



## Texas City Green Power LLC—Owner's Engineer

### MPR Establishes Predictive Tool for Evaluation of Steam Transients

#### CHALLENGE

MPR provided engineering and on-site project management assistance for the development of a new cogeneration facility at a refinery. The purpose of the new facility was to improve the efficiency of the power and steam generation, support additional loads within the refinery, and provide merchant power for the grid. In addition to the typical MPR owner's engineer scope to oversee EPC contractor technical and commercial performance, the complexity and extreme reliability requirements on the steam supply from the cogeneration facility required detailed technical evaluations to identify cost effective improvements in equipment and control system capabilities.

#### SOLUTION

MPR provided conceptual and detailed design reviews, evaluation of the procurement and construction schedule, construction oversight, and various technical analyses (including performance of complex steam transient and reliability analyses.) The oversight of the construction activities included daily review of contractor construction activities and planning. In addition, MPR provided technical support during the monthly reviews of the overall project status.

#### RESULTS

MPR developed a computer model of the power plant and the refinery steam distribution system to predict the effect of a sudden loss of production from the steam producing equipment. This thermal-hydraulic model solved the conservation of mass, momentum, and energy equations to determine the transient response of the system to rapid changes in steam supply. The model included details of the Heat Recovery Steam Generator (HRSG), the power plant steam turbine, the power plant's control system, and of the host's steam delivery system. The tool enabled the owner to be confident that the design of the cogeneration plant would satisfy the demanding transient performance requirements of the refinery. Today, the model is used as a predictive tool for plant engineers to evaluate upset events and refine operating practices to minimize the impact of a steam producing unit trip on the refinery operation.

