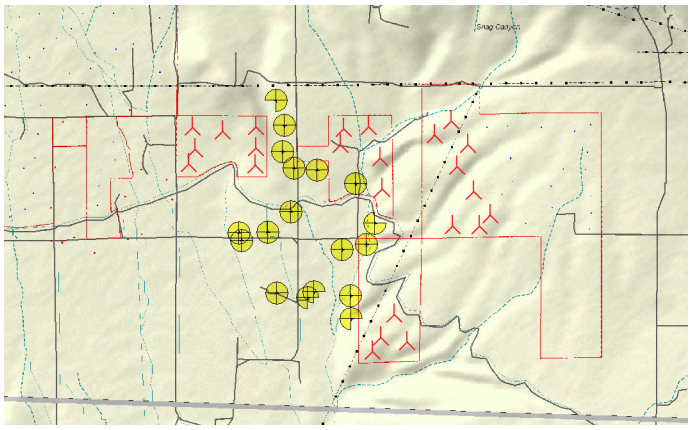
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10 East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
070	683,722	5,220,210	638	070	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
071	683,802	5,220,409	641	071	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
072	683,762	5,220,692	652	072	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
073	684,611	5,220,451	655	073	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
074	684,595	5,220,725	680	074	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
075	684,609	5,220,225	644	075	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
076	685,724	5,220,530	658	076	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
077	685,764	5,220,737	664	077	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
078	686,091	5,220,775	663	078	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
079	686,261	5,220,367	678	079	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
080	686,301	5,219,957	647	080	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
083	684,158	5,220,654	651	083	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
091	687,250	5,219,497	668	091	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
092	687,601	5,219,511	680	092	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
093	687,511	5,219,965	687	093	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
098	687,421	5,220,582	700	098	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
099	687,279	5,220,288	692	099	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
113	687,186	5,220,886	700	113	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
114	686,969	5,220,695	696	114	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
115	687,742	5,219,655	684	115	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
117	686,507	5,218,310	620	117	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
118	686,696	5,217,949	620	118	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
119	686,344	5,218,001	616	119	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
120	686,235	5,217,814	600	120	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Shadow Receptor-Input

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF027	SF027N	685,928	5,218,534	600	1.0	1.0	1.0	180.0	90.0
SF027	SF027E	685,928	5,218,534	600	1.0	1.0	1.0	-90.0	90.0
SF027	SF027S	685,928	5,218,534	600	1.0	1.0	1.0	0.0	90.0
SF028	SF028N	685,430	5,220,179	646	1.0	1.0	1.0	180.0	90.0
SF028	SF028E	685,430	5,220,179	646	1.0	1.0	1.0	-90.0	90.0
SF028	SF028W	685,430	5,220,179	646	1.0	1.0	1.0	90.0	90.0
SF029	SF029N	685,128	5,220,191	645	1.0	1.0	1.0	180.0	90.0

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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SHADOW - Main Result

Calculation: 040726 SF 027-034, 105-114, tubines skattered

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SF029	SF029E	685,128	5,220,191	645	1.0	1.0	1.0	-90.0	90.0
SF029	SF029W	685,128	5,220,191	645	1.0	1.0	1.0	90.0	90.0
SF030	SF030S	684,977	5,220,755	668	1.0	1.0	1.0	0.0	90.0
SF030	SF030E	684,977	5,220,755	668	1.0	1.0	1.0	-90.0	90.0
SF030	SF030W	684,977	5,220,755	668	1.0	1.0	1.0	90.0	90.0
SF031	SF031N	685,798	5,219,141	616	1.0	1.0	1.0	180.0	90.0
SF031	SF031E	685,798	5,219,141	616	1.0	1.0	1.0	-90.0	90.0
SF031	SF031S	685,798	5,219,141	616	1.0	1.0	1.0	0.0	90.0
SF032	SF032N	686,117	5,219,215	620	1.0	1.0	1.0	180.0	90.0
SF032	SF032W	686,117	5,219,215	620	1.0	1.0	1.0	90.0	90.0
SF032	SF032S	686,117	5,219,215	620	1.0	1.0	1.0	0.0	90.0
SF032	SF032E	686,117	5,219,215	620	1.0	1.0	1.0	-90.0	90.0
SF033	SF033N	685,947	5,220,014	640	1.0	1.0	1.0	180.0	90.0
SF033	SF033S	685,947	5,220,014	640	1.0	1.0	1.0	0.0	90.0
SF033	SF033W	685,947	5,220,014	640	1.0	1.0	1.0	90.0	90.0
SF033	SF033E	685,947	5,220,014	640	1.0	1.0	1.0	-90.0	90.0
SF034	SF034N	686,215	5,219,502	631	1.0	1.0	1.0	180.0	90.0
SF034	SF034E	686,215	5,219,502	631	1.0	1.0	1.0	-90.0	90.0
SF105	SF105E	684,419	5,219,315	616	1.0	1.0	1.0	-90.0	90.0
SF105	SF105W	684,419	5,219,315	616	1.0	1.0	1.0	90.0	90.0
SF105	SF105N	684,419	5,219,315	616	1.0	1.0	1.0	180.0	90.0
SF106	SF106E	684,461	5,219,221	613	1.0	1.0	1.0	-90.0	90.0
SF106	SF106N	684,461	5,219,221	613	1.0	1.0	1.0	180.0	90.0
SF106	SF106W	684,461	5,219,221	613	1.0	1.0	1.0	90.0	90.0
SF107	SF107N	684,806	5,219,342	620	1.0	1.0	1.0	180.0	90.0
SF107	SF107E	684,806	5,219,342	620	1.0	1.0	1.0	-90.0	90.0
SF107	SF107W	684,806	5,219,342	620	1.0	1.0	1.0	90.0	90.0
SF108	SF108N	685,104	5,219,618	629	1.0	1.0	1.0	180.0	90.0
SF108	SF108E	685,104	5,219,618	629	1.0	1.0	1.0	-90.0	90.0
SF108	SF108W	685,104	5,219,618	629	1.0	1.0	1.0	90.0	90.0
SF109	SF109E	684,965	5,220,411	655	1.0	1.0	1.0	-90.0	90.0
SF109	SF109N	684,965	5,220,411	655	1.0	1.0	1.0	180.0	90.0
SF109	SF109S	684,965	5,220,411	655	1.0	1.0	1.0	0.0	90.0
SF109	SF109W	684,965	5,220,411	655	1.0	1.0	1.0	90.0	90.0
SF110	SF110E	685,942	5,218,236	600	1.0	1.0	1.0	-90.0	90.0
SF110	SF110S	685,942	5,218,236	600	1.0	1.0	1.0	0.0	90.0
SF111	SF111W	684,857	5,221,086	680	1.0	1.0	1.0	90.0	90.0
SF111	SF111S	684,857	5,221,086	680	1.0	1.0	1.0	0.0	90.0
SF112	SF112E	685,360	5,218,490	597	1.0	1.0	1.0	-90.0	90.0
SF112	SF112S	685,360	5,218,490	597	1.0	1.0	1.0	0.0	90.0
SF113	SF113E	685,444	5,218,569	600	1.0	1.0	1.0	-90.0	90.0
SF113	SF113S	685,444	5,218,569	600	1.0	1.0	1.0	0.0	90.0
SF114	SF114E	684,947	5,218,540	600	1.0	1.0	1.0	-90.0	90.0
SF114	SF114N	684,947	5,218,540	600	1.0	1.0	1.0	180.0	90.0
SF114	SF114W	684,947	5,218,540	600	1.0	1.0	1.0	90.0	90.0

Calculation Results

No	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
SF027	SF027N	0:00	0	0:00	0:00
SF027	SF027E	29:58	106	0:30	6:54
SF027	SF027S	29:52	106	0:30	6:52
SF028	SF028N	25:24	97	0:26	8:12
SF028	SF028E	13:52	56	0:22	4:01
SF028	SF028W	17:02	66	0:26	5:53
SF029	SF029N	84:02	138	1:06	27:11
SF029	SF029E	35:58	100	0:34	9:25

Project:
030415 Desert Claim Wind Power Project, WA

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SHADOW - Main Result

Calculation: 040726 SF 027-034, 105-114, tubines skattered

No	Name	Shadow, worst case Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values Shadow hours per year [h/year]
SF029	SF029W	51:24	139	0:40	18:45
SF030	SF030S	91:50	203	0:52	17:50
SF030	SF030E	14:08	56	0:24	4:21
SF030	SF030W	83:18	182	0:46	15:19
SF031	SF031N	2:52	18	0:12	0:47
SF031	SF031E	2:52	18	0:12	0:47
SF031	SF031S	0:00	0	0:00	0:00
SF032	SF032N	4:38	24	0:16	1:16
SF032	SF032W	0:00	0	0:00	0:00
SF032	SF032S	0:00	0	0:00	0:00
SF032	SF032E	4:38	24	0:16	1:16
SF033	SF033N	6:32	39	0:22	2:02
SF033	SF033S	41:12	80	0:48	13:35
SF033	SF033W	3:22	31	0:10	1:09
SF033	SF033E	45:02	101	0:50	14:42
SF034	SF034N	6:32	41	0:14	1:50
SF034	SF034E	9:28	44	0:20	2:47
SF105	SF105E	0:00	0	0:00	0:00
SF105	SF105W	0:00	0	0:00	0:00
SF105	SF105N	0:00	0	0:00	0:00
SF106	SF106E	0:00	0	0:00	0:00
SF106	SF106N	0:00	0	0:00	0:00
SF106	SF106W	0:00	0	0:00	0:00
SF107	SF107N	0:00	0	0:00	0:00
SF107	SF107E	0:00	0	0:00	0:00
SF107	SF107W	0:00	0	0:00	0:00
SF108	SF108N	8:20	51	0:14	2:05
SF108	SF108E	8:26	52	0:14	2:07
SF108	SF108W	0:00	0	0:00	0:00
SF109	SF109E	25:30	116	0:24	7:07
SF109	SF109N	81:06	99	1:18	25:46
SF109	SF109S	35:00	98	0:50	7:04
SF109	SF109W	95:14	160	1:04	26:26
SF110	SF110E	55:12	105	0:56	15:46
SF110	SF110S	37:22	62	0:56	10:19
SF111	SF111W	33:36	86	0:40	2:51
SF111	SF111S	40:24	131	0:40	4:16
SF112	SF112E	20:34	105	0:20	4:32
SF112	SF112S	20:24	105	0:20	4:29
SF113	SF113E	13:20	69	0:18	3:05
SF113	SF113S	13:20	69	0:18	3:05
SF114	SF114E	2:44	28	0:10	0:40
SF114	SF114N	0:00	0	0:00	0:00
SF114	SF114W	0:00	0	0:00	0:00

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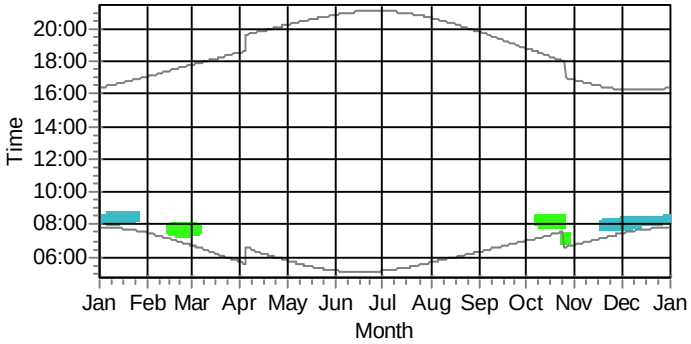
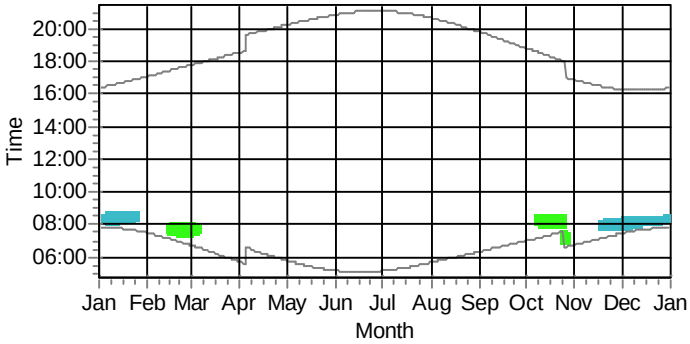
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered

SF027S



SF027E



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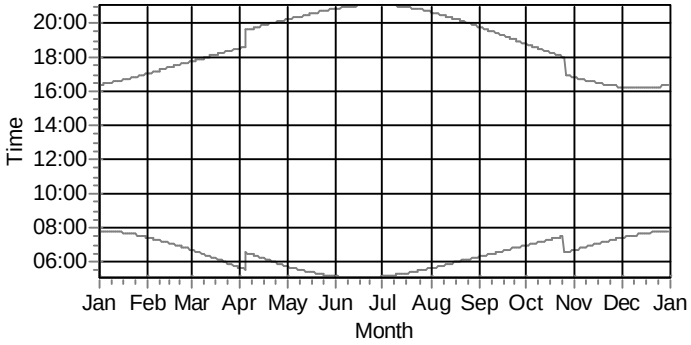

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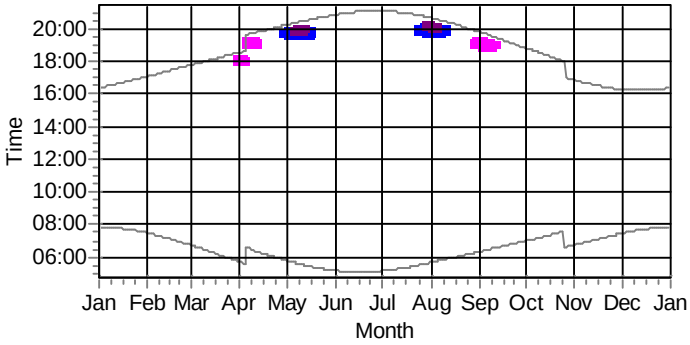

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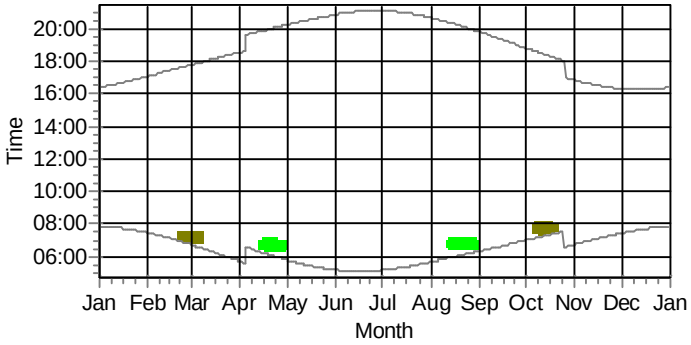

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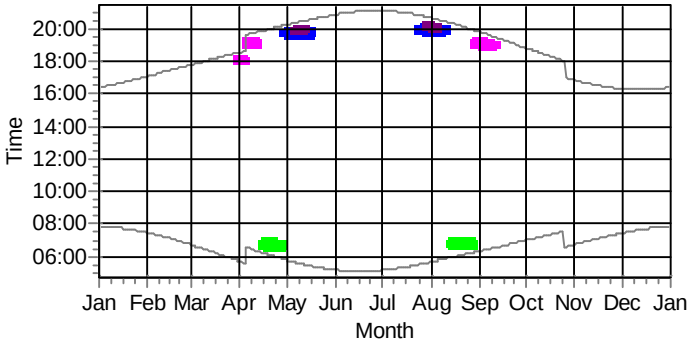

WTGs

073	079	083	118
075	080	117	

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SHADOW - Calendar, graphical

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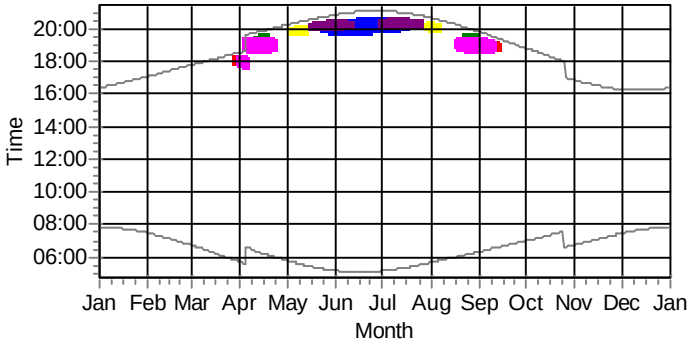
SF029W



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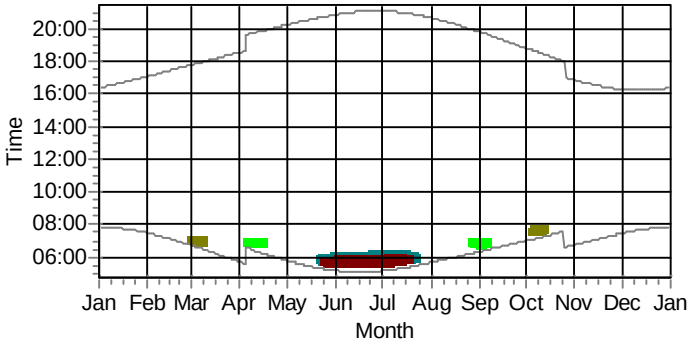

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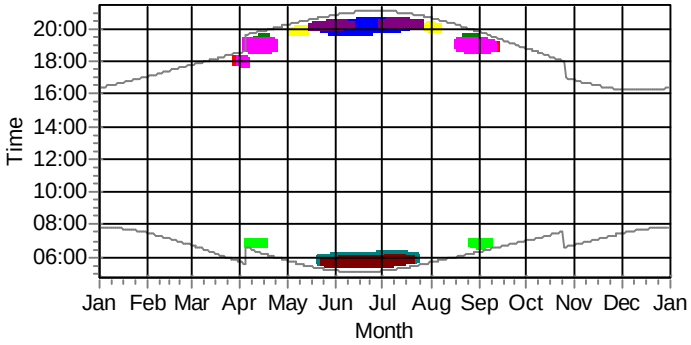

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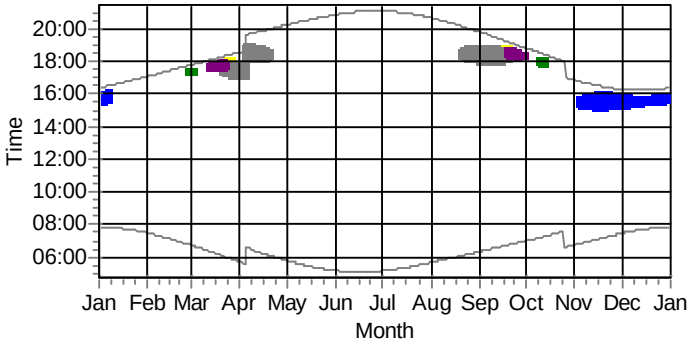

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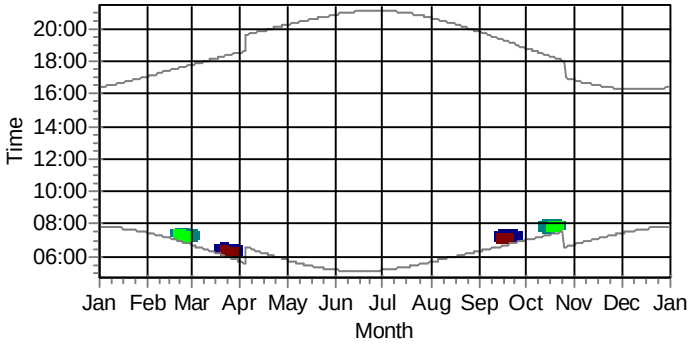
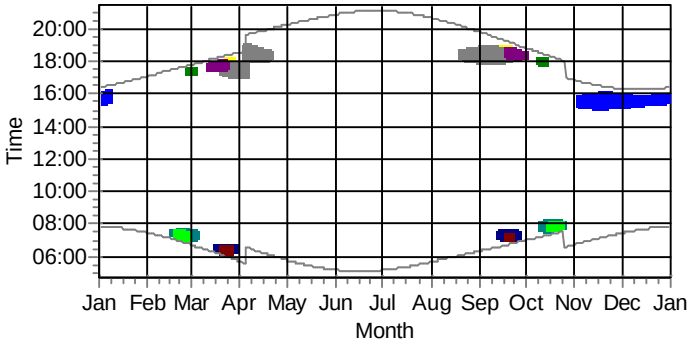


