CITY OF SACRAMENTO

1231 I Street, Sacramento, CA 95814

Permit No: 0107860
Insp Area: 4

Site Address: 34 ROLLINGBROOK CR SAC
Parcel No: 225-0700-010

Sub-Type: COM
Housing (Y/N): N

CONTRACTOR
MILESTONE EXTERIORS
9575 APPALACHIAN DR
SACRAMENTO CA 95827

OWNER
KIYOKO FLESHMAN-KUBODERA
34 ROLLINGBROOK CR
SACRAMENTO CA

ARCHITECT

Nature of Work: REROOF WITH GERARD STEEL TILE OVER EXISTING SHAKE ROOF.

CONSTRUCTION LENDING AGENCY : I hereby affirm under penalty of perjury that there is a construction lending agency for the performance of the work for which this permit is issued (Sec. 3097, Civ. C.).

Lender's Name_____ Lender'sAddress_____

LICENSED CONTRACTORS DECLARATION: I hereby affirm under penalty of perjury that I am licensed under provisions of Chapter 9 (commencing with section 7000) of Division 3 of the Business and Professions Code and my license is in full force and effect.

License Class_____ License Number 699911 Date_____ Contractor Signature_____

OWNER-BUILDER DECLARATION: I hereby affirm under penalty of perjury that I am exempt from the contractors License Law for the following reason (Sec. 7031.5, Business and Professions Code: any city or county which requires a permit to construct, alter, improve, demolish, or repair any structure, prior to its issuance, also requires the applicant for such permit to file a signed statement that he or she is licensed pursuant to the provisions of the Contractors License Law (Chapter 9 (commencing with Section 7000) of Division 8 of the Business and Professions Code) or that he or she is exempt therefrom and the basis for the alleged exemption. Any violation of Section 7031.5 by any applicant for a permit subjects the applicant to a civil penalty of not more than five hundred dollars ($500.00):

____ I, as a owner of the property, or my employees with wages as their sole compensation, will do the work, and the structure is not intended or offered for sale (Sec. 7044, Business and Professional Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who does such work himself or herself or through his/her own employees, provided that such improvements are not intended or offered for sale. If, however, the building or improvement is sold within one year of completion, the owner-builder will have the burden of proving that he/she did not build or improve for the purpose of sale.)

____ I, as owner of the property, am exclusively contracting with licensed contractors to construct the project (Sec. 7044, Business and Professions Code: The Contractors License Law does not apply to an owner of property who builds or improves thereon, and who contracts for such projects with a contractor(s) licensed pursuant to the Contractors License Law.)

____ I am exempt under Sec. _____ B & PC for this reason:_____

Date_____ Owner Signature_____

IN ISSUING THIS BUILDING PERMIT, the applicant represents, and the city relies on the representation of the applicant, that the applicant verified all measurements and locations shown on the application or accompanying drawings and that the improvement to be constructed does not violate any law or private agreement relating to permissible or prohibited locations for such improvements. This building permit does not authorize any illegal location of any improvement or the violation of any private agreement relating to location of improvements.

I certify that I have read this application and state that all information is correct. I agree to comply with all city and county ordinances and state laws relating to building construction and herby authorize representative(s) of this city to enter upon the abovementioned property for inspection purposes.

Date 6/25/01 Applicant/Agent Signature_____

WORKER'S COMPENSATION DECLARATION: I hereby affirm under penalty of perjury one of the following declarations:

____ I have and will maintain a certificate of consent to self-insure for workers' compensation as provided for by Section 3700 of the Labor Code, forthe performance of work for which the permit is issued.

__X__ I have and will maintain workers' compensation insurance, as required by Section 3700 of the Labor Code, for the performance of the work for which this permit is issued. My workers' compensation insurance carrier and policy number are:

Carrier STATE FUND Policy Number 1586416-00 Exp Date 05/01/2001

____ (This section need not be completed if the permit is for $100 or less) I certify that in the performance of the work for which this permit is issued, I shall not employ any person in any manner so as to become subject to the workers' compensation laws of California and agree that if I should become subject to the workers' compensation provisions of Section 3700 of the Labor Code, I shall forthwith comply with those provisions.

Date 6/25/01 Applicant Signature_____

WARNING: FAILURE TO SECURE WORKER'S COMPENSATION COVERAGE IS UNLAWFUL AND SHALL SUBJECT AN EMPLOYER TO CRIMINAL PENALTIES AND CIVIL FINES UP TO ONE HUNDRED THOUSAND DOLLARS ($100,000) IN ADDITION TO THE COST OF COMPENSATION, DAMAGES AS PROVIDED FOR IN SECTION 3706 OF THE LABOR CODE, INTEREST AND ATTORNEY'S FEE.

THIS PERMIT SHALL EXPIRE BY LIMITATION IF WORK IS NOT COMMENCED WITHIN 180 DAYS.

System Acceptance Test

Project Name: Gary Kubota

Address: _____

_____

1. Perform each step as indicated. Mark each step with a checkmark "√" if satisfactory, an 'X' if not satisfactory, or 'N/A' if the item is not applicable. Record other information in the space provided for notes.

I. Visual Inspections

A. PV Modules and Module Wiring

Connectors are secured	√
Cables are properly secured	√
Module surface is clean	√
No physical damage to array	√
Ground wire and lugs are secure	√

B. Source Circuit Junction Boxes

All connectors are secured	√
Wiring terminations are tight	√
Fields wiring is polarity marked	√
Ground wiring is polarity marked	√
Labels are in place	√
Covers are secure	√

C. DC and AC Disconnected Switches

Wiring terminations are tight	√
Fields wiring is polarity marked	√
Conduit connections are tight	√
Ground wire is secure	√
Covers are secure	√

D. Inverter (s)

Verify field wiring is routed properly	√
Field wiring terminations are tight	√
Field wiring is polarity marked	√
Conduit connections are tight	√
Ground wire is secure	√
Labels are in place	√

II. Electrical check-out

A. Wires, Cables and Buses

Wire continuity is ok	✓

B. Source Circuit Junction Boxes

Polarity and magnitude of inputs are correct	✓

C. DC Disconnect Switch

Polarity and magnitude of inputs are correct	✓

D. Inverter(s)

Polarity and magnitude of inputs are correct	✓
Polarity and magnitude of grid connection is correct	✓

III. Commissioning

A. System Start Up

Apply AC power to inverter	✓
Apply DC power to inverter	✓
Confirm system is on-line	✓
Confirm operating voltages and power are within expected ranges	✓

B. System Operation

Turn off DC input. Verify that system AC output is zero.	✓
Restart system	✓
Turn off DC input. Verify that system AC output is zero.	✓
Restart system	✓

C. Inverter(s) function

Display operates properly	✓
Keypad/panel controls operate properly	✓
Over/under voltage (if possible)	✓
Over/under frequency (if possible)	N/A
Loss of control power (if possible)	N/A
Other functions (as applicable)	N/A

IV. Test Completed by

Isaac Galiter

Signature

9/6/07

Date

ATLANTIS ENERGY, INC.

Project name:

Test date	9/5/07	MM/DD/YYYY
Test time	2:45 PM	H:MIN
Irradiation	~~800~~ 900	Watts / m^2
Ambient temp	(94°F) 34	°C

AC side

Inverter model	SW 4048 MPV
(Rig [MΩ]) AC side	∞

DC side

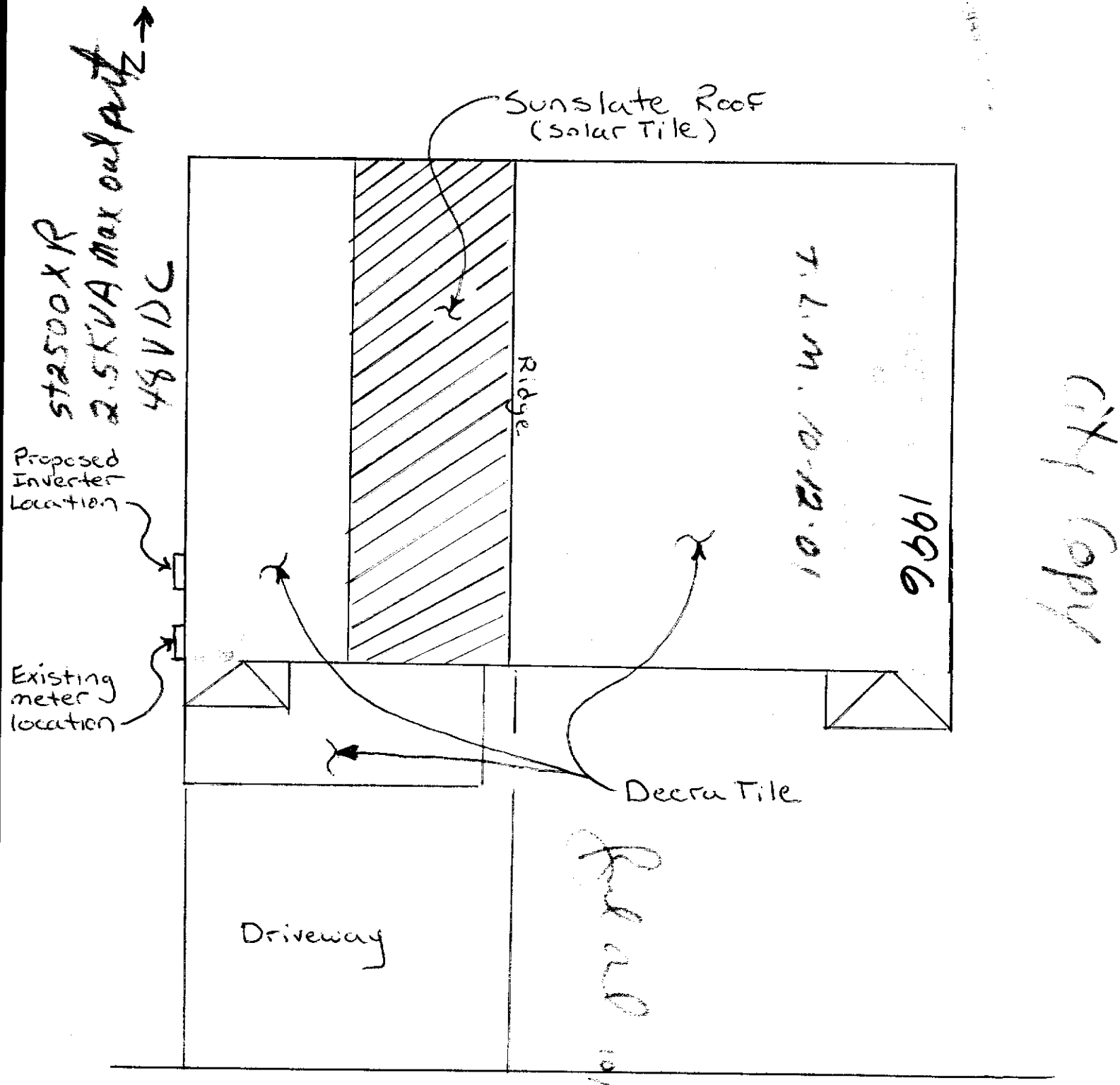
Field	Voc [V]	Isc [A]	Rfg [MΩ]	Notes:
1	~~59~~	~~3.77~~		
2	59	3.76		
3	59	3.77		
4	59	3.79		
5	59	3.79		∞
6	59	3.91		
7	60	3.98		
8	59	4.01		
9	59	4.1		
10	59	4.0		
11	59	3.98		
~~12~~				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
~~26~~				

