APPENDIX H

Air Quality

H-1. Criteria Pollutant Emissions Calculations

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Paved Road Fugitive Dust From Vehicle Travel

PROPOSED ACTION - Maximum Day Emissions (occurs during Month 30)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(pounds/day)	
Trips/day	miles/trip	(miles/day)	PM10	PM2.5	PM10	PM2.5
611	20	12,220	0.0015	0.0004	18.80	4.61

ALTERNATIVE 2 - Maximum Day Emissions (occurs during Month 10 to coincide with the PM10 exhaust Max Day)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(pounds/day)	
Trips/day	miles/trip	(miles/day)	PM10	PM2.5	PM10	PM2.5
311	20	6,220	0.0020	0.0005	12.18	2.99

ALTERNATIVE 2 - Maximum Day Emissions (for Months 23 and 24)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(pounds/day)	
Trips/day	miles/trip	(miles/day)	PM10	PM2.5	PM10	PM2.5
271	20	5,420	0.0015	0.0004	8.15	1.98

PROPOSED ACTION - Annual Emissions (2013)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(tons/year)	
Trips/year	miles/trip	(miles/year)	PM10	PM2.5	PM10	PM2.5
44,740	20	894,800	0.0015	0.0004	0.69	0.17
				Exhaust and on-site fugitive dust	11.08	2.65
				Total	11.77	2.82

PROPOSED ACTION - Annual Emissions (2014)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(tons/year)	
Trips/year	miles/trip	(miles/year)	PM10	PM2.5	PM10	PM2.5
78,415	20	1,568,300	0.0015	0.0004	1.21	0.30
				Exhaust and on-site fugitive dust	4.35	1.26
				Total	5.56	1.56

PROPOSED ACTION - Annual Emissions (2015)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(tons/year)	
Trips/year	miles/trip	(miles/year)	PM10	PM2.5	PM10	PM2.5
82,697	20	1,653,940	0.0015	0.0004	1.27	0.31
				Exhaust and on-site fugitive dust	11.24	2.67
				Total	12.51	2.98

PROPOSED ACTION - Annual Emissions (2016)

			Emission Factors		Emissions	
		VMT	(pounds/VMT)		(tons/year)	
Trips/year	miles/trip	(miles/year)	PM10	PM2.5	PM10	PM2.5
121,904	20	2,438,080	0.0015	0.0004	1.88	0.46
				Exhaust and on-site fugitive dust	4.14	1.19
				Total	6.02	1.65

Trips derived from AECOM, 2012; Attachment 1-C, Construction Vehicles Emissions. The maximum daily trips would occur during Month 30 and the maximum year is 2016.
Round-trip mileage, from the Black Rock Road/I-10 interchange to the project site and back.

Based on AP-42 Emission Factor: E (lbs/VMT) = [k (sL)^0.91 (W)^1.02](1-P/4N)

Where:

E = emission rate in pounds per vehicle mile traveled.

k = particle size multiplier (assumed 0.0022 lb/VMT for PM10 and 0.00054 lb/VMT for PM2.5 per AP-42, Table 13.2.1-1)

sL = silt content (assumed to be 0.2 for ADT Category 500-5,000 per AP-42, Table 13.2.1-2)

W = average weight (tons) of vehicles (For PA assumed 3.0 tons: 98% weight 2.5 tons, 2% weigh 30 tons; for Alt 2 assumes 3.8 tons: 95% weight 2.5 tons, 5% weigh 30 tons)

P = number of "wet" days with at least 0.254 mm (0.01 in) of preceipitation during the averaging period. Assumed to be 20 days per AP-42, Table 13.2.1-2.

N= number of days in the averaging period (i.e., 365 for annual).

PROPOSED ACTION- Total Maximum Day Construction Emissions

	VOC	NO_x	CO	SO_x	PM10[b]	PM2.5[b]
Off-road Equipment Exhaust	9	84	33	0.0	3	3
Vehicle Exhaust	14	50	185	0.3	4	3
On-site Fugitive Dust	0	---	0	---	110	23
Paved Road Fugitive Dust	0	---	0	---	19	5
Maximum Daily Emissions	23	135	218	0.3	136	34

ALTERNATIVE 2 - Total Maximum Day Construction Emissions

	VOC	NO_x	CO	SO_x	PM10[b]	PM2.5[b]
Off-road Equipment Exhaust	11	84	40	0.0	4	3
Vehicle Exhaust	10	50	122	0.2	3	3
On-site Fugitive Dust	0	---	0	---	112	23
Paved Road Fugitive Dust	0	---	0	---	8	2
Maximum Daily Emissions	21	135	162	0.2	127	31

PM10 Dust with no controls

112	0.32	350	pounds
		0.2	
	80% controls	70	pounds

2015 Emissions for Alternative 2

		Month 23	Month 24
	Working Days/month	22	20
	CO	96.6	96.6
	VOC	9.5	9.5
pounds/ day	NOx	44.1	44.1
	Sox	0.1	0.1
	PM10	23.55	23.55
	PM2.5	5.1	5.1
tons/day	CO2	7.6	7.6

		Month 23	Month 24	2015 Emissions for Alt 2
	CO	1.1	1.0	2.0
	VOC	0.1	0.1	0.2
tons/year	NOx	0.5	0.4	0.9
	Sox	0.0	0.0	0.0
	PM10	0.3	0.2	0.5
	PM2.5	0.1	0.1	0.1
metric tons /year	CO2	167.2	152.0	319.2
	PM10 offsite c	0.1	0.1	0.2
	PM2.5 offsite	0.0	0.0	0.0

		% relative to PA	Months
Proposed Action	14.5	1	8
Central route	12.5	0.862068966	6.896552
Western route	15.5	1.068965517	8.551724

Monthly Gen-Tie Emissions for Alternative 3

		Month 13	Month 14
	Working Da	21	22
	CO	5.12	5.12
	VOC	1.61	1.61
	NOx	12.99	12.99
pounds/ day	Sox	0	0
	PM10	0.51	0.51
	PM2.5	0.47	0.47
	CO2	1657	1657

		Month 23	Month 24
	CO	0.1	0.1
	VOC	0.0	0.0
	NOx	0.1	0.1
tons/year	Sox	0.0	0.0
	PM10	0.0	0.0
	PM2.5	0.0	0.0
metric tons /year	CO2	15.8	16.5
	PM10 offsit	0.0	0.0
	PM2.5 offs	0.0	0.0

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APPENDIX H

Air Quality (continued)

H-2. Greenhouse Gas Emissions Estimates

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Proposed Action

Construction Year	Annual CO_2e Emissions (metric tons)		
	Equipment and Vehicle Exhaust	Indirect Electricity and Water Use	Total Emissions
Year 2013	2,307	8	2,315
Year 2014	3,127	8	3,135
Year 2015	3,116	7	3,123
Year 2016	4,122	8	4,130
Total Project	**12,672**	**31**	12,703

Proposed Action

	tons	metric tons	tons/metric ton
30-year Amortized Construction Emissions	466	423	1.1023
Total Direct and Indirect Annual Operation Emissions	239	217	
Reduction in Carbon Sequestration During Operation	7,992	7,250	
30-year Amortized Decommissioning Emissions	466	423	
Amortized Construction + Annual Operation	9,163	8,313	
	100,000	10,000	
Proposed Action Net Emissions		-630,748	

Alternative 2

Construction Year	Annual CO_2e Emissions (metric tons)		
	Equipment and Vehicle Exhaust	Indirect Electricity and Water Use	Total Emissions
Year 2013	2,307	8	2,315
Year 2014	3,127	8	3,135
Year 2015	350	2	351
Total Project	**5,784**	**18**	5,801

For equipment and vehicle exhaust Year 2015, data for Months 23 and 24 tonnes per day for Table 4g.