SF030S



WTGs

	070		072		074		076		078		080
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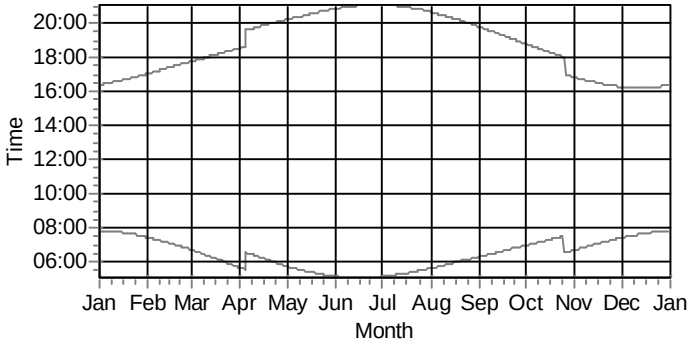
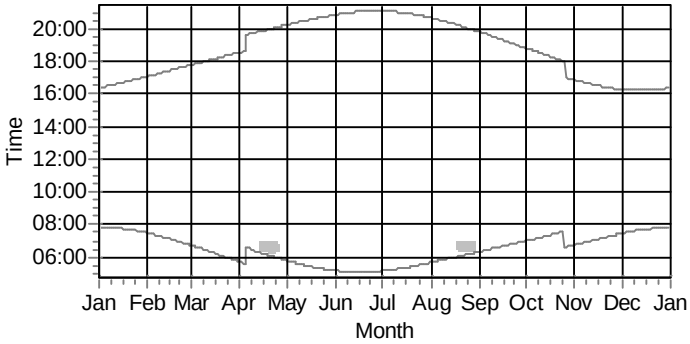
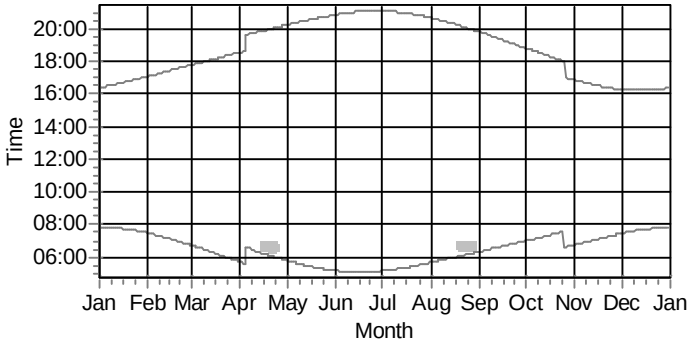
SF031S



SF031E



SF031N



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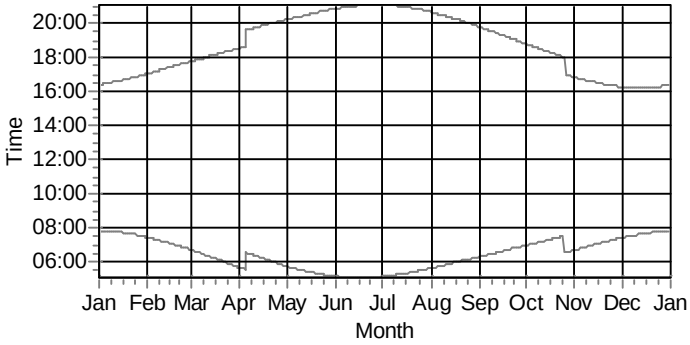

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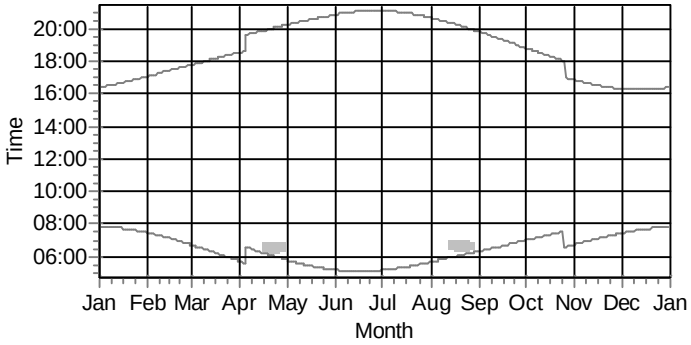

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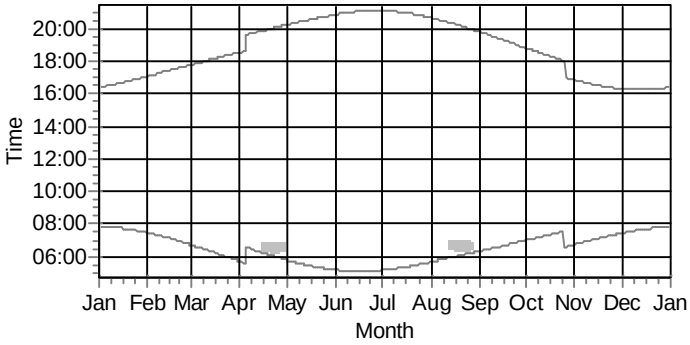

WTGs

091

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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Calculated:
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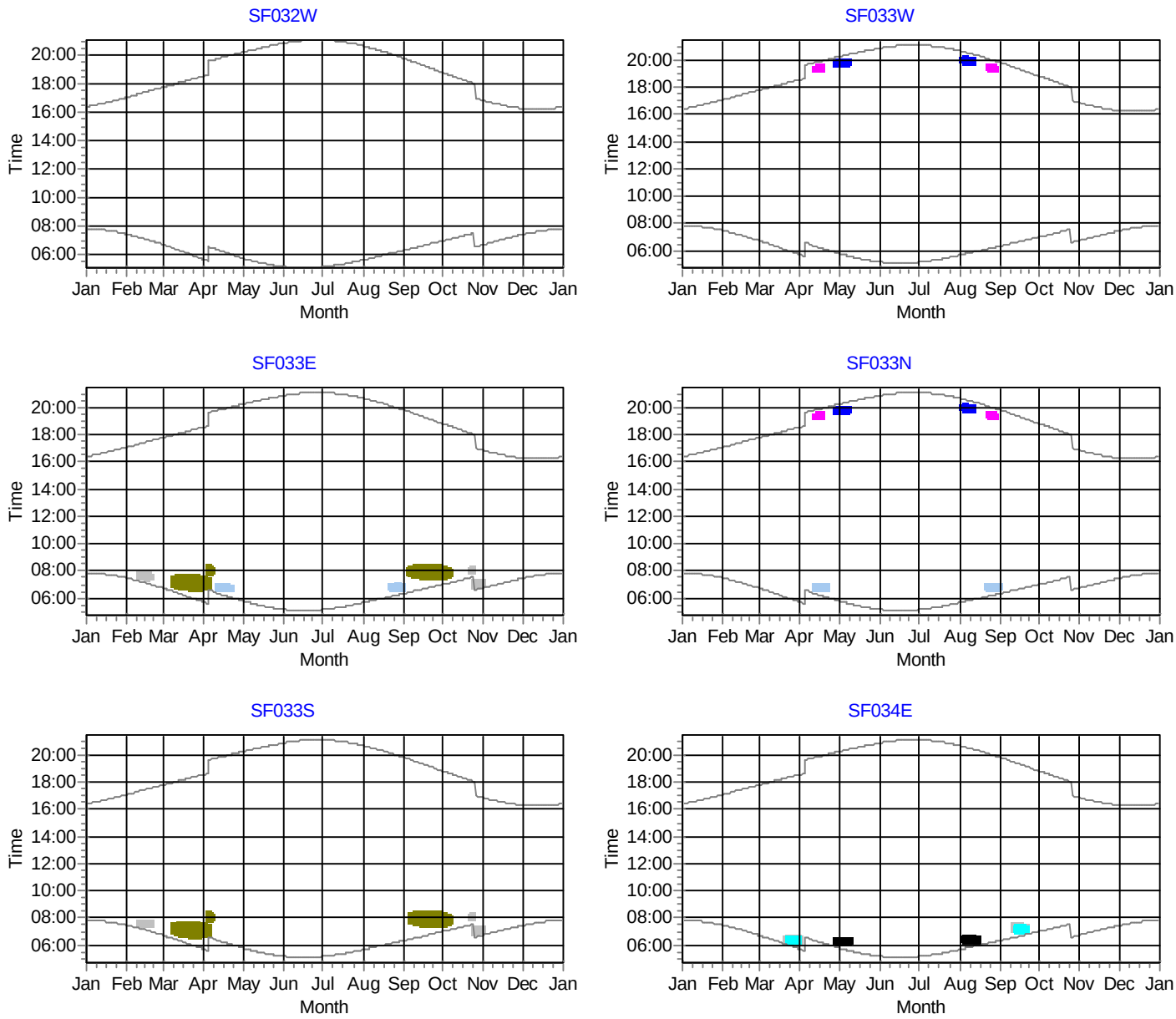
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered



WTGs

073	080	092	099
075	091	093	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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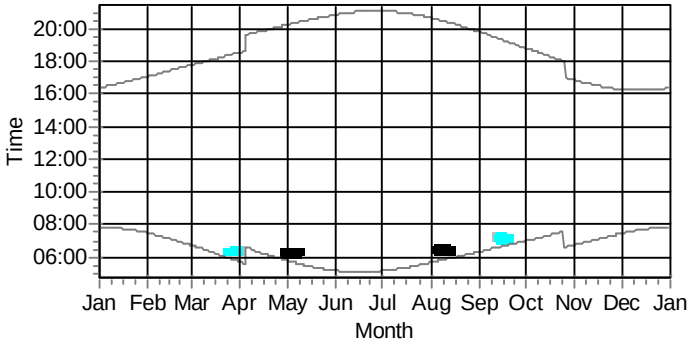
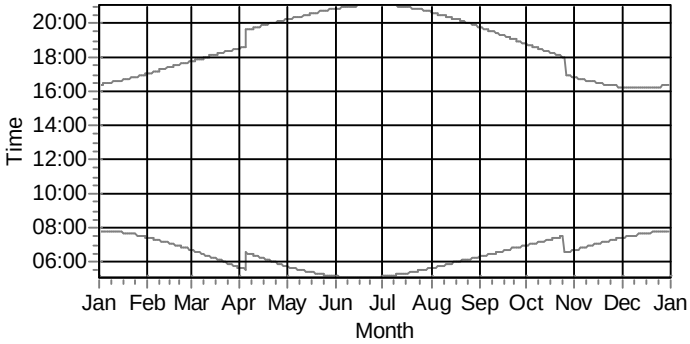
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered

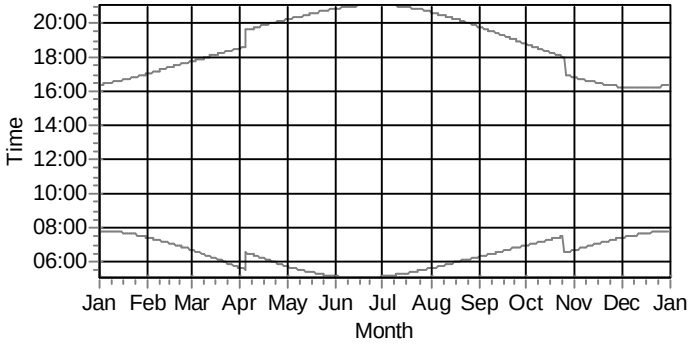
SF034N



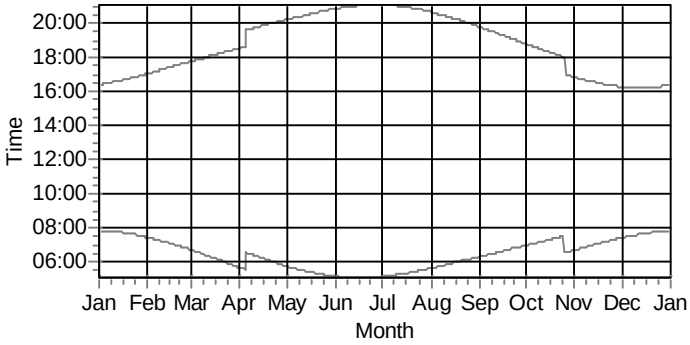
SF105N



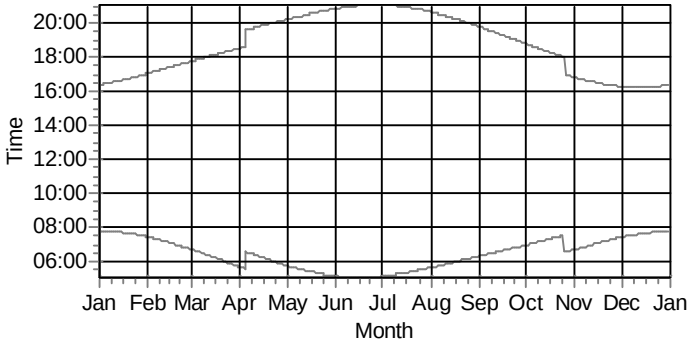
SF105W



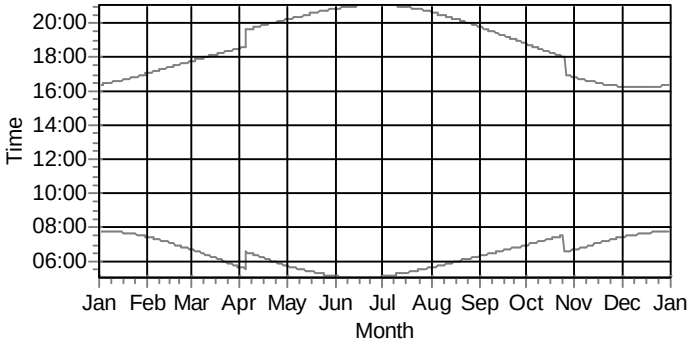
SF105E



SF106W



SF106N



WTGs

091 092 093

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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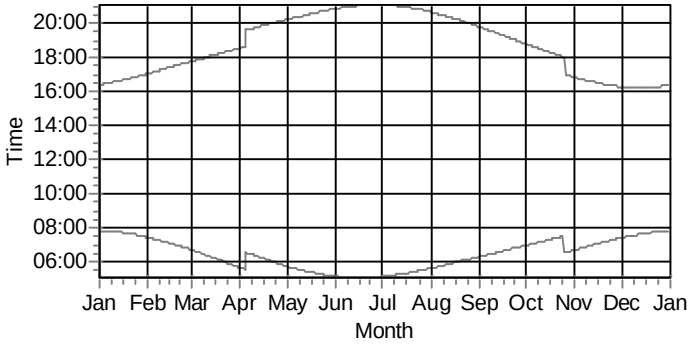
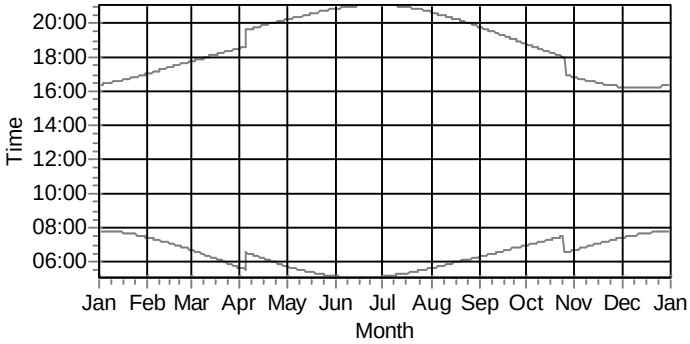
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered

SF106E



SF107W



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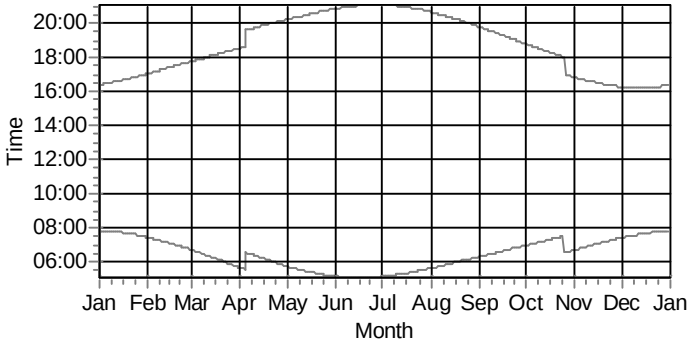
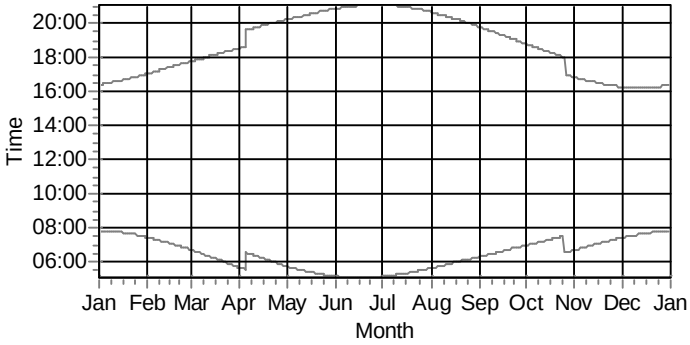
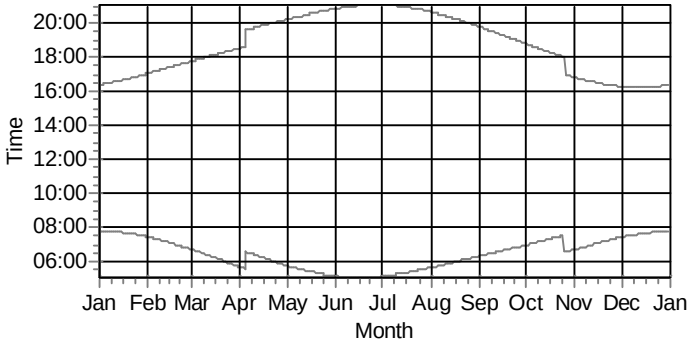


SF107N



SF108W



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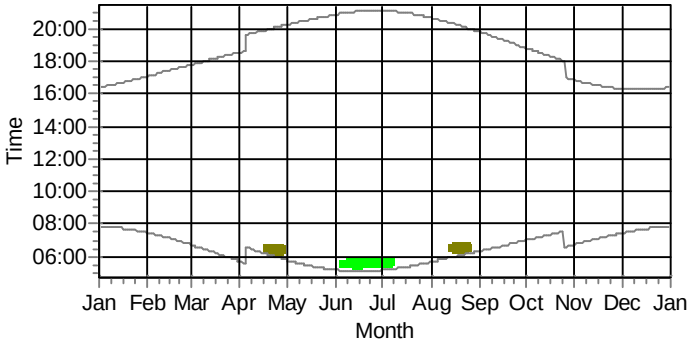

WTGs

079

080

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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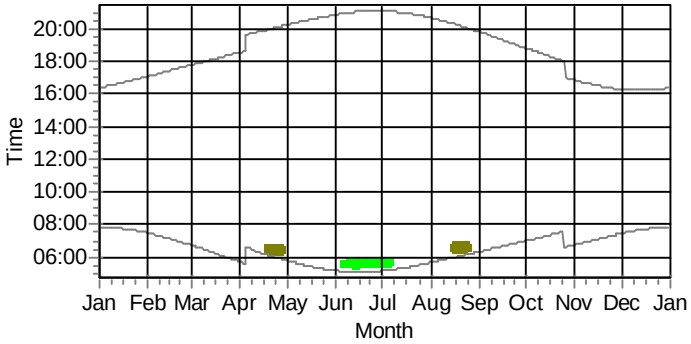
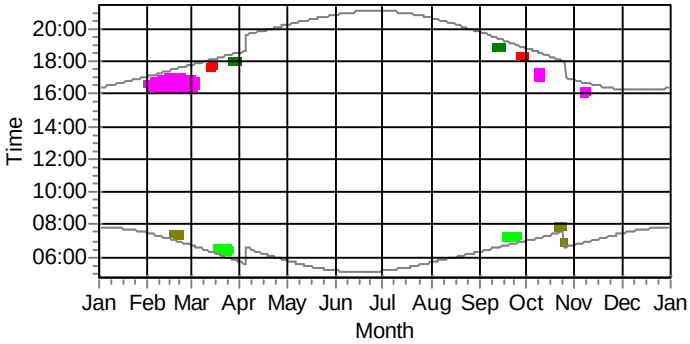
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered

