Global Solar, Inc.

Air Quality Operating Permit 3303

Technical Support Document (TSD)

I. General Comments:

A. Company Information

1. Source Name: Global Solar, Inc.
2. Source Address: 8500 S. Rita Road, Tucson, AZ 85747

B. Background

The manufacturing facility operates under the following industrial classification:

- Semiconductor and Related Devices/Solar Cells Manufacturing Plant, SIC code: 3674 (North American Industry Classification System (NAICS): 334413

The facility manufactures thin film solar cells for glass module or flexible material products. Global Solar produces Copper Indium Gallium (di) Selenide (CIGS) photo voltaic (PV) cells by initially depositing a molybdenum layer onto stainless steel film. An active layer of CIGS is then vapor-deposited onto the molybdenum-coated steel band, which is then coated with a buffer and transparent conductive layer. A grid of silver paste is printed on the product to conduct electricity.

As part of the manufacturing operation and for cleaning the facility utilizes the following chemicals: Isopropanol, Acetone, 29.4% Ammonium Hydroxide, and Hydrochloric Acid. The facility operates two natural gas-fired boilers, one emergency generator, and two fire pump engines, which are subject to reporting conditions.

Previously, the facility operated under an ATO and general permit for NSPS generators. This is the first 5-year, individual air quality permit issued to Global Solar, Inc. to include the facility operations and requirements for the older generator now subject to 40 CFR Part 63, Subpart ZZZZ.

Air pollution sources at the facility include an emergency generator and two fire pump engines, two natural gas boiler/heaters, and materials handling and solvent cleaning operations employed in the manufacturing operation. According to the application there may also be potential emissions from surface coating and spray paint operations.

The facility also has installed, and operates, equipment and operations that have been determined by the control officer, because of their size or production rate, to be de minimus emission sources and insignificant activities. These include a fume hood, two emergency diesel fire pump above ground storage tanks (ASTs), one emergency diesel generator AST, one emergency diesel generator day tank, one cooling tower, and four ammonia AST's (see Attachment 2, Table 3 of the permit). Note: The ammonia stored at the facility may be subject to the Accident Prevention Requirements under the Clean Air Act (CAA Section 112(r) as provided in 40 CFR 68 and require the submittal of a risk management plan to the appropriate state or local authorities.

The facility is a true minor stationary source for all criteria pollutants and area source of HAP.

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Table 1
Summary of Permit Actions since the previous permit was issued

Date	Permit Action
July 4, 2011	This renewal action included a significant revision since the engines became subject to RICE NESHAP, Subpart ZZZZ.

C. Attainment Classification

Global Solar, Inc. is located in a region that is designated attainment for all criteria pollutants.

II. Source Description

A. Process Description

The air pollutant emitting equipment and operations at Global Solar, Inc. consists of the following:

- One emergency generator
- Two fire pump engines
- Two Natural gas boilers/heaters
- Manufacturing operations using isopropanol as a cleaning solvent
- Possible future use of surface coating and spray painting operations
- Materials Handling and Fugitive Dust

B. Operating Capacity and Schedule

The operating schedule at the facility is not limited and the facility can operate 7 days/week, 24hours a day, 365 days a year.

The operating capacity of the affected generator/engines is limited by the permit to 100 hours each for maintenance and readiness testing, including non-emergency use in accordance with the applicable federal standards.

Current solvent cleaning and potential spray painting operations are not limited by the permit, since the facility emits less than the significance thresholds of VOC and HAP and the facility operates in an area of attainment and is not subject to a determination of reasonably available control technology requirements (RACT).

C. Air Pollution Control Equipment

N/A

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III. Emission Estimates

Table 2

Potential to Emit (Tons/yr)

Emission Sources	PM_{10}	$PM_{2.5}$	NO_X	SO_2	CO	VOC	HAP Total	HAP Single
Chemical usage	-	-	-	-	-	6.84	0.75	0.75
Emergency generator [1]	0.06	0.06	0.83	0.05	0.18	0.07	0.00	0.00
Emergency Fire pump engines [1]	0.07	0.07	0.93	0.06	0.20	0.08	0.00	0.00
Boiler Emissions	0.29	0.29	3.86	0.02	3.25	0.21	0.07	< 0.07
Facility Wide Total	**0.42**	**0.42**	**5.62**	**0.14**	**3.63**	**7.2**	**0.74**	**0.75**

[1] PTE for the emergency generators/engines is calculated on a 100 hour/year basis. Other sources are based on annual usage or operation 8760 hours/year

IV. Applicable Requirements

40 CFR, Part 60 Standards of Performance for New Stationary Sources

Appendix A Test Methods

40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants for Source Categories

Subpart A General Provisions
Subpart ZZZZ NESHAP for Reciprocating Internal Combustion Engines 'RICE'