Units	Month 23	Month 24
days per month	22	24
metric tons/day	7.6	7.6
metric tons/month	167.2	182.4
metric tons/2015	349.6	

Alternative 2

	tons	metric tons
30-year Amortized Construction Emissions	213	193
Total Direct and Indirect Annual Operation Emissions	120	109
Reduction in Carbon Sequestration During Operation	3,803	3,450
30-year Amortized Decommissioning Emissions	213	193
Amortized Construction + Annual Operation	4,349	3,946
	100,000	10,000

Alternative 2 Energy Displacement

	MW	Displaced GHGs
Proposed Action	750	639,061
Alternative 2	250	213,020
Alternative 2 Net Emissions		-209,075

See AECOM, 2012 for calculations associated with the Proposed Action displacement

It is assumed that energy displacement associated with Alternative 2 would be 1/3 that of the Proposed Action.

Alternative 2 Net Emissions

Project Electricity Demand for Construction Activities

	Unit 1	Unit 2
kW-hrs	20,000.00	18,333.33
MW-hrs	20.00	18.33

Electricity use emission factors (CCAR, 2009)

	CO2	CH4	N2O
lbs/MW-hr	681.01	0.02829	0.00623

Indirect Emission Assoc. with Water/Electricity Use (metric tons/year)

Construction	CO2	CH4	N2O	**CO2e**
Unit 1	6.178	0.000	0.000	**6.201**
Unit 2	5.663	0.000	0.000	**5.684**
Total	11.841	0.000	0.000	**11.886**

References:

California Climate Action Registry, 2011. Emission Factors

Notes:

Power during the construction period, estimated at a peak demand of 10,000 kilowatt hours (kWh) per year, would be supplied by extending a distribution line.

Year	2013	2014	2015	2016
kW-hrs	8333.33333	10000	10000	10000
MW-hrs	8.33333333	10	10	10

Electricity use emission factors (CCAR, 2009)

	CO2	CH4	N2O
lbs/MW-hr	681.01	0.02829	0.00623

Indirect Emission Assoc. with Water/Electricity Use (metric tons/year)

Construction	CO2	CH4	N2O	**CO2e**
2013	2.574	0.000	0.000	**2.584**
2014	3.089	0.000	0.000	**3.101**
2015	3.089	0.000	0.000	**3.101**
2016	3.089	0.000	0.000	**3.101**
				11.886

Alternative 2 year 2015

	2015
kW-hrs	1666.66667
MW-hrs	1.66666667

Indirect Emission Assoc. with Water/Electricity Use (metric tons/year)

Construction	CO2	CH4	N2O	**CO2e**
2015	0.515	0.000	0.000	**0.515**

Indirect Water Usage Emissions

Proposed Action Construction Water Demand

Demand	Unit 1	Unit 2
acre-feet	451	301
million gallons (Mg)	146.96	98.08

Proposed Action Operation Water Demand

Demand	Unit 1	Unit 2
acre-feet	23	22
million gallons (Mg)	7.49	7.17

Use and Emission Factors

Water energy use factor* (CEC, 2005)

250 kW-hr/MG

Electricity use emission factors (CCAR, 2009)

	CO2	CH4	N2O
lbs/MW-hr	681.01	0.02829	0.00623

Proposed Action Indirect Electricity Usage for Water Consumption

Construction	Unit 1	Unit 2	total (check)
kW-hrs	36,739.75	24,520.32	61,260.07
MW-hrs	36.74	24.52	61.26
Operation	Unit 1	Unit 2	
kW-hrs	1,873.65	1,792.18	
MW-hrs	1.87	1.79	

Indirect Emission Assoc. with Water Use (metric tons/year)

Construction	CO2	CH4	N2O	**CO2e**
Unit 1	11.349	0.000	0.000	**11.392**
Unit 2	7.574	0.000	0.000	**7.603**
Total	18.923	0.001	0.000	**18.994**
Operation	CO2	CH4	N2O	**CO2e**
Unit 1	0.579	0.000	0.000	**0.581**
Unit 2	0.554	0.000	0.000	**0.556**
Total	1.132	0.000	0.000	**1.137**

Proposed Action

year	2013	2014	2015	2016	Total (check)
acre-feet	204	204	161	180	749
million gallons (Mg)	66.47	66.53	52.41	58.65	

Note: 1 acre-foot each unit for potable water (PD pages 2-19 and 2-20)

Electricity use emission factors (CCAR, 2009)

	CO2	CH4	N2O
lbs/MW-hr	681.01	0.02829	0.00623

Year	2013	2014	2015	2016	Total (check)
kW-hrs	16,617.39	16,632.00	13,101.85	14,663.31	61,014.55
MW-hrs	16.62	16.63	13.10	14.66	61.01

Proposed Action Indirect Emission Assoc. with Water Use (metric tons/year)

Year	CO2	CH4	N2O	**CO2e**
2013	5.133	0.000	0.000	**5.152**
2014	5.138	0.000	0.000	**5.157**
2015	4.047	0.000	0.000	**4.062**
2016	4.530	0.000	0.000	**4.547**
				18.918

Alterantive 2

year	2015
acre-feet	40.83333333
million gallons (Mg)	13.31
kW-hrs	3,326.40
MW-hrs	3.33

Year	CO2	CH4	N2O	**CO2e**
2015	1.028	0.000	0.000	**1.031**

Notes: Global Warming Potential for CH4 = 25; GWP for N2O = 296. 1 acre-foot = 325851.427 gallons
* Water energy use factor includes supply, conveyance, and treatment.

References:

California Energy Commission (CEC), 2005. (Table 1-3, page 11).
The Climate Registry, 2011

APPENDIX I

Fire Management Plan

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WorleyParsons

resources & energy

EcoNomics

Fire Prevention Plan

McCoy Solar Energy Project

Riverside County, California

108010-00328

BLM Reference CACA 048728

February 2012

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Dave Akola, a Professional Engineer in the State of California, as an employee of WorleyParsons, has reviewed the report with the title **Fire Prevention Plan**.

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The information presented in this document was compiled and interpreted exclusively for the purposes stated in Section 1 of the document. WorleyParsons provided this report for McCoy Solar Energy, LLC solely for the purpose noted.

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Any questions concerning the information or its interpretation should be directed to Michele Santangelo.