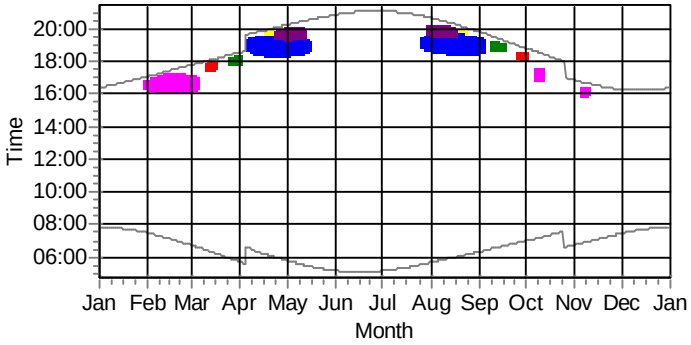
SF108N



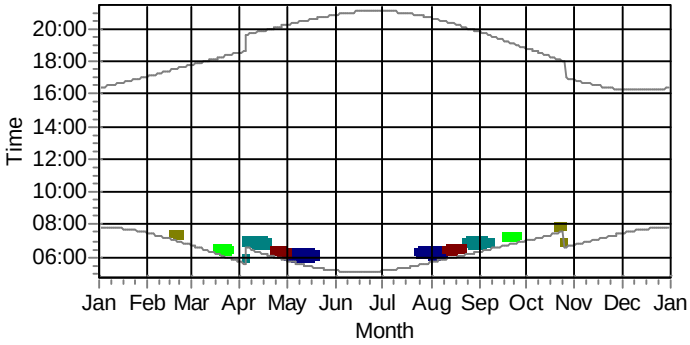
SF109S



SF109W



SF109E



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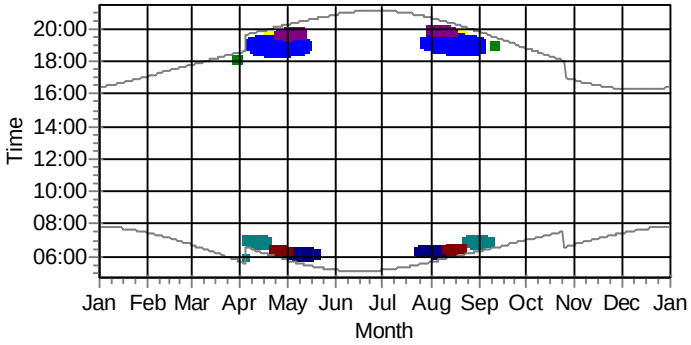

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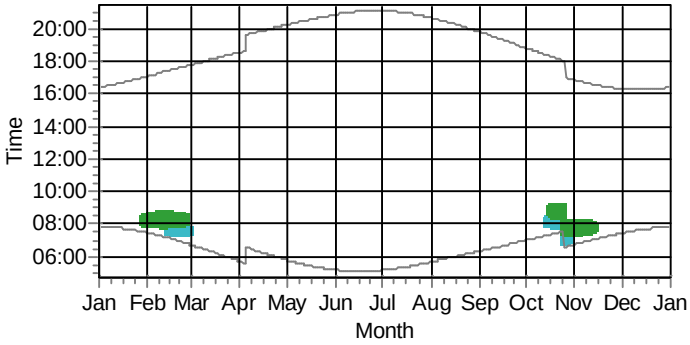

WTGs

070	073	077	080	119
071	075	078	083	
072	076	079	118	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120, GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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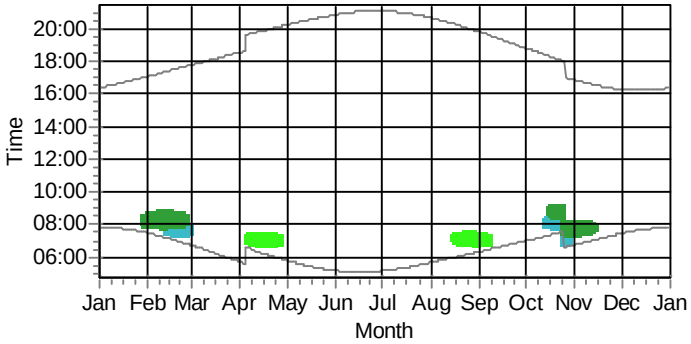
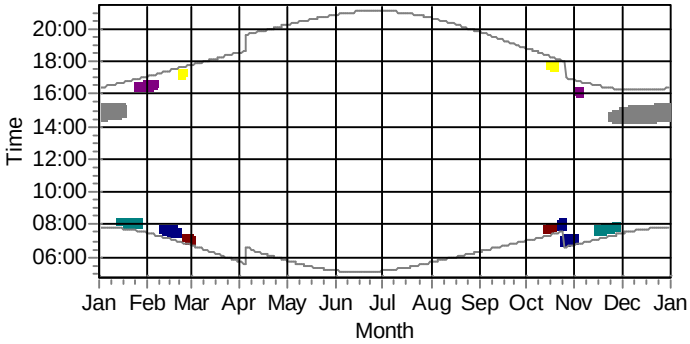
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered

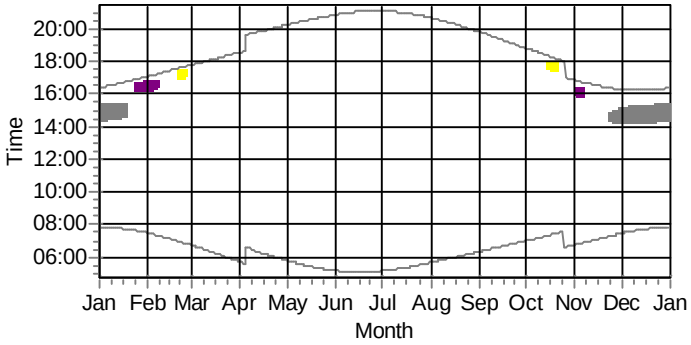
SF110E



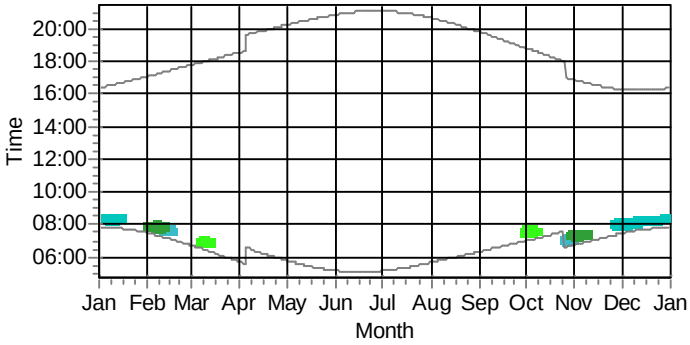
SF111S



SF111W



SF112S



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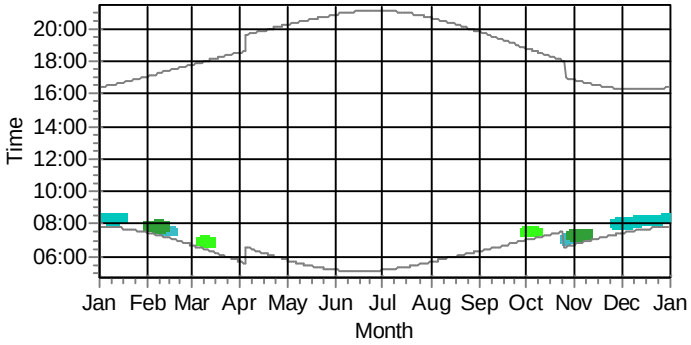
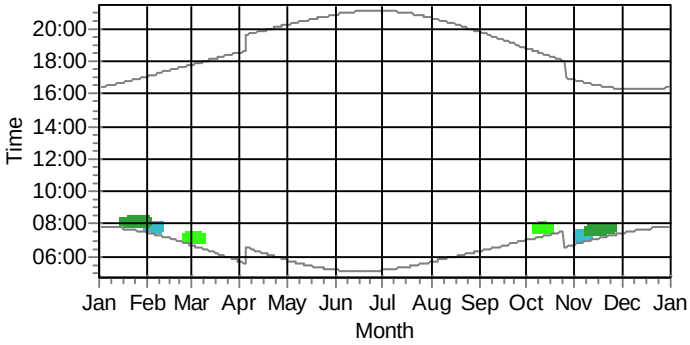


SF113S



WTGs

072	076	078	117	119
074	077	083	118	120

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120,
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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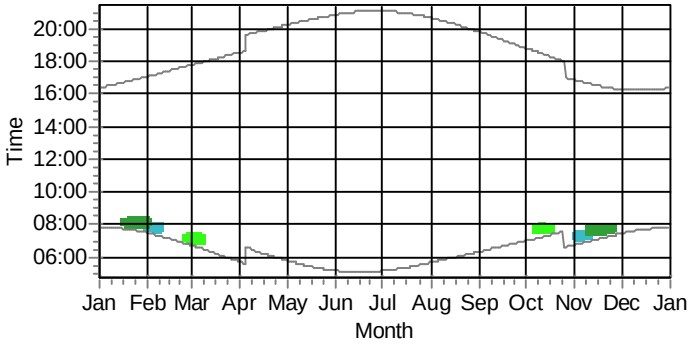
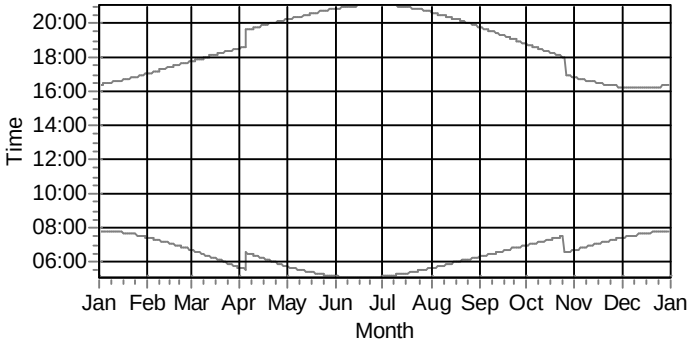
SHADOW - Calendar, graphical

Calculation: 040726 SF 027-034, 105-114, tubines skattered

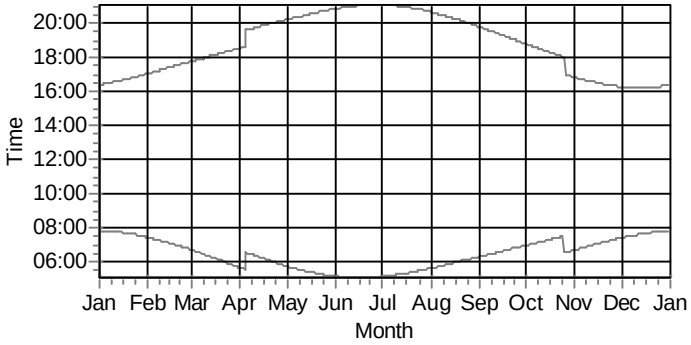
SF113E



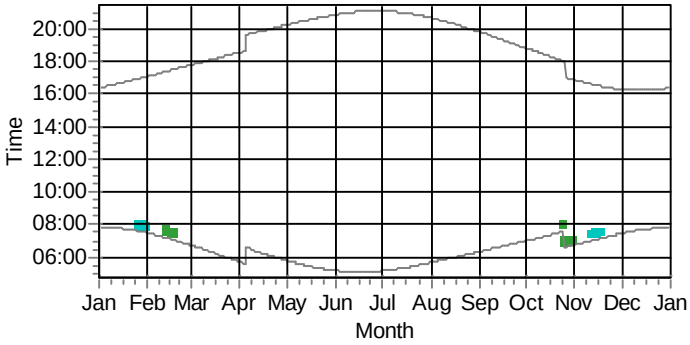
SF114W



SF114N



SF114E



WTGs

117 118 119 120

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 027 through 034 - 105 through 114, selected windows
Turbines 70-80, 83, 91-93, 98, 99, 113-115, 117-120, GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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Calculated:
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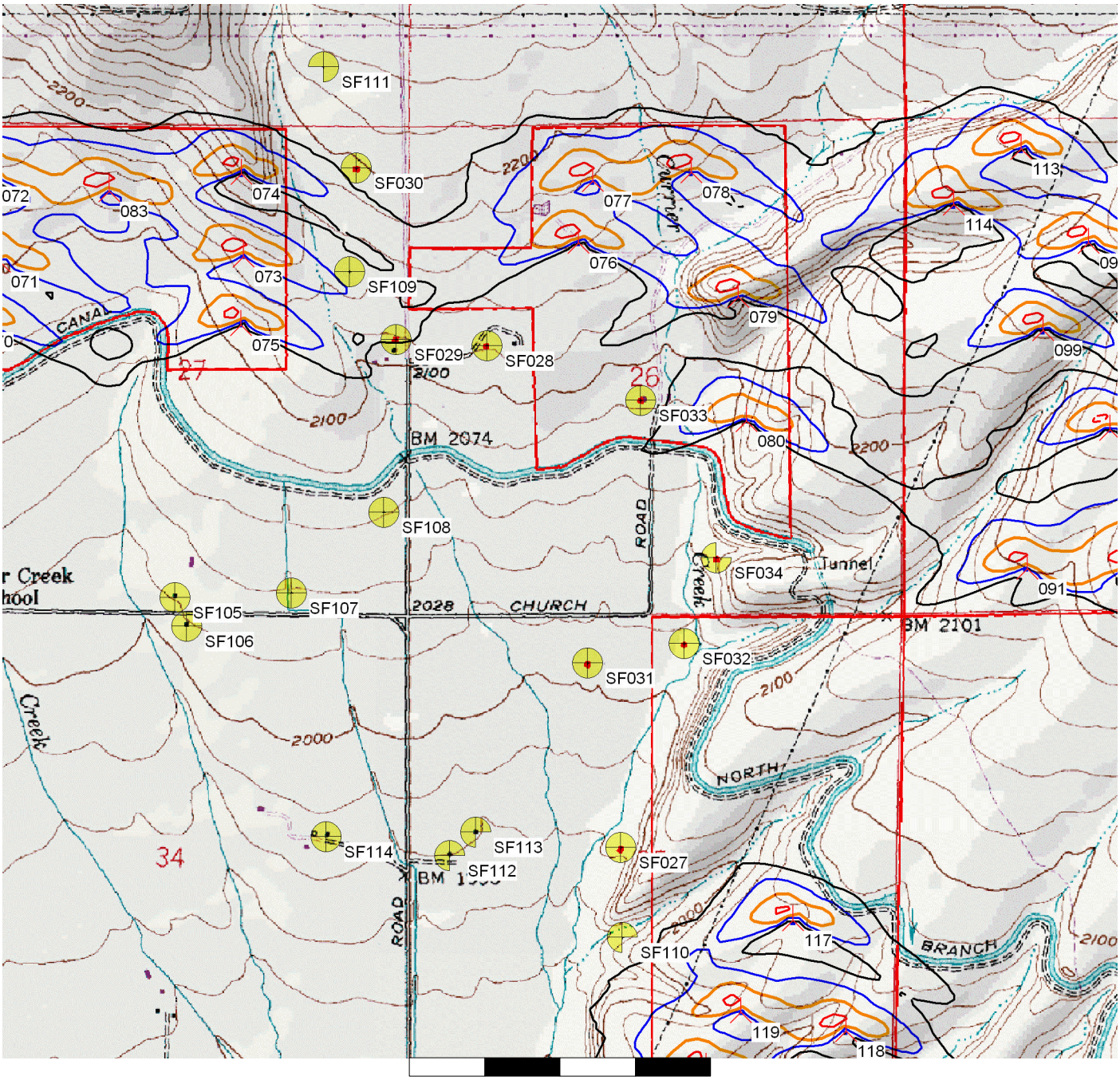
SHADOW - 040711 DCWPP USGS, z13, 31250, overlays

Calculation: 040726 SF 027-034, 105-114, tubines skattered **File:** 040711 DCWPP USGS, z13, 34375, overlays.bmi



Map: 040711 DCWPP USGS, z13, 31250, overlays , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 685,632 North: 5,219,514

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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Calculated:
07/26/2004 04:43/2.3.0.216

SHADOW - Main Result

Calculation: 040725 SF 010-018, 118-134, tubines scattered

Assumptions for shadow calculations

Maximum distance for influence	2,000	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

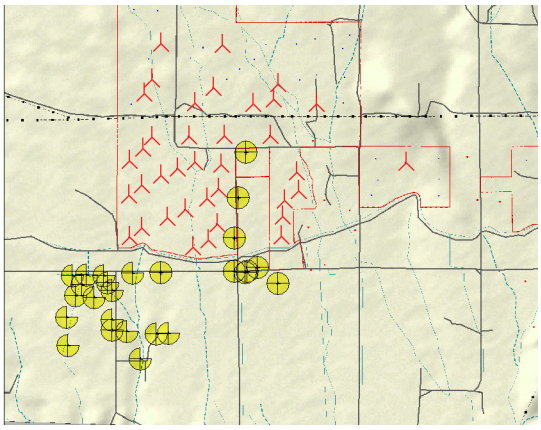
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10 East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
038	680,489	5,220,566	666	038	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
039	680,490	5,220,109	651	039	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
040	680,514	5,219,556	634	040	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
041	680,661	5,220,731	671	041	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
042	680,675	5,219,682	638	042	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
043	680,852	5,222,121	717	043	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
044	680,659	5,220,251	656	044	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
045	680,656	5,221,461	695	045	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
046	680,776	5,220,888	675	046	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
047	680,753	5,221,644	700	047	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
048	680,913	5,220,382	660	048	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
049	681,367	5,219,446	635	049	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
050	681,010	5,219,827	645	050	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
051	681,354	5,220,572	666	051	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
052	681,532	5,220,095	653	052	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
053	681,332	5,221,353	689	053	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
054	681,673	5,219,767	644	054	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
055	682,558	5,220,102	647	055	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
056	681,566	5,221,558	694	056	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
057	681,263	5,220,913	676	057	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
058	681,567	5,219,546	638	058	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
059	681,676	5,220,233	657	059	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
060	681,675	5,222,134	709	060	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
061	681,707	5,220,549	666	061	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
062	681,245	5,219,941	648	062	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
063	682,099	5,221,366	685	063	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
064	682,377	5,221,436	680	064	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
065	682,429	5,221,643	685	065	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
066	682,530	5,219,631	636	066	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
067	682,538	5,219,890	641	067	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
068	682,745	5,220,236	648	068	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
069	682,948	5,221,392	681	069	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
081	682,706	5,220,478	654	081	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
083	684,158	5,220,654	651	083	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
085	681,731	5,220,931	677	085	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
086	682,344	5,220,953	673	086	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
087	681,123	5,220,481	664	087	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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SHADOW - Main Result

Calculation: 040725 SF 010-018, 118-134, tubines scattered

		UTM NAD27 Zone: 10							
No	Name	East	North	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window
				[m]	[m]	[m]	[m]	[°]	[°]
SF132	SF132N	680,717	5,217,946	591	1.0	1.0	1.0	180.0	90.0
SF133	SF133E	680,917	5,218,286	600	1.0	1.0	1.0	-90.0	90.0
SF133	SF133N	680,917	5,218,286	600	1.0	1.0	1.0	180.0	90.0
SF134	SF134E	681,080	5,218,296	600	1.0	1.0	1.0	-90.0	90.0
SF134	SF134N	681,080	5,218,296	600	1.0	1.0	1.0	180.0	90.0
SF14	SF014W	680,951	5,219,101	622	1.0	1.0	1.0	90.0	90.0

Calculation Results

		Shadow, worst case			Shadow, expected values
No	Name	Shadow hours per year	Shadow days per year	Max shadow hours per day	Shadow hours per year
		[h/year]	[days/year]	[h/day]	[h/year]
SF010	SF010E	14:52	72	0:24	3:33
SF010	SF010N	19:12	110	0:24	6:53
SF010	SF010S	51:26	147	1:12	11:15
SF010	SF010W	66:06	216	0:52	16:23
SF011	SF011E	60:26	200	0:30	15:51
SF011	SF011N	105:16	169	1:18	37:58
SF011	SF011S	104:44	192	1:02	21:00
SF011	SF011W	151:04	260	1:08	42:33
SF012	SF012E	39:10	126	0:28	10:55
SF012	SF012N	64:52	160	0:38	20:35
SF012	SF012S	58:18	98	0:54	16:58
SF012	SF012W	84:38	189	0:56	26:44
SF013	SF013N	20:34	82	0:28	8:06
SF013	SF013E	0:00	0	0:00	0:00
SF013	SF013W	20:50	83	0:28	8:13
SF014	SF014N	4:24	54	0:06	1:07
SF014	SF014E	4:26	54	0:06	1:08
SF014	SF014S	0:00	0	0:00	0:00
SF015	SF015E	0:00	0	0:00	0:00
SF015	SF015N	27:18	97	0:26	10:41
SF015	SF015W	27:22	97	0:26	10:43
SF016	SF016E	0:00	0	0:00	0:00
SF016	SF016N	18:56	78	0:24	7:15
SF016	SF016W	19:08	78	0:24	7:19
SF017	SF017N	27:52	95	0:26	10:40
SF017	SF017E	0:00	0	0:00	0:00
SF017	SF017W	28:02	96	0:26	10:44
SF018	SF018N	9:14	65	0:14	3:34
SF018	SF018E	0:00	0	0:00	0:00
SF018	SF018W	9:18	65	0:14	3:35
SF118	SF118E	21:56	90	0:24	5:34
SF118	SF118N	21:50	90	0:24	5:33
SF119	SF119E	7:44	56	0:16	1:58
SF119	SF119N	7:44	56	0:16	1:58
SF120	SF120E	12:24	66	0:16	3:06
SF120	SF120N	12:18	66	0:16	3:05
SF121	SF121E	5:34	42	0:14	1:26
SF121	SF121N	5:34	42	0:14	1:26
SF122	SF122E	4:08	47	0:10	1:02
SF122	SF122N	4:08	47	0:10	1:02
SF123	SF123E	2:26	28	0:08	0:37
SF123	SF123N	2:26	28	0:08	0:37
SF124	SF124E	1:18	14	0:08	0:19
SF124	SF124N	1:16	14	0:08	0:18
SF125	SF125E	6:16	58	0:10	1:33
SF125	SF125N	6:12	58	0:10	1:32
SF126	SF126E	6:46	65	0:12	1:39

