

## Summary of Field Test of EarthLinked® Heat Pump by Consumers Power Company

**Project Year: 1989-1990**

**Location: Jackson, Michigan U.S.A.**



Consumers Power Company conducted a one-year field monitoring test of a 2.5-ton EarthLinked® direct exchange earth coupled heat pump in a single-family residence to determine seasonal efficiency in the heating and cooling modes, to assess system capability to provide total heating needs in cold climates and to assess operating and maintenance characteristics.

Data collection on air-side and refrigerant-side (for dual data verification, which showed  $\pm 2\%$  variation) was performed with thermocouples, pressure transducers, kWh meters with pulse output, a data logger, a disc data recorder, humidity sensors, and a PC software program to retrieve and calculate COP values.

Results were sorted by month and outdoor temperature in 5°F bins. With 6,855 heating degree days, the system recorded a high COP of 3.71, a low of 2.98, and a seasonal COP of 3.29, which exceeded by 25% the seasonal heating performance of other ground source heat pumps previously tested. With a 2.5-ton Copeland compressor, the heat output rate averaged 30,360 BTU/hr., except in May when it increased to 32,575 BTU/hr. The system required no supplemental heat down to ambient 5°F, and averaged 3.0 COP at 5-10°F, gradually increasing to 3.5 at 40°F, and declining to 2.3 with supplemental heat at -10°. For cooling, the cumulative EER was 15.7 (a COP of 4.6).

"Strictly from a performance point-of-view, the ECR (now "EarthLinked") ground-source heat pump is highly recommended. From an economics point-of-view, if installation costs are competitive with other high efficiency systems, the system is not only recommended, but seen as having great potential for increasing electric space heating customers. Its highly efficient air conditioning performance is an added sales advantage." (See Page 15 of the report.)

[It should be noted that when last checked, the system was still performing well 18 years later.]

**Reference:** J. B. Gilbert, Department Head

"ECR Technologies Ground-Coupled Heat Pump Field Evaluation," August 1, 1990; Engineering Evaluations, Consumers Power Company.