Table of Contents

APPENDICES I

FIGURES II

ABBREVIATIONS AND ACRONYMS III

1. INTRODUCTION 1
   - 1.1 Objective 2
   - 1.2 Background 2
   - 1.3 Assignment of Responsibility 3
   - 1.4 Facility Description 4
   - 1.5 Code Requirements 7
2. FIRE PROTECTION PROGRAM 9
   - 2.1 Plan Implementation 9
   - 2.2 Types of Hazards 10
   - 2.3 Safeguards 14
   - 2.4 Training 17
3. CONCLUSION 18
4. REFERENCES 19

Appendices

APPENDIX A FIRE RISK SURVEY

APPENDIX B EXITS CHECKLIST

APPENDIX C FLAMMABLE AND COMBUSTIBLE MATERIAL CHECKLIST

Figures

FIGURE 1 LOCATION MAP

FIGURE 2 GENERAL ARRANGEMENT

ABBREVIATIONS AND ACRONYMS

AC	Alternating Current
BLM	Bureau of Land Management
BSPP	Blythe Solar Power Project
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CBC	California Building Code
COI	Change of Information
CPM	Compliance Project Manager
DC	Direct Current
FDC	Fire Department Connection
HSE	Health, Safety and Environment
HTF	Heat Transfer Fluid
MW	Megawatt
NFPA	National Fire Protection Association
PCS	Power Conversion Station
POD	Plan of Development
Project	McCoy Solar Energy Project
RCFC	Riverside County Fire Code
ROW	Right of Way
SCE	Southern California Edison
USEPA	U.S. Environmental Protection Agency

1. INTRODUCTION

This report presents a Fire Prevention Plan for the McCoy Solar Energy Project (MSEP or Project), located in Riverside County, California. This plan was prepared on behalf of McCoy Solar Energy, LLC [McCoy/Applicant] (NextEra Energy Resources, LLC). McCoy Solar Energy, LLC proposes to construct, operate and maintain an up- to 750 megawatt (MW) photovoltaic (PV) solar energy generating power plant and related infrastructure in unincorporated Riverside County, California. The Proposed Project would generate and deliver solar-generated power to the California electrical grid through an interconnection at the Colorado River Substation (CRS) proposed by Southern California Edison (SCE).

The proposed solar plant site is located in a rural area of the Sonoran Desert in unincorporated Riverside County, primarily on BLM-administered land. It is located approximately 13 miles northwest of the town of Blythe, California, approximately 32 miles east of the town of Desert Center, California, and approximately 6 miles north of Interstate-10 (I-10). It is south of McCoy Wash, east of the McCoy Mountains, and north of the Blythe Airport. The Proposed Project would be developed in the Mojave Desert Air Basin and over the Palo Verde Mesa Groundwater Basin. The site location is shown in Figure 1.

The site proposed for the MSEP is located in Sections or portions of sections 36, 35, 34, 33, 32, 30, 29, 28, 27, 26, and 25 of Township 5S, Range 21E. For purposes of administration and planning, the proposed site is within the BLM's California Desert District and within the planning boundaries of the CDCA Plan, which is the applicable RMP for the project site and the surrounding areas, on approximately 3,800 acres. The site bears the CDCA Plan land use classification of "Class L" or limited use. Solar energy facilities are permitted in Class L areas provided NEPA is complied with and the CDCA Plan Amendment process is followed. The site also lies within the planning boundaries of the Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan. There are no Wilderness Areas, Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs), or Wildlife Habitat Management Areas (WHMAs) within or adjacent to the solar plant site.

The MSEP site is located within the Sonoran Desert and is almost entirely Sonoran creosote bush scrub, as described by Holland (1986). The Sonoran creosote bush scrub community is characterized by widely spaced shrubs located on well-drained soils. Common species include creosote bush (Larrea tridentata) and burro bush (Ambrosia dumosa), with brittlebush (Encelia farinose), white rhatany (Krameria grayi), galleta grass (Pleuraphis rigida), and desert lavender (Hyptis emoryi) also present. Palo verde (Cercidium floridum) and ironwood (Olneya tesota) arefound in the ephemeral drainages. Desert pavement is a common feature on much of the Solar Plant Site, increasing in both area and particle size on the upper bajada of the southwestern portion of the Solar Plant Site. Closer to the

mountains, cobbly, well-developed desert pavement, which contains very little vegetation, dominates the landscape.

The following fire prevention plan is provided only as a guide to assist employers and employees in complying with the requirements of Bureau of Land Management Fire Management Department, Riverside County Fire Department, California Public Utilities Code, California Public Resources Code, the Occupational Safety and Health Administration's (OSHA) Fire Prevention Plan Standard, 29 Code of Federal Regulations (CFR) 1910.39, as well as to provide other helpful information. It is not intended to supersede the requirements of the standard. An employer should review the standard for particular requirements that are applicable to their individual situation, and make adjustments to this program that are specific to their company. An employer will need to add information relevant to their particular facility in order to develop an effective, comprehensive program.

1.1 Objective

The purpose of this Fire Prevention Plan is to eliminate the causes of fire, prevent loss of life and property by fire, and to comply with the Occupational Safety and Health Administration's (OSHA) standard on fire prevention, 29 CFR 1910.39. It provides employees with information and guidelines that will assist them in recognizing, reporting, and controlling fire hazards.

1.2 Background

McCoy Solar Energy, LLC is committed to minimizing the threat of fire to employees, visitors, and property. McCoy Solar Energy, LLC complies with all applicable laws, regulations, codes, and good practices pertaining to fire prevention. McCoy Solar Energy Project's separate Emergency Action Plan spells out the procedures for responding to fires. This Fire Prevention Plan serves to reduce the risk of fires at McCoy Solar Energy Project in the following ways:

A. identifies materials that are potential fire hazards and their proper handling and storage procedures;
B. distinguishes potential ignition sources and the proper control procedures of those materials;
C. describes fire protection equipment and/or systems used to control fire hazards;
D. identifies persons responsible for maintaining the equipment and systems installed to prevent or control ignition of fires;
E. identifies persons responsible for the control and accumulation of flammable or combustible material;

F. describes good housekeeping procedures necessary to insure the control of accumulated flammable and combustible waste material and residues to avoid a fire emergency; and
G. provide training to employees with regard to fire hazards to which they may be exposed.

1.3 Assignment of Responsibility

Fire safety is everyone's responsibility. All employees should know how to prevent and respond to fires, and are responsible for adhering to company policy regarding fire emergencies.

A. Management

Management determines the McCoy Solar Energy Project_fire prevention and protection policies. Management will provide adequate controls to provide a safe workplace, and will provide adequate resources and training to its employees to encourage fire prevention and the safest possible response in the event of a fire emergency.

B. Plan Administrator

The Plan Administrator shall manage the Fire Prevention Plan for McCoy Solar Energy Project and shall maintain all records pertaining to the plan. The Plan Administrator shall also:

1. Develop and administer the McCoy Solar Energy Project fire prevention training program.
2. Ensure that fire control equipment and systems are properly maintained.
3. Control fuel source hazards.
4. Conduct fire risk surveys (see Appendix A) and make recommendations.

C. Supervisors

Supervisors are responsible for ensuring that employees receive appropriate fire safety training, and for notifying the Plan Administrator when changes in operation increase the risk of fire. Supervisors are also responsible for enforcing McCoy Solar Energy Project's fire prevention and protection policies.

D. Employees

All employees shall:

1. Complete all required training before working without supervision.
2. Conduct operations safely to limit the risk of fire.
3. Report potential fire hazards to their supervisors.
4. Follow Fire Emergency Procedures.

