National Renewable Energy Laboratory

Memo

To: Daryl Myers and Thomas Stoffel

From: Afshín M. Andreas

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Subject: Calibration of SRRL Baseline Measurement System (BMS) Global UV-Total Radiometers
Instruments: Eppley TUVR s/n 33444

NREL PV Radiometric Measurements Task monitored the millivolt output of one (1) BMS Global UV-Total Radiometer while measuring the spectral distribution of natural sunlight in global horizontal incidence mode on 12 September 2006 from 280 nm and 400 nm using an Optronic Laboratories OL-756 (double monochromator UV spectroradiometer). The millivolt output from the BMS Radiometers were recorded by the BMS CR23X datalogger.

The OL-756 spectrometer calibrated against NREL's National Institute of Standards and Technology (NIST) Standard of spectral irradiance F407 on 12 April 2006. Spectral data was corrected based on measurements of the EKO portable light source made on April 12 and September 12, 2006, which was on average of about 5% increase across all wavelengths.

The spectra were integrated between 280 nm and 400 nm to produce the total power under each spectral distribution. All data were used to compute the calibration factors shown in Table 1.

Table 1. September 12, 2006 NREL Global UV-Total Calibration Summary

Time (MST)	Spectrum W/m^2	TUVR mV (avg.)	$W/m^2/mV$
11:53	48.77313	6.71572	7.2625
11:55	48.51086	6.69766	7.2430
11:57	48.21495	6.68204	7.2156
11:59	48.11689	6.68356	7.1993
12:01	48.01226	6.68280	7.1845
12:03	47.81489	6.69402	7.1429
12:05	47.58374	6.66338	7.1411
12:07	47.34627	6.66110	7.1079
		Avg.	**7.187**
		Sigma	**0.0536**

UNCERTAINTY

The estimated uncertainty in the OL-756 spectral irradiance calibration is ±4.0% from 300 nm to 400nm. The accuracy of the CR23X data logger was about 0.8%. Estimated uncertainty in the derived calibration factor is ±4.8% (limit of error). Spectral data is plotted on the back of this sheet.

Figure 1. Measured Spectral Distributions indicated by OL-756 UV Spectroradiometer 12 Sept 2006