

Executive Summary Legacy Water Heater

1 - Gas Quality and LNG Study Objectives

This research study was designed to assess how residential and small commercial/industrial end-use equipment responded to changes in gas quality and to determine if Southern California Gas Company (SCG) needs to modify its current Gas Quality Standards (Rule 30). The major objectives of the study were as follows:

- Evaluate each selected unit to determine any issues relating to equipment safety and performance. Equipment safety includes changes in carbon monoxide (CO) levels, combustion stability and lifting, flashback, and yellow tipping.
- Compare measured and observed results against the major natural gas interchangeability indices, including Wobbe Number, lifting, flashback, yellow tipping and incomplete combustion.
- Collect NO_x emissions data during testing

2 - Selection Criteria

The Legacy Water Heater selected for the study was due to the large numbers of these units operating in southern California. Previous studies indicated that such units could satisfactorily combust gases with a wide range of heating values and compositions. This unit was selected to corroborate those previous findings. Factors and concerns that led to the selection of the Legacy Water Heater for this study include:

- Performance/safety may be dependent on flame characteristics
- Safety concerns related to flue gases
- High density in southern California

3 - Test Results and Findings

There were no operational, ignition, flame stability or safety problems experienced with operation of this appliance. The Legacy Water Heater was tested over a wide range of operating conditions and gas compositions according to developed test protocols¹. Test results and findings include:

¹ Testing protocols used in this program were derived from industry standards and regulatory test procedures. Note, however, that based on the needs of this program and the operating and



- CO emission concentrations were generally negligible.
- NO_x emission concentrations remained consistent for the range of test gases.
- As anticipated, this appliance demonstrated an ability to satisfactorily operate with a range of gas heating values and compositions.

4 - Legacy Water Heater Specifications

- **Description:** 40 Gallon Residential Water Heater
- **Burner:** 4.5" diameter atmospheric burner
- **Input rating:** 32,000 Btu/hr
- **Type of fuel:** Natural Gas
- **Required gas supply pressure:** 5 - 14" W.C.
- **Required gas manifold pressure:** 4" W.C.

design characteristics of equipment tested, adherence to the industry and regulatory testing standards was not literal. The reader is cautioned that no inference can nor should be drawn as regards certification of these devices to the industry or regulatory requirements as a result of this program.