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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SHADOW - Main Result

Calculation: 040725 SF 010-018, 118-134, tubines scattered

		Shadow, worst case			Shadow, expected values
No	Name	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow hours per year [h/year]
SF126	SF126N	6:44	65	0:12	1:39
SF127	SF127E	1:42	21	0:06	0:25
SF127	SF127N	1:42	21	0:06	0:25
SF128	SF128E	0:00	0	0:00	0:00
SF128	SF128N	0:00	0	0:00	0:00
SF129	SF129E	0:00	0	0:00	0:00
SF129	SF129N	0:00	0	0:00	0:00
SF130	SF130E	0:00	0	0:00	0:00
SF130	SF130N	0:00	0	0:00	0:00
SF131	SF131E	0:00	0	0:00	0:00
SF131	SF131N	0:00	0	0:00	0:00
SF132	SF132E	0:00	0	0:00	0:00
SF132	SF132N	0:00	0	0:00	0:00
SF133	SF133E	0:00	0	0:00	0:00
SF133	SF133N	0:00	0	0:00	0:00
SF134	SF134E	0:00	0	0:00	0:00
SF134	SF134N	0:00	0	0:00	0:00
SF14	SF014W	0:00	0	0:00	0:00

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

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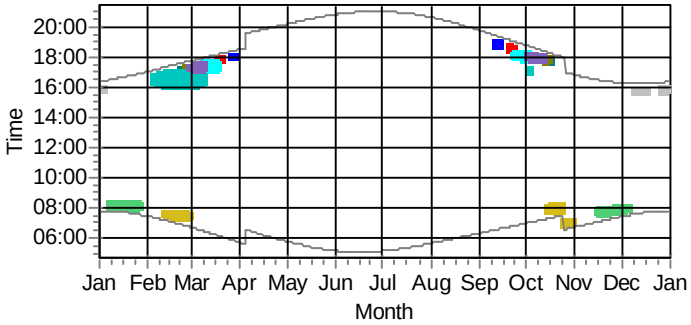
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

SF010S



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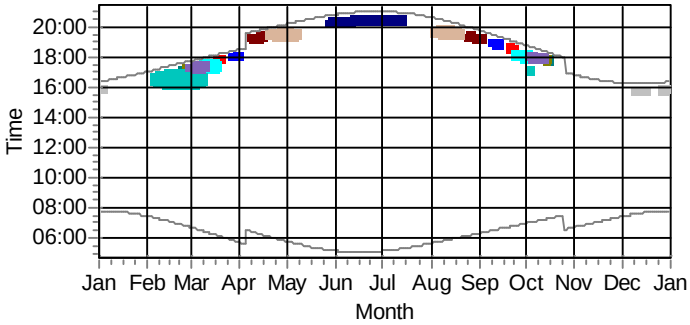
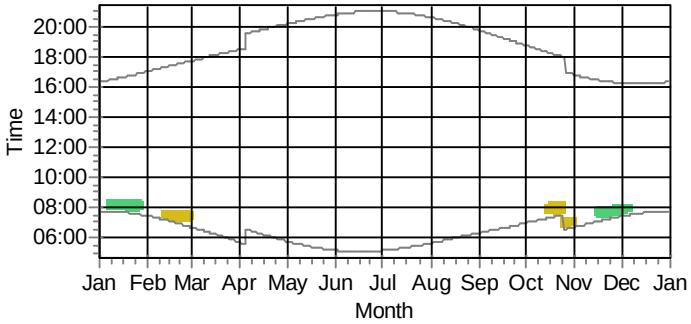


SF010E



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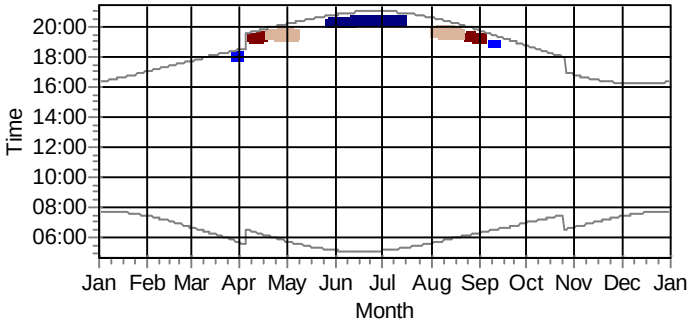

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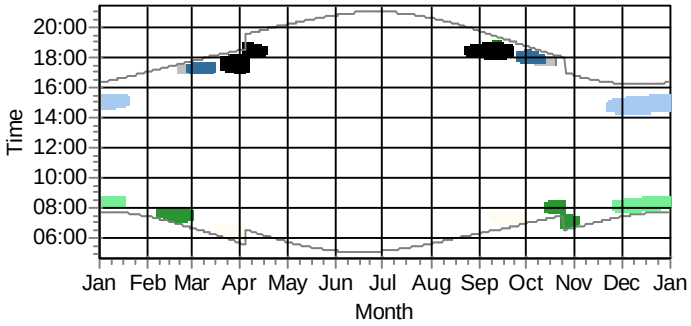

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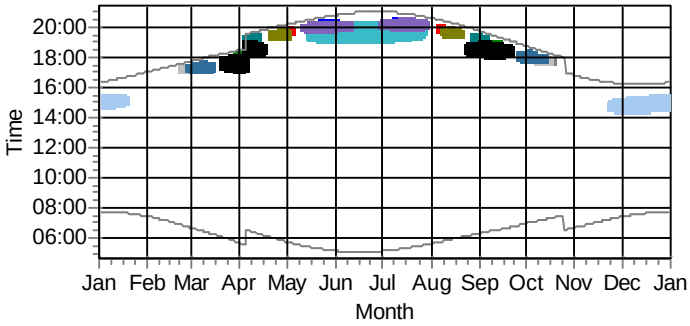

WTGs

	038		044		050		055		062		081
	039		045		051		057		066		087
	041		046		052		059		067		
	042		048		054		061		068		

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
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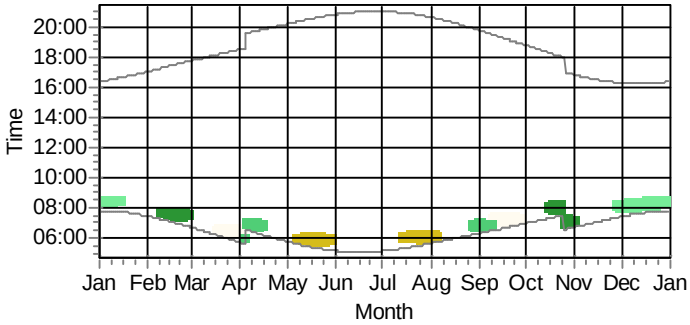
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

SF011E



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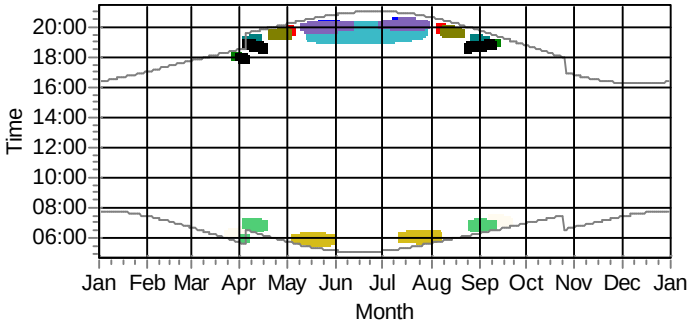

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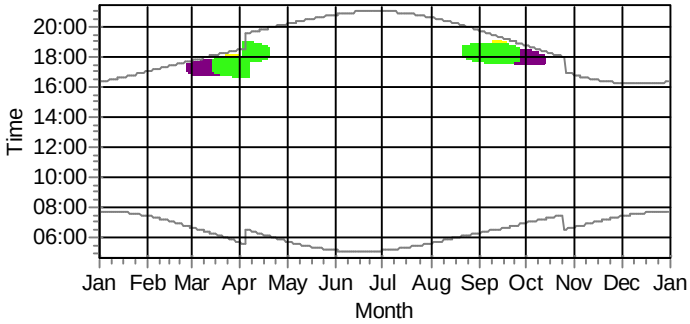

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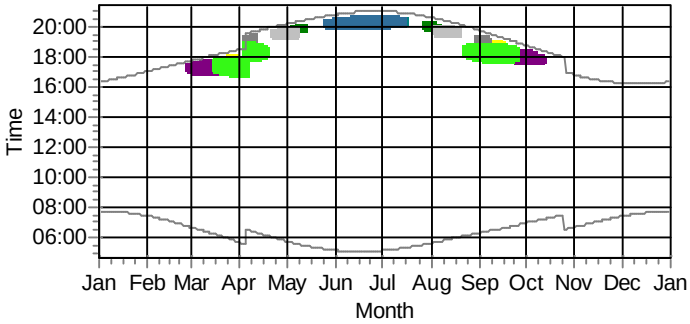

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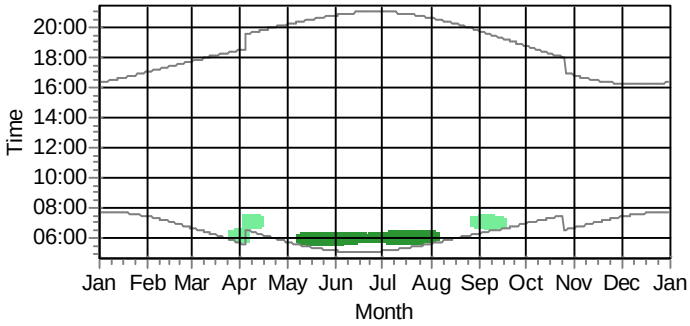

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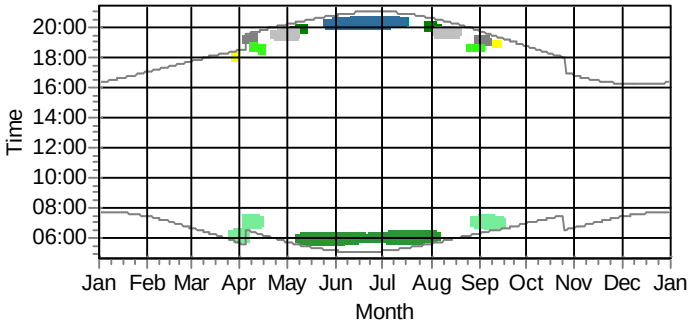

WTGs

038	042	050	059	068
039	044	052	062	081
040	048	055	066	087
041	049	058	067	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
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GE 1.5sle (77m diameter) at 65m hub height
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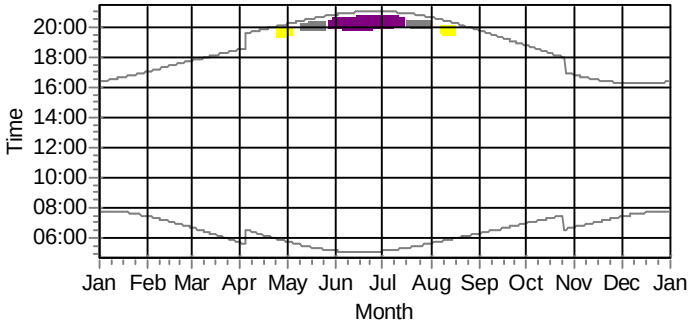
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

SF013W



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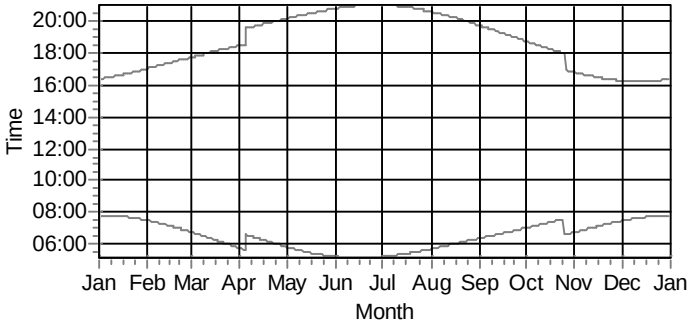

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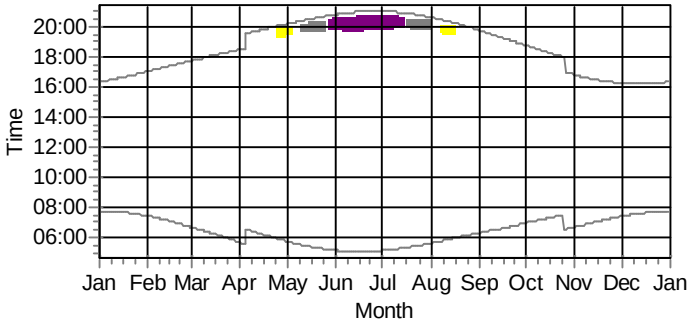

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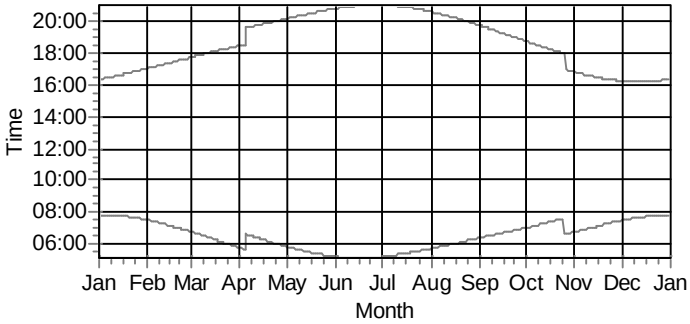

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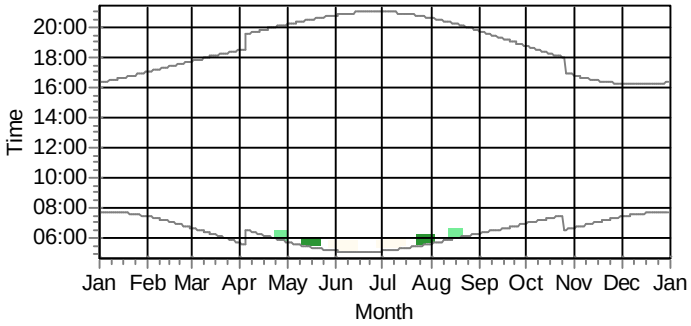

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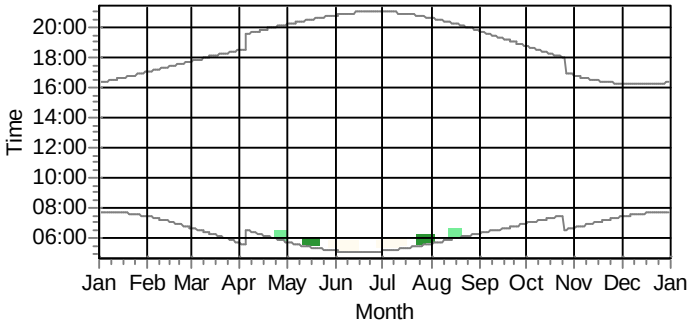

WTGs

040 042 049 055 066 067

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
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1500 meter shadow limit applied

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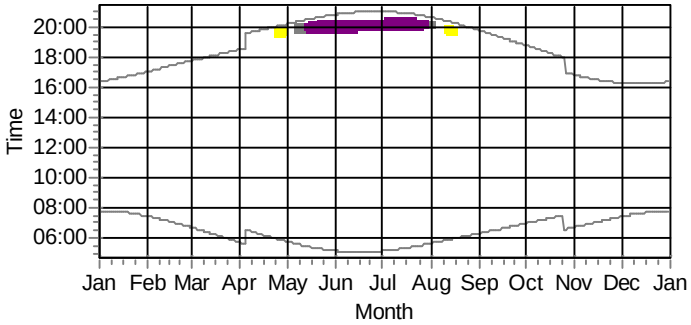
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

SF015W



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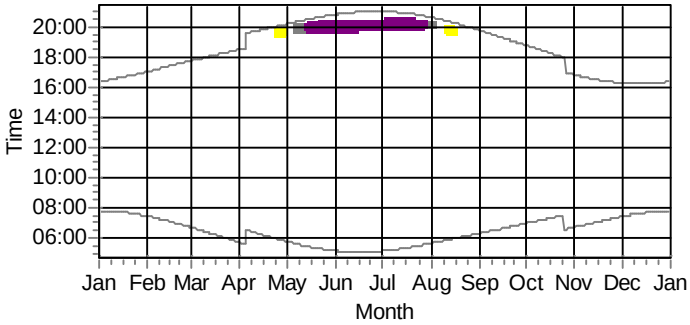

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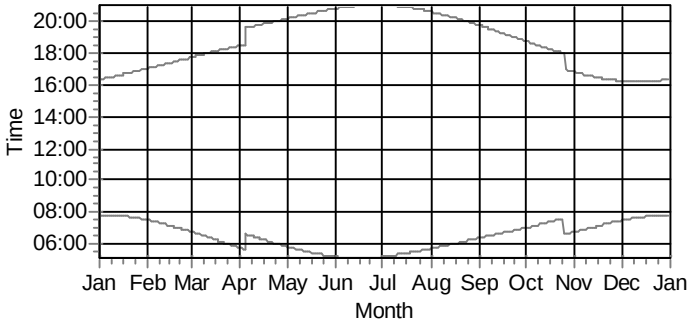

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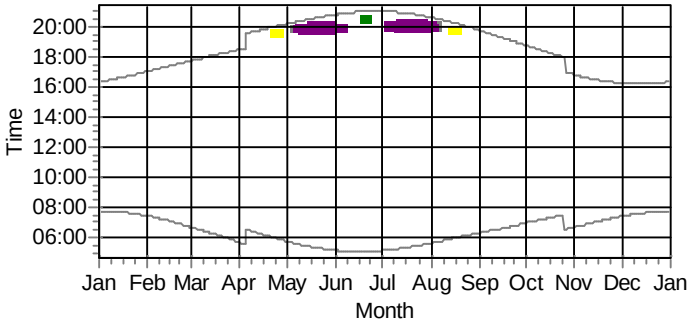

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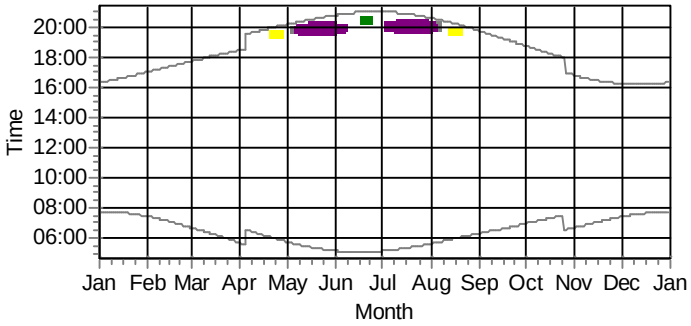

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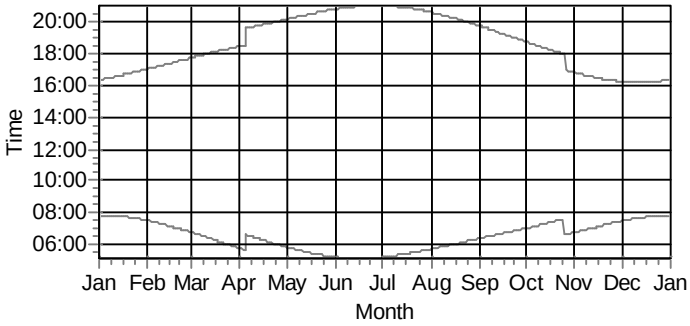