1.4 Facility Description

MSEP will be constructed in two units. Unit 1 is expected to have a 250 MW capacity comprised of an estimated 125 complete or equivalent partial 2 MW blocks. Unit 2 would have an up to 500 MW capacity comprised of an up to 250 complete or equivalent partial 2 MW blocks. The construction of Unit 1 of the MSEP will include the access road, water treatment system, initial gen-tie (consisting of the support towers and first circuit), O&M building, parking area, and the first 125 complete or equivalent partial 2 MW blocks. Proposed facilities on private land within unincorporated Riverside County will be limited to solar arrays and inverters, and potentially portions of the access road, gen-tie line, distribution line, and telecommunication line. Of the total project, approximately 50 MW is expected to be located on the private land.

Unit 1 will be arranged on the eastern side of the solar plant site and Unit 2 will be located west of Unit 1 within the solar plant site. Linear facilities extending out of the solar plant site would include the main access road, gen-tie line, switchyard, telecommunication lines, and distribution line.

Key components of the Proposed Project are:

- The solar plant site, which would include all facilities that create a footprint in and around the field of solar panels, including facilities such as:
    - The solar field (consisting of two solar power plants identified as Unit 1 and Unit 2);
    - Two on-site substations (the MSEP Unit 1 and Unit 2 Substations);
    - Shared (Unit 1 and Unit 2) operations and maintenance (O&M) facility; and
    - Other site improvements such as a temporary laydown area, perimeter and access roads, fencing and site security, drainage improvements, water treatment and lighting.
- An approximate 11 mile long (measured from the solar plant site boundary), double-circuit, overhead 230 kV generation-tie (gen-tie) line;
- 230 kV switchyard located near the CRS to connect the MSEP with the 230 kV CRS proposed by SCE;
- Two telecommunications lines (primary and redundant); and
- An SCE-owned and operated distribution line

The arrays and PCS would be accessible by two access corridors, one in a north to south direction every third block (approximately 3,000 ft) of nominal 24 ft width and the other in an east to west direction passing every PCS unit of nominal 16 ft width. These access corridors would remain unpaved compacted road base and would be used only as necessary during operations and maintenance activities.

The project will employ either a single-axis tracking system or a fixed tilt ground mount for the structures that support the PV modules.

There are two types of single-axis tracker systems that could be selected for the MSEP. Tracker Option 1 is a "ganged system" that would use one motor to control multiple rows of PV modules through a series of mechanical linkages and gearboxes. By comparison, Tracker Option 2, a stand-alone tracker system, would use a single motor and gearbox for each row of PV modules. A single-axis tracking system optimizes production by rotating the panels to follow the path of the sun throughout the day. The central axis of the tracking structure is oriented north to south and is constructed to rotate the panels east to west while limiting self-shading between rows. Each tracker holds 30-50 PV modules mounted on a metal framework structure. The steel structure would be able to withstand high-wind conditions (up to 90 miles per hour (mph)), site-specific wind gust and aerodynamic pressure effects, and seismic events.

A fixed tilt ground mount system, also being considered by the Applicant, orients the panels in a permanent "fixed" position towards the south at approximately 30 degrees to optimize production throughout the year without any mechanical movement. These racks are simple, open "table" constructions manufactured into a metal framework.

Both trackers and fixed tilt mounting systems are supported by steel posts spaced at no less than 10 ft apart and installed in a variety of ways. The most prevalent foundation design uses pile driven posts inserted into the ground to a typical depth of 4 to 7 ft below grade. Other foundation options include, but are not limited to, screw piles, grouted steel piles, and concrete foundations. The choice of foundation design is dependent on geotechnical information about the soil and the mounting structural design. Once mounted on a foundation, the bottom of each solar module array would be approximately 1.5 to 2 ft above ground at a minimum, while the top would be at approximately 6 to 10 ft above grade. As the solar modules move throughout the day for the tracking option, these heights would vary slightly during the course of a typical day.

The spacing between the rows of tracking units or fixed mounts is dependent on site-specific features and would be identified in the final design.

The PV modules would be electrically connected in series by wire harnesses that conduct DC electricity to combiner boxes. Each combiner box would collect power from several rows of modules and feed a PCS via cables placed in covered underground trenches (or within above ground cable trays or conduits in limited circumstances where underground trenching may not be practical).

Each PCS comprises an inverter package consisting of multiple inverters connected to adjacent transformers. An overhead shade or equipment enclosure will cover the inverters. The inverter package would be approximately 7 ft tall, and the transformer exterior to the enclosure would be approximately 6.5 ft tall. The overhead shade or enclosure will be in the range of 10-12 ft tall. In the PCS, the inverters would change the DC output from the combiner boxes to AC electricity.

The resulting AC current from each individual inverter then would be routed through underground AC cables (or within above ground conduits in limited circumstances where underground trenching may not be practical) to an oil-filled, medium voltage, step-up transformer positioned within secondary containment. Based on preliminary design, the 265 volt output from an inverter would be stepped up (increased) to the desired substation feed voltage of 34.5 kV by the transformer. The transformer would be placed on a pre-cast concrete pad delivered by flatbed truck during construction. The medium voltage collection circuits would be installed underground leading to a MSEP Substation in trenches that would be approximately 3 ft deep. A portion of the medium voltage collection circuit may be routed overhead on poles. The medium voltage cabling would create one to two collection circuits that would carry the electricity from the solar field to one of the MSEP's Substations.

Multiple PCS blocks (~10 MWac) would form a lateral configuration and transmit the AC power at 34.5 kV via aboveground monopoles or underground lines in covered trenches (or within above ground conduits in limited circumstances where underground trenching may not be practical). Approximately three laterals would be combined into an aboveground or underground feeder line (24-26 MWac) that transmits the AC power to the Power Distribution Center (PDC) at each substation. As applicable, AC trenches would be approximately 3 ft deep and from 8 inches to 6.5 ft wide and would also be used to house fiber optic cables for communication.

Each of the Project's two Units would have a substation that combines all the AC power from the feeders within the respective Unit. Access to each substation will be provided by the main 24 ft wide paved access road from the improved and extended BSPP access road. Each substation would consist of parallel sets of internal power distribution systems, including 34.5 kV buses and circuit breakers, disconnect switches, and main step-up transformers. Shield wires and lightning arrestors will be included to protect the substation equipment and personnel against lightning strikes.

1.5 Code Requirements

The following codes are applicable to this project:

- California Building Code (CBC), 2010 Edition.
- Riverside County Fire Code (RCFC), 2011 Edition (2010 California Fire Code with RCFC Amendments).
- National Fire Protection Association (NFPA) 13, *"Standard for the Installation of Sprinkler Systems,"* 2010 Edition.
- National Fire Protection Association (NFPA) 72, *"National Fire Alarm Signaling Code,"* 2010 Edition.
- National Fire Protection Association (NFPA) 850, *"Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations,"* 2010 Edition
- Bureau of Land Management Fire Management Department

A. Occupancy Classification

CBC Chapter 3 is used to establish occupancy type. Section 312.1 defines Group U Occupancies, Utility and Miscellaneous, as "Buildings and structures of an accessory character and miscellaneous structures not classified in any specific occupancy." The Handbook to the International Building Code (IBC) provides further clarification, "This section (Section 312) covers those utility occupancies that are not normally occupied by people. The fire load in these structures and uses varies considerably but is usually not excessive. Because they are normally not occupied, the concern of fire load is not very great, and as a group, these uses constitute a low hazard."

