

SESSION 12

LAND SUBSIDENCE AND MICROSEISMICITY ASSOCIATED WITH GEOPRESSURED-GEOTHERMAL FLUID PRODUCTION

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Subsidence and fault-related surface displacements are the chief environmental concerns related to the long-term production of large volumes of fluids from geopressured-geothermal reservoirs. Environmental monitoring efforts at the three designed test well sites in Louisiana (Parcperdue, Sweet Lake, and Gladys McCall) have focused on leveling surveys, recording of microseismic events, and tiltmeter installation to provide baseline and fluid-production-related data useful in measuring land-surface and faulting effects of testing.

Analysis of pretesting land-surface elevation surveys has revealed a complex pattern of subsidence related to sediment compaction, basin subsidence, and possibly to ground-water production and soil wetting and drying. The relative importance of each of these is not clear and the impact of geopressured-geothermal fluid production has not been determined. A three-year period of microseismic monitoring has produced reports by contractors of some 1000 suspected microseismic events; many of these require further verification. 64 events were recorded at Parcperdue, 141 at Gladys McCall, and 893 at Sweet Lake. Considering only events recorded by 5 stations or more reduces the total to 316, of which only six have the classic microseismic event characteristics. Analysis of all recorded events and their relation to fluid production and/or disposal is continuing. Tiltmeter data from Sweet Lake indicate that ground deformation correlates with fluid production and seismicity. This relationship is being studied and will be compared with data from Gladys McCall gathered during fluid production.

The complexity of background subsidence and fault-related processes in the Gulf Coast area makes identification of processes directly related to geopressured-geothermal fluid production very difficult. Data from Sweet Lake suggest a correlation; hopefully, results from Gladys McCall will clarify interpretations made thus far.