

SUPPRESSION OF GAS WELL BLOWOUT FIRES USING WATER SPRAYS;  
LARGE AND SMALL SCALE STUDIES

Dwight Pfenning  
Energy Analysts, Inc.  
Norman, Oklahoma

David Evans  
National Bureau of Standards  
Washington, DC

Abstract

Large scale simulation tests were conducted to demonstrate the effectiveness of water spray systems to control and extinguish gas well blowout fires. Selected results from small scale experiments performed in this research program are given primarily to help explain the development of the water spray extinguishment method, but also to examine scaling of important phenomena. Two techniques of water spray injection, internal and external to the initial gas jet, were tested at large scale on fires with heat release rates from 144 megawatts (138 SCFS methane flow) to 222 megawatts (212 SCFS methane flow). Using external water injection from four nozzles surrounding the gas jet, fires of almost 200 megawatt size could be extinguished with a mass flow ratio (water/gas) of 2.17 (129 GPM water flow) and continued to burn at a ratio of 1.56 (86 GPM water flow). This technique of water injection could be the basis of a practical blowout fire suppression system.

Key words: blowout fires, extinguishment, water spray.

1. INTRODUCTION

The blowout of oil and gas wells during drilling, production, and work-over presents a serious hazard to personnel, the environment, and equipment. The only practical method to control a well fire subsequent to a blowout is to