

BID REQUEST 99-1101MB

Attached hereto is a copy of the District's Request for Bid and Specification 99-1101MB for Flat Plate Crystalline Photovoltaic Modules.

Please return a signed original and ONE copy to the District (reference Instruction to Bidders, Paragraph 1, Sub-Paragraph b). This will prevent any delay in the evaluation of your bid.

In addition, your cooperation in responding to the following questionnaire will be appreciated.

Mike Buchanan, Supervising Buyer
Supply Chain Services Department

* * * *

If you are submitting a "NO BID", please state your reason. _____

Do you wish to be retained on the District's Bidders List for the above item?

YES ____ NO ____

NAME OF CORPORATION, COMPANY OR INDIVIDUAL BIDDER

SIGNATURE OF AUTHORIZED REPRESENTATIVE

BID REQUEST 99-1101MB

**REQUEST FOR BID AND SPECIFICATIONS
FOR THE PURCHASE OF**

FLAT PLATE CRYSTALLINE PHOTOVOLTAIC MODULES

FOR

The Photovoltaic Distribution Technologies Department

FORMAL BID OPENING TO BE HELD

DATE: NOVEMBER 9, 1999

TIME: 2:00 P.M.

SACRAMENTO MUNICIPAL UTILITY DISTRICT
SUPPLY CHAIN SERVICES DEPARTMENT
1708 - 59TH STREET
SACRAMENTO, CALIFORNIA

ALL QUESTIONS AND CORRESPONDENCE CONCERNING
THIS BID REQUEST SHALL BE DIRECTED TO

MIKE BUCHANAN, SUPERVISING BUYER, (916) 732-5612
(Telecopy No. (916) 732-5601)

ADOPTED THIS DATE: **OCTOBER 29, 1999**

SACRAMENTO MUNICIPAL UTILITY DISTRICT

BY/s/MIKE BUCHANAN, SUPERVISING BUYER
SUPPLY CHAIN SERVICES DEPARTMENT

SACRAMENTO MUNICIPAL UTILITY DISTRICT

BID REQUEST NO. 99-1101MB

SECTION CONTENTS

PAGE NOS.

1. INSTRUCTIONS TO BIDDERS.....	1-1
2. BID.....	2-6
3. DELIVERY SCHEDULE.....	3-8
4. BIDDING SCHEDULE	4-10
5. GENERAL CONDITIONS.....	5-24
6. EQUAL BUSINESS OPPORTUNITY PROGRAM PROVISIONS	6-30
7. NOT APPLICABLE	7-35
8. NOT APPLICABLE	8-36
9. TECHNICAL SPECIFICATIONS.....	9-37

1. INSTRUCTIONS TO BIDDERS

1.1. ADDRESSING, FILING AND PREPARATION OF BIDS:

- A. All bids shall be enclosed in sealed envelopes addressed to the Sacramento Municipal Utility District; Manager, Supply Chain Services Department, and shall be distinctly marked "Bid", with the title of the work, bid request number and the bidder's name and address appearing on the outside, and must be received at the Supply Chain Services Department Office of the District, 1708 59th Street, Sacramento, California 95819-4628, not later than the date and time specified on Page 1. If the bid is mailed, it should be addressed to SMUD Supply Chain Services Department, P.O. Box 15830, Sacramento, California 95852-1830; and **if the bid is delivered or express mailed, it should be brought to the office of the Manager, Supply Chain Services Department of the District at 1708 59th Street, Sacramento, California, 95819-4628.** When requested by the District, satisfactory evidence of the authority of the person signing on behalf of the Bidder shall be furnished. Bids that are not provided in a sealed envelope (such as bids received by fax) and bids received later than the opening time specified will not be considered.
- B. Bidder shall submit bids in an **ORIGINAL and ONE COPY**, all of which are to be executed by a duly authorized officer of the firm, company or corporation bidding, together with full descriptive information on the materials and supplies offered, engineering specifications and catalog numbers where appropriate. If requested elsewhere, the bid shall include a summary description of Bidder's quality assurance system and programs.
- C. When other than manufacturers are bidding, for example, distributors, jobbers, etc., bids from such distributors or jobbers should indicate the name of the manufacturer of the product offered and point of origin of the shipment.

1.2. BID ACCEPTANCE PERIOD:

Bids offering less than **30** calendar days for acceptance by the District from date of opening, will be considered unresponsive and will be rejected.

1.3. EXCEPTIONS:

- A. Base bids must be for the exact conditions set forth in this Bid Request. If the Bidder's equipment or services differ in any way, the bidder must itemize the differences in the bid under a separate heading in the Bidding Schedule, entitled "EXCEPTIONS TO SPECIFICATIONS" (including commercial conditions). The District reserves the right to rule on the significance of such exceptions relative to their overall impact on the required specifications and commercial conditions and further reserves the right to accept or reject such exceptions in consideration for award.

B. Bids may not limit warranty liabilities. Bids may not limit other liabilities to less than the total contract amount. Bids which include exceptions, additions and/or comments to the General Conditions listed below (if any) or limit liabilities as indicated above will be rejected.

1. General Condition 5.12 - Applicable Law
2. General Condition 5.18 - Indemnity

Bidder's exceptions, additions and/or comments to other General Conditions must be listed under a separate heading titled "EXCEPTIONS TO SPECIFICATIONS" and will be treated in accordance with the conditions of paragraph "A" of this instruction.

C. Bidders may submit technically acceptable alternate bids. However, award would be made only to the bidder submitting the lowest evaluated base bid meeting the Technical Specifications.

1.4. BRAND NAMES:

Brand names and figure numbers, when specified, are illustrative of an approved type, and the substitution of an equivalent type of another manufacturer may be offered but is subject to District approval.

1.5. DESCRIPTION:

Bidder must give complete description of equipment, including materials of construction, software, manufacturing locations, maintenance facilities, and description of shipment breakdown.

1.6. FOREIGN MATERIALS:

Bids which include equipment or components that are not manufactured in the United States will be considered. However, Bidders must specifically list in their bids all such equipment or components and state their source. All imported materials must meet the requirements of the applicable United States codes and specifications.

1.7. DRAWINGS, ETC.:

When required by the Technical Specifications, Bidder must furnish outline, arrangement and sectional drawings with the Bidder's description of equipment, priced recommended spare parts list, and must complete and return the included Data Sheets (if any). Bidder is to submit with its bid either a statement of concurrence with the time allotted for preparation and submittal of drawings to the District as shown in the Technical Specifications, or the number of calendar weeks required by the Bidder to prepare and submit the drawing requirements after receipt of notice of contract award.

1.8. TOOLS:

When required by the specifications, Bidder must submit a list of the type and quality of special tools required for operation and maintenance of the equipment included in the bid.

1.9. ERECTION OR START-UP:

When Bidder considers erection supervision, specialists, or start-up personnel to be necessary, Bidder must so state, and the cost must be quoted as separate items in the bid.

1.10. PRICES

Firm bids only will be accepted. Escalation will not be allowed.

1.11. TERMS OF PAYMENT

Bidder's terms of payment must be indicated in the Bidding Schedule.

1.12. DELIVERY:

It is essential that delivery of the equipment and/or material and software hereunder be made as specified. The Bidder should bear in mind that the delivery time bid in the Delivery Schedule will be an important consideration in making the award.

1.13. FEDERAL, STATE AND LOCAL TAXES:

Do not include California Sales or Use Tax in your prices. Except as may be otherwise provided in this Bid Request, the bid price must include all United States taxes and duties in effect and applicable to the purchase. Sacramento Municipal Utility District, a political subdivision of the State of California, is exempt (exemption certificate furnished upon request) from any Federal Manufacturer's Excise Tax under the provisions of Section 4221(a) (4) of the Internal Revenue Code and is obligated to the State of California for California Sales or Use Tax.

1.14. QUALIFICATION OF BIDDERS:

- A. The District reserves the right to require any Bidder to submit a statement of facts in detail as to such manufacturer's business and technical organization, financial resources, and plant available to be used in performing the contemplated work. Also, the District may require evidence that the Bidder has designed, constructed, or had in successful operation, materials or equipment of like specifications.