WTGs

039 040 042 049

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
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GE 1.5sle (77m diameter) at 65m hub height
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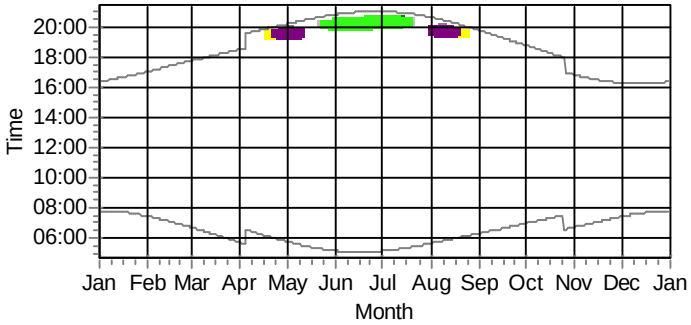
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

SF017W



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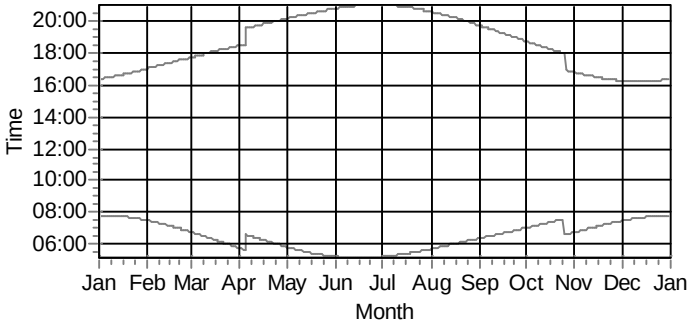
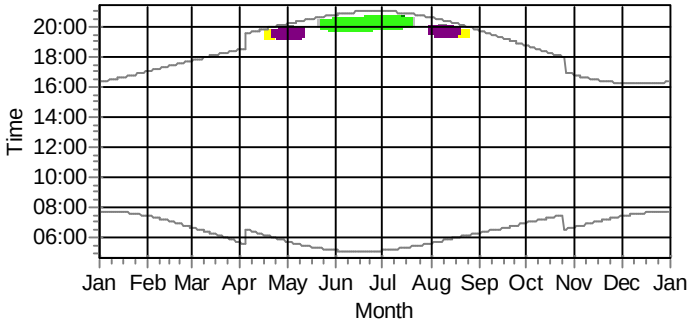
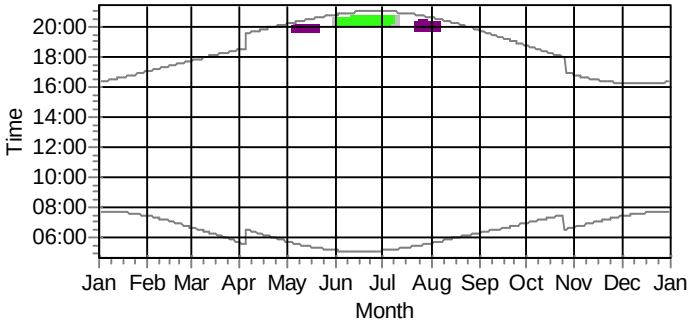


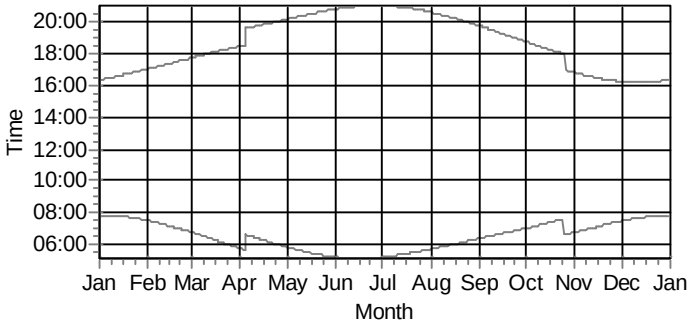
SF017N



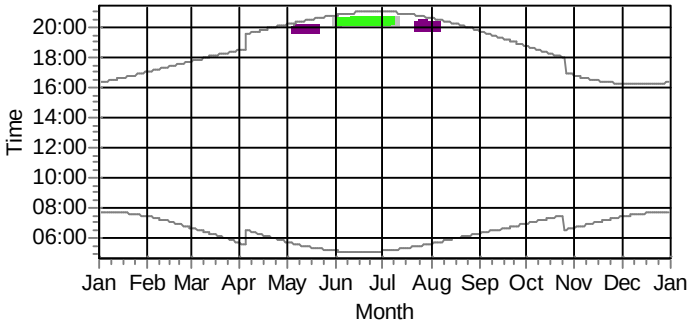
SF018W



SF018E



SF018N



WTGs

039 040 042 049 050 058

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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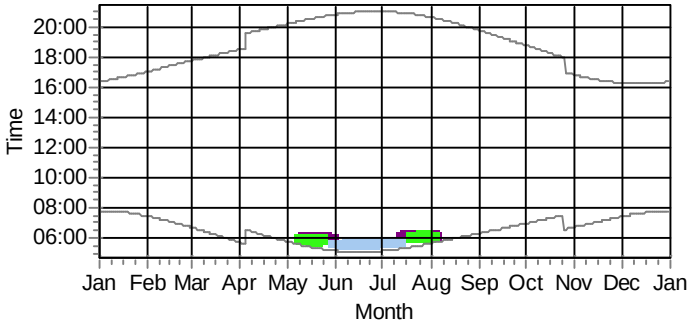
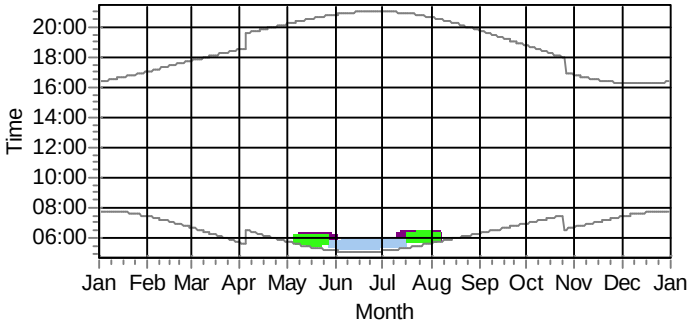
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

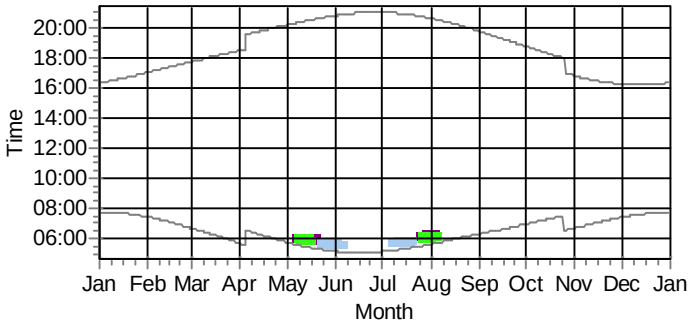
SF118N



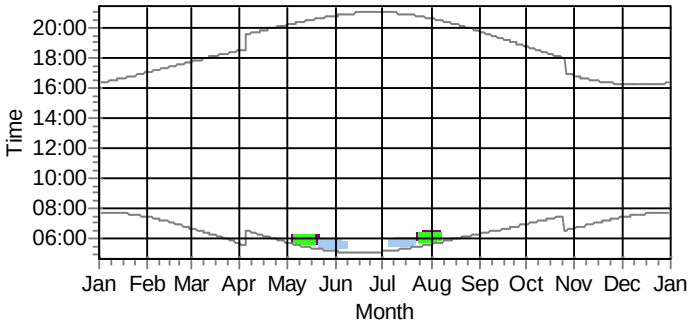
SF118E



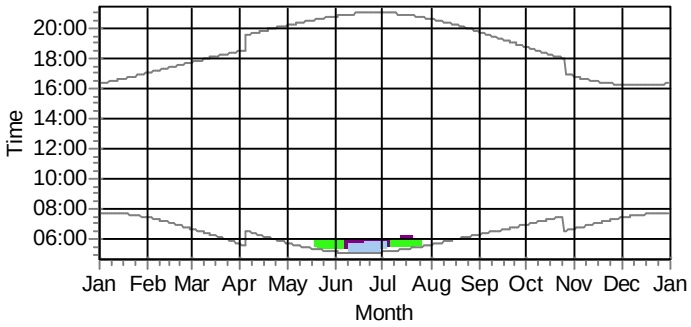
SF119N



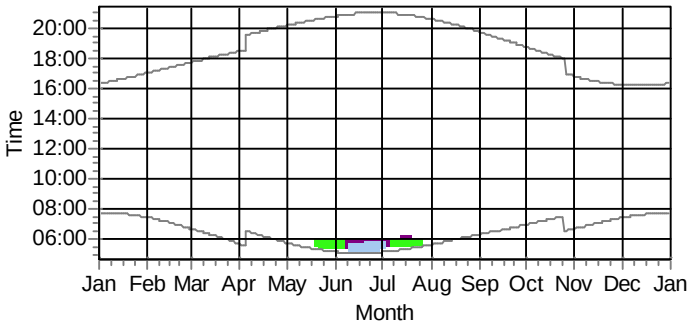
SF119E



SF120N



SF120E



WTGs

049 054 058

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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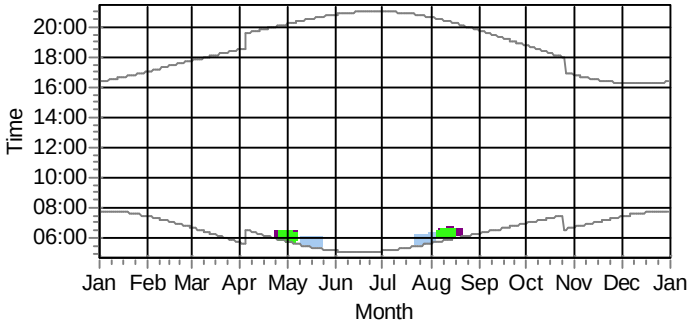
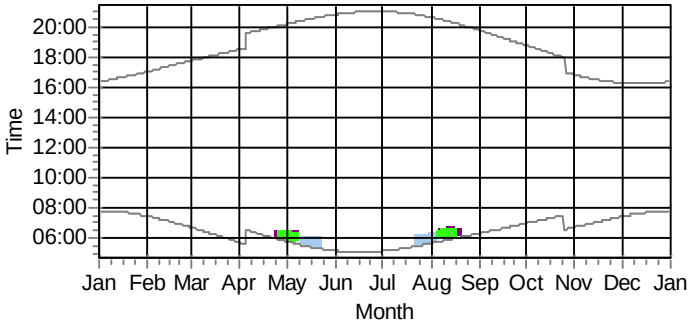
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

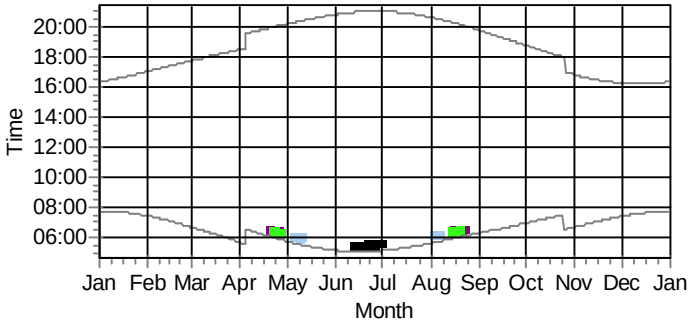
SF121N



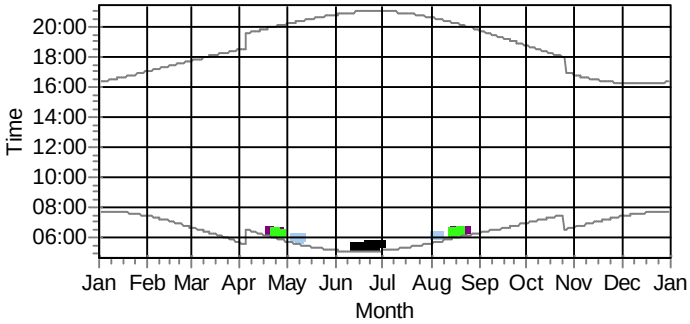
SF121E



SF122N



SF122E



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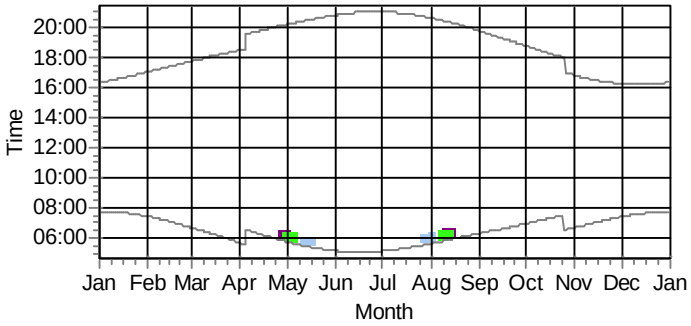

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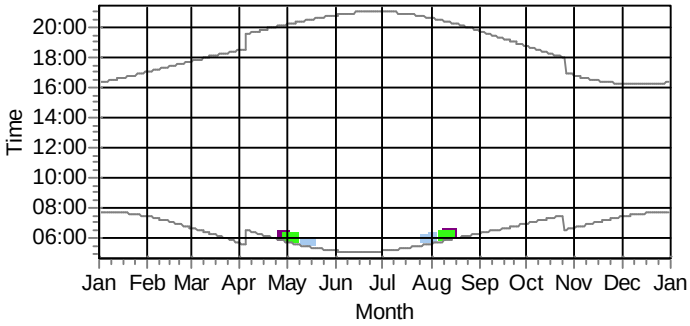

WTGs

049 052 054 058

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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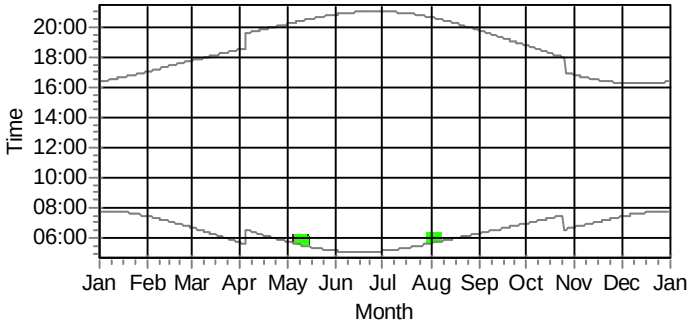
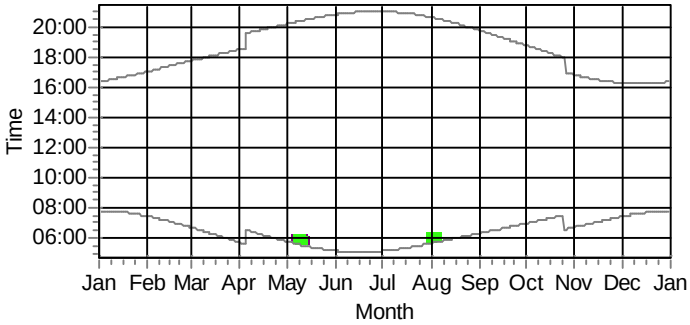
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

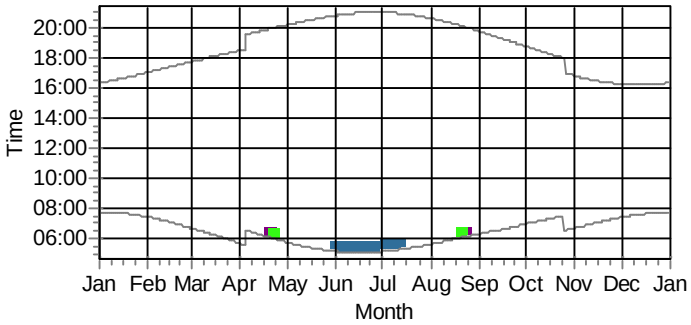
SF124N



SF124E



SF125N



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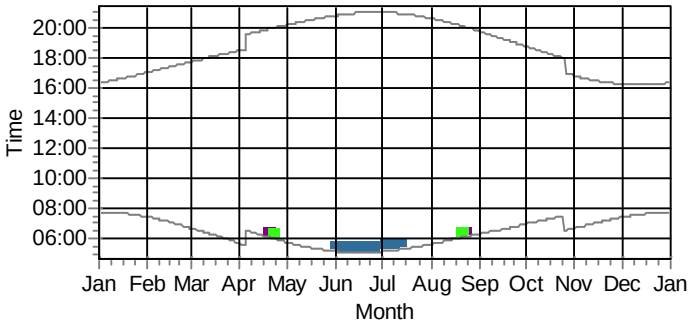
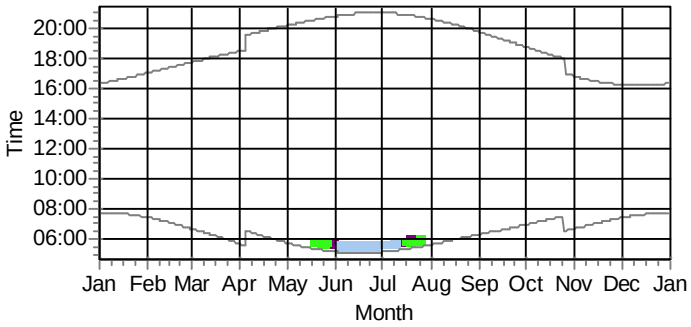
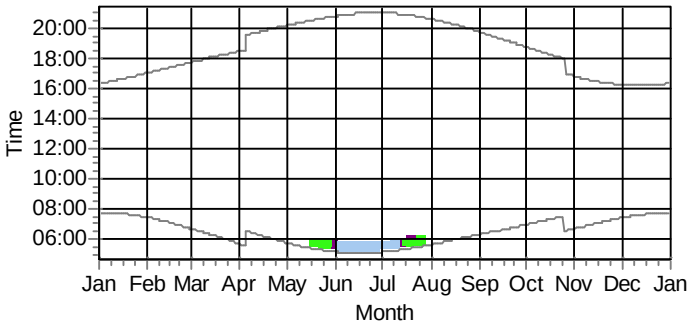


SF126N



SF126E



WTGs

049 050 054 058 062

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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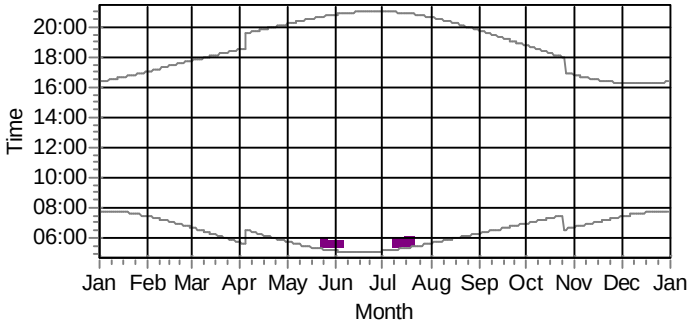
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

SF127N



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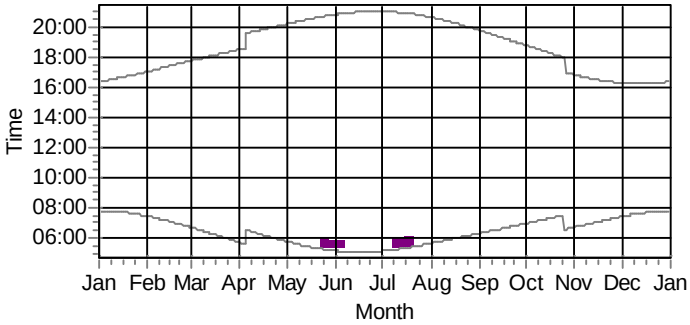

