

Miller Power & Communications

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December 17, 2003

Pacific Valley School
69325 Highway 1
Big Sur, CA 93920

Dear Sirs or Ms.:

John Ewan at Pacific Energy contacted me and requested I prepare a bid for upgrade of the off-grid power system at Pacific Valley School. To expedite the process, I did not have the opportunity of make a site visit. Although I have worked on your system once in the past, I was working only on the AC side of the system, completing a specific repair. Therefore, I have not surveyed the DC side of this system. I am relying on photos and descriptions from John Ewan and your web site. As such, this estimate will need to be verified by site inspection. That being said, I have completed an exhaustive design so I am fairly confident that we can perform the work for the price specified.

I was surprised to learn that the photo voltaic system was installed without charge control. This is completely contrary to industry standards. This wastes energy at night and risks damaging the battery array. It is not known to me if proper over-current protection is provided between the batteries and the PV modules, but this is essential and will be provided by the equipment we will install. Furthermore, the National Electrical Code section 690.9 requires fusing of series strings of modules. This is essential for safe operation of any PV system and will be part of our installation.

In the process of installing the combining and control system we are assuming we will need to install new conduit, and that is included in the bid. Older, none series fused systems use different conduit routing than will be required for the combiner system we will be installing.

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The NEC section 690.5 requires ground fault protection on dwelling units. We have seen first hand how one pinched wire can cause an electrical fire. We feel that the ground fault requirements for residential wiring should apply to public schools. Our upgrade will provide that protection. We have more information of a technical nature on our web site pertaining to ground fault protection of PV arrays on roof installations at: http://www.kcbx.net/~wrmiller/ground_fault.html.

In summary, safety is our number one product and we have ample experience in providing safe installations.

Below is the bid requested for installation of a Solar Electric system. The parameters for the bid are:

1. Scope: Installation of combiner and charge control system for 72 M53 modules to bring that part of system to code and safety compliance.
2. Client will provide all equipment specified by Pacific Energy Company.
3. We will design and install a complete system. This includes all labor and transportation of equipment, all materials including all conduit, wire and electrical material, complete documentation of system and training.
4. Equipment should be warranted by vendor. We will charge standard rates for removing and replacing warranty repaired equipment.
5. Special Considerations: Below are listed any factors that affect this bid:
 - We need to first remove old wiring before we can begin the new wiring.
 - Client will assist us in formulating a work plan that allows us to do the majority of the work during daylight, weekday hours without compromising on safety of student or staff.
 - It would greatly assist us if we can park our service vehicles close to the work site.
 - We will need to interrupt power only briefly and this can be arranged for when classes are not in session. Solar charging may be unavailable for 48 to 72 hours, but generator charging will always be available.

We can do the above described work for the price of \$5,600.00.00. We will require the following payments:

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Before commencing work:	\$1,680.00	(30%)
Upon completion of work:	\$3,360.00	(60%)
After building inspection:	\$560.00	(10%)
Total:	\$5,600.00	(100%)

(This bid expires in 30 days.)

A note about our work style: We are committed to paying very careful attention to detail. We are installing a system that could be a fire hazard (like any other electrical system), a roof leak hazard or could cause the inconvenience of a power failure. We take these considerations seriously and have the experience to install a system that will virtually eliminate these risks and work dependably for you for years to come. We have many references should you wish to review them. Some photographs of our installs are available for viewing on our web site, the address is on our letterhead.

Thank you for your interest. Please let us know if you have any questions.

Sincerely,

William Miller