System AC - working
ON ✓
OFF ✓
ON —

Signature: .....
Date: 9/6/07

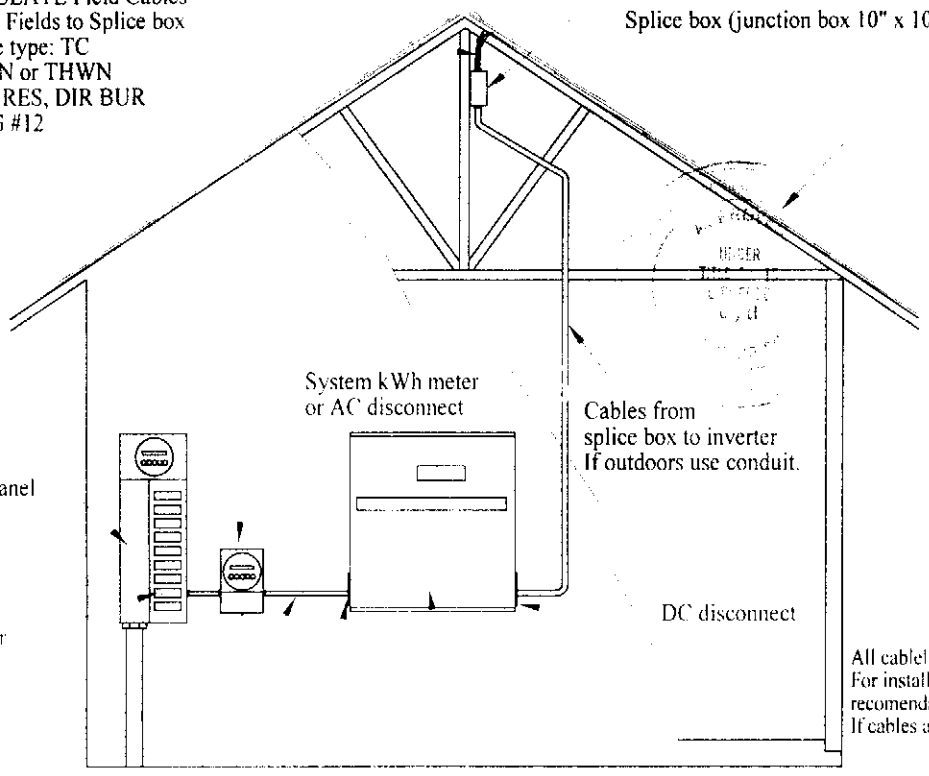
4610 Northgate Blvd. 150, SACRAMENTO, CA 95834 TEL: 916-920-9500. FAX: 916-927-1697.
www.atlantisenergy.com

9107860


N
ST2500XP
2.5KVA Max output
48 V DC
Sunslate Roof
(Solar Tile)
Ridge
Proposed
Inverter
Location
Existing
meter
location
Decra Tile
Driveway
1996

0107860

SUNSLATE Field Cables
From Fields to Splice box
Cable type: TC
THHN or THWN
SUN RES, DIR BUR
AWG #12



All cableling shall be installed refering to the NEC.
For installation instructions refer to part producer recomendations.
If cables are installed outdoor conduit is required.

All cables from Roof penetration to inverter and from inverter to sub panel are located indoor

For Installation Refer to:
Inverter Owners Manual (Part#2031-6)
SUNSLATES Installation Manual (Part# MN100)

AC cables from
inverter to main distribution
panel

AC disconnect

Inverter
Field combiner

SMUD APPROVAL:

Approved by:_____

Todor Galitev

Todor Galitev

Atlantis Energy, Inc.
4510 Northgate Blvd. 160, Sacramento CA 95834. FAX:916 927 1697

SUNSLATE ELECTRICAL SYSTEM

05SMUD99 - 008 - 103

www.atlantisenergy.com

Grid -Connected Installations

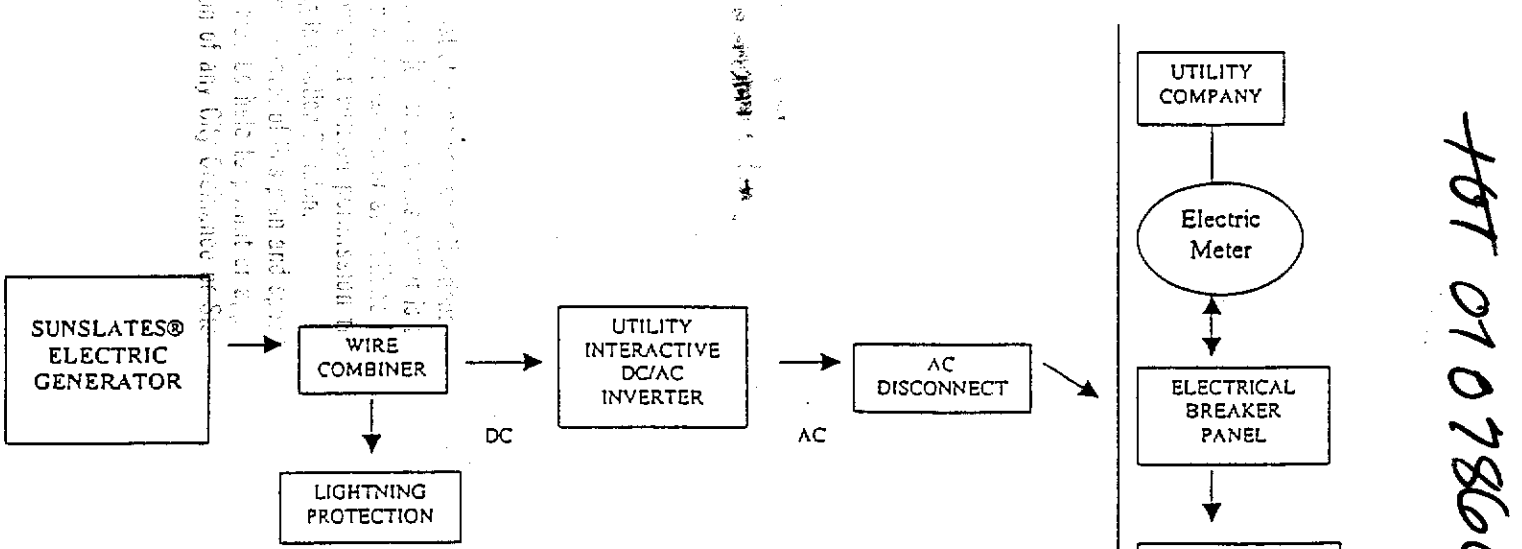
Since its commercialization, electricity has been supplied to residential and commercial customers by means of central station generation and a complex transmission and distribution system. All conventional power plants have inherit problems such as pollution, dependence on fuel supply stability, and / or widespread public opposition to their use. In Addition, central station generation makes large numbers of people vulnerable to electrical blackouts. Photovoltaic eliminates many of these problems. With widespread commercialization of PV and other distributed sustainable energy resources, such as wind and biomass, our society will become less dependent on conventional central-station generation.

While PV is capable of powering houses and businesses without any connection to existing electrical infrastructure, such as arrangements are not always the most practical. In many states, when PV system owners connect to the grid, the utility and the customer enter into a new kind of relationship, often called "net metering." With net metering, surplus electricity produced by the PV system can be exported back to the utility grid, effectively spinning the electric meter backwards. The home or office then gets this power back at [illegible]en exchange at night and during periods of low sun. The electric utility helps the building owners by becoming the storage medium for their PV system, thus eliminating the need for batteries or other storage devices. The PV owners benefit

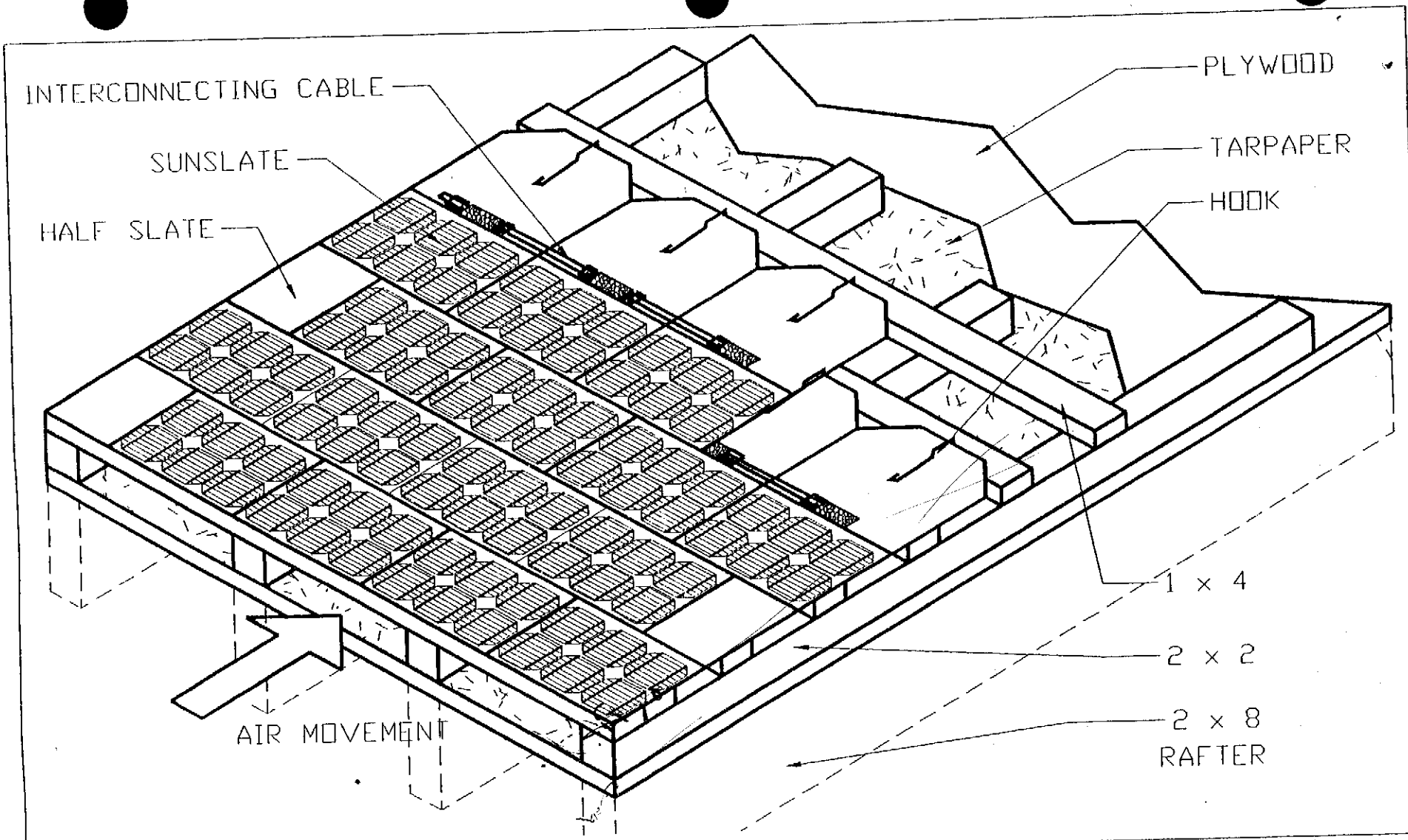
The utilities by providing their surplus power to the grid during daytime peak periods when many utilities tend to need the electricity most.