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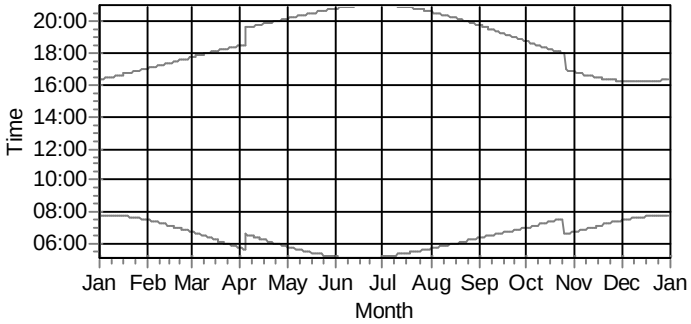
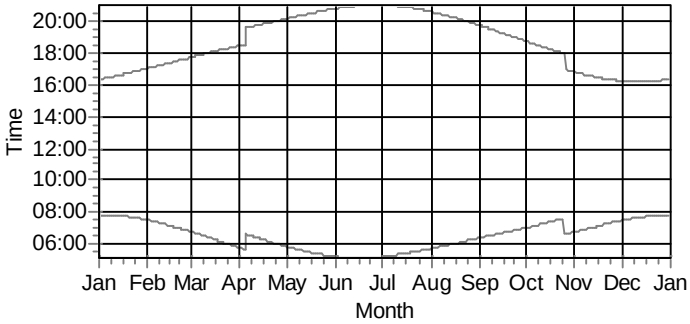
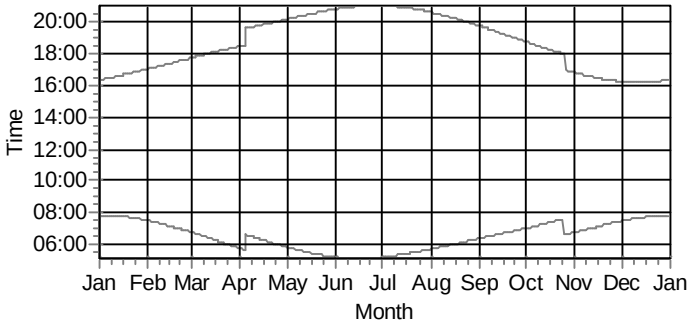


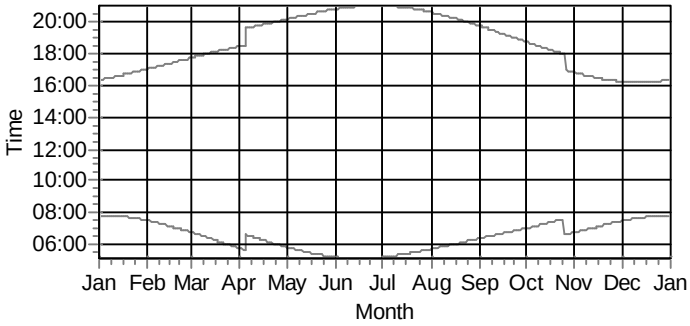
SF128E



SF129N



SF129E



WTGs

049

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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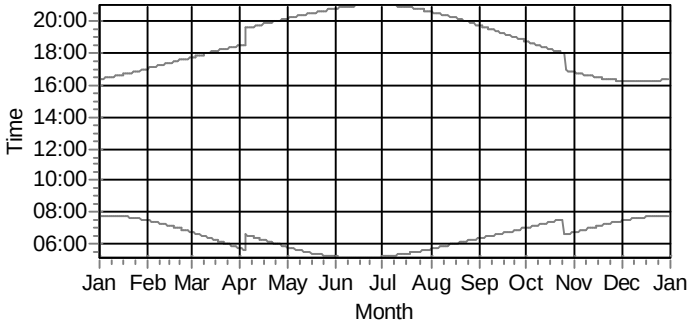
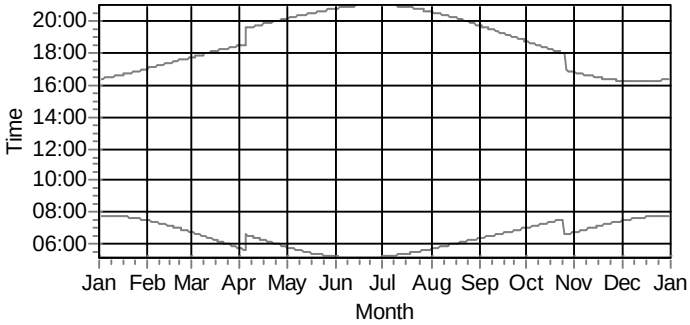
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

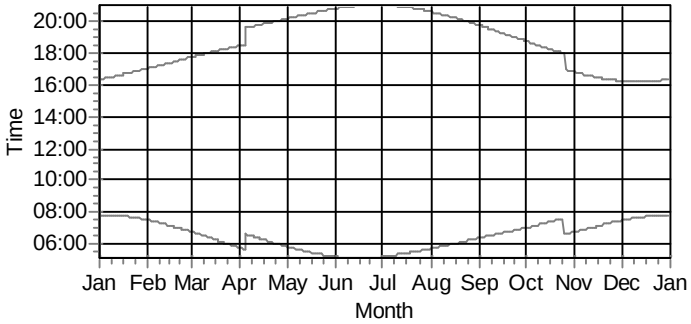
SF130N



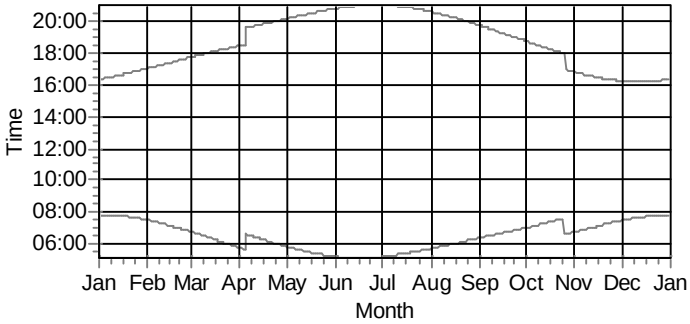
SF130E



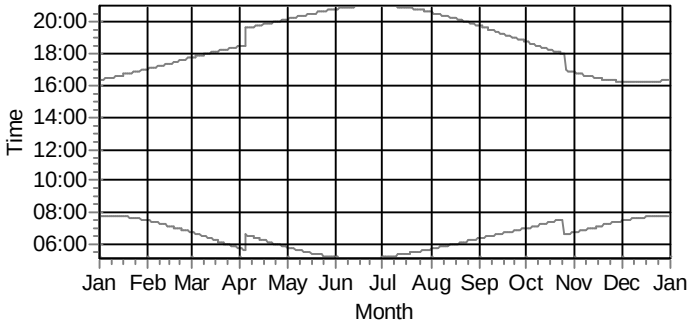
SF131N



SF131E



SF132N



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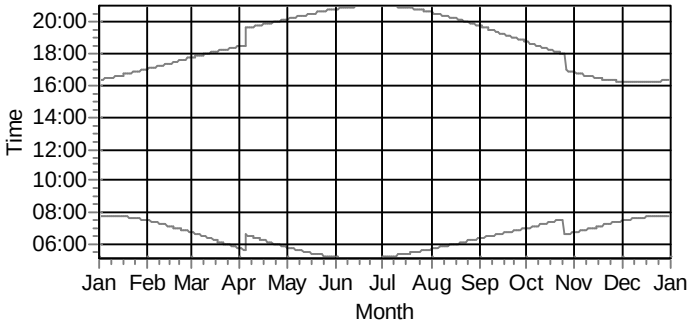

WTGs

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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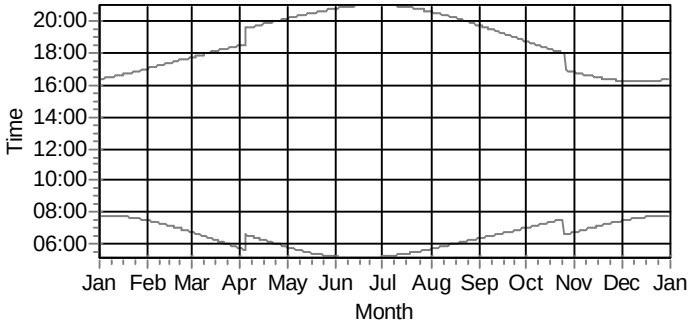
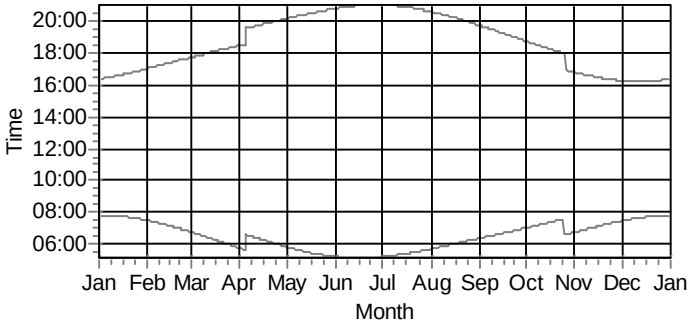
SHADOW - Calendar, graphical

Calculation: 040725 SF 010-018, 118-134, tubines scattered

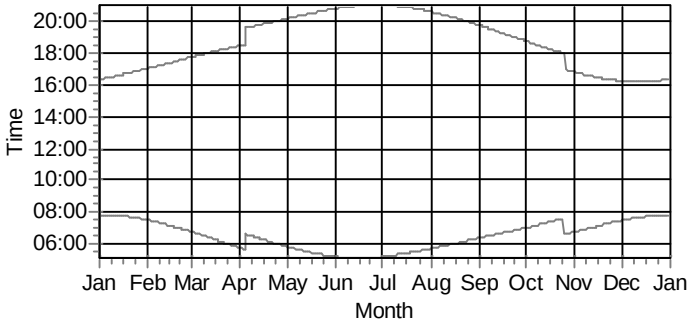
SF133N



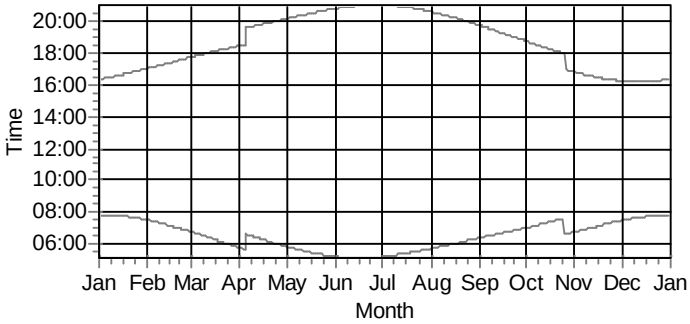
SF133E



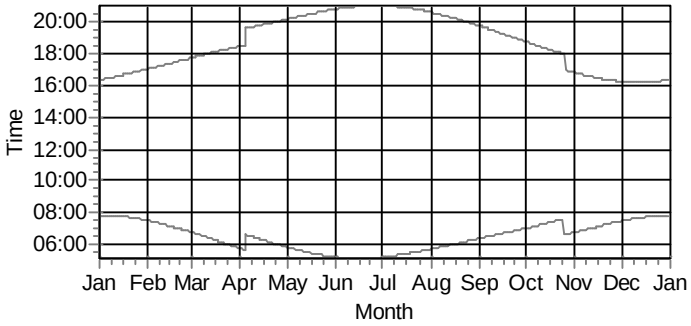
SF134N



SF134E



SF014W



WTGs

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 010 through 018, 118 through 134 - all windows
Turbines 038-069, 081, 083, 085-087
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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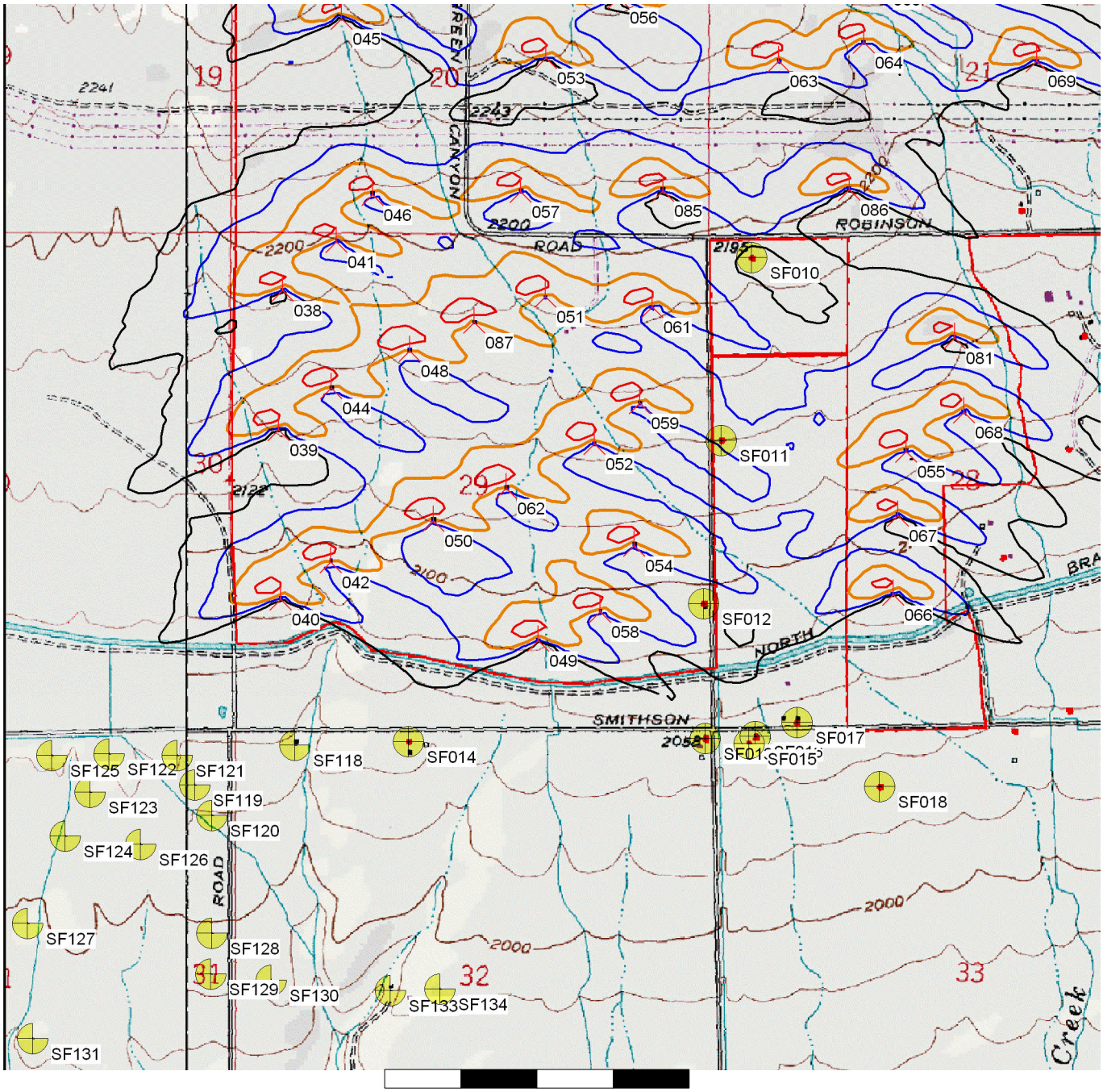
SHADOW - 040711 DCWPP USGS, z13, 31250, overlays

Calculation: 040725 SF 010-018, 118-134, tubines scattered **File:** 040711 DCWPP USGS, z13, 34375, overlays.bmi



0 250 500 750 1000m

Map: 040711 DCWPP USGS, z13, 31250, overlays , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 681,292 North: 5,219,724

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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Calculated:
07/28/2004 08:14/2.3.0.216

SHADOW - Main Result

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

Assumptions for shadow calculations

Maximum distance for influence	1,500	m
Minimum sun height over horizon for influence	3	°
Day step for calculation	1	days
Time step for calculation	2	minutes

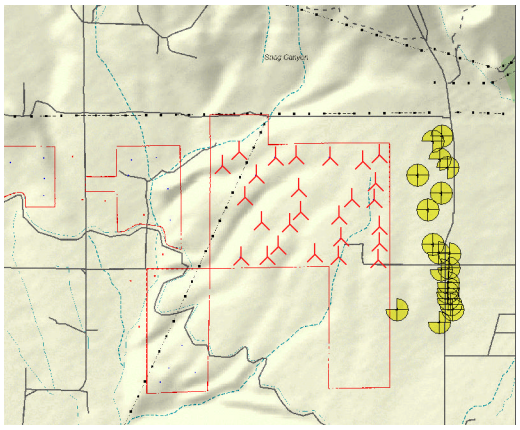
Sun shine probabilities (part of time from sun rise to sun set with sun shine)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.25	0.46	0.56	0.56	0.56	0.65	0.75	0.65	0.65	0.56	0.35	0.25

Operational time

N	NNE	ENE	E	ESE	SSE
164	95	84	187	562	515

S	SSW	WSW	W	WNW	NNW	Sum
373	322	402	281	1,171	2,147	6,304



Scale 1:100,000

New WTG Shadow Receptor

WTGs

	UTM NAD27 Zone: 10 East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type	Power [kW]	Diam. [m]	Height [m]	RPM [RPM]
091	687,250	5,219,497	668	091	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
092	687,601	5,219,511	680	092	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
093	687,511	5,219,965	687	093	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
094	687,945	5,220,852	720	094	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
095	688,830	5,220,812	741	095	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
096	687,669	5,220,826	715	096	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
097	689,042	5,220,901	748	097	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
098	687,421	5,220,582	700	098	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
099	687,279	5,220,288	692	099	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
100	687,888	5,219,951	699	100	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
101	688,026	5,220,123	702	101	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
102	687,992	5,220,421	709	102	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
103	688,697	5,220,308	720	103	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
104	688,391	5,220,848	731	104	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
105	688,993	5,220,311	724	105	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
106	689,076	5,219,960	714	106	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
107	688,537	5,220,075	711	107	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
108	688,567	5,219,790	703	108	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
109	688,546	5,219,547	698	109	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
110	688,227	5,219,566	694	110	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
111	689,071	5,219,520	700	111	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
112	689,083	5,219,735	706	112	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
113	687,186	5,220,886	700	113	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
114	686,969	5,220,695	696	114	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
115	687,742	5,219,655	684	115	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0
116	689,009	5,220,533	733	116	Yes	GE Wind Energy	1.5sle 77m Class III	1,500	77.0	65.0	18.0

Shadow Receptor-Input

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF149	SF149W	689,915	5,218,715	677	1.0	1.0	1.0	90.0	90.0
SF149	SF149N	689,915	5,218,715	677	1.0	1.0	1.0	180.0	90.0
SF150	SF150W	690,087	5,218,888	681	1.0	1.0	1.0	90.0	90.0
SF150	SF150N	690,087	5,218,888	681	1.0	1.0	1.0	180.0	90.0
SF151	SF151W	690,061	5,218,959	683	1.0	1.0	1.0	90.0	90.0

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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SHADOW - Main Result

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

No	Name	UTM NAD27 Zone: 10 East	North	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]
SF151	SF151N	690,061	5,218,959	683	1.0	1.0	1.0	180.0	90.0
SF152	SF152W	689,345	5,218,869	682	1.0	1.0	1.0	90.0	90.0
SF152	SF152N	689,345	5,218,869	682	1.0	1.0	1.0	180.0	90.0
SF153	SF153W	690,022	5,219,029	687	1.0	1.0	1.0	90.0	90.0
SF153	SF153N	690,022	5,219,029	687	1.0	1.0	1.0	180.0	90.0
SF154	SF154W	690,015	5,219,117	689	1.0	1.0	1.0	90.0	90.0
SF154	SF154N	690,015	5,219,117	689	1.0	1.0	1.0	180.0	90.0
SF155	SF155W	690,016	5,219,167	691	1.0	1.0	1.0	90.0	90.0
SF155	SF155N	690,016	5,219,167	691	1.0	1.0	1.0	180.0	90.0
SF156	SF156W	690,013	5,219,246	694	1.0	1.0	1.0	90.0	90.0
SF156	SF156N	690,013	5,219,246	694	1.0	1.0	1.0	180.0	90.0
SF157	SF157W	689,917	5,219,412	702	1.0	1.0	1.0	90.0	90.0
SF157	SF157N	689,917	5,219,412	702	1.0	1.0	1.0	180.0	90.0
SF158	SF158W	690,021	5,219,440	701	1.0	1.0	1.0	90.0	90.0
SF158	SF158N	690,021	5,219,440	701	1.0	1.0	1.0	180.0	90.0
SF159	SF159W	689,878	5,219,636	709	1.0	1.0	1.0	90.0	90.0
SF159	SF159N	689,878	5,219,636	709	1.0	1.0	1.0	180.0	90.0
SF160	SF160W	690,025	5,219,621	708	1.0	1.0	1.0	90.0	90.0
SF160	SF160N	690,025	5,219,621	708	1.0	1.0	1.0	180.0	90.0
SF161	SF161N	689,710	5,220,198	727	1.0	1.0	1.0	180.0	90.0
SF161	SF161W	689,710	5,220,198	727	1.0	1.0	1.0	90.0	90.0
SF161	SF161S	689,710	5,220,198	727	1.0	1.0	1.0	0.0	90.0
SF162	SF162N	689,884	5,220,423	737	1.0	1.0	1.0	180.0	90.0
SF162	SF162W	689,884	5,220,423	737	1.0	1.0	1.0	90.0	90.0
SF162	SF162S	689,884	5,220,423	737	1.0	1.0	1.0	0.0	90.0
SF163	SF163N	689,561	5,220,647	743	1.0	1.0	1.0	180.0	90.0
SF163	SF163W	689,561	5,220,647	743	1.0	1.0	1.0	90.0	90.0
SF163	SF163S	689,561	5,220,647	743	1.0	1.0	1.0	0.0	90.0
SF164	SF164W	689,964	5,220,765	751	1.0	1.0	1.0	90.0	90.0
SF164	SF164S	689,964	5,220,765	751	1.0	1.0	1.0	0.0	90.0
SF165	SF165W	689,856	5,220,867	755	1.0	1.0	1.0	90.0	90.0
SF165	SF165S	689,856	5,220,867	755	1.0	1.0	1.0	0.0	90.0
SF166	SF166W	689,757	5,221,102	765	1.0	1.0	1.0	90.0	90.0
SF166	SF166S	689,757	5,221,102	765	1.0	1.0	1.0	0.0	90.0
SF62o	SF62oN	689,799	5,219,740	712	1.0	1.0	1.0	180.0	90.0
SF62o	SF62oW	689,799	5,219,740	712	1.0	1.0	1.0	90.0	90.0
SF62o	SF62oS	689,799	5,219,740	712	1.0	1.0	1.0	0.0	90.0
SF64o	SF64oW	689,867	5,221,179	769	1.0	1.0	1.0	90.0	90.0
SF64o	SF64oS	689,867	5,221,179	769	1.0	1.0	1.0	0.0	90.0