Pima County Code Title 17, Chapter 17.12 – Permits and Permit Revisions

Article I – General Provisions

17.12.010 Statutory Authority
17.12.020 Planning, Constructing, or Operating Without a Permit
17.12.040 Reporting requirements
17.12.045 Test methods and procedures
17.12.050 Performance tests
17.12.080 Permit Display or Posting

Article II – Individual Source Permits

17.12.165 Permit application processing procedures for Class II and Class III permits
17.12.185 Permit contents for Class II and Class III permits
17.12.235 Facility Changes that require a permit revision
17.12.240 Procedures for certain changes that do not require a permit revision Class II or Class III
17.12.255 Minor Permit Revision
17.12.260 Significant Permit Revision
17.12.270 Permit Reopenings – Revocation and reissuance – Termination

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17.12.350 Material permit condition

Article VI – Individual Source Permits

17.12.520 Fees related to Class II and Class III permits

Pima County Code Title 17, Chapter 17.16 – Emission Limiting Standards

Article I – General Provisions

17.16.010 Local rules and standards; Applicability of more than one standard
17.16.020 Noncompliance with applicable standards
17.16.030 Odor limiting standards

Article II – Visible Emission Standards

17.16.040 Standards and applicability (includes NESHAP)
17.16.050 Visibility limiting standard

Article III – Emissions from Existing and New Nonpoint Sources

17.16.060 Fugitive dust producing activities
17.16.070 Fugitive dust emissions standards for motor vehicle operation
17.16.080 Vacant lots and open spaces
17.16.090 Roads and streets
17.16.100 Particulate materials
17.16.110 Storage piles

Article IV – New and Existing Stationary Source Performance Standards

17.16.130 Applicability
17.16.165 Standards of performance for fossil-fuel fired industrial and commercial equipment
17.16.340 Standards of performance for stationary rotating machinery
17.16.400 Organic Solvents and other organic materials
17.16.430 Standards of performance for unclassified sources

Pima County Code Title 17, Chapter 17.20 – Emissions Source Testing and Monitoring

17.20.010 Source sampling, monitoring and testing
17.20.040 Concealment of emissions

Pima County Code Title 17, Chapter 17.24 – Emissions Source Recordkeeping and Reporting

17.24.020 Recordkeeping for compliance determination

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V. Permit Changes and Applicability Determinations.

A. Permit and Permit Summary:

The facility previously operated under an ATO and general permit for the emergency generators and fire pump engines. The engines are now subject to 40 CFR Part 63, Subpart ZZZZ, and an individual permit is required. The generator engine provisions have been included in Section 4. In addition, the facility has two Natural gas boilers/hot water heaters that are subject to PCC standards that have been included in Permit Section 3. Finally, the facility is subject to the provisions in PCC 17.16.400 and may operate and install future spray painting and surface coating operations. The PCC standards for surface coating and solvent cleaning have been incorporated into the Facility Wide Operations in Section 2.

B. Applicability:

Section 1 of the permit provides a reference for the applicability of affected sources, PCC and federal rules to the facility and operations, and to help organize the permit sections.

C. Facility Wide Operations:

1. Section 2 incorporates the applicable facility wide provisions to include the following: general provisions, materials handling operations, surface coating and solvent degreasing/cleaning operations, opacity limits, visibility limiting standards, and fugitive dust provisions.

   This section also includes periodic monthly monitoring of materials handling operations, surface coating operations (if any), solvent cleaning operations, and monitoring for fugitive dust from the facility as well as the general requirements for recordkeeping and facility changes.

2. Surface Coating and Solvent Degreasing/Cleaning

   a. Applicable provisions for facility wide surface coating operations or projects are incorporated into this section directly from 17.16.400.C. Surface coating operations includes spray paint operations, and architectural coating operations. I.D.1 of Section 2 applies to all spray paint operations except as provided in Tech policy 202 (see PDEQ Policy No.: TECH-202).

   b. Surface coating, spray paint and architectural coating 'operations' as provided in I.D.1 through 4 of Section 2 of the permit applies to any operation or project that uses surface coatings that contain organic solvents or employ organic solvents to apply a protective or decorative polymeric coating to a substrate, unless otherwise excluded by an applicable federal rule in 40 CFR Part 60 – Standards of Performance for new Stationary Sources (NSPS) or Part 63 – National Emission Standards for Hazardous Air Pollutants (NESHAP) and as provided below:

      i. Per PCC 17.04.340.A (136) and 17.16.400.C.5 the per gallon surface coating standards in I.D.2 of Section 2 apply to the application of surface coatings to miscellaneous metal parts and products and include the following:

         Large farm machinery, such as harvesting, fertilizing and planting machines, tractors, and combines; Small farm machinery, such as lawn and garden tractors, lawn mowers, and rototillers; Small appliances, such as fans, mixers, blenders, crock pots, dehumidifiers, and vacuum cleaners; Commercial machinery, such as office equipment, computers and auxiliary equipment, typewriters, calculators, and vending machines; Industrial machinery, such as pumps, compressors, conveyor components, fans, blowers, and transformers; Fabricated metal products, such as metal covered doors and frames; *and any other industrial category which coats metal parts or products under the code in the "Standard Industrial Classification Manual, 1987" of Major Group 33 (primary metal*