Today, utilities have started to encourage, and even sponsor, the installation of grid-connected PV systems. In 1985, New England Electric installed 100kWp of distributed, roof-top PV systems, including the world's first PV-powered neighborhood, in the central Massachusetts town of Gardner. Other far-sighted utilities such as the Sacramento Municipal Utility District (SMUD) in California are now installing distributed PV systems on customer's buildings. These systems will support the grid, help meet peak demand while reducing dependence on traditional sources of power and improving the environment. Recently, a nationwide organization involving roughly 90 electric utilities formed the Utility Photovoltaics Group to promote and sponsor the installation of distributed PV systems across the country.

As many examples demonstrate, costs can be shaved from PV installations not only by tying them into the utility grid, but also by means of design features lower construction costs. Using the PV system as the building's weathering skin, for example, eliminates the need for an additional roof, thus displacing conventional building materials and labor costs.



BLOCK DIAGRAM OF UTILITY-INTERACTIVE PV SYSTEM



SPECIFICATIONS

SUNSLATE-SOLAR ELECTRIC ROOFTILE

ATLANTIS ENERGY
4610 NORTHGATE BLVD., STE 150
SACRAMENTO, CA 95834
PH: (916) 920-9500 FX: (916) 927-1697

CONTRACT NO.		
DRAWN BY TMG	DATE	
CHECKED BY		
DESIGNED BY		
DESIGN ACTIVITY		
CUSTOMER		

COMPANY: Atlantis Energy, Inc.

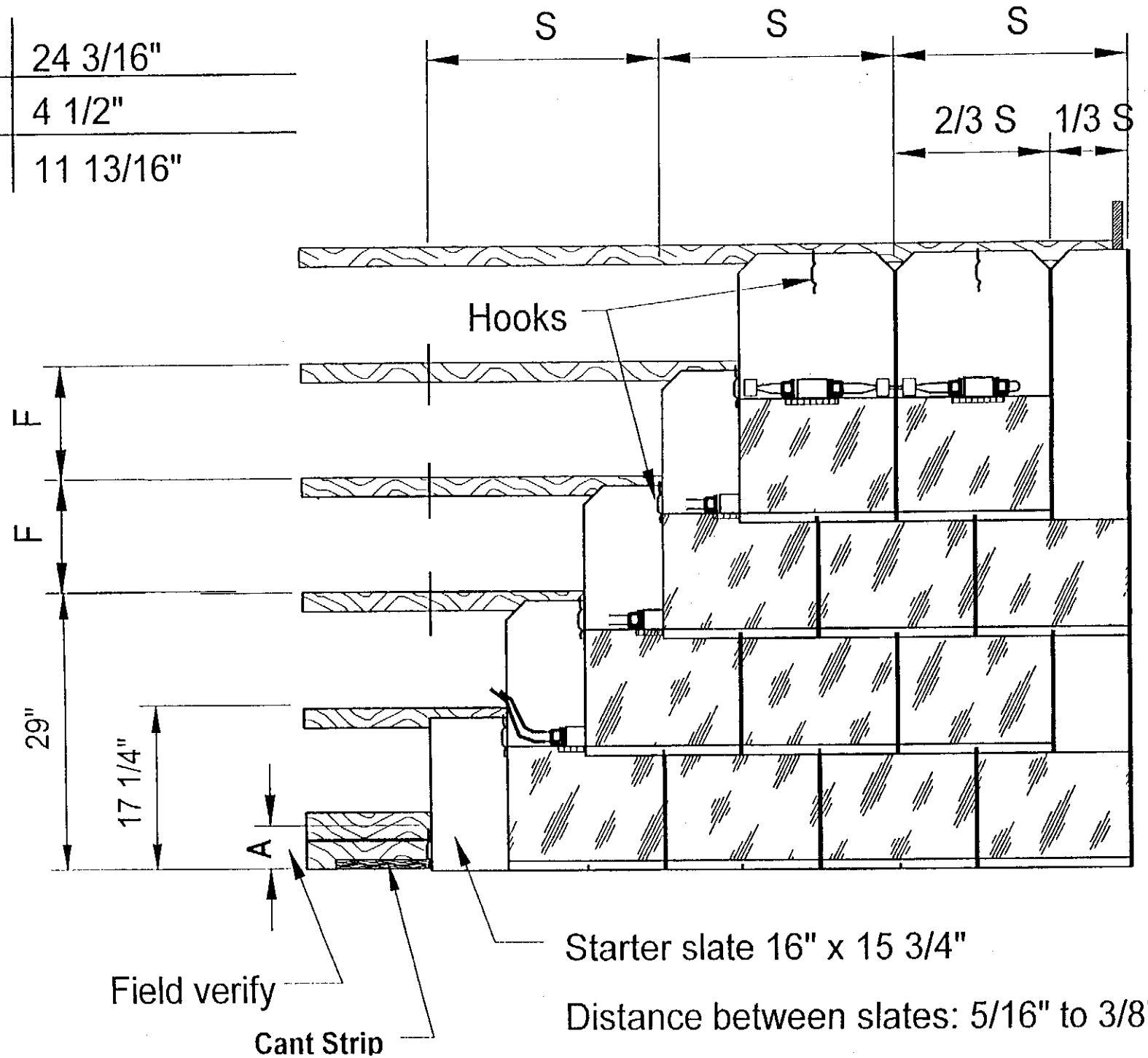
TITLE: SUNSLATE ROOF LAYOUT

SIZE	FSCM NO.	DWG NO. / FILE NAME
A		

SCALE	DATE	SHEET
NTS	SEP. 18. 97	1 of 1

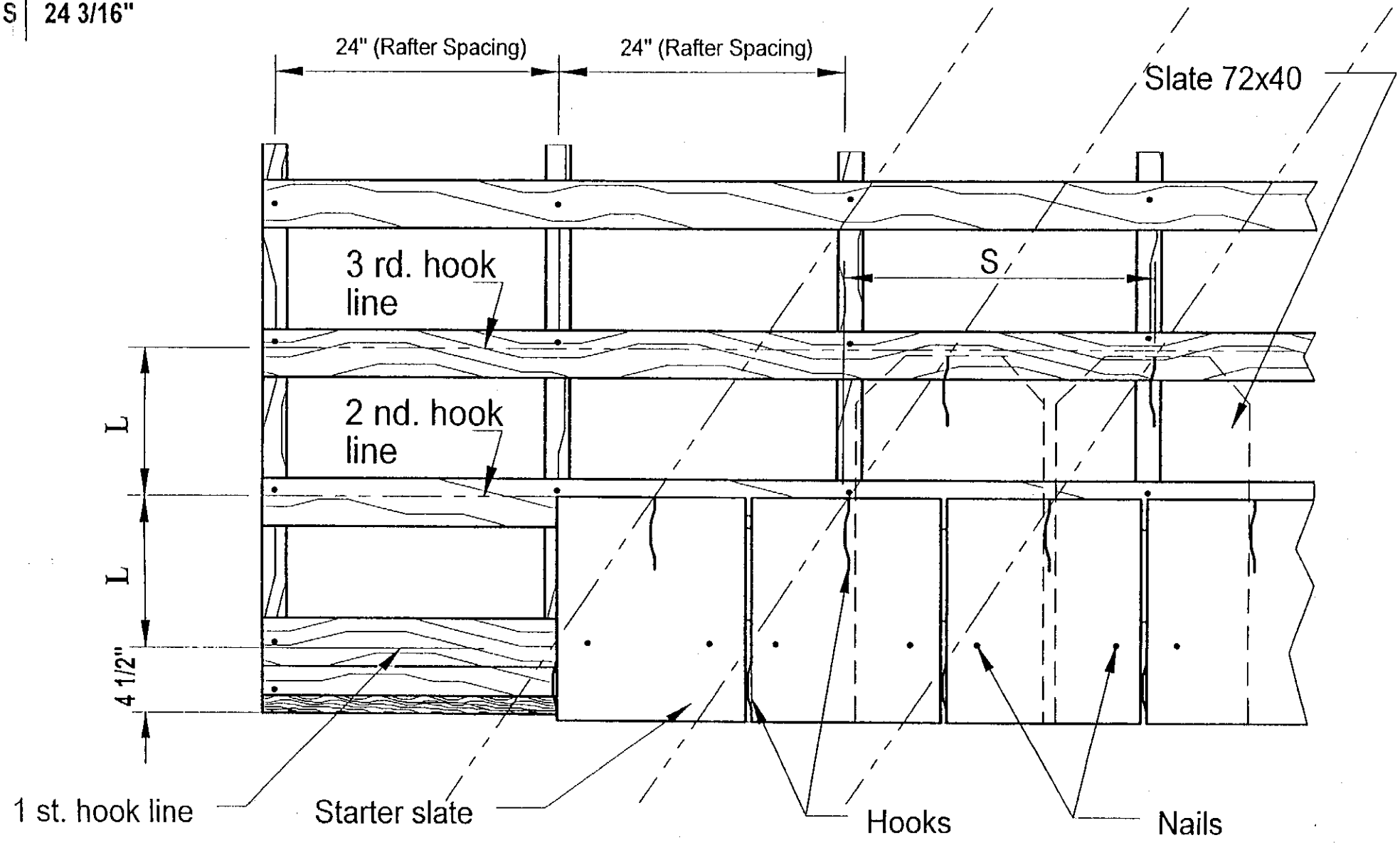
FRONT VIEW

S	24 3/16"
A	4 1/2"
F	11 13/16"