- B. The District reserves the right to reject any bid if the District determines that the business and technical organization, plant, financial, and other resources or experience of the Bidder compared with work bid upon justifies such rejection.
- C. Bidders identified by SMUD as having a history of poor performance for safety related material/equipment (including nonconformance reports issued against a specific supplier's equipment) will be considered nonresponsive and the bid will be rejected.

1.15. COMPARISON OF BIDS:

For the purpose of comparing bids, consideration will be given, but not limited to, the following items as well as price:

- A. Qualification of Bidder
- B. Drawings and data submitted with bid
- C. Availability of appropriate maintenance facilities
- D. All costs to the District that may vary among Bidders (i.e. terms of payment, engineering, expediting, inspecting, testing, etc.)
- E. Installation and operating costs
- F. Evaluation of quality control programs (if required)
- G. Bidder's guarantees

If the lowest bid received is determined to be non-responsive, the District will furnish that Bidder a written notice describing the grounds for declaring the bid non-responsive. In the event a Bidder elects to protest the District's decision, the protest must be submitted in writing to the District's Process Owner, Supply Chain Services Department within five (5) business days of the notification to the non-responsive Bidder. The District's Contract Award and Protest Policy is available upon written request to the Supply Chain Services Department.

Bids will be evaluated in accordance with State and Federal Law in effect at the time of bid opening.

1.16. EXPLANATION TO BIDDERS:

A Bidder wishing an interpretation of any portion of the specifications must submit a request for such interpretation in writing in sufficient time to enable the District to reply before bids are submitted. Any interpretation made by the District will be in the form of an addendum to the specifications and will be transmitted to all Bidders. Signed copies of all such addenda must be returned with each bid. The District will not be bound by any oral interpretation of the specifications which may be made by any of its representatives.

1.17. ACCEPTANCE OR REJECTION OF BIDS:

The District reserves the right to reject any or all bids and to waive any informality in any bid. In case of discrepancies between the unit price(s) bid and the extension(s) of such amount(s), the unit prices shall govern. Acceptance of the successful bid will be by telephone notice confirmed in writing.

1.18. PROPRIETARY/CONFIDENTIAL DATA:

Bidders are advised that the California Public Records Act (the "Act" Government Code §§ 6250 et seq.) provides that any person may inspect or be provided a copy of any identifiable public record or document that is not exempted from disclosure by the express provisions of the Act. Each Bidder shall clearly identify any information within its submission which it intends to ask the District to withhold as exempt under the Act. Any information contained in a Bidder's submission which the Bidder believes qualifies for exemption from public disclosure as "proprietary" or "confidential" must be identified as such at the time of first submission of the Bidder's response to this Bid Request. A failure to identify information contained in a Bidder's submission to this Bid Request as "proprietary" or "confidential" shall constitute a waiver of Bidder's right to object to the release of such information upon request under the Act. The District favors full and open disclosure of all such records. The District will not expend public funds defending claims for access to, inspection of, or to be provided copies of any such records.

1.19. EQUAL BUSINESS OPPORTUNITY PROGRAM:

A description of the District's Equal Business Opportunity Program and corresponding price advantages is attached as Section 6 of this Bid Request. Bidders must comply with all the requirements specified in Section 6 and shall complete the M/WBE Declaration Forms included in the Bidding Schedule, Section 4, to be eligible for the price advantages.

2. BID

(THIS SECTION TO BE SIGNED BY BIDDER AND INCLUDED WITH BID)

The undersigned certifies that the Bidder has examined and is familiar with Bid Request No. 99-1101MB, including the specifications; that the Bidder has checked all the figures shown in the Bidding Schedule and other attachments hereto and understands that Sacramento Municipal Utility District will not be responsible for any errors or omissions on the Bidder's part in making up this bid.

The undersigned further certifies that:

1. The bid has been arrived at by the Bidder independently and has been submitted without collusion with any other vendor of materials, supplies or equipment of the type described in the Bid Request.
2. The contents of the bid have not been communicated by the Bidder, nor, to the Bidder's best knowledge and belief, by any of the Bidder's employees or agents, to any person not an employee or agent of the Bidder, and will not be communicated to any such person prior to the official opening of the bid.
3. By signing below, the Bidder agrees that it shall indemnify, defend and hold Sacramento Municipal Utility District (SMUD), its directors, officers, agents, and employees (collectively, "Indemnitees") harmless against all claims or causes of action brought against Indemnitees seeking to cause the release or disclosure of Bidder's Bid and related materials submitted to Indemnitees in response to SMUD Bid Request No. 99-1101MB, for Flat Plate Crystalline Photovoltaic Modules. In the event Bidder fails or refuses to indemnify or defend Indemnitees upon a timely request as provided hereunder, Bidder shall unconditionally waive all claims against, completely release and forever discharge Indemnitees from any and all claims, damage, loss, expense and liability Bidder may incur arising from or in any way connected to Indemnitees release of Bidder's Bid and materials related thereto.

If awarded the contract, the undersigned hereby agrees to execute a contract (or purchase order) within thirty (30) calendar days after receipt of these documents from the District.

Attached hereto and made a part hereof by this reference are the Bidding Schedule and the bid data furnished by Bidder.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

BID REQUEST NO. 99-1101MB

It is understood by the undersigned that the contract, when awarded, will incorporate the following:

1. General Conditions of Bid Request.
2. Technical Specifications of Bid Request.
3. Data submitted in bid by Bidder. (including Bidding Schedule and Delivery Schedule)

DATE: _____

BIDDER: _____

BY: _____

SIGNATURE

NAME/TITLE (printed)

TELEPHONE: _____

ADDRESS: _____

FAX: _____

3. DELIVERY SCHEDULE

(THIS SCHEDULE TO BE INCLUDED WITH BID)

The date(s) shown is/are the date(s) that delivery completion is desired by the District based on an anticipated contract award on **NOVEMBER** __, **1999**. Bidders are hereby notified that bids showing later delivery date(s) will be considered and evaluated.

Bidders are to include time for drawing submittal, District's return of drawings, and transit in their equipment/material delivery schedule.

ITEM NO.	DELIVERY COMPLETION DESIRED BY	BIDDER'S DELIVERY COMPLETION DATE
1	<u>DECEMBER 31, 1999</u>	<hr/> <hr/> <hr/>

Will a delay in contract award result in a day for day delivery delay?

YES NO. Explain: _____

NOTES:

1. DELIVERY LOCATION: SMUD STORES, RECEIVING DIVISION
1708 59TH STREET
SACRAMENTO, CA 95819-4628

2. It is essential that the schedule shown above be met in order to coordinate the work under this contract with that of others on the project and to assure operation of the system by the desired date.

3. Failure on the part of a successful bidder to meet the quoted delivery schedule may have a serious impact on any consideration for future business with the District.

4. Shipment shall be marked with Contract or Purchase Order Number.

5. The District shall be notified ten (10) days prior to shipment. Contact **Dave Collier**, Telephone Number (916) **5952**. Railroad car number, truck-trailer number, number of pieces including individual piece weights, exact delivery date and time, and/or other shipping information shall be supplied at this time. The initial contact shall be followed by a contact within forty-eight (48) hours of actual delivery time in order to fully coordinate receipt of shipment. Failure to do so may delay material acceptance and invoice processing.

6. Bidder shall show a complete breakdown of equipment included in the bid for shipment. Breakdown to include:
 - A. Number of pieces per truck or rail car. _____

 - B. Size and weight of individual pieces to be unloaded. Location from which shipment is made:

7. Location from which shipment is made: _____

City and State

8. Method of shipment: _____

9. All large components must be shipped in open rack-type flatbed trucks. Closed van-types are unacceptable and will be rejected with all charges incurred for reshipment to the Contractor's account.

