

Appendix W
Soil Loss Calculations

Soil Loss Calculations No1

Stirling Energy Systems Solar One Project HRA Calculations

Cancer Risk Calculations - PMI		
Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	0.00014	µg/m ³
Inhalation Cancer Potency Factor for diesel particulate matter (from OEHHA) is	1.10E+00	(mg/kg-day) ⁻¹
Inhalation dose (mg/kg-day) = (Annual conc) * DBR * A * EF * ED * 1e-6 / AT		
DBR = daily breathing rate (L/kg-day), used 95th percentile	393	L/kg-day
A = Inhalation absorption factor (fraction of chemical absorbed), default	1	
EF = Exposure frequency (days/year)	365	days/year
ED = Exposure duration (years), default	70	years
AT = Averaging time period over which exposure is averaged (days), default (e.g., 25,550 days for 70 year cancer risk)	25550	days
Inhalation dose (mg/kg-day) =	5.42E-08	mg/kg-day
Inhalation cancer risk = (Inhalation dose) * (cancer potency factor)	5.97E-08	
Inhalation cancer risk =	0.060	in a million
Chronic Non-cancer Hazard Index Calculations - PMI		
Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	0.00014	µg/m ³
Diesel particulate matter chronic reference exposure level (REL) from OEHHA	5	µg/m ³
Chronic Non-cancer Hazard Index (HI)	0.00003	

Stirling Energy Systems Solar One Project HRA Calculations

Cancer Risk Calculations - Sensitive Receptor 1

Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	1.60E-06	µg/m ³
Inhalation Cancer Potency Factor for diesel particulate matter (from OEHHA) is	1.10E+00	(mg/kg-day) ⁻¹
Inhalation dose (mg/kg-day) = (Annual conc) * DBR * A * EF * ED * 1e-6 / AT		
DBR = daily breathing rate (L/kg-day), used 95th percentile	393	L/kg-day
A = Inhalation absorption factor (fraction of chemical absorbed), default	1	
EF = Exposure frequency (days/year)	365	days/year
ED = Exposure duration (years), default	70	years
AT = Averaging time period over which exposure is averaged (days), default (e.g., 25,550 days for 70 year cancer risk)	25550	days
Inhalation dose (mg/kg-day) =	6.29E-10	mg/kg-day
Inhalation cancer risk = (Inhalation dose) * (cancer potency factor)	6.92E-10	
Inhalation cancer risk =	0.001	in a million

Chronic Non-cancer Hazard Index Calculations - Sensitive Receptor 1

Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	1.60E-06	µg/m ³
Diesel particulate matter chronic reference exposure level (REL) from OEHHA	5	µg/m ³
Chronic Non-cancer Hazard Index (HI)	3.20E-07	

Stirling Energy Systems Solar One Project HRA Calculations

Cancer Risk Calculations - Sensitive Receptor 2

Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	3.39E-06	µg/m ³
Inhalation Cancer Potency Factor for diesel particulate matter (from OEHHA) is	1.10E+00	(mg/kg-day) ⁻¹
Inhalation dose (mg/kg-day) = (Annual conc) * DBR * A * EF * ED * 1e-6 / AT		
DBR = daily breathing rate (L/kg-day), used 95th percentile	393	L/kg-day
A = Inhalation absorption factor (fraction of chemical absorbed), default	1	
EF = Exposure frequency (days/year)	365	days/year
ED = Exposure duration (years), default	70	years
AT = Averaging time period over which exposure is averaged (days), default (e.g., 25,550 days for 70 year cancer risk)	25550	days
Inhalation dose (mg/kg-day) =	1.33E-09	mg/kg-day
Inhalation cancer risk = (Inhalation dose) * (cancer potency factor)	1.47E-09	
Inhalation cancer risk =	0.001	in a million

Chronic Non-cancer Hazard Index Calculations - Sensitive Receptor 2

Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	3.39E-06	µg/m ³
Diesel particulate matter chronic reference exposure level (REL) from OEHHA	5	µg/m ³
Chronic Non-cancer Hazard Index (HI)	6.78E-07	