Calculation Results

No	Name	Shadow, worst case: Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]	Shadow, expected values: Shadow hours per year [h/year]
SF149	SF149W	0:00	0	0:00	0:00
SF149	SF149N	0:00	0	0:00	0:00
SF150	SF150W	0:00	0	0:00	0:00
SF150	SF150N	0:00	0	0:00	0:00
SF151	SF151W	6:00	39	0:14	2:23
SF151	SF151N	5:54	39	0:12	2:21
SF152	SF152W	0:00	0	0:00	0:00
SF152	SF152N	0:00	0	0:00	0:00
SF153	SF153W	13:14	57	0:18	5:17
SF153	SF153N	13:08	57	0:18	5:15
SF154	SF154W	8:20	41	0:18	3:11
SF154	SF154N	8:14	41	0:18	3:09
SF155	SF155W	7:48	49	0:18	2:54
SF155	SF155N	7:48	49	0:18	2:54

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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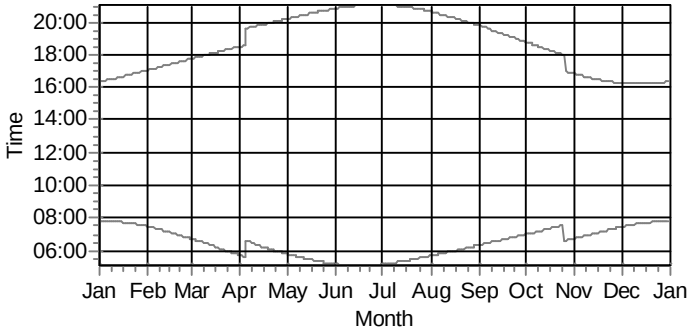
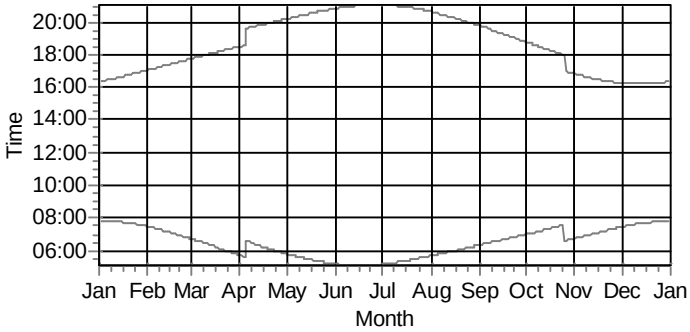
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

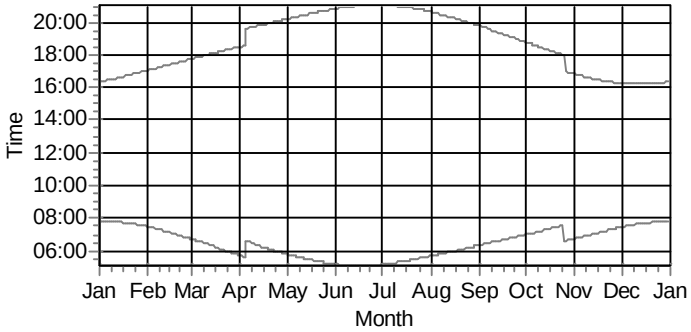
SF149N



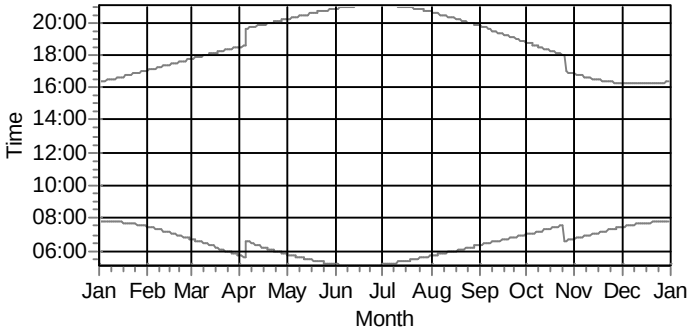
SF149W



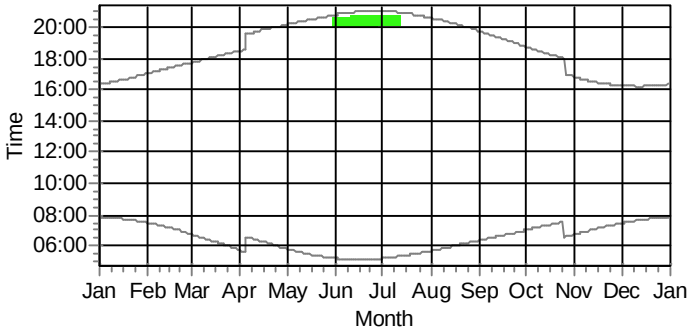
SF150N



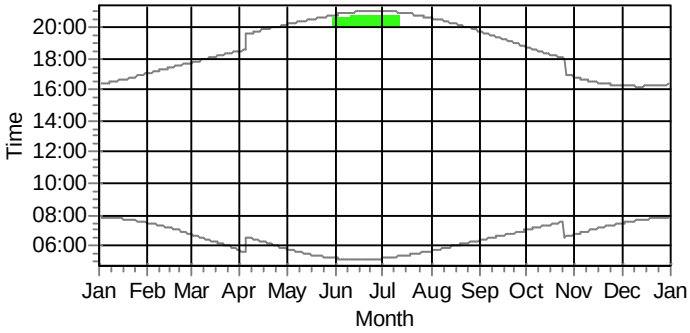
SF150W



SF151N



SF151W



WTGs

111

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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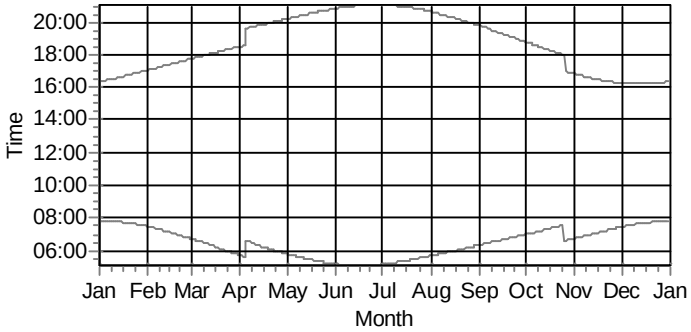
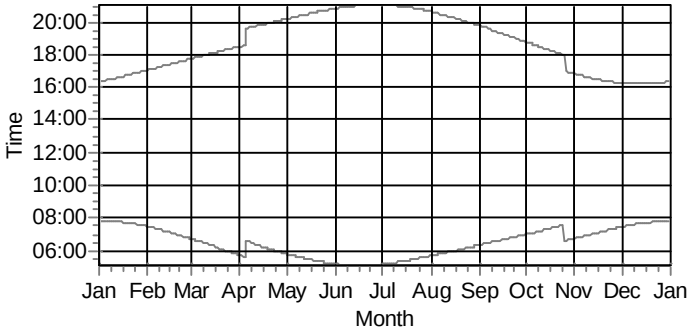
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

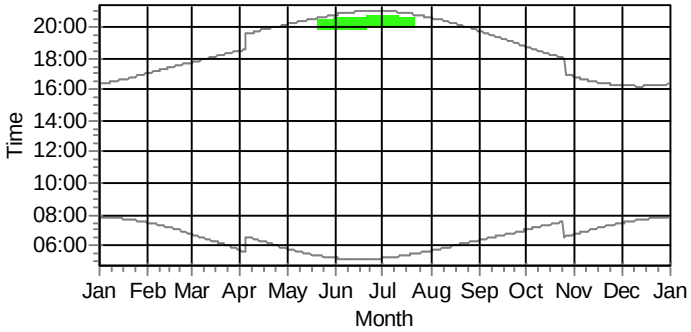
SF152N



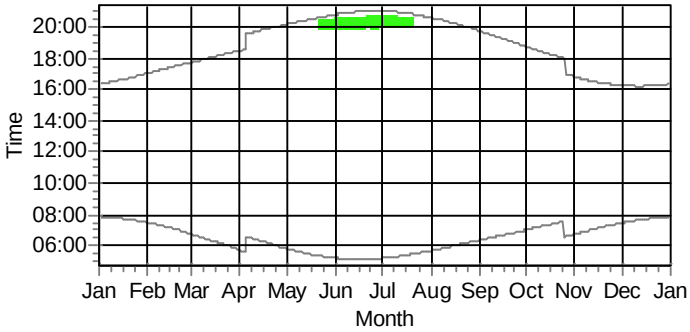
SF152W



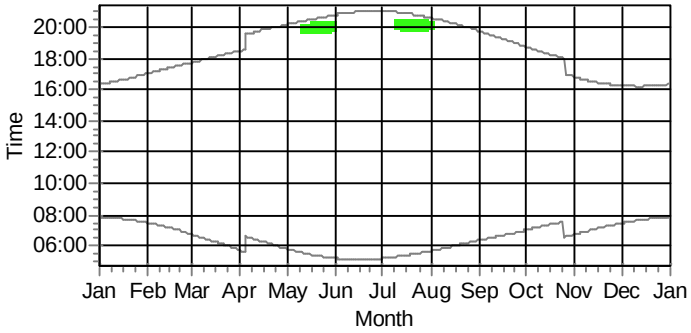
SF153N



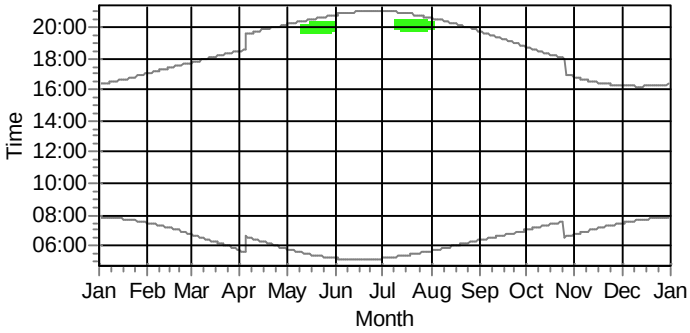
SF153W



SF154N



SF154W



WTGs

111

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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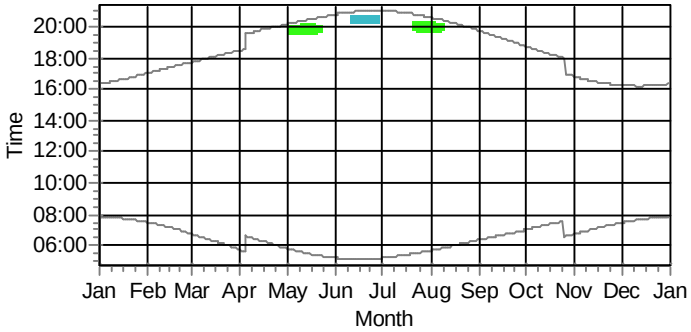
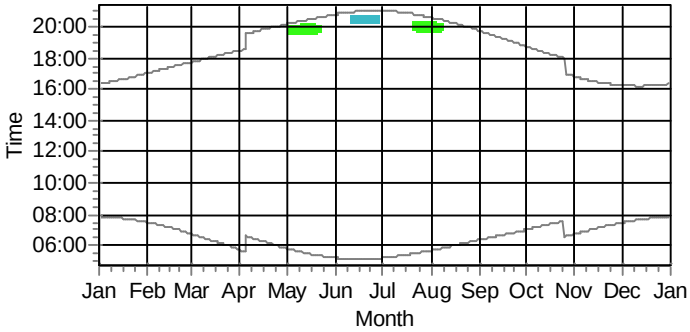
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

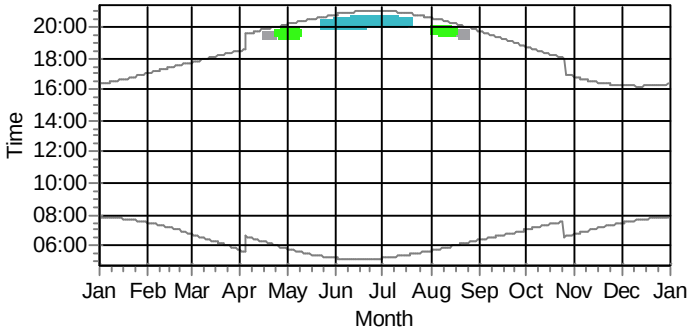
SF155N



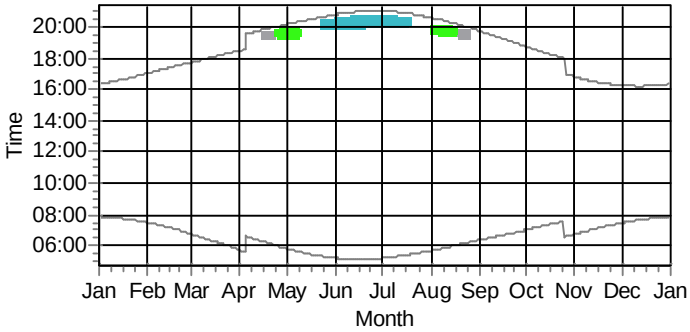
SF155W



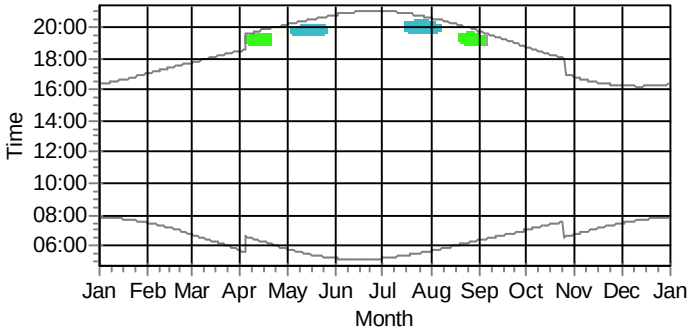
SF156N



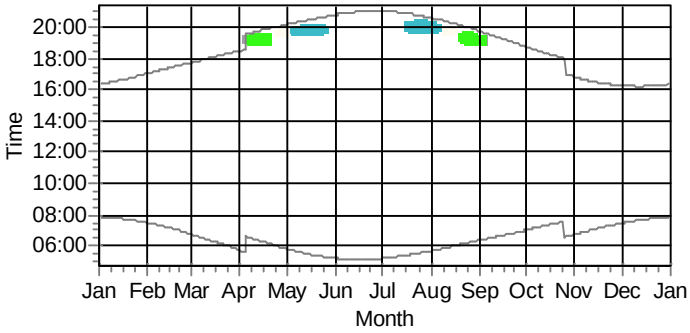
SF156W



SF157N



SF157W



WTGs

108 109 111 112

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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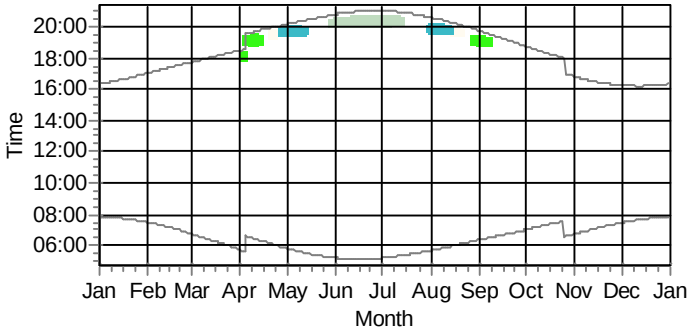
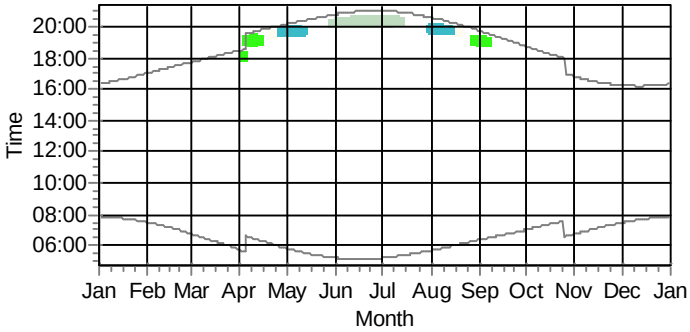
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

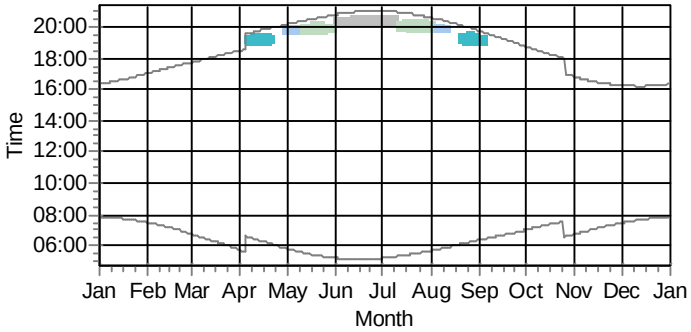
SF158N



SF158W



SF159N



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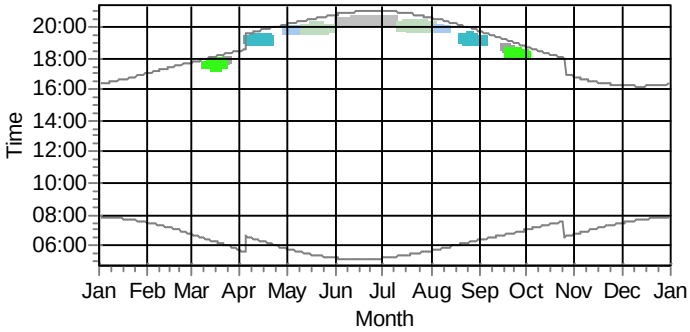

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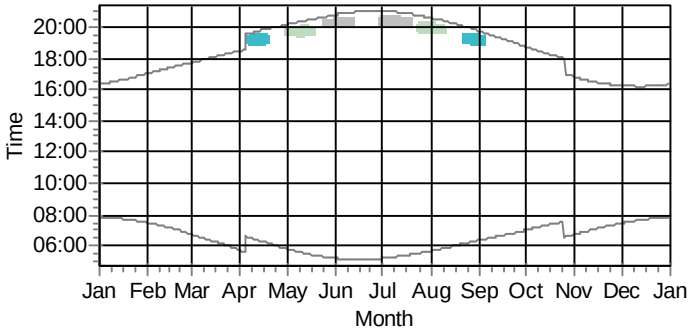