4. BIDDING SCHEDULE

(THIS SCHEDULE TO BE INCLUDED WITH BID)

4.1. NOTES:

1. Firm prices only shall be quoted.
2. Prices shall be quoted in United States dollars and no allowance will be made for any foreign currency rate exchange.
3. Bidders must bid on a complete schedule. Failure to do so will be cause for rejection of bid. An award will be made based on Bid Item 3 subject to inclusion in the evaluation of the factors noted in Instruction to Bidders (Item 1.15).
4. Prices shall be quoted F.O.B. Destination (Domestic and Canadian) or CIF (Foreign) to the District's designated delivery site.
5. Prices quoted will be exclusive of sales and/or use tax.
6. In case of discrepancy between the unit prices bid and the extensions therefore, the unit prices shall govern.
7. The District shall notify the successful bidder to proceed by telephone call which shall immediately be confirmed in writing. The date of the telephone call shall be established as the award date and shall be used to calculate delivery date and the date for submittal of information required after award. Contractor shall proceed pursuant to the terms and conditions specified in this Bid Request and the bid submitted by Contractor on which the award was based. Contractors failing to comply with this requirement shall be removed from the District's bid list and consideration for future bids.
8. Bidders shall comply with all of the requirements of this specification. These requirements should be submitted with all instructions fulfilled and all spaces filled in to present a complete bid for the work described in this specification. Incomplete bids may be rejected.
9. Optional items may be awarded at the quoted prices up to **SIX (6)** months after award of the contract.

4.2. BID ITEMS

ITEM NO.	DESCRIPTION	AMOUNT
1	Photovoltaic Power Modules, 130 kW Total at PTC, in accordance with the Technical Specifications	\$ _____
2	\$166,400 X (1 - (6% / _____% module efficiency*))	\$ _____
3	Total Evaluated Module Cost (Subtract Bid Item 2 from Bid Item 1)	\$ _____

*Percent Guaranteed PV Module Efficiency from Module Design Summary Sheet (attachment A, line 7)

Indicate the revised cost per kW for the entire quantity ordered if the District changes the quantity ordered anywhere within the range of 130 kW to 200 kW. (Not included in the bid evaluation).

4.3. SPARE PARTS (NOT INCLUDED IN BID EVALUATION)

Bidder shall provide a price listing of his recommended spare parts for the first **TEN (10)** years of operation. The listing shall include: part name, part number, recommended quantity, unit price, and extended price. Prices shall reflect requirements for packaging and shipping, and preservation to prevent damage due to high temperature and high humidity. In addition, where parts recommended for spares are manufactured by other than the Contractor, the name of the original manufacturer and his part number shall be matched with the Contractor's number on the spare parts list. The Contractor's drawings shall be sufficient in detail to locate and identify each part listed on the recommended spare parts list. Spare parts may be awarded at the quoted prices up to six (6) months after award of the contract.

PART NAME	PART NUMBER	QUANTITY	UNIT PRICE	EXTENDED AMOUNT

Manufacturer and Model No _____

GUARANTEE:

Terms of Payment: _____

Payment terms and cash discounts, if applicable, will commence from either the date of inspection and acceptance by the District or the date correct invoices are received, whichever is later.

Prompt Payment Program Check if this applies

The District has a prompt payment program for small businesses (manufacturing and construction firms with annual sales less than \$5,000,000 and less than 50 employees, or non-manufacturing and service firms with annual sales less than \$2,000,000 and less than 25 employees, or a small business certified by the State of California).

Under the program, The District will guarantee payment of invoices within 20 calendar days from the date of inspection and acceptance by the District or the date correct invoices are received, whichever is later. Cash discounts will be considered, evaluated and paid as indicated above.

If the District fails to meet the 20 calendar days payment guarantee, the small business will be paid interest on the unpaid invoice at prime plus 2% APR. Late interest payments, if applicable, will be made without an additional invoice from the small business.

To select this program, please indicate "prompt payment" above, along with any discounts offered, if applicable, and provide evidence of the aforementioned certification with your bid.

4.4. GENERAL BID DATA (REQUIRED OF ALL BIDDERS)

1. Manufacturing Locations:

Location (Street Address, City and State) of the plant or plants at which the major equipment will be manufactured. If more than one plant is involved, describe portion of the equipment manufactured in each plant and percentage of total cost represented by that portion.

2. Service Facilities:

Location (Street Address, City, and State) of the plant or plants where service facilities for prompt maintenance and repair are available.

4.5. GENERAL BID DATA (REQUIRED OF ALL BIDDERS)

3. Quality Assurance Program:

The Bidder shall furnish a description of their quality assurance program with the bid.

4. Experience Data:

Provide the names of two (2), but not more than five (5) customers (preferably utilities) who have purchased similar items from your company.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

BID REQUEST NO. 99-1101MB

	CUSTOMER NAME AND CONTACT PERSON	TELEPHONE NUMBER	DATE INSTALLED
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____

Have you made the necessary arrangements to use these customers as a reference?

YES NO

5. Exceptions To Specifications (Including Exceptions to Commercial Conditions):

Following is a list of all items of deviation and exceptions to the specification including commercial conditions on which this bid is based. There are no others. The Bidder understands that any provisions in the Bidder’s bid inconsistent with provisions in this specification including commercial conditions, which are not expressly described or referred to below, will be interpreted as though such inconsistent provisions had not been included in the bid. Write in “NONE” if no exceptions are taken.

4.6. TECHNICAL BID DATA (REQUIRED OF ALL BIDDERS)

NOTES:

1. Each bidder shall submit complete and definitive information on the Bidder’s offering in sufficient detail to permit a complete analysis of the bid.
2. The requirements for information contained in this section are basic requirements. Additional information shall be provided as requested by the District.
3. All information, drawings, and data shall be in the English language. All dimensions and units of measure shall be in United States standard units. Full compliance with the requirements of this section is essential. Regardless of any statement by the Bidder with respect to the Bidder’s intention or ability to comply, failure on the Bidder’s part to submit the drawings and data prior to the time fixed for opening of bids, or failure of such drawings or data to conform to the requirements of the invitation, may preclude consideration of the bid for award.

FAILURE TO PROVIDE ALL INFORMATION WITH BID MAY BE CAUSE FOR REJECTION OF BID

4. One set of all such information, drawings, data, etc., shall be furnished with the original and each copy of the bid.

PLEASE COMPLETE THE FOLLOWING “ATTACHMENT A” (3 PAGES)

ATTACHMENT A

DESIGN SUMMARY SHEET FOR MODULE

PTC = PVUSA Test Conditions STC = Standard Test Conditions

1. Cell Type (e.g., CS-Si, a-Si, etc.): _____
2. Module Design (e.g. 57X point focus, unframed glass laminate):

3. Module Overall Dimensions (inches): _____ Width _____ Length _____ Depth
4. Module Power at PTC (stabilized): _____
PTC rating for stabilized Modules (post 30 days (1000W/square meter) exposure)
5. Module Efficiency based on Items 3 & 4 above: _____ Percent
6. Net module area excluding frame: _____ Square meters
7. Module Efficiency based on Items 4 & 6 above: _____ Percent
8. Module Design (e.g. flat plate or concentrator, materials used in construction):

9. DC System Module (all values at PTC** unless stated otherwise)
Maximum Power Voltage STC* _____ volts Open Circuit voltage, STC* _____ volts
Maximum Power Current, STC* _____ amps Short Circuit Current, STC* _____ amps
Series _____ cells Parallel _____ cells
Nominal operating cell temperature (NOCT) _____ degrees C
Voc @ 0.2 kW/m₂, Tair = -7 °C _____ volts ISC @ 1.2 kW/m₂, Tair = 46 °C _____ amps
Net DC power at PTC** (sum of module power - losses _____ kW

ATTACHMENT A

DESIGN SUMMARY SHEET FOR MODULE (Continued)

PV PARAMETERS

All PTC rating for stabilized Modules (post 30 days (1000W/square meter) exposure)

<u>Module (Stabilized)</u>	<u>PTC**</u>	<u>STC*</u>
Vmp =	_____	_____
Imp =	_____	_____
Voc =	_____	_____
Isc =	_____	_____
Overall Area =	_____ m ²	
Aperture =	_____ m ²	
Current temp. coefficient	= _____ amps/°C	
Voltage temp. coefficient	= _____ volts/°C	
Internal resistance (series)	= _____ ohms	
Curve correction factor	= _____ ohms/°C	
Efficiency temperature coefficient	= _____ %/°C	
PV module cover transmissivity	= _____ %	
PV cell absorptivity	= _____ %	

* STC = Standard Test Conditions

Flat Plate
 1000 W/m² POA irradiance
 25°C cell temperature
 1.5 Air Mass Spectrum

Concentrators
 850 W/m² DN Irradiance
 25°C cell temperature
 1.5 Air Mass Spectrum