STARTERS

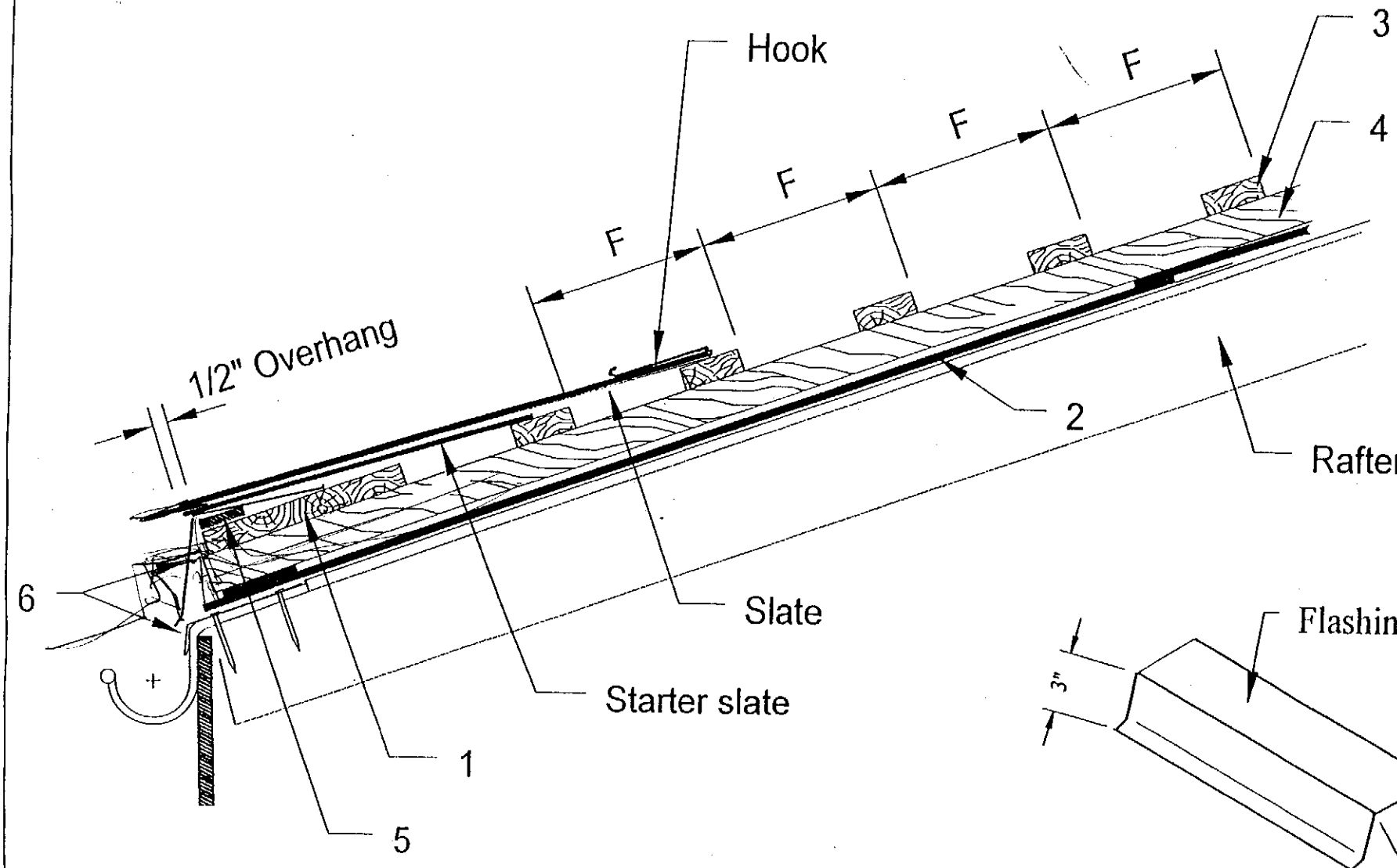
L	11 13/16" Exposure
S	24 3/16"



SIDE VIEW

F | 11 13/16"

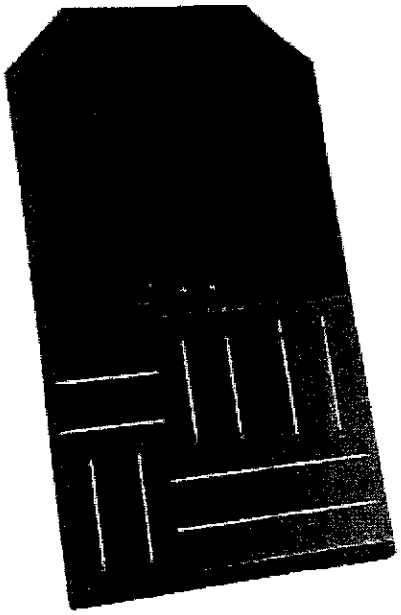
1. 1 x 8 or two 1 x 4 Batten
2. Roof sheeting and felt paper
3. 1 x 4 Horizontal Batten
4. 2 x 2 Vertikal Batten
5. Cant strip
6. Flashing



flashing angle = Roof tilt + 95

SUNSLATES™ INSTALLATION MANUAL

PART NUMBER # MN100



CAUTION:

- Startle reaction hazard.
- Do not install in wet or damp conditions
- Always keep SUNSLATES™ clear of debree
- Wear safety glasses when handling this product
- Exposed live parts until installation is complete.
- Use non-conductive ladders.
- Do not walk on SUNSLATES™
- Use insulated and appropriate Installation tools.

1. Introduction

Atlantis Solar Systems provides these guidelines for the installation of PV Roofing Slates to assist the applicator in effecting an efficient and workman-like application. Although this manual provides details for typical conditions encountered on slate applications, all application details are beyond the scope of this text. When encountering any conditions not illustrated in this manual, please contact Atlantis Energy, Inc. for assistance.

All materials utilized in the construction, including fasteners, flashing, felts, under laymen's and penetrations should be selected to provide the same life (50 year life time expected). The installer must use all of the electrical materials (SUNSLATES™, cables, junction boxes, inverters, connecting technique) specified in this manual and project documents. Artificially concentrated sunlight shall not be directed on the module. Failure to conform to these Installation Guidelines will void the Atlantis Energy or Eternit Warranty.

This product is Listed to applicable UL Standards and requirements by Underwriters Laboratories Inc.

UL LISTED 1703 Photovoltaic Module (**class A**)

UL LISTED 790 Roofing Material Fire Rating (**class A**)

2. SUNSLATES™ and SUNSLATES™ string (field) electrical characteristics

The electrical characteristics are within ±10 percent of the indicated values of Isc, Voc and Pmax under standard test conditions (1000 W/m^2 irradiance, 25 degC (77 degF) cell temperature and AM 1:5 spectrum). Under normal conditions, the SUNSLATE™ is likely to experience conditions that produce more current and/or voltage then reported at standard test conditions (output may vary depending on time of day, time of year, ambient conditions, ambient temperature and shading). Accordingly, the value of Isc and Voc marked on the SUNSLATE should be multiplied by a factor 1.25 when determining component voltage ratings, conductor ampacities, fuse size and the size of controls connected to the PV output.

2.1 SUNSLATE™ electrical characteristics

There are six (6) crystalline PV cells, connected in series, in each SUNSLATE™.

Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	12.20	2.90	3.60	4.21	4.70
AP-G	12.00	2.90	3.60	4.14	4.60
AP-F	11.80	2.85	3.55	4.14	4.40
SX-D	11.60	2.86	3.64	4.07	4.58
SX-E	11.00	2.82	3.63	3.93	4.39
SM-II	12.20	2.86	3.67	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

2.2 SUNSLATE™ string (field) electrical characteristics

When running a 48 Volts DC nominal utility-connected PV system, each series string (field) must have, either 18, 19 or 20 SUNSLATES™. Series fuse size @ 8 Amps per series string.

A string of 18 SUNSLATES™ in series

SUNSLATE™ Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	219.6	52.2	64.8	4.21	4.70
AP-G	216.0	52.2	64.8	4.14	4.60
AP-F	212.4	51.3	63.9	4.14	4.40
SX-D	208.8	51.5	65.5	4.07	4.58
SX-E	198.0	50.7	65.3	3.93	4.39
SM-II	219.6	51.5	66.0	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

A string of 19 SUNSLATES™ in series

SUNSLATE™ Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	231.8	55.1	68.4	4.21	4.70
AP-G	228.0	55.1	68.4	4.14	4.60
AP-F	224.2	54.2	67.5	4.14	4.40
SX-D	220.4	54.3	69.2	4.07	4.58
SX-E	209.0	53.6	68.9	3.93	4.39
SM-II	231.8	54.3	69.7	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

A string of 20 SUNSLATES™ in series

SUNSLATE™ Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	244.0	58.0	72.0	4.21	4.70
AP-G	240.0	58.0	72.0	4.14	4.60
AP-F	236.0	57.0	71.0	4.14	4.40
SX-D	232.0	57.2	72.8	4.07	4.58
SX-E	220.0	56.4	72.6	3.93	4.39
SM-II	244.0	57.2	72.8	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

2.3 Battery charging systems

The following configuration applies, one series string (field) will have:

12 Volts DC nominal **6 (six) SUNSLATES™ in series**

SUNSLATE™ Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	73.2	17.4	21.6	4.21	4.70
AP-G	72.0	17.4	21.6	4.14	4.60
AP-F	70.8	17.1	21.3	4.14	4.40
SX-D	69.6	17.2	21.8	4.07	4.58
SX-E	66.0	16.9	21.8	3.93	4.39
SM-II	73.2	17.2	22.0	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

24 Volts DC nominal **12 (twelve) SUNSLATES™ in series**

SUNSLATE™ Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	146.4	34.8	43.2	4.21	4.70
AP-G	144.0	34.8	43.2	4.14	4.60
AP-F	141.6	34.2	42.6	4.14	4.40
SX-D	139.2	34.4	43.6	4.07	4.58
SX-E	132.0	33.8	43.6	3.93	4.39
SM-II	146.4	34.4	44.0	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

48 Volts DC nominal **24 (twenty-four) SUNSLATES™ in series**

SUNSLATE™ Model	Pmax Watts	Vmax Volts	Voc Volts	Imax Amps	Isc Amps
AP-H	292.8	69.6	86.4	4.21	4.70
AP-G	288.0	69.6	86.4	4.14	4.60
AP-F	282.2	68.4	85.2	4.14	4.40
SX-D	278.4	68.8	87.2	4.07	4.58
SX-E	264.0	67.6	87.2	3.93	4.39
SM-II	292.8	68.8	88.0	4.30	4.72

AP = Astropower cell, SX = Solarex cell, SM = Siemens cell

Atlantis Energy recommends that all system components, including batteries and electronic devices be listed by a nationally recognized laboratory.

