ODORIZATION MANUAL

Prepared by

Odorization Manual Revision Group (OMRG)

Operations Section

Revised

April 2017

AGA

American Gas Association

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FOREWORD

The use of odorant as the primary method of warning of gas leaks has been highly successful and has contributed significantly to making natural gas a safe fuel for the public to use. The issues addressed here are intended to help individual operators to potentially improve an already valuable and reliable method of ensuring safety.

This document is intended for consideration by operators and should be read in the context of all of the statutes, rules, regulations and tariffs that pertain to the highly regulated natural gas industry. Under no circumstances should this document be interpreted to be the standard of care to be followed by operators. In some instances, particularly concerning gathering, processing operations and farm tap systems, other rules, tariffs and regulations apply. Many gas transmission and distribution companies have tariffs that are approved by state and federal regulatory authorities and that may vary their duties and responsibilities. Nothing in this document should be considered to vary or alter those tariff provisions.

Please note that each operator serves a unique and defined geographic area. System infrastructures vary based on many factors, such as pipeline materials and condition and operating practices. Each operator will need to evaluate the profiled practices in light of system variables. Not all practices in this document will be applicable to all operators due to the unique sets of characteristics of their specific systems. Each operator needs to evaluate actions in light of system variables. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional to determine the exercise of reasonable care in any given circumstance.

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Rosemarie Halchuk with Xcel Energy served as the chair of the Task Group, which was organized into teams by chapter.

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Gas odorants are classified by DOT as Class 3 Flammable Liquids. This classification is defined as any liquid having a flash point below 100°F (38°C). Odorants are included in National Fire Protection Association NFPA 30: Flammable and Combustible Liquids Code. Enforceable under OSHA and many state and local regulations, NFPA 30 provides

INTRODUCTION

This manual is a revision of the 2000 edition of the Odorization Manual published by the American Gas Association. It is intended to provide general guidelines for the odorization of natural gas distribution and transmission systems. The revised manual is the culmination of collaborative efforts of many experts on odorization of natural gas. It is intended to provide potential improvements on an already safe and reliable practice.

Extensive revision and expansion of the previous edition include practical operating guidelines for the design, construction and operation of odorization systems, odor and odorant monitoring techniques and instrumentation, as well as a summary of recent research in the chemistry and olfaction science of natural gas odorants. This document is intended for both new and seasoned professionals in the natural gas industry and its supporting organizations, such as contractors, appliance installers, public officials, emergency responders, etc.

The history of odorization dates back to the late 19th and early 20th century when fuel gases manufactured from coal were used for street lighting and eventually for house lighting, cooking and heating. Some of these “coal gases” were characterized by distinctive unpleasant odors from residues of coal gasification, but others, like “blue water gas,” had little to no odor. Manufactured gas contained high concentrations of carbon monoxide, and the safety risk of a gas leak due to potential CO poisoning was often greater than the flammability risk. Thus, the addition of warning-agent additives was needed, and research for effective odorants was carried out both in Europe and in the U.S. Some of the original work involved compounds that smelled like coal gas since its odor was historically known as a warning agent by the public. The discovery of oil and natural gas in the 1920s led to the development of the pipeline industry in North America and to the introduction of natural gas as another odorless but cleaner burning fuel.

Today’s legislated standards for gas odorization date back to a school disaster in New London, Texas, on March 18, 1937. The school was initially supplied with pipeline quality natural gas for heating and cooking. However, the school changed its gas supplies to unprocessed, or “residue,” gas from local production fields available at lower cost than the typical pipeline natural gas. Unodorized residue gas leaked into the school from an improperly installed line and was not detected. The gas was accidentally ignited by an electric sander in the school shop. The resulting explosion destroyed the school and caused approximately 300 deaths, mostly school children, and hundreds of injuries. The disaster devastated the small town that had prospered from the local oil boom and received world-wide attention. Within four months, the Texas Railroad Commission enacted odorization requirements for natural gas distribution. Similar regulations were later passed in other states and at the federal level.