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industries), Major Group 34 (fabricated metal products), Major Group 35 (nonelectric machinery), Major Group 36 (electrical machinery), Major Group 37 (transportation equipment), Major Group 38 (miscellaneous instruments), and Major Group 39 (miscellaneous manufacturing industries).

ii. The following are excluded from the industrial categories above:

Automobiles and light duty trucks; Metal cans; Flat metal sheets and strips in the form of rolls or coils; Magnet wire for use in electrical machinery; Metal furniture; Large appliances; Exterior of airplanes; Automobile refinishing; Customized top coating of automobiles and trucks, if production is less than 35 vehicles per day; and the exterior of marine vessels.

iii. Spray Painting Operations are prohibited from spray applying coatings containing target HAP unless a revision application and Initial Notification is submitted to the Control Officer in accordance with 40 CFR Part 63, Subpart HHHHHH (See Summary of Regulations Brochure).

b. Solvent Degreasing and Cleaning provisions in I.D.3 and II.C.1 of the permit apply to any operation engaged in the employment or application of organic solvents.

VI. Periodic Monitoring.

This is a class III permit and does not include a semiannual summary report of required monitoring or annual compliance certifications. The permit requires the facility to maintain the required monitoring records on site or as requested by the control officer in order to demonstrate compliance with the standards.

VII. Insignificant Activities.

The insignificant activities per PCC and additional equipment identified in the application are listed in a table in attachment 3.

VIII. Impact to Ambient Air Quality

Not a major source so no impact studies are required.

IX. Control Technology Determination

No control technologies needed to be determined; the source is not subject to RACT, BACT or LAER.

X. Exclusion of PCC Particulate Matter Discharge Rate Standards

The applicable PCC rules for the maximum particulate discharge rates are not normally included for Class II and III area source permits as explained below.

- For particulate matter sources, the calculated maximum particulate matter discharge rate, as provided in Title 17, yields maximum rates that far exceed the emissions expected from most typical area sources. For example a 200 ton/hour process source, which is typical for an average construction

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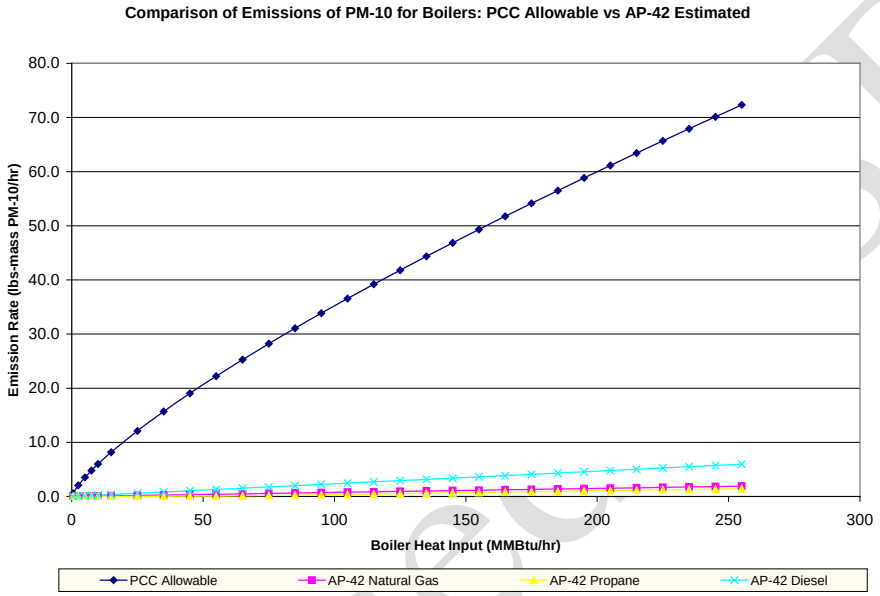
aggregate screening operation, would be limited to a maximum discharge rate of 40.4 lbs/hour or 177 tons/year. This limit far exceeds estimated emissions from typical sources and the source is far more likely to exceed opacity and visibility limiting standards well before reaching this limit.

- With regard to fuel burning equipment, PCC 17.16.165.C limits the emissions of particulate matter from commercial and industrial fossil-fuel fired equipment (including but not limited to boilers). This limit is not normally included in permits because allowable emissions are consistently over an entire order of magnitude higher than EPA AP-42 estimated potential emissions. The chart below, illustrates the point.



Comparative Chart of Allowable Particulate Emissions Under Pima County Code, Title 17, and Estimated Potential Emissions based on EPA AP-42 Estimates for External Combustion Sources. Allowable emissions are consistently over ten times estimated potential emissions. Therefore, it is not necessary to include the standard in the permit explicitly, but by reference in Attachment 1.

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