3. Tools and materials used for installing the SUNSLATES™ Roof.

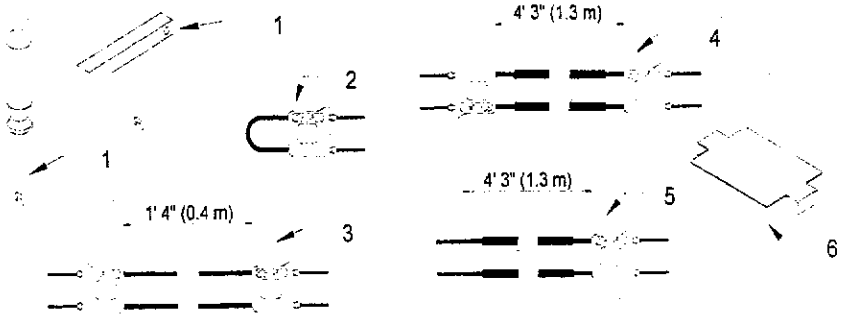


Figure 1

1. Connection opener
2. Bridge cable
3. SUNSLATE™ inner-connecting cable
4. SUNSLATE™ Twister cable
5. Field cable
6. Protection shield

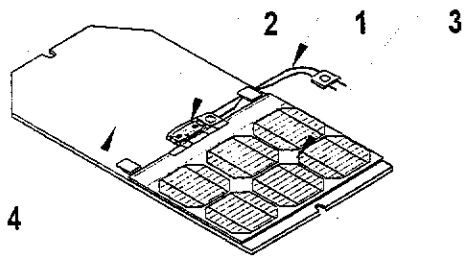


Figure 2

SUNSLATES ™
1. Interconnecting cable
2. Connection box
3. Solar module
4. Slate

Dimensions:	28 3/8"x 15 3/4"	77 ea. /100 Sq.Ft.
Exposed surface: 11 3/4 x 15 3/4"		

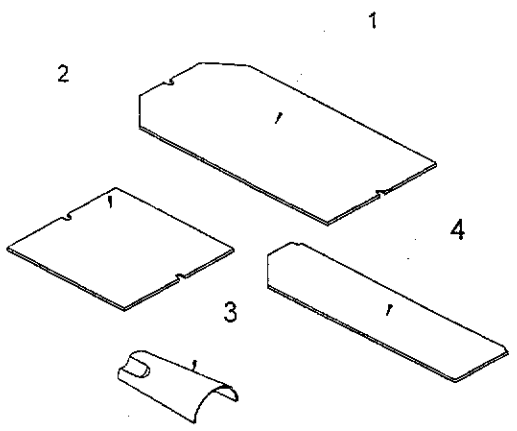


Figure 3

1	Slate	28 3/8" x 15 3/4"	77 ea./100 Sq.Ft.
2	Starter slate	18 3/8 "x 15 3/4"	77 ea./100 Sq.Ft
3	Ridge cap	17 5/8" x 7 3/4"	9 ea. / 10 ft.
4	Half slate	28 3/8" x 7 5/8"	

Hooks (125 mm) - 5"
Nails - 0.121" x 1" Galvanized steel or copper
Metal flashing
Wooden battens:
- 2x2 vertical batten
- 1x4 horizontal batten

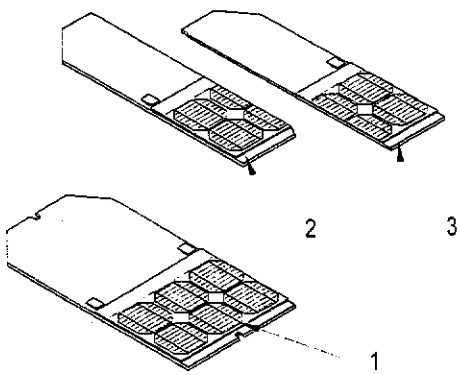


Figure 4

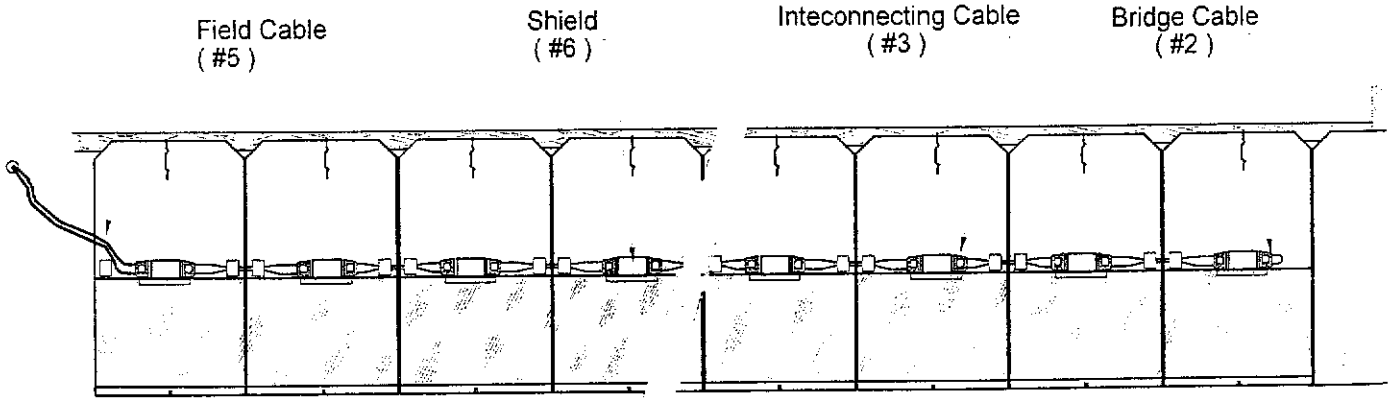
No Power SUNSLATES™ (NP) are used for aesthetic purposes. There is no electrical performance from the NP SUNSLATES™.
Figure 4

1. NP SUNSLATE™
2. Left NP SUNSLATE™
3. Right NP SUNSLATE™

4. SYSTEM

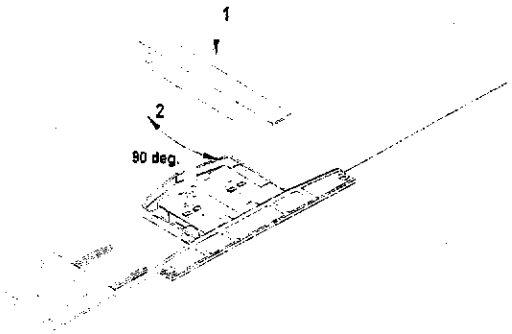
4.1 Field (String) - The building (roof) on which the SUNSLATES ™ are installed is setup from SUNSLATE fields (strings). All the fields are installed with an equal number of SUNSLATES ™ in them. The field has a beginning (bridge cable) and an end (field connecting cable). When installing the field, always start (first SUNSLATE from the string) with field connecting cable (which goes through the roof into the building) and end with the bridge cable. The "System Design" document (see appendix 2), will show how many fields are needed and the position of every field.

Reference part list fig.1 sec.3



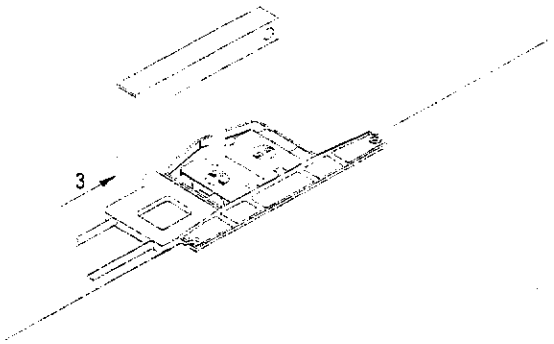
SUNSLATE™ Field (String)

4.2 SUNSLATES ™ connections.

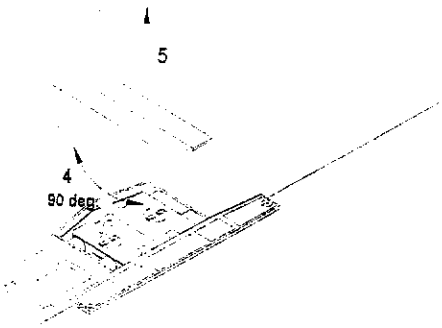


To open connector

1. Place the tool in the connection box
2. Turn the tool 90 degrees. **OPEN**

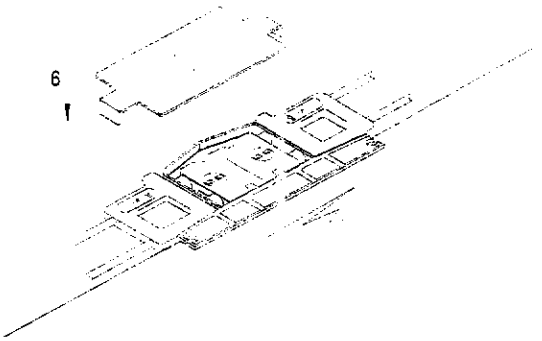


3. Place the cable in the connection box
   Be sure to fully seat connector.
   Gasket at base of pins must snap in.



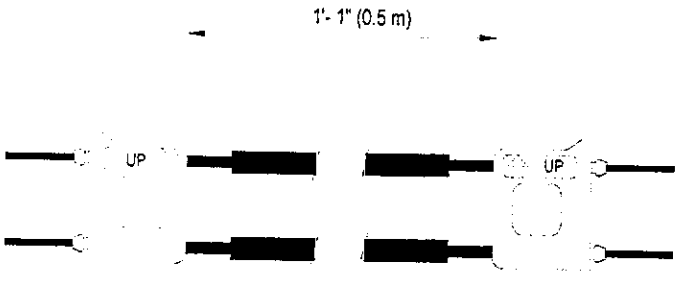
To close connector

4. Turn the tool 90 degrees. **CLOSED**
5. Remove the tool.



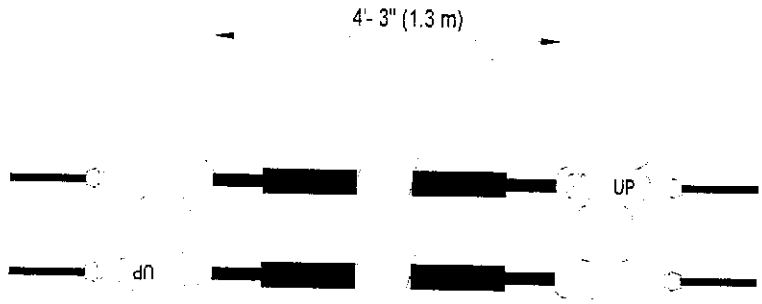
6. After the connectors are closed, place the shield over the connection box and push it down, firmly seating the shield.