** PTC = PVUSA Test Conditions

Flat Plate
 1000 W/m² POA irradiance
 20°C ambient temperature
 1 m/s wind speed (at 10 meters above grade)

Concentrators
 850 W/m² DN Irradiance
 25°C cell temperature
 1 m/s wind speed (at 10 meters above grade)

PVUSA Flat Plate Module Qualification Test Summary

Manufacturer: _____ Subcontract No. _____

Test Organization: _____

Model #: _____ Serial # _____ mfg Date: _____

Initial Electrical Performance: ¹ Date: _____ Time: _____ Irradiance _____ Cell Temp.: _____
Voc: _____ Isc _____ Vpp: _____ Ipp: _____ Ppp: _____ F.F _____
Final Electrical Performance: ¹ Date: _____ Time _____
Voc: _____ Isc _____ Vpp: _____ Ipp: _____ Ppp: _____ F.F _____
Percentage Change:
Voc: _____ Isc _____ Vpp: _____ Ipp: _____ Ppp: _____ F.F _____

Initial Visual Inspection (Use additional sheets as necessary): _____ Photographs? Yes No

Intermediate and Final Visual Inspection (Use additional sheets as necessary): _____ Photographs? Yes No

Seq	Test	Measurement Values	Pass	Fail
	Initial Ground Continuity	Ω		
	Initial Dry Hi-pot	μA		
A	Initial Wet Insul. Resistance	MΩ		
	Thermal Cycle	cycles		
	Humidity Freeze	cycles		
	Mechanical Loading			
	Hail Impact			
	Surface Cut Susceptibility			
	Final Wet Insul. Resistance	MΩ		
	Wet Hi-pot	μA		
	Final Ground Continuity			
B	Bypass Diode Thermal	°C		
	Hot Spot Endurance			
	Dry Hi-pot	μA		

¹ Performance conditions must remain constant for all test and modules

MINORITY/WOMEN BUSINESS ENTERPRISE ADVANTAGE

If you are requesting M/WBE advantage as described in the Equal Business Opportunity Program Provisions, the Minority/Women Business Enterprise Declaration form on the following page, shall be completed and a copy of the certification returned with bid.

Note: Certification must be an authorized agency. Self-certification by the Bidder is not acceptable.

If this bid is being submitted by a “Manufacturer”, please signify by checking this box.

If this bid is being submitted by a “Distributor”, please signify by checking this box.

If this bid is being submitted by a “Broker”, the following information is required for each line item for which a bid is submitted:

Total dollar amount of the “commission” being paid by the manufacturer to the broker

\$ _____

Note: The commission amount shall only include the amount paid to the broker by the manufacturer (e.g. shall not include any overhead, administrative or other costs of the broker directly or indirectly related to the contract.).

SACRAMENTO MUNICIPAL UTILITY DISTRICT
MINORITY/WOMEN BUSINESS ENTERPRISE DECLARATION

(To be completed by each bidder claiming advantage
as a Minority or Woman Business Enterprise)

(Company Name)

I hereby certify that this firm is a Minority/Women Business Enterprise as defined in the Equal Business Opportunity Program in this Bid Request. I have been certified and have attached a copy of my certification from:

- _____ City of Sacramento Joint Certification
- _____ California Department of Transportation
- _____ Public Utilities Commission Clearinghouse
- _____ Other (must meet Federal standards in 49CFR23)

I further certify that I am doing or have attempted to do business in the "District's Market Area", as defined in the Equal Business Opportunity Program section of this Bid Request.

YES ____ NO ____

My firm is best described as a _____ (gender code) of _____ (ethnic code) origin.

I _____ hereby swear that I am duly authorized to legally act on behalf of the above named company.

Signature

Title

Date

Gender Code: M - Male F - Female

Ethnic Code: 1 - African American 2 - Asian Pacific American 3 - Hispanic American 4 - Native American 5 - Caucasian

DESIGNATION OF SUBCONTRACTORS AND SUPPLIERS

LISTING OF SUBCONTRACTORS IS MANDATORY UNDER SECTION 4100 TO 4114, INCLUSIVE, OF THE CALIFORNIA PUBLIC CONTRACT CODE.

The following are the names and business locations of all subcontractors who will perform work or labor or render service to the Bidder in or about the work, or who will specially fabricate and install a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent (0.5%) of the total bid, together with a statement of the portion of the work to be done by each subcontractor.

In addition, the Bidder shall list the portion of work performed by all other subcontractors, suppliers and miscellaneous service contractors.

	Firm (Name and Address)	Work, Material Or Service (Provide Brief Description)	Equal Business Opportunity Program Status (Check Status)			Percent (Of Total Bid Price)	Dollar Amount (Of This Firm's Work, Material Or Service)
				Male	Female		
1.	Bidder/Prime Contractor: _____ _____ _____ _____	_____ _____ _____ _____				_____ % of Total Bid	\$ _____ Amount of Total Bid
			African American				
			Asian Pacific American				
			Hispanic American				
			Native American				
			Caucasian				
			Other:				
Certified MBE/WBE (Circle One)			YES	NO			
2.	_____ _____ _____ _____	_____ _____ _____ _____				_____ % of Total Bid	\$ _____ Amount of Sub Bid
			African American				
			Asian Pacific American				
			Hispanic American				
			Native American				
			Caucasian				
			Other:				
Certified MBE/WBE (Circle One)			YES	NO			
3.	_____ _____ _____ _____	_____ _____ _____ _____				_____ % of Total Bid	\$ _____ Amount of Sub Bid
			African American				
			Asian Pacific American				
			Hispanic American				
			Native American				
			Caucasian				
			Other:				
Certified MBE/WBE (Circle One)			YES	NO			
4.	_____ _____ _____ _____	_____ _____ _____ _____				_____ % of Total Bid	\$ _____ Amount of Sub Bid
			African American				
			Asian Pacific American				
			Hispanic American				
			Native American				
			Caucasian				
			Other:				
Certified MBE/WBE (Circle One)			YES	NO			

MBE = Minority-owned Business Enterprise WBE = Women-owned Business Enterprise
(COPY THIS FORM AND ATTACH ADDITIONAL SHEETS AS NEEDED)

EQUAL BUSINESS OPPORTUNITY PROGRAM COMPLIANCE DOCUMENTATION

I read and understand the Equal Business Opportunity Program requirements described in the Equal Business Opportunity Program Provisions and am declaring that I meet the Self-Performance Requirements and will not subcontract out any portion of this work after award without the District's written approval.

Company Name

Date

Signature

Print Name

5. GENERAL CONDITIONS

5.1. CHANGES - TERMINATIONS:

The District may by written change order make any changes, including additions to or deletions from the quantities or services originally ordered, or in the specifications or drawings. If any such change affects the amount due or the time of performance hereunder, an equitable adjustment shall be made which shall either be provided for in the change order or determined by the District in a later change order. Contractor shall be obligated to perform in accordance with such change orders, but Contractor may file a claim with the District if Contractor is dissatisfied with such equitable adjustment. Any such claim must be filed in writing within 30 days of date of the change order or other document establishing the equitable adjustment.

The District may at any time by written change order terminate this contract partially or completely as to any of the materials not shipped and/or services not performed. An equitable adjustment will be made between the parties as to any work or materials then in progress; provided that no such adjustment shall be made in favor of Contractor with respect to any goods which are Contractor's standard stock, nor shall any such adjustment be made for Contractor's anticipated profits for that portion of the materials and/or services terminated. Such termination shall not relieve the District or the Contractor of any of their obligations as to any materials already delivered and/or services already performed. Any action by the Contractor for adjustment hereunder must be received in writing by the District within 30 days of date of the change order or other document establishing the equitable adjustment.

5.2. NON-WAIVER:

Failure of the District to insist upon strict performance of any of the terms and conditions hereof, or its failure to exercise any rights or remedies provided herein or by law or to properly notify Contractor in the event of breach, or the acceptance of or payment for any goods hereunder, or approval of design, shall not release Contractor of any of the warranties or obligations of this contract, and shall not be deemed a waiver of any right of the District to insist upon strict performance hereof or any of the District's rights or remedies as to any such goods, regardless when shipped, received or accepted, or as to any prior or subsequent default hereunder, nor shall any purported oral modification or rescission of this contract by the District operate as a waiver of any of the terms hereof.

5.3. NO ASSIGNMENT:

Any assignment of this contract or of any rights hereunder or hypothecation thereof in any manner, in whole or in part, by operation of law or otherwise without the prior written consent of the District shall be void.

5.4. INSPECTION:

The District shall have the right to inspect the goods and to witness any of Contractor's regularly scheduled testing of the goods during their manufacture and prior to shipment, and to perform final inspection within a reasonable time after arrival at the ultimate destination. The goods shall not be deemed accepted until after said final inspection. The making or failure to make any inspection of, or payment for, or acceptance of the

goods, shall in no way impair the District's right to reject nonconforming goods, or to avail itself of any other remedies to which the District may be entitled, notwithstanding the District's knowledge of the nonconformity, its substantiality or the ease of its discovery.

5.5. EXPEDITING:

The goods furnished under this contract shall be subject to expediting by the District or its representatives, either of whom shall be allowed reasonable access to Contractor's plants, and those of the Contractor's sub-suppliers, for expediting purposes.

5.6. DRAWINGS:

Drawings and documents requested in Technical Specifications of this Bid Request are to be sent as directed in the specification. DO NOT send such documents to the Supply Chain Services Department.

5.7. PASSING OF TITLE: FOB DESTINATION

- A. If the manufacture and shipment of materials and supplies herein described is from within the Continental United States of America, the terms of sale shall be f.o.b. the destination as designated by the District, and title to the materials and supplies herein described shall pass to the District upon delivery to and acceptance by the District.
- B. If the manufacture and shipment of materials and supplies herein described is from the Dominion of Canada, the terms of sale shall be f.o.b. the destination as designated by the District, and title to the materials and supplies herein described shall pass to the District upon delivery to and acceptance by the District. The entire responsibility for all loss or damage to said materials and supplies shall rest with the contractor until delivery and acceptance by the District at destination.

5.8. SELLER'S GUARANTEE:

Guarantee shall be as stated by Contractor in the Bidding Schedule.

5.9. MILLENNIUM COMPLIANT

The Contractor hereby represents and warrants that the materials and equipment furnished under this Agreement, and all portions thereof, are "Millennium Compliant." As used in this Agreement, "Millennium Compliant" is the quality of a system, hardware, software, and/or other equipment to provide all of the following functions:

- A. handle correctly and without error date information before, spanning, during, and after January 1, 2000, including but not limited to accepting date input, providing date output, and performing calculations on dates or portions of dates, including, but not limited to February 29, 2000 and September 9, 1999;

- B. function accurately and without interruption before, during, spanning, and after January 1, 2000, without any change in operations associated with the advent of the new century, including, but not limited to, changes in operations associated with the dates February 29, 2000 and September 9, 1999;
- C. where a two-digit year-date field is used, respond to two-digit year-date input in a way that resolves ambiguity as to century in a disclosed, defined, and predetermined manner; and
- D. store and provide output of date information in ways that are unambiguous as to century.

The foregoing is in addition to all other representations and warranties of the Contractor, and shall apply notwithstanding any attempt by the Contractor to limit or disclaim its liability, either hereunder or pursuant to a future agreement, unless such future agreement is in writing and signed by both parties.

5.10. DELAYS

Time is of the essence. However, Contractor shall not be liable for delays in delivery or failure to manufacture or deliver due to causes not reasonably foreseeable which are beyond its reasonable control, such as acts of God, acts of civil or military authorities, Governmental priorities, fires, strikes, floods, epidemics, war or riot. In the event of any such delay, the date of delivery shall be extended for the period equal to the time actually lost by reason of the delay. The failure of any subcontractor or supplier to complete work or make deliveries to Contractor on time shall not relieve Contractor from liability for delay unless such failures are due to one of the causes set forth herein.

5.11. COMPLIANCE:

Contractor warrants that all goods sold hereunder shall have been produced, sold, delivered and furnished in strict compliance with all applicable laws and regulations to which the goods are subject. Contractor shall execute and deliver all documents as may be required to effect or to evidence compliance as set forth herein. All laws and regulations required to be incorporated in agreements of this character are hereby incorporated herein by this reference.

5.12. APPLICABLE LAW:

It is agreed that in the event of any litigation arising hereunder, the Contractor at the request of the District will submit to the jurisdiction of any court of competent jurisdiction within the State of California and will comply with all the requirements necessary to give such Court jurisdiction, and that all matters arising hereunder shall be determined in accordance with the law and practice of such Court. It is further agreed that service of process in any such litigation may be made in the manner provided for in Section 415.40 of the California Code of Civil Procedure or in any other manner provided for in said code for service upon a person outside of the State of California.

5.13. PATENT AND COPYRIGHT INDEMNITY:

The Contractor hereby agrees to defend, indemnify and hold harmless the District from and against any and all liability, loss, or damage and to reimburse the District for any cost or expense to which the District may be put because of claims or litigation on account of infringement or alleged infringement of any letters patent or patent rights or copyright by reason of the services, work, processes, materials, equipment or other items used by the Contractor in its performance of this agreement.

5.14. INVOICES:

Mail invoices in duplicate with Bill of Lading to Sacramento Municipal Utility District, Attention: Accounting Department, Post Office Box 15830, Sacramento, California 95852-1830.

Show any Sales Tax or Use Tax as separate items, giving permit number authorizing collection of taxes.

Note: Invoices may be mailed immediately upon shipment of materials. However, in no event will payment be made until proper receipt and acceptance of the material and freight documentation by the District. All statements of discounts shall be subject to this stipulation.

5.15. PACKING SLIPS:

Packing slips must be included in all shipments. Contract number must appear on all packing slips, whether covering partial or complete shipments.

5.16. PARTIAL SHIPMENTS:

Partial shipments and/or billings are not permitted unless approved in writing by Supply Chain Services Department Office.

5.17. PRICES:

If during the period of the contract the Contractor's list price should decline below the price in the contract, such reduction shall be for the benefit of the District.

5.18. INDEMNITY:

Contractor shall indemnify, defend, and hold harmless the District, its directors, officers, agents and employees against all claims, loss, damage, expense, and liability asserted or incurred by other parties, including, but not limited to, District's employees and Contractor's employees, arising out of or in any way connected with the performance of this contract and excepting only such loss, damage or liability as may be caused by the intentional acts or the sole negligence of the District.

5.19. PRIME CONTRACTOR RESPONSIBILITY:

If any Contractor's bid includes equipment or services marketed by other firms, it will be mandatory for such Contractor to act as prime Contractor for the procurement and setting up of maintenance for the items offered. The successful Contractor shall be the sole point of contact with regard to contractual matters and maintenance services.

5.20. NOTICE TO PROCEED:

The District shall notify the successful bidder to proceed by telephone call which shall immediately be confirmed in writing. The date of the telephone call shall be established as the award date and shall be used to calculate delivery date and the date for submittal of information required after award. Contractor shall proceed pursuant to the terms and conditions specified in this Bid Request and the bid submitted by Contractor on which the award was based. Contractors failing to comply with this requirement shall be removed from the District's bid list and consideration for future bids.

5.21. FRANCHISE TAX:

The District shall withhold an amount equal to seven percent (7%) from payments made pursuant to the terms and conditions of this contract as set forth herein, to all independent contractors who are not residents of the State of California and who have not filed a Certificate of California Residence with the District and to all corporations which have not registered as a "Foreign Corporation" with the California Secretary of State or who have not received an exemption from this requirement from the California Franchise Tax Board. This requirement applies to all contractors performing personal services in California, for which the District pays in excess of Fifteen Hundred Dollars (\$1,500.00) annually.

(Ref. Cal. Rev. and Tax Code Sec. 26131, California Code of Regulations, Title 18, Sec. 18805, 18805-3.)

5.22. EQUAL OPPORTUNITY:**A. Equal Employment Opportunity.**

Contractor shall not discriminate against any employee or applicant for employment on account of race, religion, sex, color or national origin, handicap or age. Contractor shall ensure that this requirement is applied to applicants and employees in actions including, but not limited to, employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training, including apprenticeships.

