ACID GAS INJECTION AND CARBON DIOXIDE SEQUESTRATION

John J. Carroll

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Acid Gas Injection and Carbon Dioxide Sequestration

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This book is dedicated to Wu Ying, my loving wife.
She is the love of my life and a constant source of inspiration.

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Preface

Acid gas injection (AGI) has become a mature technology for disposing of acid gas, a mixture of CO_2 and H_2S. AGI is particularly useful for small producers who have few options for dealing with the H_2S. Larger producers, however, have seen the value in AGI as well and the industry has discovered that AGI is an environmentally friendly solution to a difficult problem.

This book presents the art, the science, and the engineering aspects of AGI, and to present it in a manner that is accessible to the average engineer. It begins with a discussion of the basic data and models for designing an injection scheme. In particular it is important that those working in the field have a good understanding of the phase equilibria involved. Most of the operational problems are related to the formation of an unwanted phase. Admittedly, some of these concepts are a little complicated, and it is a challenge to present them in a form that is comprehensible to a wide audience.

Next the engineering aspects are presented. These include the design of the compressor and pipeline and in particular what makes them different from standard designs. Finally, some of the subsurface aspects are reviewed. Admittedly, the focus of this book is the surface aspects of AGI, but the subsurface aspects cannot be overlooked, even by the process engineer.

Hopefully, those involved in the emerging field of CO_2 sequestration will note the similarities and take the information presented here and apply it to their projects. Lessons learned in AGI can be exported to the technology of carbon sequestration.

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There are many people to thank when one writes a book. The first, and certainly the most important, is my employer Gas Liquids Engineering, and in particular the company principals Doug MacKenzie and Jim Maddocks but also my colleague Peter Griffin. They provided me the opportunity to present the course and much of the time to write the manuscript.

In addition, through my job at Gas Liquids Engineering, I have had the chance to work on many acid gas injection projects throughout the world. Some of these were just studies that have not yet come to fruition, but others have been operating for many years. Much of what is presented in this book has come from lessons learned from working on those projects.

Alan Mather has been my long time friend and mentor. He is an important source of information, often from obscure sources. Plus his lab is the source of much of the useful information in this field. The research studies of his group are vital to the advancement of many fields in the gas processing.

This book is based on a course on acid gas injection that I have presented throughout the world. Feedback from the attendees over the years has greatly improved the quality and content of both the course and this book. The acid gas injection course has also been presented in Chinese and Polish. I have received excellent feedback from Eugene Grynia, my Polish translator, and Ying Wu, my Chinese translator.

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