4.3 SUNSLATE™ to SUNSLATE™ horizontal cable (SUNSLATE™ inner-connecting cable)



The number of SUNSLATES ™ in the field will be specified in the "System Design" document (see appendix2) for the particular project (the most common number of SUNSLATES ™ in a field is 18, 19 or 20 for crystalline cells). One SUNSLATE includes the interconnecting cable for the connection between the modules.

4.4 Rows to row cable - Twister cable



The function of the Twister cable is for row to row Connections inside the SUNSLATES™ field. We use the Twist cable when one field does not fit in one row and has to be connected with the next row (figure 4) of SUNSLATES™. (The roof plan shows the row to row connection location).

Before installing the next row of SUNSLATES™, the installer has to check that all of the connection boxes are in a closed position, and check the field voltage (see field checking example sec. 5 - page 9).

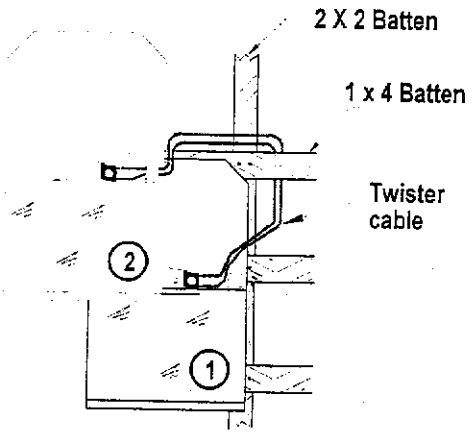
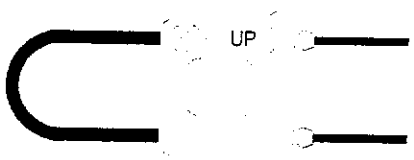


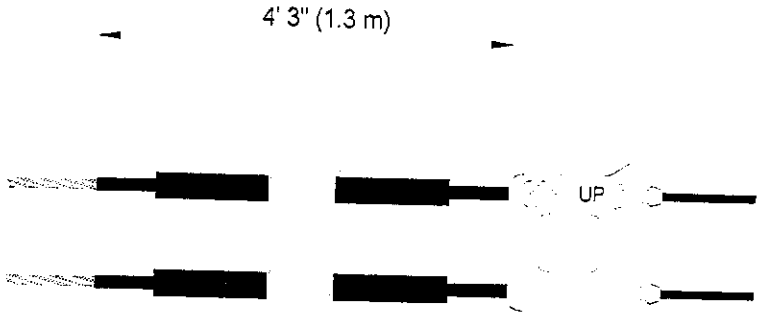
Figure 4

4.5 Bridge cable



The function of the Bridge is to close the electrical circuit of the SUNSLATES™ field. It is connected to the first SUNSLATE™ of the field.
The Bridge is also used for field testing (see point 5).

4.6 Field to junction box connection



The field cable is placed at the beginning of the field (the first SUNSLATE™) and after checking the field voltage (see field checking example - page 4) the cable is placed through a hole (min ⌀ 0.5") on the roof - then the installation of the next field may begin. The field cable has two wires – a positive and a negative end.
Custom (longer) field cables may be designed if roof penetrations are impossible, or if only one roof penetration is needed.

All cables for the installation (inner-connecting cable, bridge cable, twister cable and field cable) supplied by Atlantis are: 14 AWG, single conductor, stranded, double insulation, sunlight resistant, type UF (UL) 600 Volts

The home run cable (from junction box to inverter) is to be type THHN, NM-B* or similar.
All cables are to be chosen referring to the NEC for the given installation environment.

Size AWG	Maximum length (two conductors)* Feet
12	34
10	50

- based on 1.3% Power loss @ 149°F per series field
- If longer cables are needed please contact Atlantis for assistance

The electrician will make the connections under the roof (in the building). The field cable, which has been placed by the roofer through the hole on the roof, has to be connected in a junction box (via terminal strips, 10A) to a standard NM-B* nonmetallic sheathed cable. That cable must be connected in the inverter. Seal the hole in the roof from the inside with the fire stopping expanding foam or silicon seal. (**figure 5**)
The fire stop sealant shall be a one-part, neutral curing silicone sealant. The sealant shall be completely water resistant and shall contain no solvents nor inorganic fibers of any kind. The through-penetration fire stop sealant shall allow movement of ±25% and shall be UL Classified and/or FM Systems Approved and tested to the requirements of ASTM E814 (UL1479). Recommended silicon sealant Pensil® 300 (PEN300).

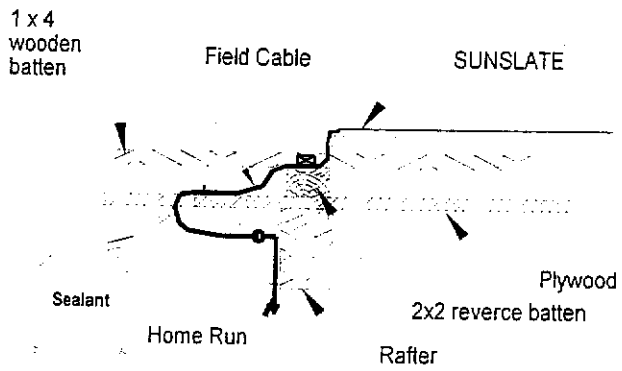


Figure 5

The field cable has to be secured with a cable clamp, for strain relief, on to the nearest 2x2 vertical batten.
The electrician (installer) shall refer to section 690-8 of the National Electric Code for an additional multiplying factor of 125 percent (80 percent derating) which may be applicable.

CAUTION! Do not connect more than three (3) field cables in parallel before inverter (if needed contact Atlantis Energy for support). Make sure that the DC positive goes to the positive terminal of the inverter and the DC negative goes to the negative terminal of the inverter. Test the field polarity prior making any connection.

* **Refer to NEC for cable type in given environment. If different cable type is to be installed contact Atlantis for assistance.**

5. Field checking (Row-Checking).

The most common error made is that the SUNSLATES™ connection box is not in a closed position. The installer must perform row - checking to insure that each SUNSLATES™ connection boxes are closed and making electrical contact. Every field must be checked for open circuit voltage before the row is covered.
Checking is performed using a simple DC voltmeter:
Determine the open circuit voltage (Voc) shown in the "System Design" document (see appendix 2)" on the first page. The most common Voc for crystalline cells is 3.7 [VDC], however, that number may change as the SUNSLATE™ temperature change. Therefor, when we measure the fields, we must be sure that all the fields Voc are the same or the difference is not greater than 3 [VDC]. Shadows from instruments or cables over the SUNSLATE™ will cause the voltage to drop, be sure that there are no shadows when testing the field.

Example:
If one field is 20 SUNSLATES ™ in series, the Voc = 3.7x20 $\pm$ 3 [VDC] = 74$\pm$3 [VDC]
If all the fields have Voc= 74 [VDC], then everything is properly connected. If one of the fields has Voc= 70 [VDC] and all the others have Voc= 74 [VDC], then one SUNSLATE is badly connected and the roofer has to go back and check the bad field for 1) a junction box which is not closed or 2) a bad SUNSLATE. If the bad field does not give any Voc then there is a bad connection in the field and the series circuit is not closed.

To find the bad SUNSLATE the easiest way is to start checking the field by dividing it by two (disconnect, put a bridge cable on the left part and check the voltage of that part). You have to calculate the Voc for all the variations.

Example 20 SUNSLATES ™ Voc=74 [VDC]
5 SUNSLATES ™ Voc =18.5 [VDC]
2 SUNSLATES ™ Voc =7.4 [VDC]
10 SUNSLATES ™ Voc =37 [VDC]
3 SUNSLATES™ Voc =11.1[VDC]
1 SUNSLATES ™ Voc =3.7 [VDC]

6. SUNSLATES™ Roofing Product Information

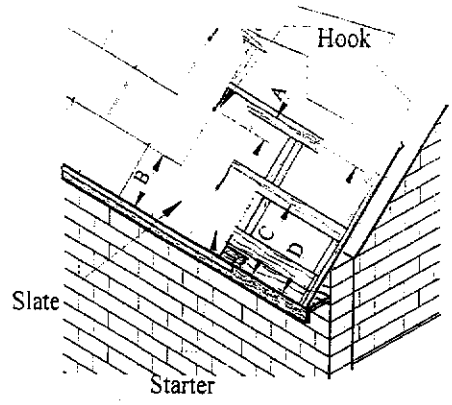


Figure 7

	Eternit Slate	SUNSLATE™
Headlap (A)	5"	5"
Exposure (B)	11 13/16"	11 13/16"
Starter Height (C)	16 1/2"	16 1/2"
Slate Height (D)	28 3/8"	28 3/8"
Storm Anchor Location (Hook) (E)	7 7/8"	7 7/8"
Slates/Square	77	77
Weight/Square	500 lbs.	720 lbs.
Slates/ Crate**	56	22
Squares/ Crate**	0.73	0.28
Weight/ Crate**	380 lbs.	230 lbs.

The crate dimensions are **2'-6" x 1'-2" x 1'-6" (LxWxH).

