



Figure 11.10 Cross-section of the SEA Corporation extruded lens linear Fresnel module. Reproduced from Kaminar N, Curchod D, “SEA 10X Module Development”, Presented at 1990 DOE/Sandia Crystalline Photovoltaic Technology Project Review Meeting (1990) with permission by Sandia National Laboratories

envisioned as a final push to jump-start a concentrator industry. Eight research contracts were let, four in cell development and four in collector development. The program was split between two low-concentration, linear-focus approaches and two high-concentration approaches. The low-concentration approaches were pursued by Entech, further refining the previous work they had done, and by SEA Corporation (later Photovoltaics International). SEA Corporation had developed an innovative extruded Fresnel lens, shown in Figure 11.10, which promised further cost reductions [21]. This lens is domed similarly to the Entech lens, and has therefore similar benefits.

The two high-concentration point-focus modules were developed by Alpha Solarco of Cincinnati, Ohio, and Solar Kinetics of Dallas, Texas. Both used modules similar to the Sandia Baseline 3 module, shown in Figure 11.9.

The high-concentration cell contracts were to Applied Solar Energy Corporation (ASEC), Spectrolab, and SunPower Corporation. SunPower was a new company created to commercialize concentrators based on the point-contact cell developed under EPRI funding described below. ASEC and Spectrolab adapted for concentration use the passivated emitter rear contact (PERC) cell developed by the University of New South Wales. Solarex worked on adapting the buried contact cell process from the UNSW to low concentration use. This program was reviewed by Maish in 1993 [22]. Despite excellent technical progress, funding shortfalls forced the termination of the program in 1993, and no long-lasting commercial effort resulted.¹⁰

11.3.6 Early Demonstration Projects

First-generation Martin Marietta modules were deployed in two significant demonstration projects. The first was the 350-kW SOLERAS system in Saudi Arabia and the second was a 225-kW system at the Phoenix Sky Harbor Airport. The SOLERAS system, which operated from 1981 to 1998, is shown in Figure 11.11. These systems demonstrated the

¹⁰ SEA Corporation (later Photovoltaics International) continued under reduced funding for a period and deployed several demonstration projects prior to exiting the business in 2000. In addition, SunPower Corporation continues to market high concentration solar cells and Entech is working on space concentrator systems.