Stirling Energy Systems Solar One Project HRA Calculations

Cancer Risk Calculations - Sensitive Receptor 3

Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	7.78E-07	µg/m ³
Inhalation Cancer Potency Factor for diesel particulate matter (from OEHHA) is	1.10E+00	(mg/kg-day) ⁻¹
Inhalation dose (mg/kg-day) = (Annual conc) * DBR * A * EF * ED * 1e-6 / AT		
DBR = daily breathing rate (L/kg-day), used 95th percentile	393	L/kg-day
A = Inhalation absorption factor (fraction of chemical absorbed), default	1	
EF = Exposure frequency (days/year)	365	days/year
ED = Exposure duration (years), default	70	years
AT = Averaging time period over which exposure is averaged (days), default (e.g., 25,550 days for 70 year cancer risk)	25550	days
Inhalation dose (mg/kg-day) =	3.06E-10	mg/kg-day
Inhalation cancer risk = (Inhalation dose) * (cancer potency factor)	3.36E-10	
Inhalation cancer risk =	3.36E-04	in a million

Chronic Non-cancer Hazard Index Calculations - Sensitive Receptor 3

Total Project PM ₁₀ annual emission rate	8.30E-05	g/s
AERMOD Maximum annual PM ₁₀ concentration using actual emission rate	7.78E-07	µg/m ³
Diesel particulate matter chronic reference exposure level (REL) from OEHHA	5	µg/m ³
Chronic Non-cancer Hazard Index (HI)	1.56E-07	

Soil Loss Calculations No2

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: Carrizo stony sand 85%

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 0.53 t/ac/yr

Detachment on slope: 0.53 t/ac/yr

Soil loss for cons. plan: 0.53 t/ac/yr

Sediment delivery: 0.53 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
1/1/0	default		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: Carrizo stony sand 85%

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 0.53 t/ac/yr

Detachment on slope: 0.53 t/ac/yr

Soil loss for cons. plan: 0.53 t/ac/yr

Sediment delivery: 0.53 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
4/15/0	Highly disturbed land\blade cut material		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: Carrizo stony sand 85%

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 1.4 t/ac/yr

Detachment on slope: 1.4 t/ac/yr

Soil loss for cons. plan: 1.4 t/ac/yr

Sediment delivery: 1.4 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
4/15/0	Highly disturbed land\blade fill material		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: Carrizo stony sand 85%

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 0.53 t/ac/yr

Detachment on slope: 0.53 t/ac/yr

Soil loss for cons. plan: 0.53 t/ac/yr

Sediment delivery: 0.53 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
4/15/0	Highly disturbed land\blade cut material		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: Carrizo stony sand 85%

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: 3 - 0.2% grade terrace in middle

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 0.33 t/ac/yr

Detachment on slope: 0.33 t/ac/yr

Soil loss for cons. plan: 0.33 t/ac/yr

Sediment delivery: 0.33 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
4/15/0	Highly disturbed land\blade cut material		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)
Soil: default *30% gravel, 30% sand, 40% fines*
Horiz. overland flow path length: 150 ft
Avg. slope steepness: 5.0 %

<i>Management</i>	<i>Vegetation</i>	<i>Yield units</i>	<i>Yield (# of units)</i>

Contouring: default
Strips/barriers: (none)
Diversion/terrace, sediment basin: (none)
Subsurface drainage: (none)
Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 2.1 t/ac/yr
Detachment on slope: 2.1 t/ac/yr
Soil loss for cons. plan: 2.1 t/ac/yr
Sediment delivery: 2.1 t/ac/yr

Crit. slope length:
Surf. cover after planting: 0 %

<i>Date</i>	<i>Operation</i>	<i>Vegetation</i>	<i>Surf. res. cov. after op, %</i>
1/1/0	basic/general\no operation		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: default *30% gravel, 30% sand, 40% fines*

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

Management	Vegetation	Yield units	Yield (# of units)

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: (none)

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 2.1 t/ac/yr

Detachment on slope: 2.1 t/ac/yr

Soil loss for cons. plan: 2.1 t/ac/yr

Sediment delivery: 2.1 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Highly disturbed land/blade cut material		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)
 Soil: default *30% gravel, 50% sand, 40% fines*
 Horiz. overland flow path length: 150 ft
 Avg. slope steepness: 5.0 %