Further demonstration of the CBC's acknowledgement of the low fire risk of Group U Occupancies is the lack of requirements for automatic sprinkler protection. Additionally, as Group U Occupancies rarely have windows, a special exception to CBC Section 903.2.11, which required sprinklers if adequate openings are not provided, is allowed for Group U Occupancies.

The McCoy Solar Energy Project is best defined as a Group U Occupancy.

The O&M Building is approximately 3,000 square feet in area and will contain parts storage, a small office, restroom, and control room. The building will be characterized as a Group S-2 Occupancy with an accessory Use Group B Occupancy (office).

The water treatment building, if installed, will be smaller.

The temporary construction trailers will each have a Use Group B Occupancy classification.

B. General Life Safety Requirements

Due to the unmanned nature of the majority of the facility, as well as small size of the buildings, automatic sprinkler or fire alarm systems are not required by the code. The one entrance door to each of the power conversion stations provides adequate egress. Appropriate means of egress are also provided from the O&M Building and temporary trailers.

Fire department access and water supply requirements will be determined upon final project design and compliance requirements. Fire department access roads will be designed providing that all portions of exterior walls are within 150 feet of the access roads. However, the fire official has authority to increase these dimensions when there are not more than two Group U Occupancies. As stated previously, the majority of the facility is a single Group U Occupancy.

The O&M Building will be occupied normally on a 40 hour weekday schedule. The water treatment building will be occupied for brief periods when water treatment operations are occurring. However, no sprinklers will be installed in either, as the building sizes are less than 3,600 square feet as required by RCFC Section 903.2. Near the end of project construction period water will be supplied to a fire water connection near or adjacent to the buildings connected into a minimum required flow fire line. Portable fire extinguishers will also be available.

Fire support services to the MSEP site would be under the jurisdiction of the Riverside County Fire Department. Fire Station No. 43 in Blythe, which is equipped with a medic engine, a squad, a county engine, and a water tender, is 15 miles from the solar plant site. Fire Station No. 45, located at the Blythe airbase 7 miles from the solar plant site, is equipped with a medic engine. These are the closest stations to the MSEP area. The closest hazmat responder would be Fire Station No. 81 in Palm Desert.

2. FIRE PROTECTION PROGRAM

2.1 Plan Implementation

A. Good Housekeeping

To limit the risk of fires, employees shall take the following precautions:

1. Minimize the storage of combustible materials.
2. Make sure that doors, hallways, stairs, and other exit routes are kept free of obstructions.
3. Dispose of combustible waste in covered, airtight, metal containers.
4. Use and store flammable materials in well-ventilated areas away from ignition sources.
5. Use only nonflammable cleaning products.
6. Keep incompatible (i.e., chemically reactive) substances away from each other.
7. Perform "hot work" (i.e., welding or working with an open flame or other ignition sources) in controlled and well-ventilated areas.
8. Keep equipment in good working order (i.e., inspect electrical wiring and appliances regularly and keep motors and machine tools free of dust and grease.
9. Ensure that heating units are safeguarded.
10. Report all gas leaks immediately. The Plant Manager shall ensure that all gas leaks are repaired immediately upon notification.
11. Repair and clean up flammable liquid leaks immediately.
12. Keep work areas free of dust, lint, sawdust, scraps, and similar material.
13. Do not rely on extension cords if wiring improvements are needed, and take care not to overload circuits with multiple pieces of equipment.
14. Ensure that required hot work permits are obtained.
15. Turn off electrical equipment when not in use.

B. Maintenance

The Plant Manager will ensure that equipment is maintained according to manufacturers' specifications. McCoy Solar Energy Project will also comply with requirements of the National Fire Protection Association (NFPA) codes for specific equipment. Only properly trained individuals shall perform maintenance work.

The following equipment is subject to the maintenance, inspection, and testing procedures:

1. equipment installed to detect fuel leaks, control heating, and control pressurized systems;
2. portable fire extinguishers, automatic sprinkler systems, and fixed extinguishing systems;
3. detection systems for smoke, heat, or flame;
4. fire alarm systems; and
5. emergency backup systems and the equipment they support.

2.2 Types of Hazards

Fire Loss History

A literature search of fire events at solar energy fields was completed. The following sources were reviewed: National Fire Protection Association (NFPA), FM Global, National Institute of Standards and Technology, Heat Transfer and Alternate Energy Systems Group, and the US Department of Energy. No data was found regarding fires in such occupancies, indicating the frequency of fire is very low.

General information regarding small wiring fires at plants owned by Tucson Electric in Arizona was found. Incorrect wiring at solar panels and bad terminal box connections caused these fires. The magnitude of the fires was very small with only damage to wiring local to the ignition point. Fire spread beyond did not occur due to the lack of combustibles.

Review of fire loss data for electric generating plants within the United States, which have equipment similarities with solar energy plants, can be used to gain a perspective of the most common area of fire origin. During the period of 2002-2005, the most common area of origin of fires in such plants was within transformers, which experienced 17 fires annually and consisted of 13% of the total fires within electric generating plants. Windings failures accounted for 40-60% of these fires.

The frequency of fires within solar arrays was found to be very low, as was the severity of such an event. Regardless of this data, McCoy Solar Energy, LLC has developed a fire protection program that will minimize fire damage and provide occupant and responder safety.

The following sections address the major workplace fire hazards at McCoy Solar Energy Project's facilities and the procedures for controlling the hazards.

A. Electrical Fire Hazards

Electrical system failures and the misuse of electrical equipment are leading causes of workplace fires. Fires can result from loose ground connections, wiring with frayed insulation, or overloaded fuses, circuits, motors, or outlets.

To prevent electrical fires, employees shall:

1. Make sure that worn wires are replaced.
2. Use only appropriately rated fuses.
3. Never use extension cords as substitutes for wiring improvements.
4. Use only approved extension cords [i.e., those with the Underwriters Laboratory (UL) or Factory Mutual (FM) label].
5. Check wiring in hazardous locations where the risk of fire is especially high.
6. Check electrical equipment to ensure that it is either properly grounded or double insulated.
7. Ensure adequate spacing while performing maintenance.

B. Portable Heaters

All portable heaters shall be approved by the Plant Manager. Portable electric heaters shall have tip-over protection that automatically shuts off the unit when it is tipped over. There shall be adequate clearance between the heater and combustible furnishings or other materials at all times.

C. Office Fire Hazards

Fire risks are not limited to the McCoy Solar Energy Project industrial facilities. Fires in offices have become more likely because of the increased use of electrical equipment, such as computers and fax machines. To prevent office fires, employees shall:

1. Avoid overloading circuits with office equipment.
2. Turn off nonessential electrical equipment at the end of each workday.
3. Keep storage areas clear of rubbish.
4. Ensure that extension cords are not placed under carpets.
5. Ensure that trash and paper set aside for recycling is not allowed to accumulate.