B. Minority/Women Owned Business Enterprises.

It is the policy of the District that minority and women business enterprises shall have the maximum opportunity to participate in the District's contracts. In this regard, District contractors shall take all necessary and reasonable steps in accordance with this solicitation to ensure that minority and women business enterprises have the maximum opportunity to participate in this contract. Contractor shall not discriminate on the basis of race, religion, sex, color or national origin, handicap or age in the award or performance of any contract or subcontract resulting from or relating to these services.

6. Equal Business Opportunity Program Provisions (Commodities and Supplies)

6.1. EQUAL BUSINESS OPPORTUNITY PROGRAM:

Introduction and Program Objectives -- The District's 1998 Disparity Study demonstrates that while significant and measured progress has been made in correcting systemic past and present discrimination in connection with the District's contracting and subcontracting programs, statistically significant disparity continues to exist with respect to certain ethnic groups and women contractors in specified areas of District contracting. Accordingly, the objective of the Equal Business Opportunity Program (EBOP) is to eliminate statistically significant disparity through the use of contracting procedures that address the remaining disparity within the contract groups identified in the 1998 Disparity Study.

The 1998 Disparity Study demonstrates that with respect to commodities contracts, statistically significant disparity continues to exist as to Prime contractors who are Hispanic American or Women Owned Business Enterprise (WBE) (Caucasian Female) Accordingly, bidders (Prime contractors) who are certified Hispanic American or WBE meet the District's prime contractor's participation goals for commodities contracts up to \$1,000,000. There are no statistically significant areas in commodities for subcontracting.

Self-Performance Declaration -- If the bid amount is between \$50,000 and \$1,000,000 and the Bidder will be performing 100% of the work with no subcontracting, the Bidder must declare this self-performance status by completing and signing the applicable statement on the *Equal Business Opportunity Program Compliance Documentation Form*.

Subcontracting -- The District requires bidders to submit a list of the minority-owned business enterprises (MBE), WBE, and other business enterprises (OBE) subcontractors or suppliers to be used in the performance of the work, and the percentage of work, by task, allocated to each subcontractor or supplier on the *Designation of Subcontractors and Suppliers Form*.

A firm certified as an MBE and a WBE may be counted only as an MBE for the purpose of meeting the District's participation goals. The definition of a WBE business is limited to ownership by Caucasian women for purposes of the District's EBOP goals.

Evaluation and Award -- Compliance with the provisions of the EBOP will be the initial screening criteria, before evaluation of the experience, technical criteria, price, and other requirements.

6.2. APPLICATION OF FIVE PERCENT PRICE ADVANTAGE:

PRIME CONTRACTORS PARTICIPATION PRICE ADVANTAGE: The District shall extend a five (5) percent price advantage, capped at \$50,000, in all bids submitted by certified Hispanic American MBEs or WBEs as prime contractors for bids up to \$1,000,000 (on an annualized basis). For M/WBE Manufacturers, the price advantage will be based on one hundred (100) percent of the bid value. For distributors who inventory and distribute manufactured goods, the five (5) percent price advantage will be based on sixty (60) percent of the bid value. M/WBEs acting as brokers will be limited to a five (5) percent price advantage based on the value of their commission. Price advantages will be calculated on the bid amounts before cash discounts.

The application of the Equal Business Opportunity Program price advantage and participation goals are summarized as follows:

IF	AND	THEN
The Prime Bidder is: A certified Hispanic American or WBE Prime Contractor	The Bid is: Up to \$1,000,000 (on an annualized basis)	5 Percent Prime Contractor Price Advantage on the entire Bid amount, subject to the above limitation is applied for evaluation purposes

6.3. DEFINITIONS:

Minority-owned business (MBE) means an enterprise that is at least 51% owned by a minority individual or group; or, in the case of any publicly owned business, at least 51% of the stock of which is owned by one or more minorities; and whose daily management and daily business operations are controlled by one or more such individuals.

- A. "African-Americans" means all persons having origins in any black racial groups of Africa.
- B. "Hispanic-Americans" means all persons of Mexican, Puerto Rican, Cuban or Central or South American, or other Spanish or Portuguese culture or origin regardless of race.
- C. "Asian Pacific Americans" means all persons having origins in Asia or the Indian subcontinent, including, but not limited to, persons from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam the U.S. Trust Territories of the Pacific, Northern Marinas, Laos, Cambodia, Taiwan, India, Pakistan, and Bangladesh.
- D. "Native Americans" means all persons having origin in any of the original peoples of North America or the Hawaiian Islands, in particular American Indians, Eskimos, Aleut or Native Hawaiians.

Woman-owned business (WBE) means an enterprise that is at least 51% owned by one or more Caucasian women; or, in the case of any publicly owned business, at least 51% of the stock of which is owned by one or more Caucasian women; and whose daily management and daily business operations are controlled by one or more such individuals.

Other Business Enterprise (OBE) means a business enterprise that does not meet the definition of a minority owned business or a woman-owned business.

Self-Performance means that a prime contractor will perform 100% of the work.

Evaluation Credits means the available points assigned in the evaluation criteria for the achievement of participation goals.

Operate means being actively involved in the day-to-day management and not merely as an officer or director.

Market Area means Sacramento County, California.

6.4. CERTIFICATION:

The District participates in the Joint Regional Certification Reciprocity Program, conducted by the City of Sacramento, Office of Small Minority Women Owned Business, in conjunction with the County of Sacramento, Sacramento Regional Transit and Sacramento Housing and Redevelopment Agency.

The City agrees to provide formal certification, including verification, of minority and women-owned businesses based on ownership, control, and management in accordance with the certification eligibility standards adopted in the code of Federal Regulations 49, CFR section 23. The City will provide timely updates on all certifications and decertifications.

The District will also accept certifications from Caltrans, Office of Civil Rights and other agencies, on a reciprocal basis, which certify to the standards adopted in the Code of Federal Regulations 49, CFR section 23 and meet the minority definitions as stated above.

The District will also accept certifications from the Public Utilities Commission Clearinghouse.

Note: It is the Bidder's responsibility to ensure that the MBE/WBE firm is certified by the bid opening date. The District does not accept self-certification.

6.5. BID FORMS:

The Designation of Subcontractors Form must include the 1) name, 2) dollar amount, 3) item of work, and 4) percent of bid performed by Bidder and all subcontractors, by ethnicity and gender, including MBE/WBE/OBE suppliers and miscellaneous service contractors.

The District's Minority and Women Business Declaration Form must be completed by all certified MBE/s in order to count toward the participation contract goal. Verification of MBE/WBE certification must be submitted with the Declaration.

6.6. PROMPT PAYMENT:

The District shall provide to any MBE/WBE/OBE firm, who also meets the definition of an "economically disadvantaged business", prompt payment of verified invoices, ensuring payment within twenty days of the District receipt of an acceptable invoice submitted in accordance with the requirements specified in the Contract documents or the District shall provide a payment penalty for any late payment at an annual rate of the prime rate plus 2 points.

6.7. CONTRACT COMPLIANCE:

The District shall maintain post award monitoring of any contract, which includes M/WBE participation. Contractors will be required to maintain certified payroll reports by the Contractor and all subcontractors, regardless of contract amount. Other related documentation may be required and shall be provided when requested by the District to verify M/WBE participation equal to or greater than the participation levels stated at the time of award. No substitution of subcontractors will be allowed without prior written approval from the District.

6.8. FALSIFICATION OF INFORMATION:

- A. Falsification of information on the forms required for certification may cause the District to cancel any existing contracts with the vendor and disqualify the vendor from contracting with the District in the future.
- B. Firms claiming M/WBE status under false pretense; i.e. listing M/WBEs for scopes of work that they will not fully perform or utilizing M/WBE as a pass-through to achieve the participation goals, will be disqualified from doing business with the District for a period of not less than one year and no more than five years unless determined by the General Manager that such firm should never be permitted to propose on a District contract, and the District may seek any legal remedies available under the law.

7. NOT APPLICABLE

8. Not applicable

9. TECHNICAL SPECIFICATIONS

This project is part of a program to encourage local economic development and the sustained orderly development of Photovoltaic Generation in order to accelerate the cost reduction and commercialization of grid interconnected photovoltaic systems. It is expected to lead to cost-effective grid-connected PV applications by the end of this procurement.