DO NOT INSTALL OR HANDLE SUNSLATES™ IF SURFACE IS WET OR DAMP

7. STORAGE AND HANDLING

7.1 Storage

The **SUNSLATES®** and roofing slates are delivered in crates.
The crate dimensions are 2'-6" x 1'-2" x 1'-6" (LxWxH).
Store Eternit Slates and **SUNSLATES®** in a clean, dry, well ventilated area protected from the weather and other trades. As soon as the slates have been delivered and stored under cover, split the plastic wrap to allow for ventilation to prevent excessive water condensation. If the slates should get wet in storage, efflorescence is likely to occur. Mild efflorescences of the slates will usually disappear over a period of time. Severe efflorescences may require special treatment. Contact the Technical Department at Eternit Inc. or Atlantis Energy Inc. for details.
Do not handle SUNSLATES™ in rainy or wet weather conditions (water is not allowed in the connection box before installing the SUNSLATES™).

Cutting Tools

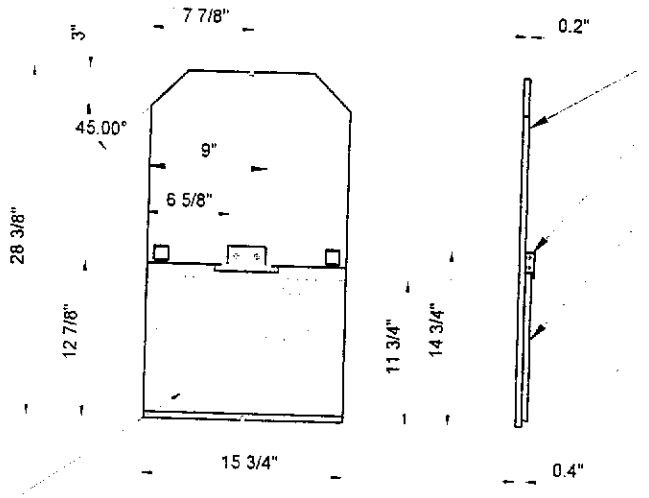
Unlike other mineral fiber cement slates, Eternit Slates can be cut and punched with a slater's hammer.

For rapid and efficient cutting, punching and notching, a portable slate cutting machine may be utilized. Interior cuts in the slate can be accomplished with a pin punch and hammer. Individual slates can be faced,scored and snapped over a straight edge. Eternit Slates can be field cut to provide an interesting feature to the completed roof utilizing a slater's cutter.

7.2 Uninstalling and replacing a SUNSLATE™

Before disconnecting the SUNSLATE™ the DC disconnect switch at the inverter must be in OFF position. Bend the hook which holds the slate at the bottom with the roofers hammer, then slide the slate down until you see the SUNSLATE™ junction box. Open the connectors and pull out the inner-connecting cables, the SUNSLATE™ will then slide down and can be removed. Replace with new SUNSLATE™ by sliding it up between the slates and then connect the inner-connecting cables (see 4.2). The hook has to be then bent back to secure the slate.

8. Application



Mono or polycrystalline solar cells

SUNSLATES ™ are a roofing and façade material, which uses solar energy to produce electrical power for the building's use. SUNSLATES ™ are composed from 1) a solar module, 2) connection box and 3) *Eternit* slate. The solar module and the connection box are laminated together and then glued to the surface of the slate. SUNSLATES ™ are installed by the technique (double overlap system) provided from the *Eternit* Company. SUNSLATES ™ are a light concrete roofing material and have passed all of the roofing tests made by the *Eternit* Company.
SUNSLATES ™ are a UL listed product.

Installation of the double overlap system
The double overlap system is a method of cladding thin panels fixed to battens. This method of cladding is characterized by the fact that at every point on the surface there are at least two layers of slate.
To get a good water and airtightness, an underlay of roofing-felt, battens and counter (reverse) battens are necessary.

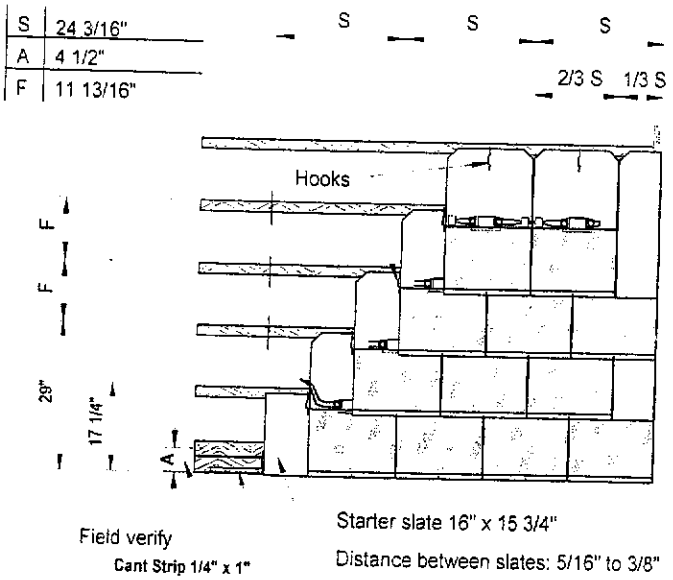
Roofing Felt
One layer of 30 lb. felt. In some areas an underlayment of an approved modified bitumen or other high performance underlayment may be desired as an upgrade.

Reverse Battens:
Fix battens to conform to chalk lines securing at not more than 24" on center using 0.121" x 1 1/4" corrosion resistant nail or #10 x 1 1/2" plated deck screw.

Battens:
Fix reverse battens to conform to chalk lines securing at not more than 11 3/8"on center using 0.121" x 1 1/4" corrosion resistant nail or #10 x 1 1/2" plated deck screw.

FRONT VIEW

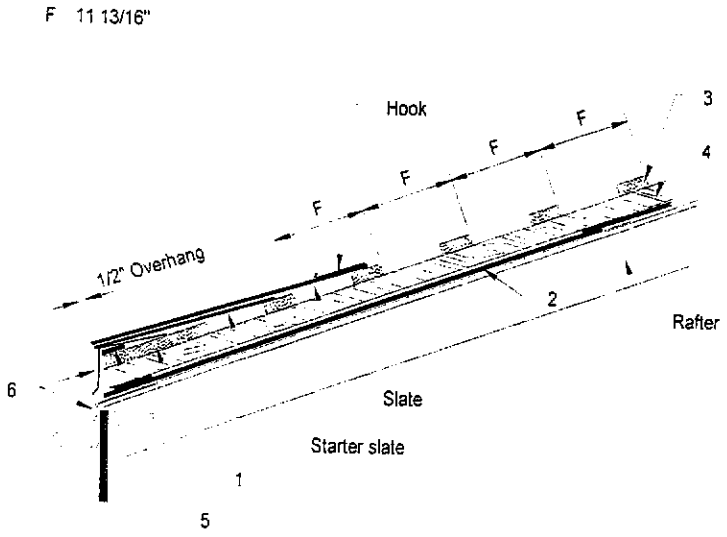
S	24 3/16"
A	4 1/2"
F	11 13/16"



Field verify
Cant Strip 1/4" x 1"

Starter slate 16" x 15 3/4"
Distance between slates: 5/16" to 3/8"

SIDE VIEW



For every whole slate/ SUNSLATE there has to be one hook.
The half or cut slate and the slates, which are on the edges of the roof/façade, have to be nailed or screwed to the battens.
Do not nail the SUNSLATE unless they are cut or are placed on the edge of the roof.
The hook must be nailed directly to the battens. If the hook has a tilt in the battens direction the space between slates will get bigger with every next slate.
If the row is not straight, use a chalk line to mark the position of the hook.

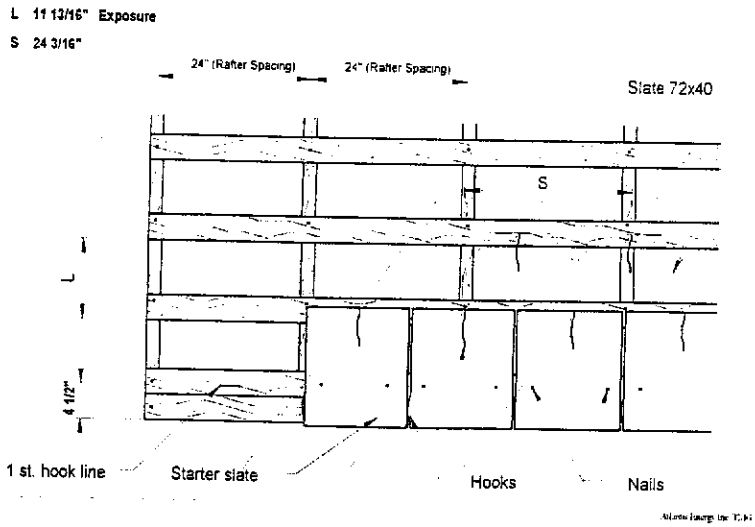
1. Starter batten - 1x8 or two 1x4
2. Plywood – 5/8 or 1 /2 CDX
3. Batten – 1 /4
4. Reverse batten – 2x2
5. Cant strip
6. Drip edge

Every slate on the roof has to be strengthened by a hook.

Fixing the starters and the first course

The starter slates and first row of hooks are the most important to ensure an aligned roof. The eaves course slate is a full slate whose length has been reduced by the gauge, i.e. actual length of eaves course slate is gauge plus lap. The starter course slate is secured by two nails and a hook on the top. Before installing the whole row, make sure that the hook line, for the hooks between the starters, is marked with chalk line. The distance between the slates must not be smaller then one hook thickness and not bigger then 1¼ hook thickness. After installing the starters measure the straightness of the first row of hooks with a chalk cord and a waterlevel.
The first course has to be installed using the first row of hooks and then nailing the slate hook.

STARTERS



ATLANTIS ENERGY, Inc. TMG. ©1999
4610 NORTHGATE Blvd. 150, SACRAMENTO, CA 95834
TEL: 916 920 9500, FAX: 916 927 1697, e-mail: support@atlantisenergy.com

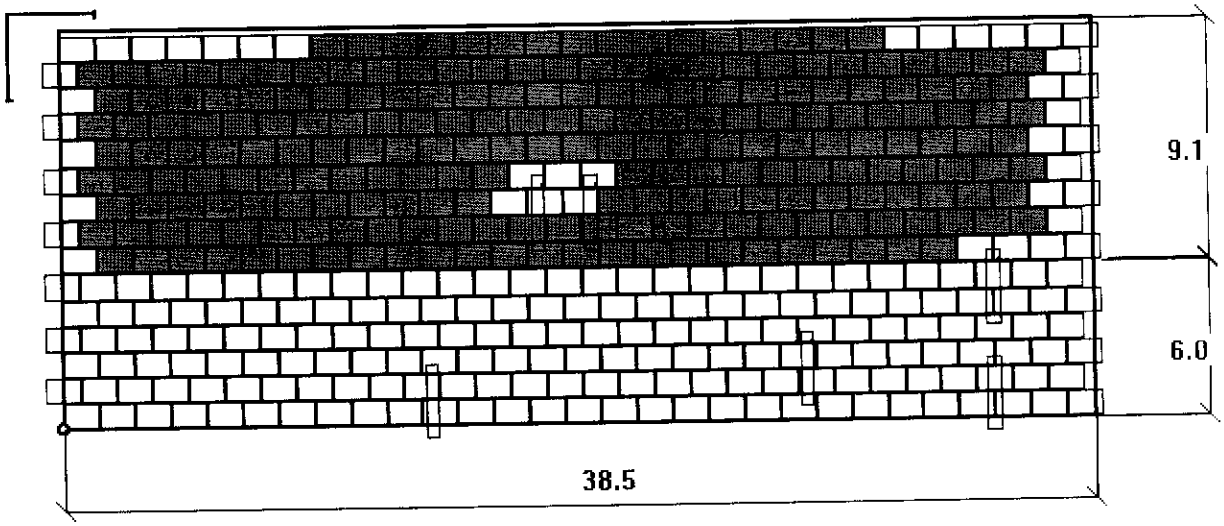
ATLANTIS ENERGY Inc.