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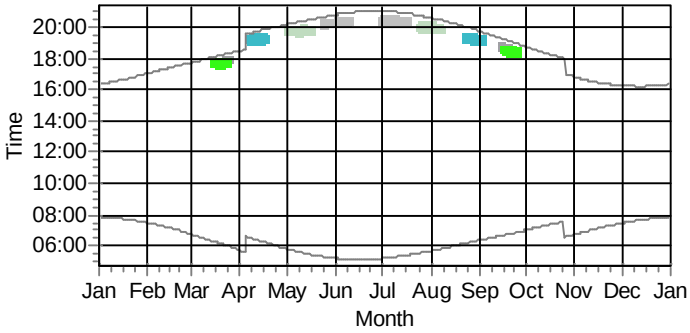

WTGs

103	107	109	112
106	108	111	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
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Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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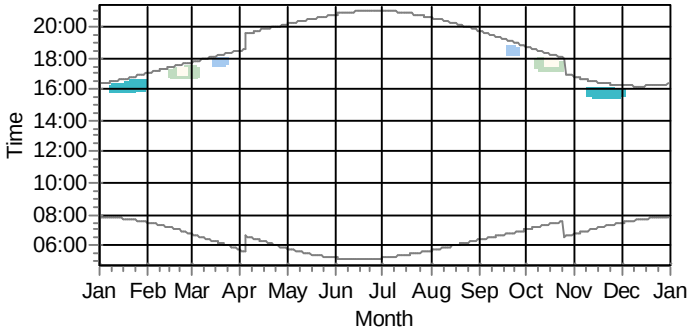
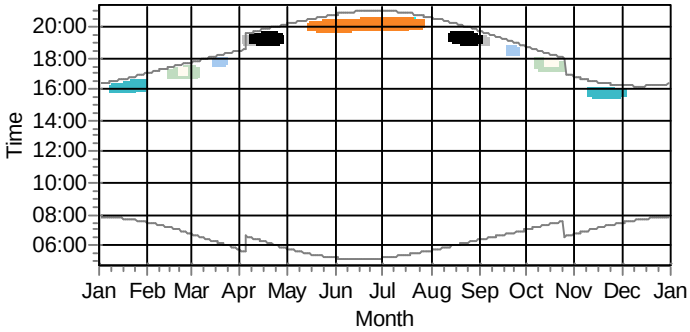
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

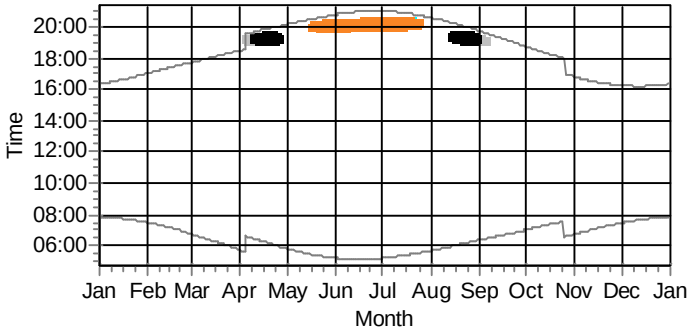
SF161S



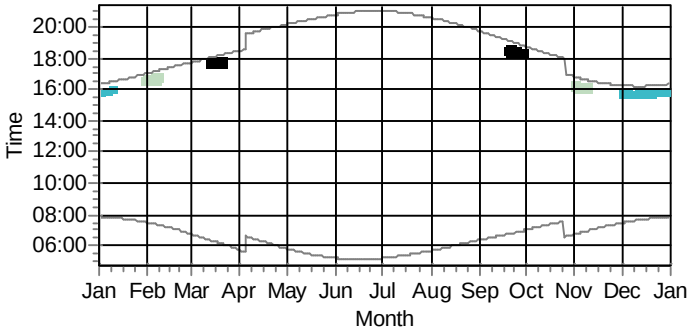
SF161W



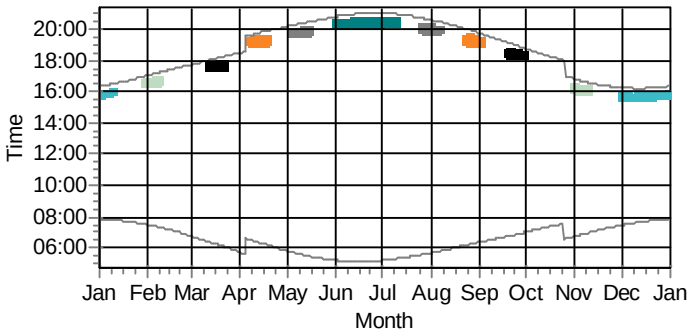
SF161N



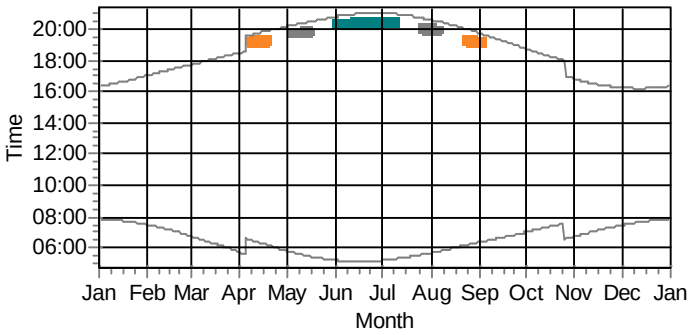
SF162S



SF162W



SF162N



WTGs

095	103	105	107	112
097	104	106	108	116

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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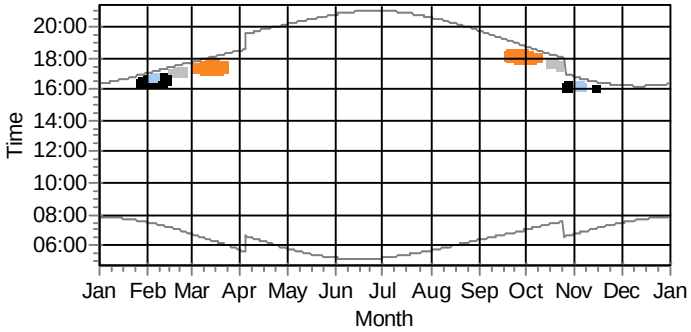
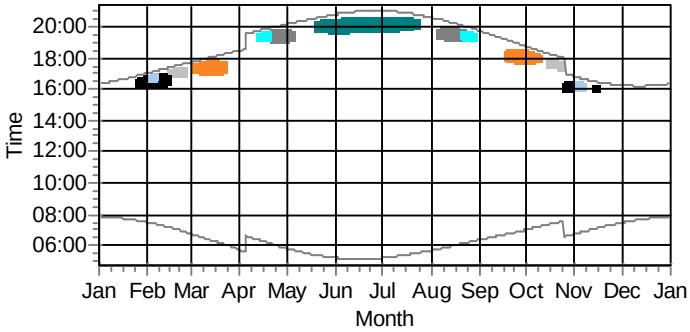
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

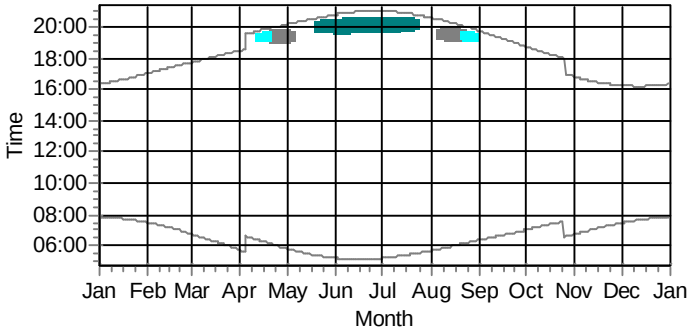
SF163S



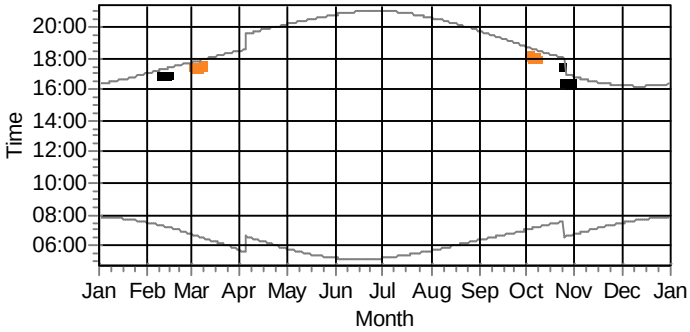
SF163W



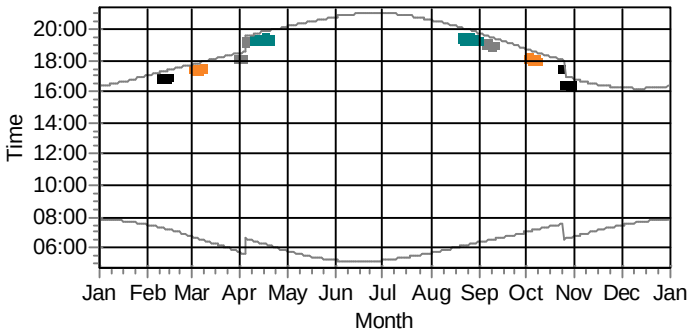
SF163N



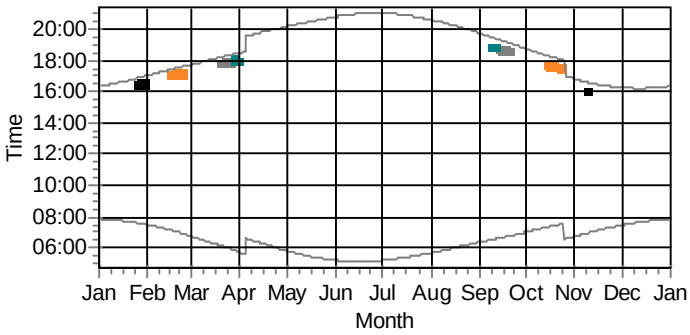
SF164S



SF164W



SF165S



WTGs

095	103	105	116
097	104	107	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

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Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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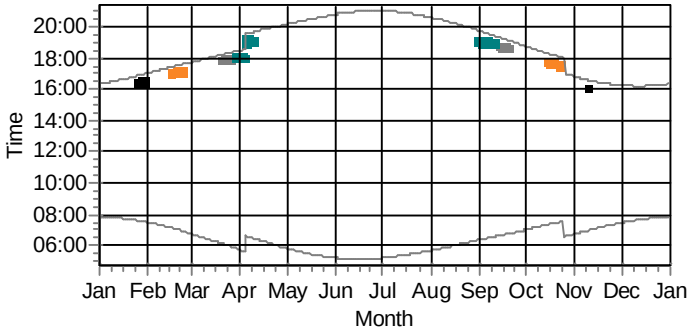
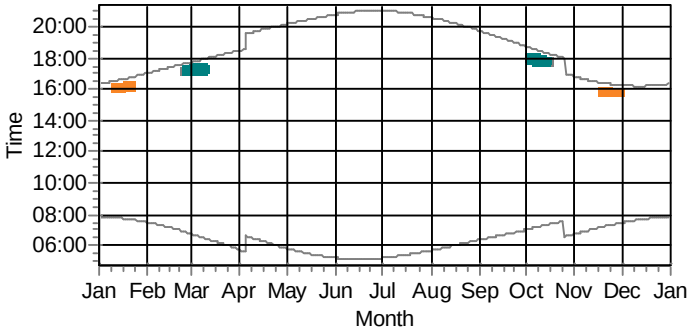
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

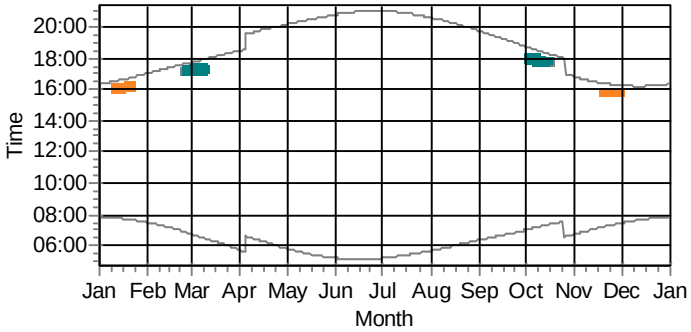
SF165W



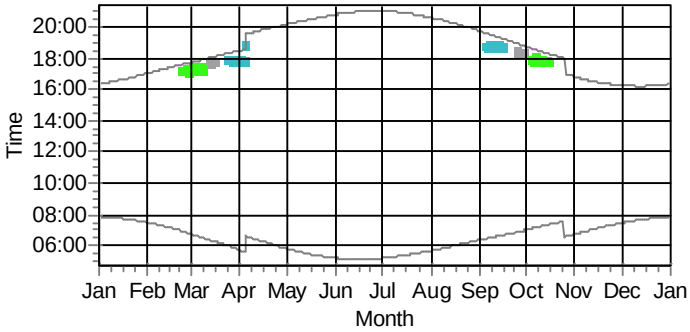
SF166S



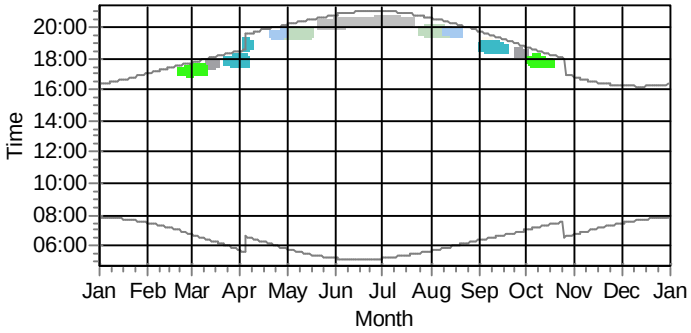
SF166W



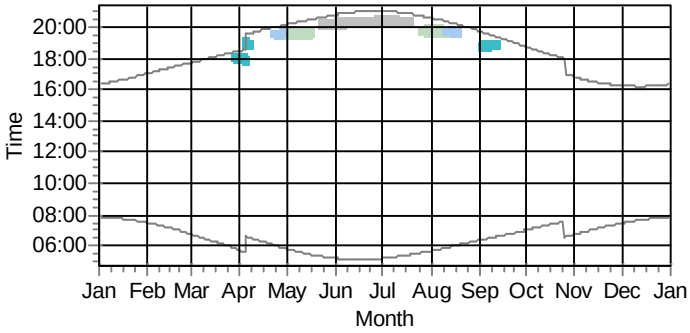
SF62oS



SF62oW



SF62oN



WTGs

095	103	106	108	111	116
097	105	107	109	112	

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

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Tubines 091-116
GE 1.5sle (77m diameter) at 65m hub height
Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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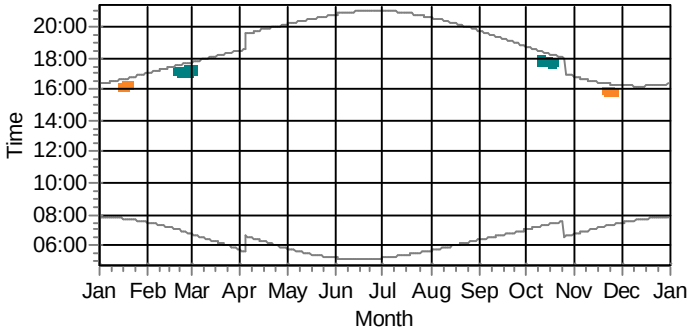
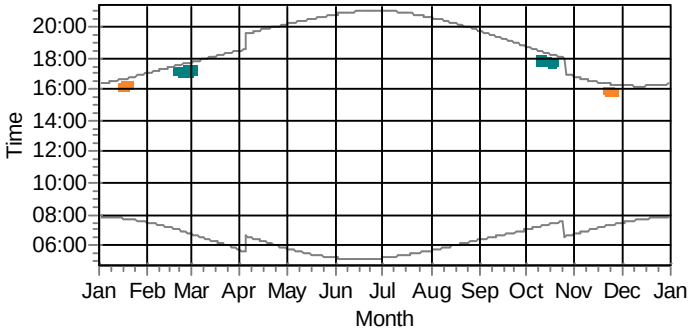
SHADOW - Calendar, graphical

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116

SF64oS



SF64oW



WTGs

095 097 116

Project:
030415 Desert Claim Wind Power Project, WA

Huckell/Weinman Associates, Inc.

Description:
Shadow-Flicker receptor 149 through 166, 64o, 62o, selected windows
Tubines 091-116
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Monthly sunshine percentage applied
Joint frequency distribution applied (for run-hours and direction)
1500 meter shadow limit applied

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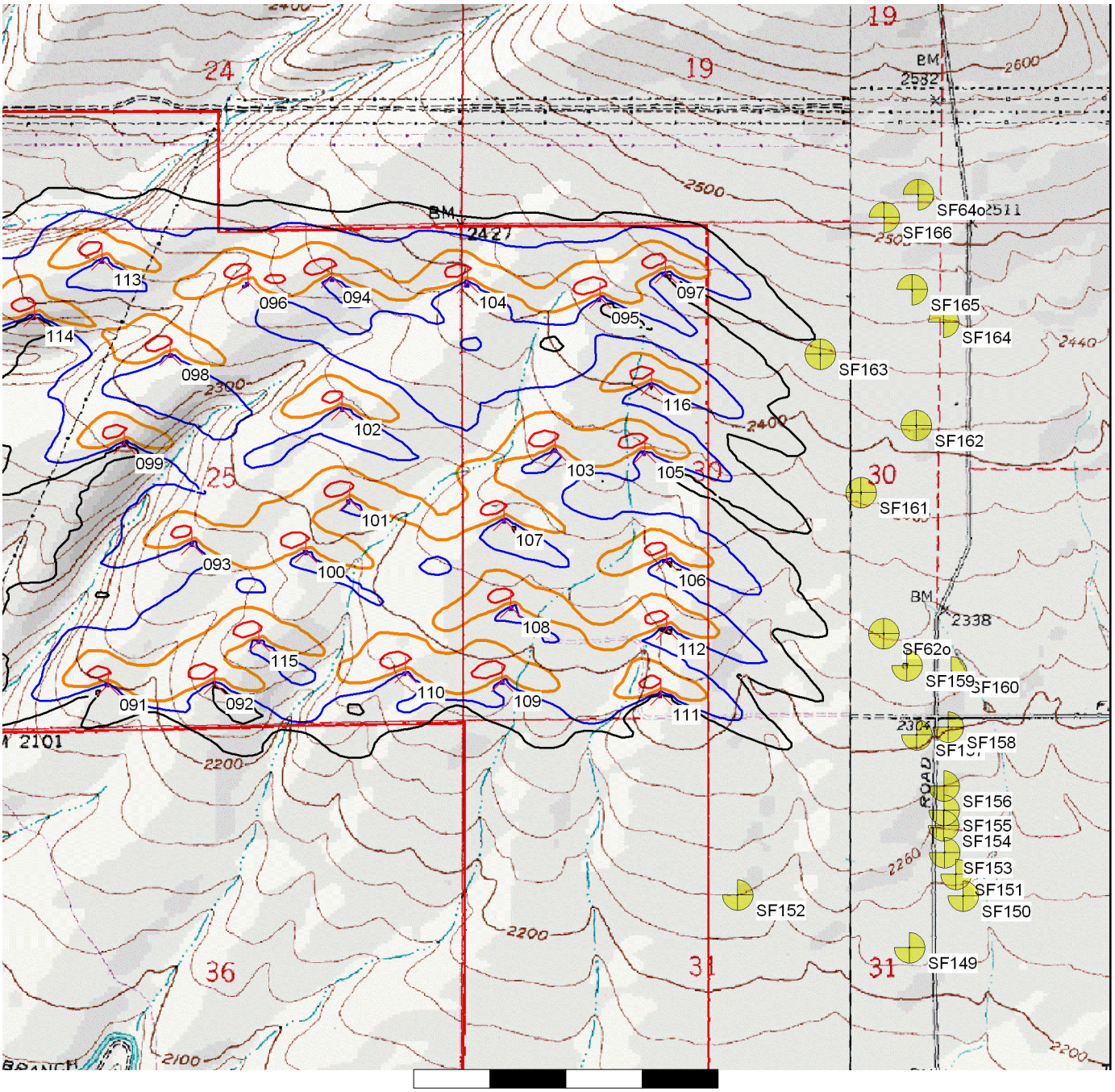
SHADOW - 040711 DCWPP USGS, z13, 31250, overlays

Calculation: 040727 SF 149-166, 64o, 62o, tubines 091-116 **File:** 040711 DCWPP USGS, z13, 34375, overlays.bmi



0 250 500 750 1000m

Map: 040711 DCWPP USGS, z13, 31250, overlays , Print scale 1:20,000, Map center UTM NAD27 Zone: 10 East: 688,682 North: 5,219,964

New WTG Shadow Receptor

Isolines showing shadow in Shadow hours per year. Real value calculation.

25 50 100 200