Throughout this document, District shall mean The Sacramento Municipal Utility District, and Contractor shall mean the Contractor (successful bidder) supplying the Photovoltaic (PV) equipment and/or services.modules

9.1. PHOTOVOLTAIC POWER MODULES

9.1.1 SCOPE OF WORK AND DELIVERABLES

The Flat Plate crystalline PV Modules totaling 130 to 200kWDC PTC, delivered by December 31, 1999 as per the delivery schedule, shall be designed for various PV installations.

The bid price must be below \$500,000

The scope of work and deliverables required by this technical specification are identified in the text. Document submittal requirements are summarized in Section 9.1.5.4.3. The following is a general outline:

9.1.1.1 SCOPE OF WORK

- 9.1.1.1.1 Design, qualify, fabricate, assemble, test, ship to Sacramento, California Photovoltaic Flat Plate crystalline modules that meets the requirements delineated herein.
- 9.1.1.1.2 Supply spare parts at the District's option.

9.1.1.2 DELIVERABLES

- 9.1.1.2.1 Drawings, calculations, documents and reports, including evidence of a minimum 30 year design life for the PV Modules.
- 9.1.1.2.2 QA/QC Program. See Section 9.1.8.2.
- 9.1.1.2.3 Certified factory test reports on module qualification test certification. See Sections 9.1.6.1.
- 9.1.1.2.4 A shipping schedule

9.1.1.2.5 A list of recommended spare parts with quoted prices prior is required with bid.

9.1.1.2.6 Supply additional modules. See Section 9.1.10.

9.1.1.2.7 Drawings corrected to as-built conditions prior to final payment.

9.1.2 SERVICES TO BE FURNISHED BY THE DISTRICT

9.1.2.1 Receiving and storage of PV Modules.

9.1.3 CODES, & STANDARDS

The quality of the flat plate PV modules supplied by the Contractor shall be consistent with the applicable guidelines included in the codes and standards listed below. In case of conflict, this specification shall govern, and the Contractor shall notify the District in writing of such conflicts.

- National Electrical Code - NFPA 70-1990
- National Electrical Safety Code - ANSI C2-1990
- Insulated Cable Engineers Association (ICEA) Standards
- UBC - Uniform Building Code - 1995
- All outdoor enclosures shall be minimum NEMA 3, or equivalent rating
- Occupational Safety and Health Administration (OSHA) Directives
- ANSI/IEEE 519 1992 Guide for Harmonic Control and reactive Compensation of Static Power Controllers
- Flat Plate PV Modules: IEEE P 1262 "Recommended Practice for qualifications of Photovoltaic Modules" (This Standard is currently being printed. If final printed version of the Standard is not available, use the draft of this IEEE P1262 standard, available from UPVG)
- ANSI/IEEE 928-1986 Recommended Criteria for Terrestrial PV Power Systems (PV System Performance criteria)
- ANSI/IEEE 929-1988 Recommended Practice for Utility Interface of Residential and Intermediate PV Systems (Note: If a conflict between this standard and ANSI/IEEE 519 exists in the area of harmonic distortion requirements (only) then the requirements of ANSI/IEEE 519 shall apply).
- All PV Modules, and electrical components shall be required to be listed or recognized by an appropriate and recognized United States Safety Laboratory (for example:

UL1703, CEC503, ETL, etc.) for all residential and commercial, customer-sited installations.

- Flat-plate thin film modules shall successfully pass the tests described in the Interim Qualification Tests and Procedures for Terrestrial Photovoltaic Thin-Film Flat-Plate Modules, SERI/TR213-3624, printed January 1990, by R. DeBlasio, et al.
- ANSI/ASCE 7-88 - Building code Requirements for Minimum Design Loads in Buildings and Other Structures
- FCC Regulations Electromagnetic Interference (EMI) Part 15, Subpart A, Subpart B, Subpart J, October 1992.
- Local and State Codes and Standards.
- AISC-1989 - Manual of Steel Construction, 9th edition Allowable Stress Design - 1989
- AWS D1.1-90 - Structural Welding Code - Steel, 12th Edition
- AWS D1.3-89 - Structural Welding Code - Sheet Steel, 2nd Edition
- AISI SG-673-1980 - Specification for Design of Coldformed Steel Structural Members
- Specifications for Aluminum Structures (The Aluminum Association)

If any components in the PV modules are normally manufactured to non-U.S. standards, conformance of the equipment to the specified U.S. standards shall be certified by the Contractor.

The PV Modules design shall comply with all applicable State of California regulations and local codes in effect on the date of the contract.

9.1.4 SITE CONDITIONS

9.1.4.1 LOCATION

The flat plate crystalline PV Modules shall be installed at various sites in California by a contractor yet to be determined.

9.1.4.2 ENVIRONMENT

The following multi-year average weather data for Sacramento gathered from the National Oceanic and Atmospheric Administration (NOAA) are:

- The local temperature at the sites ranges from 18 to 111 degrees F
- The local average annual precipitation is 18.00 inches
- No measurable snowfall in 12 year sample period

- The mean annual relative humidity is 60 percent
- Winter fog, 100% humidity, condensing (visibility 1/4 mile) averages 39.2 days annually
- The site elevation is approximately 23 to 200 feet above mean sea level
- The isokeraunic level for the general area of the site is 5

9.1.4.3 SEISMOLOGY

Determine seismic loads in accordance with UBC for Zone 3.

9.1.4.4 WINDS

The design wind loads shall be obtained from ANSI/ASCE 7-88 using the following parameters:

- Basic Wind Speed = 80 mph
- Exposure Category C
- Importance Category - I = 1.0

9.1.5 DESIGN, FABRICATION AND CONSTRUCTION REQUIREMENTS

9.1.5.1 GENERAL

This technical specification includes a number of general and supporting specifications for flat plate PV Modules including those listed in Section 9.1.3. In cases of conflict between the codes and standards and general specifications and this technical specification, Contractor shall notify the District in writing of any such conflicts. Work shall not proceed until such conflicts are resolved.

The methods and materials specified herein are intended to represent minimum requirements. Reliance thereon shall not diminish the responsibility for meeting performance and other requirements stated here in.

9.1.5.2 FLAT PLATE PV MODULE GENERAL DESCRIPTION

The PV modules shall be designed to produce low-cost energy, to have minimum maintenance requirements and high reliability, to have a minimum 30 year design life, and to be designed for normal unattended operation.

The PV modules must be compatible to operate with the new high frequency Trace Engineering 2.5 kW inverter.

The PV modules may be framed or unframed flat plate laminates designed for a fixed installation of a minimum efficiency of approximately 10% at standard test conditions (STC). Higher efficiencies are desirable and will be credited in the bid evaluation. Price quotes for both framed and unframed laminates are requested. Framed modules with plug connectors with demonstrated lower installation costs are desirable and will be given credit in the bid evaluation.

The PV modules covered by this specification must be new, unused and be of a proven design successfully operated in systems for a minimum period of one year or contractor must supply an additional one year warranty for a total of 11 years. The PV module minimum warranty is 10 years.

9.1.5.3 PV MODULE POWER

The PV module power shall be rated at a DC power level after one month of operation at PVUSA test conditions (PTC)

The minimum modules efficiency shall be 9% (Attachment A, Design Summary Sheet For Modules line 7)

The PV module will be rated at PTC Test Conditions as follows:

PVUSA Test Conditions For Flat-Plate

1000 W/m² Plane of Array (POA) irradiance, 20 degree C ambient air temperature and 1 m/s wind speed (measured at 10 meters above grade).

9.1.5.4 PV MODULE STRUCTURAL

PV module structures must have suitable evidence to show that the design is commensurate with a 30-year life.

Calculations based on accepted engineering practice shall be supplied with bid to show that the design of the entire PV module, framed or unframed, will withstand an 80 mph basic wind speed and/or gusts, and other specified loads.

Framed PV Module shall be anodized aluminum with pre-drilled mounting holes or mounting channels as approved by the District. Acceptable mounting methods for unframed modules shall be provided by the manufacturer.

Bolted and similar connections shall be non-corrosive and include locking devices designed to prevent loosening over the 30 year design life of the PV system. ASTM A325 or A490 bolts do not require locking devices but shall be installed in accordance with the applicable standards in the AISC Manual of Steel Construction - 9th Edition.