Project Name: Gary K.

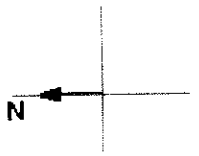
System Design

Offer S-01.09.s1

0107860



Total installed power DC @ STC:	2,645	[W]
Total installed power AC @ PTC:	2,000	[W]
Sunslates surface:	284.2	Sq.Ft.



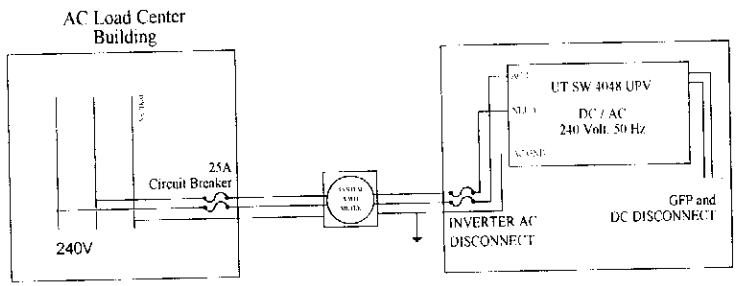
Orientation
90.00° from South

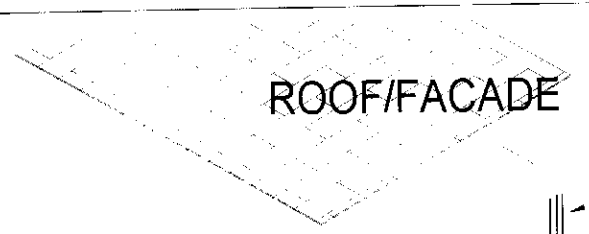
4610 NORTHGATE BLV. 150, SACRAMENTO CA95834, Tel:916 920 9500 Fax: 916 927 1697 e-mail:Atlantis@gv.net

s1

9/6/01

File:kubadero.atl





SUNSLATE Field Cables
From Fields to Inverter

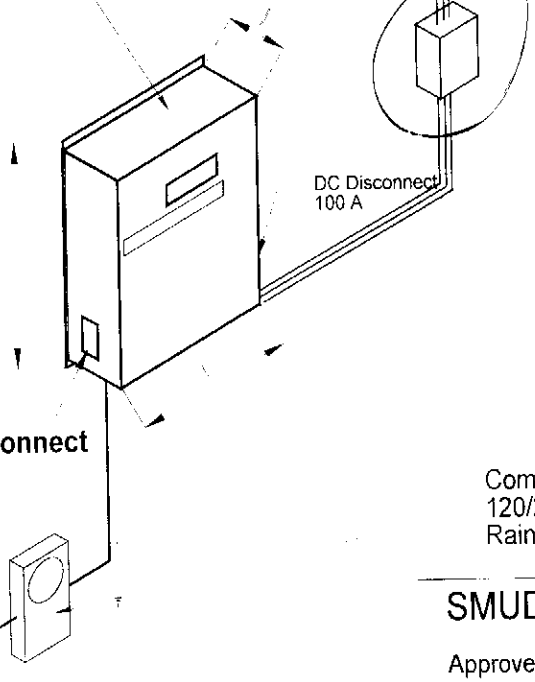
Cable type: TC
THHN or THWN
SUN RES, DIR BUR
AWG #12

Required

DO NOT COMBINE CABLES

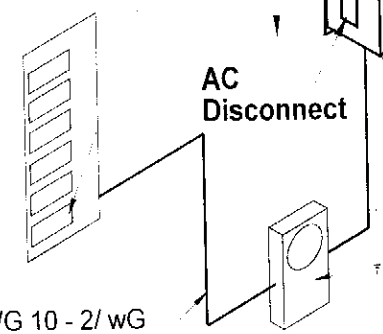
TRACE UT SW 4048 UPV
240 VAC, 50 Hz
PV-GFP: 100ADC, 125 VDC

Pull Box (optional)
The cables from the roof are to be spliced in the box to a #12 AWG THHN or TWHN cable
Metal box has to be grounded



Pre-installed #12 AWG indoor cable
Conduit is required if cables are installed outdoors

Distribution panel
25 [A] two pole Breaker



All cableling shall be installed refering to the NEC.
For installation instructions refer to part producer recomendations.

All cables from Roof penetration to inverter and from inverter to sub panel are located indoor

For Installation Refer to:
Inverter Owners Manual (Part#2031-6)
SUNSLATES Installation Manual (Part# MN100)

AWG 10 - 2/ wG
THHW or THWN

Combination Service Entrance Device
120/240 V ~, 100A (No Disconnects)
Rainproof Type 3R Enlosure Surface Mount

SMUD APPROVAL:

Approved by:_____

CONTRACT NO			
DRAWN BY	Todor Galitev	DATE	
CHECKED BY			
DESIGNED BY	Todor Galitev		
DESIGN ACTIVITY			
CUSTOMER			

COMPANY **Atlantis Energy, Inc.**
4610 Northgate Blvd. 150, Sacramento CA 95834. FAX:916 927 1697

TITLE Electrial System for SW4048 - 240 VAC

SIZE	FSCM NO.	DWG NO. / FILE NAME
		06SMUD00 - 015 - 101

SCALE | DATE | SHEET 1 of 1

SCHOEN ENGINEERING
9524 BEDINGTON WAY
SACRAMENTO, CA 95827
(916) 369 6866
Licensed by the California State
Board for Engineers and Land Surveyors
LIC.# C042913

July 16, 2001

Jerry Ragsdale
Milestone Exteriors
9647 Folsom Blvd.
Sacramento, CA 95827

SUBJECT: Installation of "Sunslates" at 34 Rollingbrook Circle, Sacramento, CA 95833

Jerry:

On July 5th 2001 I inspected the roof structure of the residence at the above mentioned address. The second story roof was made up of metal plated trusses with 2x4 Douglas fir No. 2 top chords @ 2' o.c. spanning 20' from plate to plate. The trusses were 4-panel trusses and there was a "W" truss configuration and a Howe truss configuration with a vaulted bottom chord. The roof slope was 4:12. The area to receive the "Sunslates" was the West slope of the second story from the ridge down 9'.

I certify that this structure is adequate for the following : ½" plywood or OSB installed over the existing skip sheathing; 30lb. tarred felt; 1x2 batts; "Sunslate" tiles weighing 7.5 lbs./sq.ft. In the West slope of the second story roof.

NOTE: it is possible when reroofing that the increased load to structural elements also supporting wall, ceiling and floor finishes could cause some minor cosmetic cracking of these finishes. This is typical of wood framed structures and does not of itself indicate structural inadequacy of these members.

This report deals with the structural adequacy of roof supporting members that were readily observable. It does not address any structure that was covered by wall finishes, buried in the ground or was otherwise not observable. Any such structures were assumed to conform to standard construction specifications in the Uniform Building Code. Also, it does not address any existing deflection or warping of roof surfaces, nor is it guaranteed that any structural modifications that may be listed in this report will remove such deflections or warping. The repair of such deflections or warping to improve architectural appearance is at the option of the building owner and the roofing contractor.

I would like to thank you for allowing me to provide my services in this matter. Please let me know if I may be of further assistance.

Sincerely,

Mark S. Schoen P.E.

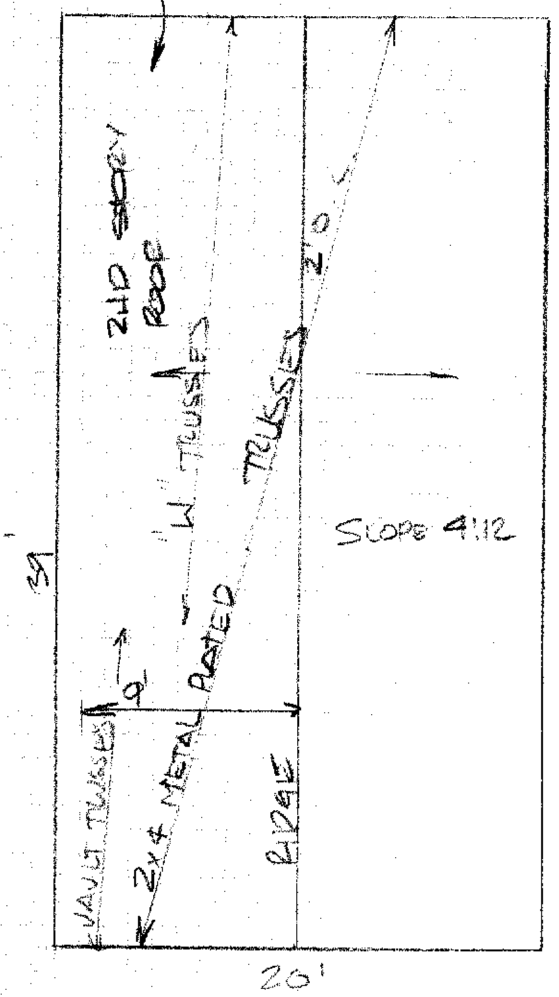
MSS:mss
S-ENG2001\MIEX001.001

10/12/01

0107860

NOTE: OVERHANGS
NOT SHOWN

THIS SLOPE TO RECEIVE SUNSLATES
FROM RIDGE 9' DOWN FULL LENGTH
OF 2ND STORY



2ND STORY ROOF PLAN
FOR:

34 ROLLINGBROOK CIRCLE
SACRAMENTO, CA 95833