D. Cutting, Welding, and Open Flame Work

The Plant Manager will ensure the following:

1. All necessary hot work permits have been obtained prior to work beginning.
2. Cutting and welding are done by authorized personnel in designated cutting and welding areas whenever possible.
3. Adequate ventilation is provided.
4. Torches, regulators, pressure-reducing valves, and manifolds are UL listed or FM approved.
5. Oxygen-fuel gas systems are equipped with listed and/or approved backflow valves and pressure-relief devices.
6. Cutters, welders, and helpers are wearing eye protection and protective clothing as appropriate.
7. Cutting or welding is prohibited in sprinklered areas while sprinkler protection is out of service.
8. Cutting or welding is prohibited in areas where explosive atmospheres of gases, vapors, or dusts could develop from residues or accumulations in confined spaces.
9. Cutting or welding is prohibited on metal walls, ceilings, or roofs built of combustible sandwich-type panel construction or having combustible covering.
10. Confined spaces such as tanks are tested to ensure that the atmosphere is not over ten percent of the lower flammable limit before cutting or welding in or on the tank.
11. Small tanks, piping, or containers that cannot be entered are cleaned, purged, and tested before cutting or welding on them begins.
12. Fire watch has been established.

E. Flammable and Combustible Materials

The Plant Manager shall regularly evaluate the presence of combustible materials at McCoy Solar Energy Project (see Appendix C).

Certain types of substances can ignite at relatively low temperatures or pose a risk of catastrophic explosion if ignited. Such substances obviously require special care and handling.

1. Class A combustibles.

These include common combustible materials (wood, paper, cloth, rubber, and plastics) that can act as fuel and are found in non-specialized areas such as offices.

To handle Class A combustibles safely:

a. Dispose of waste daily.
b. Keep trash in metal-lined receptacles with tight-fitting covers (metal wastebaskets that are emptied every day do not need to be covered).
c. Keep work areas clean and free of fuel paths that could allow a fire to spread.
d. Keep combustibles away from accidental ignition sources, such as hot plates, soldering irons, or other heat- or spark-producing devices.
e. Store paper stock in metal cabinets.
f. Store rags in metal bins with self-closing lids.
g. Do not order excessive amounts of combustibles.
h. Make frequent inspections to anticipate fires before they start.

Water, multi-purpose dry chemical (ABC), and halon 1211 are approved fire extinguishing agents for Class A combustibles.

2. Class B combustibles.

These include flammable and combustible liquids (oils, greases, tars, oil-based paints, and lacquers), flammable gases, and flammable aerosols.

To handle Class B combustibles safely:

a. Use only approved pumps, taking suction from the top, to dispense liquids from tanks, drums, barrels, or similar containers (or use approved self-closing valves or faucets).
b. Do not dispense Class B flammable liquids into containers unless the nozzle and container are electrically interconnected by contact or by a bonding wire. Either the tank or container must be grounded.
c. Store, handle, and use Class B combustibles only in approved locations where vapors are prevented from reaching ignition sources such as heating or electric equipment, open flames, or mechanical or electric sparks.
d. Do not use a flammable liquid as a cleaning agent inside a building (the only exception is in a closed machine approved for cleaning with flammable liquids).
e. Do not use, handle, or store Class B combustibles near exits, stairs, or any other areas normally used as exits.
f. Do not weld, cut, grind, or use unsafe electrical appliances or equipment near Class B combustibles.

g. Do not generate heat, allow an open flame, or smoke near Class B combustibles.

h. Know the location of and how to use the nearest portable fire extinguisher rated for Class B fire.

Water should not be used to extinguish Class B fires caused by flammable liquids. Water can cause the burning liquid to spread, making the fire worse. To extinguish a fire caused by flammable liquids, exclude the air around the burning liquid. The following fire-extinguishing agents are approved for Class B combustibles: carbon dioxide and multi-purpose dry chemical (ABC).

F. Smoking

Smoking is prohibited in all McCoy Solar Energy Project buildings. Certain outdoor areas may also be designated as no smoking areas. The areas in which smoking is prohibited outdoors are identified by NO SMOKING signs.

2.3 Safeguards

A. Project Safeguards

Transformers have been identified as having the highest probably of fire origin within the facility. To limit the magnitude of such a fire, the transformers will use "Less Flammable" insulating oil. This reduces a transformer fire event to involvement of just the transformer windings and insulation, or in the worst case, the limited heat-release rate oil. Additionally, the transformer separation will greatly exceed that required by FM Global standards.

Providing such safeguards reduces the severity of the most probable fire event to a minor fire involving only one transformer causing no exposure to any personnel on site, adjacent areas of the facility, or neighboring buildings beyond.

The majority of the facility is comprised of noncombustible construction and contents, other than electrical wiring and equipment. The potential for a fire other than a small electrical fire due to equipment failure is very low. The spread of fire beyond the area of origin is also unlikely.

The solar panels, as discussed previously, are energized continuously when sunlight is present and cannot be de-energized. Proper protocol must be followed to prevent accidental injury or death due to responder contact with the solar panels or other equipment. The application of water to the panels or other electrical equipment can be particularly hazardous.

As the majority of the facility is unmanned and separated such that no exposure exists to adjacent property, it is recommended that active fire-fighting on the site be avoided for all solar panels and power conversion stations. Any fire which could occur will be short in duration and cause no exposure or threat to life safety, nor to surrounding property.

Underground cabling originations will be designated with reflective signage stating "buried electrical wiring". Main power will be clearly marked and indicated on the site map (see section B. Fire Department Access below). These locations will be accessible to firefighting equipment via graveled access perimeter and interior roads.

Fire water connections will be provided adjacent to the buildings. These connections will serve as the water source for the fire department if there is a fire within these buildings only.

Vegetation clearances ("defensible space") will be maintained around panels, structures, transformers, roads, and other distributional electrical equipment. According to California Public Utilities code and California Public Resources Code best practices of a 100 feet minimum clearance around structures and equipment service areas clearance of 10 foot radius will be observed. These clearances will be maintained for the life of the project.

Address signage of site will be a minimum of 6" with reflecting print and contrasting colors and installed on main access road.

All road intersections will be installed with signage including road name, address or location number, or designator to allow clear understanding of locations. All signage will be reflective, all-weather and maintained regularly.

McCoy Solar Energy, LLC will provide training of responding personnel such that the operation of the facility is understood. The facility emergency plan will be coordinated with fire department protocol.

B. Fire Department Access

All accidental fire ignitions will be reported immediately to BLM through the Federal Interagency Communications Center (FICC) 909-383-5652.

Medical emergencies, although rare due to the majority of the facilities' unmanned nature, can occur. Fire department access for such events will be provided by the roads around the perimeter of the site. These roads will be a minimum of 20 feet wide and will be compacted native soil or compacted aggregate base if necessary, designed to support a fire apparatus and all vehicle egress gates will be a minimum of 12' wide.

A Knox box will be installed at all emergency vehicle access gates which can be accessed by Riverside County Fire Department approved keys. The Knox keys will be distributed to the Riverside County Fire Department upon gate and Knox box installation. The Knox box will contain a site map indicating access routes, designators, water sources, structures, structure floor plans, special hazards, emergency shut-offs. An emergency contact information list will also be enclosed.