Management	Vegetation	Yield units	Yield (# of units)

Contouring: default
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: (none)
 Subsurface drainage: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 5.7 t/ac/yr
 Detachment on slope: 5.7 t/ac/yr
 Soil loss for cons. plan: 5.7 t/ac/yr
 Sediment delivery: 5.7 t/ac/yr

Crit. slope length:
 Surf. cover after planting: 0 %

Date	Operation	Vegetation	Surf. res. cov. after op, %
4/15/0	Highly disturbed land\blade fill material		0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)
 Soil: default *30% Gravel, 30% sand, 40% fines*
 Horiz. overland flow path length: 150 ft
 Avg. slope steepness: 5.0 %

Management	Vegetation	Yield units	Yield (# of units)
Highly disturbed land\silt fence\silt fence full retardance	Highly disturbed land\silt fence full retardance	lb	100

Contouring: default
 Strips/barriers: (none)
 Diversion/terrace, sediment basin: 1 - 0.5% grade terrace in middle
 Subsurface drainage: (none)
 Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 0.052 t/ac/yr
 Detachment on slope: 0.052 t/ac/yr
 Soil loss for cons. plan: 0.052 t/ac/yr
 Sediment delivery: 0.052 t/ac/yr

Crit. slope length:
 Surf. cover after planting: 0 %

Date	Operation	Vegetation	Surf. res. cov. after op, %
1/1/0	basic/general\begin growth	Highly disturbed land\silt fence full retardance	0

RUSLE2 Profile Erosion Calculation Record

Info: Profile is default that RUSLE2 uses when you have not specified a profile.

File: profiles\Solar 1

Inputs:

Location: San Bernardino county average (San Bernardino)

Soil: default 30% gravel, 30% sand, 40% fine

Horiz. overland flow path length: 150 ft

Avg. slope steepness: 5.0 %

Management	Vegetation	Yield units	Yield (# of units)
Highly disturbed land\silt fence\silt fence full retardance	Highly disturbed land\silt fence full retardance	lb	100

Contouring: default

Strips/barriers: (none)

Diversion/terrace, sediment basin: 1 - 0.5% grade terrace in middle

Subsurface drainage: (none)

Adjust res. burial level: Normal res. burial

Outputs:

Soil loss erod. portion: 0.052 t/ac/yr

Detachment on slope: 0.052 t/ac/yr

Soil loss for cons. plan: 0.052 t/ac/yr

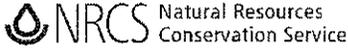
Sediment delivery: 0.052 t/ac/yr

Crit. slope length:

Surf. cover after planting: 0 %

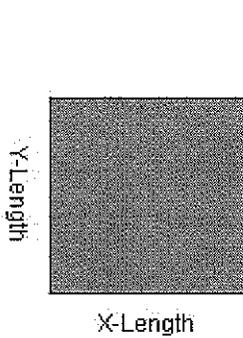
Date	Operation	Vegetation	Surf. res. cov. after op, %
1/1/0	basic/general\begin growth	Highly disturbed land\silt fence full retardance	0

WEPS Run Summary



Client
Farm No
Run Name Solar 1
Run Location Solar1
Management Graze (DESERT)
Soil Rositas_130_85_S

Tract No
Field No



Simulation & Site Information

Mode : NRCS
State : California
County : San Bernardino

Soil Loss T: 5 T/ac/yr
Latitude : 34.8 °N
Longitude : 116.4 °W

Field Dimension Information

X-Length : 5279.86 ft
Y-Length : 5279.86 ft
Area : 639.97 ac
Elevation : 1919.29 ft
Orientation : 0 °

Weather Station / Files

Cligen Station :DAGGETT AP
Wingen Station :BARSTOW-DAGGETT

Period	Crop	Gross Loss (tons/acre)	Net Soil Loss From Field (tons/acre)		
			Total Creep/Salt.	Suspension	PM10
Rot. yr: 1		>100	>100	>75	>75
Ave. Annual		>100	>100	>75	>50

Date	Operation	Crop
Jan 01, 01	Graze, stubble or residue 50 pct	

Run specific information: