**NREL**

National Renewable Energy Laboratory

Memo

To: Daryl Myers and Thomas Stoffel
From: Afshín M. Andreas
Date: 18 April 2008

Subject: Calibration of SRRL BMS Photometric Sensors
Instruments: Licor LI-210 s/n PH7994 (BMS Global Horiz.).

NREL PV Radiometric Measurements Task monitored the millivolt and count output of one (1) SRRL LI-210 Photometric Sensor while measuring the spectral distribution of natural sunlight in global horizontal incidence mode on 14 April 2008 from 300 nm to 1100 nm at 2nm intervals using a LICOR LI-1800 Spectroradiometer. The millivolt output from the BMS sensors were recorded by the BMS CR23X data logger.

The LI-1800 S/N PRS-158 spectrometer was calibrated against NREL's National Institute of Standards and Technology (NIST) Standard of spectral irradiance F571 on 7 April 2008.

The LI-1800 has a command ("IL") to automatically integrate the data between 370 and 790nm using the CIE standard photopic response curve and display the result in the units of lux. All data used to compute the calibration factors shown in Table 1.

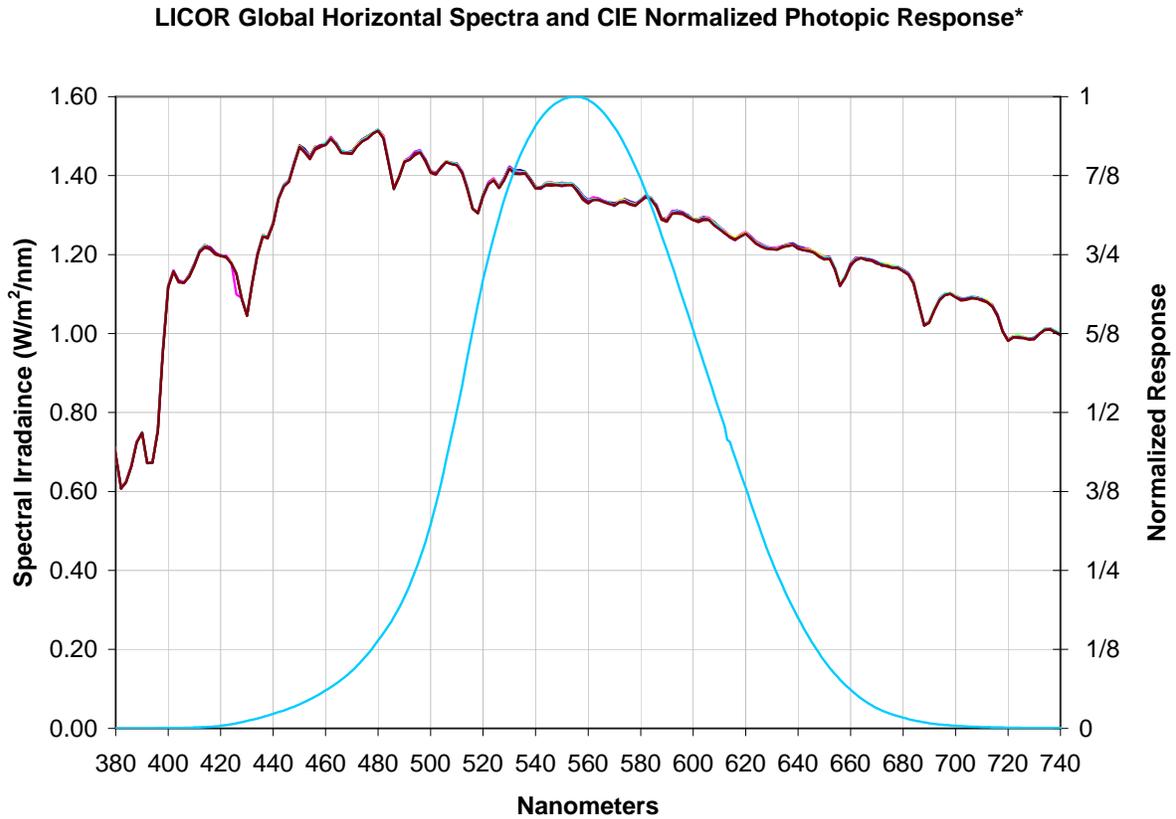
Table 1. April 14, 2008 NREL Photometric LI-210 Calibration Summary

Time (MST)	LI-1800 IL klux	PH7994 mV (avg.)	klux/mV CF
12:39	98.13	-19.8221	-4.9505
12:40	98.14	-19.8124	-4.9535
12:42	98.04	-19.8084	-4.9494
12:43	98.00	-19.8026	-4.9489
12:45	97.88	-19.7830	-4.9477
12:46	97.79	-19.7596	-4.9490
		Avg.	-4.950
		Sigma	0.0020

UNCERTAINTY

The estimated uncertainty in the LI-1800 spectral irradiance calibration is $\pm 4.0\%$ from 370 nm to 790nm. The accuracy of the CR23X data logger was about 0.8%. Estimated uncertainty in the derived calibration factor is $\pm 4.8\%$ (limit of error). Spectral data is plotted below.

Figure 1. Measured Spectral Distributions indicated by LI-1800 Spectroradiometer 14 April 2008



*Note: LI-210 response curve follows CIE very closely as shown below:

