Performance: The building was monitored from Feb. 5 to April 3, 1978. The temperature swing of the PCM ceiling on sunny days was from 82 to 70 oF. The indoor air temperature, in sunny days, was about 10 oF below the ceiling temperature. The indoor temperature swing was about 10 oF., even in very sunny days. The solar heating contribution was 52.9% in February and 75.9% in March.

A.2 Summary of the SANDIA and JONES Reports.

Haskin and Stromberg (SANDIA 1979), AIA Research Corp. (1978) and Jones (1982) have evaluated the performance of passive solar houses, mainly in NM but also in other climatic regions. The information on the individual buildings in the SANDIA Report is more detailed than in the AIA and the Jones reports. Therefore the SANDIA data will serve as a basis for the summary, with supplemental data from the AIA and Jones Reports, when needed.

The SANDIA report provides data on the performance of the buildings in terms of the "net" load, the auxiliary heating and the SHF, as well as on the solar glazing area. From the net load and the auxiliary use it is possible to calculate total and unit area solar gain. The Report does not provide data on the solar radiation impinging on the collecting elements. Therefore, for these buildings, it is not possible to calculate the "efficiency" of the buildings, as defined above (Introduction).

Table A-1 gives original and additional performance data for the buildings covered by the SANDIA report.

Five of the houses reviewed in this report are located in northern New Mexico, with similar climatic conditions. This is the only report with data on performance of solar buildings in NM. Other three residential buildings discussed in this report are: one in Virginia (One Design), one in New Jersey (Kelbough) and one in Vermont (Green Mountain Homes). This last building is discussed also in the AIA Research Corp. Report.

Two of the buildings in NM have Direct Gain, one is with a sunspace and an "active" rock bed, one with a combination of a water wall and Direct Gain, one with an under-floor passive collector and an air loop and one building with a combination of a Trombe wall and Direct Gain. The solar heating fraction of the six buildings ranged from 0.57 to 0.84.

The best performance of a building with Direct Gain (Shankland) was a solar gain per unit area of glazing of 170 Kbtu/sf.Y. With solar glazing to floor area ratio of 0.14 it provided a computed SHF of 0.66. In reality the owner did not use the auxiliary system, except for a wood stove, but when the outdoor temperature was -15°F the indoor was very cool, 44°F.

Review of the building's plans shows very direct connection between the solar glazing and the rooms where heat is needed. This architectural design feature should be stressed because, it is one of the main factors which determine the performance of passive solar buildings.

The other building with Direct Gain (Williamson) has a much higher collector to floor area ratio, 0.25. In comparison to