

APPENDIX H – CODES AND STANDARDS

Research into the applicability of codes and standards for a facility to generate hydrogen shows that there is no comprehensive standard governing the design of such facilities. The Idaho National Engineering and Environmental Laboratory (INEEL) reports that "There are no specific codes pertaining to the generation of hydrogen and few recommended practices dealing with hydrogen refueling; however, there are numerous standards dealing with hydrogen as an industrial gas." There are several industry standards and recommended practices, however, that apply to the components of such systems, such as the ASME Boiler and Pressure Vessel Code, Section VIII, "Rules for the Construction of Pressure Vessels." In some cases, these standards are referenced by other codes, and in other cases have been adopted based on the judgment of the design professional or Pinnacle West.

No comprehensive standard exists for dispensing gaseous hydrogen fuel. Some limited research has been completed by the National Energy Laboratories in Idaho and Colorado; however, this new technology does not yet have a corresponding common set of rules. The INEEL report goes on to state that "Guidance from natural gas vehicular fuel codes is considered appropriate for ensuring safety of hydrogen handling, as long as hydrogen's unique physical and combustion properties are accounted for when following that guidance." This project has, therefore, adopted NFPA 52, applying the CNG dispensing standards to the hydrogen dispensing, based on the fact that both are "lighter than air, low-energy, spark-ignitable gases."

The Alternative Fuels Pilot Plant was designed in accordance with the requirements of the following codes and standards:

American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, "Rules for the Construction of Pressure Vessels."

American Society of Mechanical Engineers Code for Chemical Plant and Petroleum Refinery Piping, B31.3.

Compressed Gas Association Standard for Hydrogen Piping at Consumer Locations, G5.4.

Compressed Gas Association Standard for Hydrogen Vent Systems, G5.5.

Compressed Natural Gas Vehicular Fuel Systems Code, NEPA 52, 1998 edition.

Guide for Venting of Deflagrations, NFPA 68, 1998 edition, where the basic assumptions of the NFPA 69 model for evaluating a deflagration apply to this structure.

National Electric Code, NFPA 7, 1996 edition, as adopted by the City of Phoenix.

Standard for Gaseous Hydrogen Systems at Consumer Sites, NEPA 50A, 1999 edition, with selective application to a hydrogen generation process.

Uniform Building Code, 1997 edition, as adopted by the City of Phoenix.

Uniform Fire Code, 1997 edition, as adopted by the City of Phoenix, Articles 52, 80, and Standard 52-1.

Uniform Mechanical Code, 1997 edition, as adopted by the City of Phoenix.

Uniform Plumbing Code, 1997 edition, as adopted by the City of Phoenix.

At the outset of this project, a code analysis site plan was developed, showing all of the existing buildings on the east side of Second Avenue at the 501 Facility of Arizona Public Service. As part of this effort, each of the buildings was examined visually to determine its construction type, occupancy, and fire protection features. This analysis was given to the City of Phoenix for review and comment, and the comments received from the City of Phoenix were incorporated into the design of the Alternative Fuels Pilot Plant.