9.1.5.4.1 Governing Documents

Unless specifically stated otherwise, the design of all structures shall be based on applicable portions of the codes, specifications, industry standards, and other reference documents listed in Section 9.1.3.

Aluminum shall be in accordance with Specifications for Aluminum Structures (The Aluminum Association).

9.1.5.4.2 Design Loads and Load Combinations

PV module structure shall be designed to resist dead, live, plus wind or seismic loads. Also, all structures shall be designed to resist load combinations per the requirements of Section 9.1.3.

In addition, thermal loads caused by expected fluctuation of component and ambient temperatures must be combined with all the above load combinations.

9.1.5.4.3 Submittals

All Structural drawings, specifications and calculations shall be submitted for review and acceptance prior to purchase of material or start of fabrication.

Submittal shall include the following:

- Fabrication Drawings
- Certificate of Compliance for Materials
- Copies of Welder Qualification Records
- Inspection Reports for:
 - Welding
 - Structural Framing Erection

9.1.5.5 PV MODULE ELECTRICAL

The individual PV Module operating voltage shall be compatible with the new high frequency Trace Engineering 2.5 kW inverter..

Compression type terminal strip PV module output terminals shall be provided in a water tight module mounted terminal box with knockouts for 1/2 inch water tight conduit mountings. Bypass diodes shall be supplied, mounted and connected on each PV module in the water tight module mounted terminal box. Alternatives may be acceptable with SMUD approval. If bypass diodes are not required, evidence of this must be supplied with bid for approval by SMUD.

PV Modules without junction boxes but with UL approved interconnection wiring methods may be acceptable with SMUD approval.

9.1.5.6 MECHANICAL

Outdoor enclosures shall be NEMA 3 weatherproof and capable of surviving in tact under the site environmental conditions specified. Outdoor enclosures shall be equipped to prevent condensation.

Positive and negative PV module terminals shall be clearly identified with suitable permanent designations.

All doors, covers, panels, and cable exits shall be gasketed or otherwise designed to limit the entrance of dirt and moisture.

The site temperatures, incident sunlight and the effect of temperature on component life shall be considered in developing the thermal design for all components. Heat sinking and thermal design shall be considered for bypass diodes, and similar components.

9.1.6 MODULE TESTING

9.1.6.1 MODULE QUALIFICATION TESTS

Qualification tests shall be performed to establish the acceptability of the design, materials and manufacturing process of the modules to be furnished. The tests shall be conducted on modules produced from the Contractor's production line. The test modules shall, at a minimum, pass the tests specified in this document. (See Module Design Summary Sheet, Module Qualification Test Summary [Attachment A]). After passing the module qualification tests, no changes in design, materials, or manufacturing process are allowed, unless submitted to the District for review. Prior to acceptance, the District may require requalification after review of the changes. A wet megger test shall be performed on one module at 10% increments of production run. If failures of wet megger test result, ten successful 1% increments shall be performed. The District reserves the right to witness and review the results of these tests.

Flat Plate PV Modules shall pass the tests described in the following: IEEE P 1262 "Recommended Practice for qualifications of Photovoltaic Modules" (This Standard is currently being printed. If final printed version of the Standard is not available, use the draft of this IEEE P1262 standard, available from UPVG)

Flat-plate thin film modules shall successfully pass the tests described in the Interim Qualification Tests and Procedures for Terrestrial Photovoltaic Thin-Film Flat-Plate Modules, SERI/TR213-3624, printed January 1990, by R. DeBlasio, et al.

The District reserves the right to witness any or all of the tests. No exception will be allowed to the requirements of this section.

9.1.6.2 FIELD WET RESISTANCE TEST

The installed modules and DC system will be subjected to a wet resistance/megger test. The test will be conducted by the District. The test will be conducted during installation of the PV system after all modules and DC wiring are installed but prior to connection of voltage sensitive components, such as surge protectors, and parallel connection of the source circuits.

The test will consist of measuring the leakage resistance between the test section and ground while the modules are wet. A 500-volt or 1000-volt high-impedance ohm meter (Megger) will be used. The Megger will be inserted between the test section connection point and ground (i.e., module/array structure). The test section will be floating and open circuited for this test so that the modules near the test section ground connection point will be at the megger voltage. The remaining modules will be at progressively higher voltages contributed by the modules which will be open circuited and in sunlight for fixed tilt arrays.

The test will be performed one at a time on all test sections. A test section is a smaller portion of a source circuit, so selected such that the minimum expected resistance reading is 200 kilo ohms or more.

Each test section's leakage resistance to ground will first be measured with the modules dry. The resistance will then be measured with the modules wet, both on front and on the back.

The modules will be sprayed with water/wetting agent solution so as to produce a sheeting action with the solution. The solution may be diluted Windex, Glass Plus, or Alconox or a similar wetting solution.

The allowable leakage resistance will be based on the allowable module leakage current. The allowable leakage current of 12.5 microamperes per square foot of module aperture area at twice the system voltage plus 1000 volts will be translated into a module resistance. The resistances to ground for all of the modules in a test section will be combined into an expected resistance. The calculation will take into account the fact that modules in the test section will be at progressively higher voltages. This calculated resistance will be multiplied by a factor of 0.8 to determine the allowable leakage resistance for each test section.

Testing will be done to determine if the leakage resistance of each test section is above the allowable. Contractor shall be responsible for finding the exact cause of failure and making necessary repairs and/or modifications.

At the conclusion of the test, the array panels and modules will have been washed with a weak detergent solution and will be essentially clean. The Contractor may, at its discretion and expense, conduct additional washing and/or rinsing at anytime up to the end of the 30-day conditioning period.

The completed installation will be subject to periodic field wet resistance tests by the District during its design life (following the same procedure), as part of a continuing evaluation program. Modules (including bypass diodes with an insulation resistance which falls below the acceptance level, during the warranty period, will be considered defective under the terms of the warranty.

9.1.7 MAINTENANCE

9.1.7.1 MAINTENANCE BY THE DISTRICT

The Contractor shall remain available by telephone or telefax and provide consultation and required repairs for the District on the PV module malfunctions during the warranty period.

9.1.8 SUBMITTALS

9.1.8.1 GENERAL

Information as to the required scope and content of submittals is included in the text of this specification.

Review and acceptance of submittals shall not encumber the District with responsibility for the adequacy of the PV system design.

9.1.8.2 QA/QC PROGRAM

A QA/QC program shall be submitted covering the PV modules (including PV qualification modules). The scope of the program shall include plans covering control of module design, module qualification tests and the module manufacturing process. Control of the manufacturing process shall include material control, process control and factory testing of the finished modules. The District reserves the right to witness tests, review data, and enforce the suppliers program.

9.1.8.3 PROGRESS REPORTS

Progress Reports shall be submitted by the fifth working day of each month. These reports should be concise letter reports of 1 to 2 pages and shall include a Critical Path Method (CPM) schedule updated monthly illustrating the baseline and current status for various phases of the contract. Also, it shall include the status of sub-tier contractor activities. The reports shall briefly describe project activities during the previous month, milestones attained and activities planned for the next reporting period. The reports shall also include details of problems encountered and the solutions applied. the District reserves the right to verify contents of the Progress Reports through visits to Contractor facilities or sub-tier contractor facilities.

9.1.8.4 DOCUMENTS AND DRAWINGS

The following documents and drawings shall be submitted for approval within 30 days of contract award and prior to purchasing any materials. Any subsequent PV module change in design or power rating will require a new set of submittals for approval prior to manufacturing and shipping. The District will respond within 14 days. This includes:

- Outline dimensions, services, and mounting details
- Assembly drawings and shop drawings
- Schematic diagrams
- Design summary sheet, Attachment A. This shall be updated promptly as changes occur. Any changes from the initial bid must be approved by the District.
- Erection and installation procedures
- Site storage and handling instructions

9.1.9 PV MODULE ACCEPTANCE BY THE DISTRICT

The District will verify that all provisions of the Contract have been met, including verification of all required submittals, any spare parts delivery, and any required system modifications.

9.1.10 ADDITIONAL MODULES

The contractor shall supply five modules to the District to be installed for test. These shall be delivered within 4 weeks of their manufacture.

9.1.11 PV MODULE WARRANTY

The PV Modules warranty shall be a minimum of 20 years.