C. Water Supply

CFC Section 507 provides water supply requirements. Section 507.3 allows use of an approved method or CFC Appendix B to establish the required fire flow. Due to the noncombustible nature of the project, low combustible loading, and the hazard of application of water to the electrical equipment, an onsite water supply is not appropriate for the solar fields and will not be provided.

The following is the proposed water supply plan for the O&M Building, and temporary trailers:

- At least one onsite well will be provided for the facility (location to be determined).
- A gravity line with will be provided from a construction water supply tank to a temporary fire department connection (FDC), which will serve the temporary trailers.
- A potable water tank will be provided on site near the temporary trailers during construction and then moved adjacent to the O&M Building at the end of construction.
- After construction of the O&M Building, the temporary water supply and FDC will be removed. A new water tank will be installed to serve the fire water connection located in the building area.
- The well(s) will serve the permanent water tank after construction.

D. Prevention of Incendiary Fires

The facility will be secured with fencing and provided with perimeter security measures to prevent access by unauthorized persons, thus lowering the probability of ignition by arson or other malicious means.

E. Early Detection and Notification

The power conversion stations will be provided with smoke detectors to detect a fire in the early stages of development. The detectors will be monitored at an offsite building which is manned 24 hours a day.

2.4 Training

The Plan Administrator or his designee shall present basic fire prevention training to all employees upon employment, and shall maintain documentation of the training, which includes:

A. review of 29 CFR 1910.38, including how it can be accessed;

B. this Fire Prevention Plan, including how it can be accessed;

C. good housekeeping practices;

D. proper response and notification in the event of a fire;

E. instruction on the use of portable fire extinguishers (as determined by company policy in the Emergency Action Plan); and

F. recognition of potential fire hazards.

Supervisors shall train employees about the fire hazards associated with the specific materials and processes to which they are exposed, and will maintain documentation of the training. Employees will receive this training:

A. at their initial assignment;

B. annually; and

C. when changes in work processes necessitate additional training.

3. CONCLUSION

Except for a small O&M Building, the McCoy Solar Energy Project can be characterized mainly as an unmanned facility of noncombustible construction and minimal combustible loading and as such is considered low hazard by current codes. The fire protection program outlined herein will reduce the magnitude of the most likely fire event, provide early notification of an event, provide access for medical emergencies, and most importantly protect responding fire fighters from the hazards presented by the electrical power generation equipment. Compliance with the intent of the 2010 California Building Code and County of Riverside Fire Code is therefore achieved.

The Plant Manager shall review this Fire Prevention Plan at least annually for necessary changes.

4. REFERENCES

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National Fire Protection Association, 2002. Introduction to Employee Fire and Life Safety, Colonna, January 2002

Figures

Figure 1 Location Map

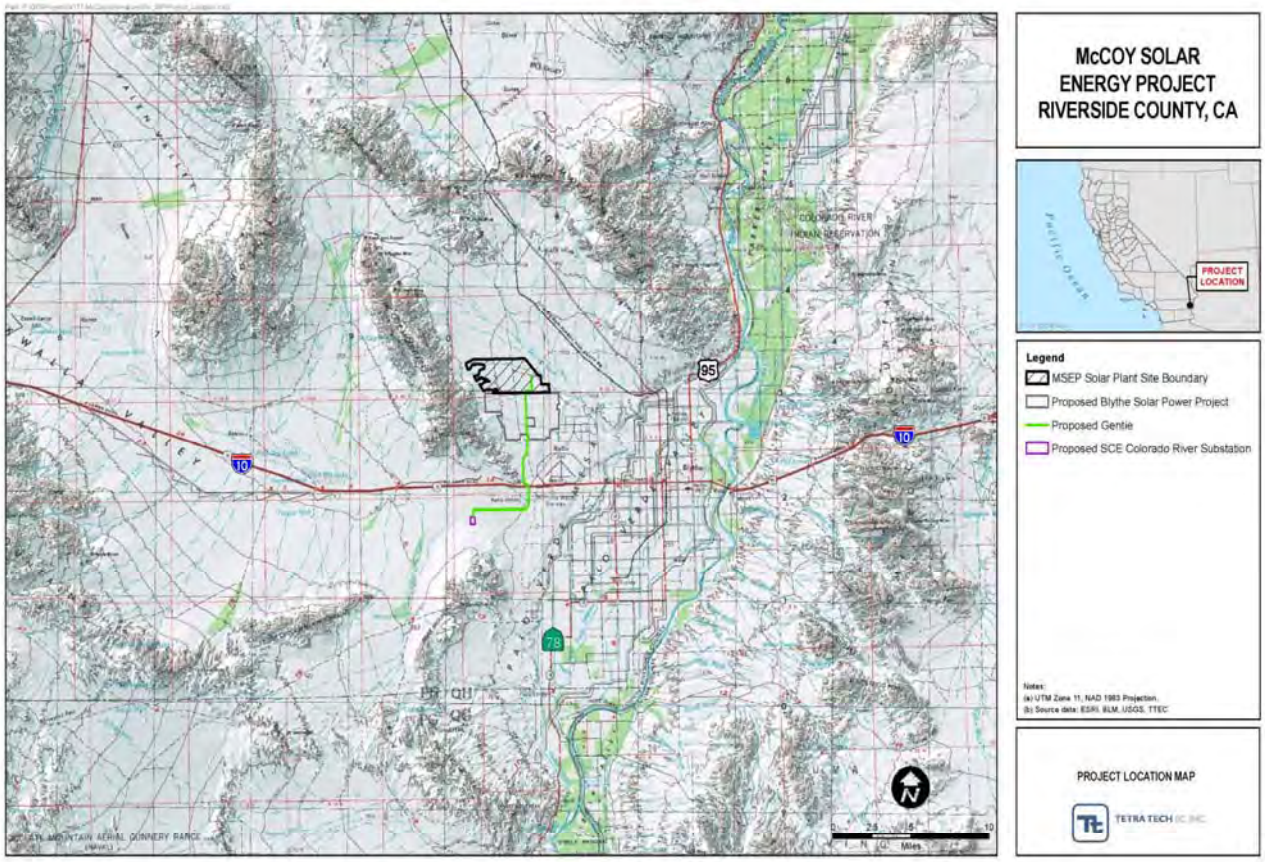
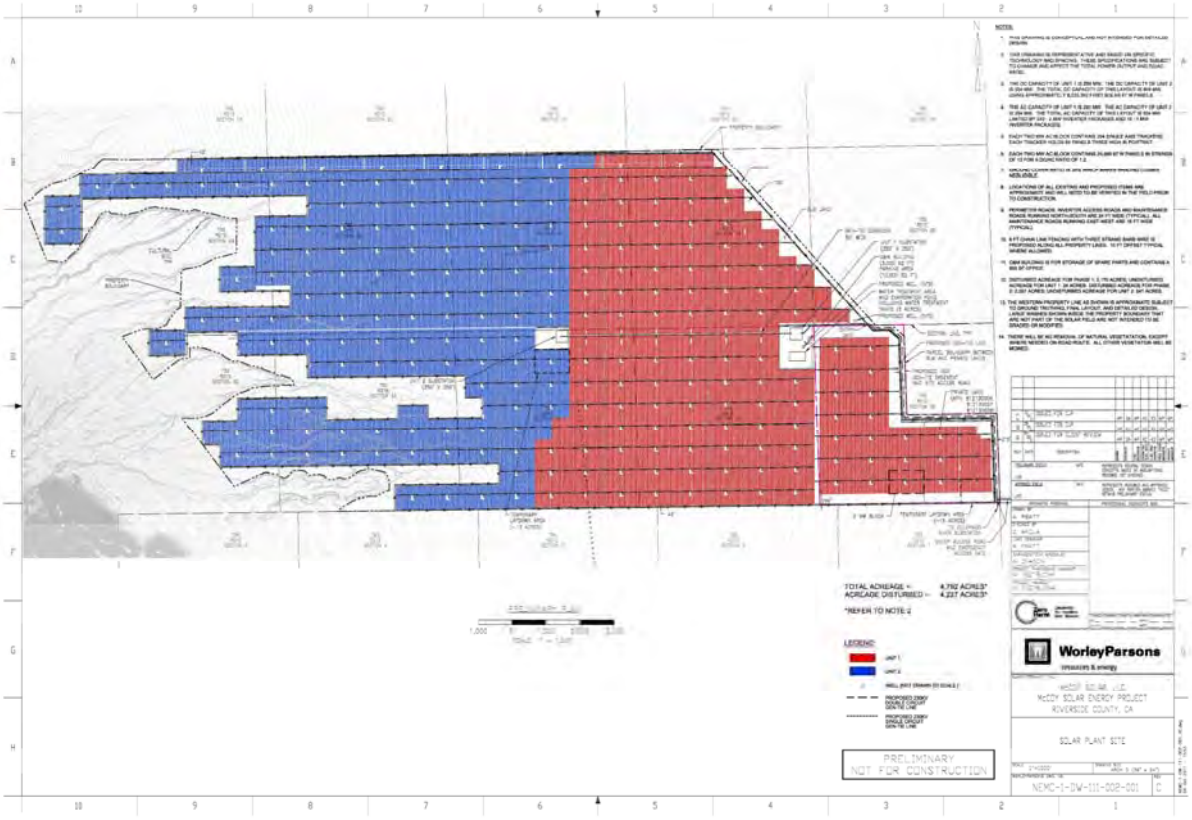


