

PROJECT PROFILE

COST SAVINGS THROUGH ALTERNATE FOUNDATION DESIGN

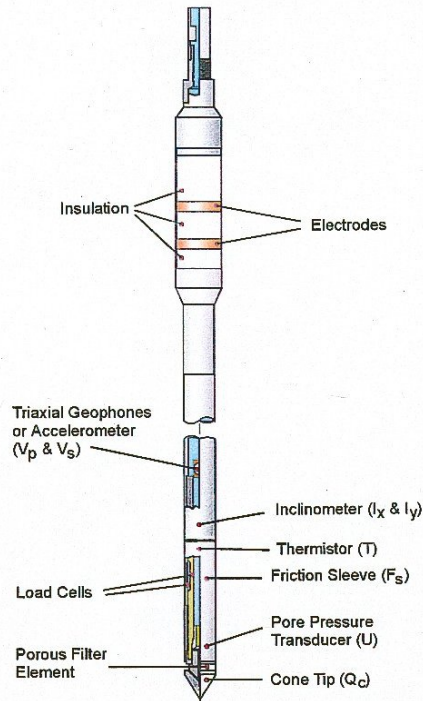
D'Appolonia was engaged to prepare foundation recommendations for a new \$125 million chemical plant planned for a site near the Mississippi River. Sub-surface soils at the site consisted of relatively soft, compressible clay. The primary plant facilities include four movement-sensitive process structures and 14 storage tanks.

A geotechnical report prepared by a local firm recommended placing all structures on piles. Through additional engineering, D'Appolonia demonstrated that the tanks could be placed on less expensive ring foundations and that the pile capacity predictions could be increased for the process structure foundations.

D'Appolonia recommended that additional subsurface exploration and testing be conducted to more effectively evaluate the strength and time-deformation characteristics of the foundation soils. A significant part the exploration program was Cone Penetration Testing with pore pressure measurements (CPTU). CPTUs are conducted by pushing an instrumented device into the soil at a constant rate. The device uses electronic sensors to continuously measure the cone tip resistance, side resistance of the friction

sleeve and the dynamic pore water pressure at the cone tip. CPTU results provide a more reliable basis for estimating pile tip bearing and side friction capacity compared to empirical approaches which rely on the use of more conventional boring and laboratory test programs of the type previously conducted at the site. Pile capacity esti-

mates based on the CPTU results were confirmed through a pile load testing program developed and managed by D'Appolonia. The alternative design led to an approximate 50-percent reduction in 60-foot steel pipe piles compared to the original design resulting in substantial cost savings and a commensurate reduction in construction time.



Schematic of instrumented CPTU device.
(Illustration provided by ConeTec, Inc.)



Pile driving rig lifting a 60-foot-long steel pipe pile.



Pile driving operations near existing plant area. The pile driving rig at right is working along a pipe rack line with several completed steel pipe piles visible at left.



Full-scale load test in progress with hydraulic jack applying load.