Figure 2 General Arrangement Plan



Appendix A

Appendix A

Fire Risk Survey
McCoy Solar Energy Project

Type of Fire Hazard	Location	Emergency Actions	Required PPE

Completed by:_____ **Date:**_____

Appendix B

Appendix B

McCoy Solar Energy Project
Exits Checklist

Use this checklist to evaluate McCoy Solar Energy Project's compliance with OSHA's standard on emergency exit routes.

□ Yes □ No	Is each exit marked with an exit sign and illuminated by a reliable light source?
□ Yes □ No	Are the directions to exits, when not immediately apparent, marked with visible signs?
□ Yes □ No	Are doors, passageways, or stairways that are neither exits nor access to exits, and which could be mistaken for exits, marked "NOT AN EXIT" or other appropriate marking?
□ Yes □ No	Are exit signs provided with the word "EXIT" in letters at least five inches high and with lettering at least one inch wide?
□ Yes □ No	Are exit doors side-hinged?
□ Yes □ No	Are all exits kept free of obstructions?
□ Yes □ No	Are there at least two exit routes provided from elevated platforms, pits, or rooms where the absence of a second exit would increase the risk of injury from hot, poisonous, corrosive, suffocating, flammable, or explosive substances?
□ Yes □ No	Is the number of exits from each floor of a building and from the building itself appropriate for the building occupancy? (NOTE: Do not count revolving, sliding, or overhead doors when evaluating whether there are sufficient exits.)
□ Yes □ No	Are exit stairways that are required to be separated from other parts of a building enclosed by at least one-hour fire-resistant walls (or at least two-hour fire-resistant walls in buildings over four stories high)?
□ Yes □ No	Are the slopes of ramps used as part of emergency building exits limited to one foot vertical and 12 feet horizontal?

□ Yes □ No	Are glass doors or storm doors fully tempered, and do they meet the safety requirements for human impact?
□ Yes □ No	Can exit doors be opened from the direction of exit travel without the use of a key or any special knowledge or effort?
□ Yes □ No	Are doors on cold storage rooms provided with an inside release mechanism that will release the latch and open the door even if it's padlocked or otherwise locked on the outside?
□ Yes □ No	Where exit doors open directly onto any street, alley, or other area where vehicles may be operated, are adequate barriers and warnings provided to prevent employees from stepping into the path of traffic?
□ Yes □ No	Are doors that swing in both directions and are located between rooms where there is frequent traffic equipped with glass viewing panels?

Completed by:_____ **Date:**_____

Appendix C

Appendix C

McCoy Solar Energy Project
Flammable and Combustible Material Checklist

Use this checklist to evaluate McCoy Solar Energy Project's compliance with OSHA's standards on flammable and combustible materials:

□Yes □ No	Are combustible scrap, debris, and waste materials such as oily rags stored in covered metal receptacles and removed from the worksite promptly?
□Yes □ No	Are approved containers and tanks used for the storage and handling of flammable and combustible liquids?
□Yes □ No	Are all connections on drums and combustible liquid piping vapor and liquid tight?
□Yes □ No	Are all flammable liquids kept in closed containers when not in use?
□Yes □ No	Are metal drums of flammable liquids electrically grounded during dispensing?
□Yes □ No	Do storage rooms for flammable and combustible liquids have appropriate ventilation systems?
□Yes □ No	Are NO SMOKING signs posted on liquefied petroleum gas tanks?
□Yes □ No	Are all solvent wastes and flammable liquids kept in fire-resistant covered containers until they are removed from the worksite?
□Yes □ No	Is vacuuming used whenever possible rather than blowing or sweeping combustible dust?
□Yes □ No	Are fuel gas cylinders and oxygen cylinders separated by distances or fire-resistant barriers while in storage?
□Yes □ No	Are fire extinguishers appropriate for the materials in the areas where they are mounted?*
□Yes □ No	Are appropriate fire extinguishers mounted within 75 feet of outside areas containing flammable liquids and within 10 feet of any inside storage area

for such materials?*

□Yes □ No Are extinguishers free from obstruction or blockage?*

□Yes □ No Are all extinguishers serviced, maintained, and tagged at least once a year?*

□Yes □ No Are all extinguishers fully charged and in their designated places?*

□Yes □ No Where sprinkler systems are permanently installed, are the nozzle heads directed or arranged so that water will not be sprayed into operating electrical switchboards and equipment?

□Yes □ No Are NO SMOKING signs posted in areas where flammable or combustible materials are used or stored?

□Yes □ No Are safety cans utilized for dispensing flammable or combustible liquids at the point of use?

□Yes □ No Are all spills of flammable or combustible liquids cleaned up promptly?

□Yes □ No Are storage tanks adequately vented to prevent the development of an excessive vacuum or pressure that could result from filling, emptying, or temperature changes?

*(NOTE: Use of fire extinguishers is based on company policy regarding employee fire fighting in your Emergency Action Plan and local fire code.)

Completed by:_____ Date:_____