


*Enhanced Oil Recovery Potential in the
United States*

January 1978

NTIS order #PB-276594

**Enhanced Oil
Recovery Potential
in the United States**

CONGRESS OF
THE UNITED STATES 
Office of Technology Assessment
WASHINGTON, D. C. 20540

Library of Congress Catalog Card Number 77-600063

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, DC. **20402** Stock No. **052-003-00503-4**

TECHNOLOGY ASSESSMENT BOARD

EDWARD M. KENNEDY, MASS., CHAIRMAN
LARRY WINN, JR., KANS., VICE CHAIRMAN

ERNEST F. HOLLINGS, S.C. OLIN E. TEAGUE, TEX.
HUBERT H. HUMPHREY, MINN. MORRIS K. UDALL, ARIZ.
CLIFFORD P. CASE, N.J. GEORGE E. BROWN, JR., CALIF.
TED STEVENS, ALASKA CLARENCE E. MILLER, OHIO
ORRIN G. HATCH, UTAH JOHN W. WYDLER, N.Y.

DANIEL De SIMONE

Acting DIRECTOR

OFFICE OF TECHNOLOGY ASSESSMENT

WASHINGTON, D.C. 20510

January 6, 1978

The Honorable Ted Stevens
Technology Assessment Board
Office of Technology Assessment
United States Senate
Washington, D. C. 20510

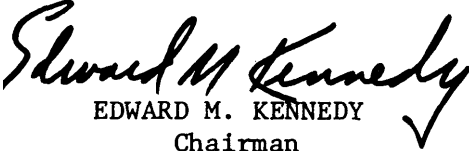
Dear Senator Stevens :

On behalf of the Board of the Office of Technology Assessment, we are pleased to forward the results of the assessment you requested of the potential of enhanced recovery of oil and Devonian gas in the United States.


This report, Enhanced Recovery of Oil coincides with the recently released Status Report on the Potential for Gas Production From the Devonian Shales of the Appalachian Basin.

These assessments will provide additional perspective on future U.S. energy supplies and we hope that they will be helpful as the Congress continues its review of national energy policy.

Sincerely,


EDWARD M. KENNEDY
Chairman

Sincerely,


LARRY WINN, JR.
Vice Chairman

Enclosure

Foreword

It is estimated that about 300 billion barrels of discovered oil remain in the United States. However, conventional techniques of extraction can deliver only 10 percent of that oil economically, or about 30 billion barrels. What about the remaining 270 billion barrels?

This report assesses the potential of enhanced recovery techniques for freeing more of this oil from the sandstone and limestone formations in which it is trapped. The methods for doing this include injecting steam, chemicals, or carbon dioxide to either break the oil loose and push it up or make it easier to flow. The question is at what price?

At current world oil prices, enhanced oil recovery methods could yield from 11 to 29 billion additional barrels of that trapped oil. And at oil prices comparable to those required to produce synthetic oil from coal, enhanced recovery methods could increase the yield to as much as 42 billion extra barrels of oil. At the utmost, about 51 billion barrels might be recoverable, assuming the most favorable economic factors and technologies that can now be foreseen.

This report discusses the uncertainties in these estimates and assesses policy options available to Congress for recovering more of America's oil resources.

This assessment is another in the series of energy policy projects that the Office of Technology Assessment is conducting for the Congress.



DANIEL DeSIMONE
Acting Director
Office of Technology Assessment

OTA Energy Advisory Committee

Milton Katz, Chairman
Director, International Legal Studies, Harvard Law School

Thomas C. Ayers
President and Chairman
of the Board
Commonwealth Edison Company

Kenneth E. Boulding
Professor of Economics
Institute of Behavioral Science
University of Colorado

Eugene G. Fubini
Fubini Consultants, Ltd.

Levi (J. M.) Leathers
Executive Vice President
Dow Chemical USA

Wassily Leontief
Department of Economics
New York University

George E. Mueller
President and Chairman
of the Board
System Development Corporation

Gerard Piel
Publisher, Scientific American

John F. Redmond, Retired
Shell Oil Company

John C. Sawhill
President
New York University

Chauncey Starr
President, Electric Power
Research Institute

Enhanced Oil and Gas Recovery Advisory Panel

Richard Perrine, Chairman
University of California

Gerard Brannon
Georgetown University

Frank Collins
Oil Chemical and Atomic Workers
International Union

Robert Earlougher
Godsey-Earlougher, Inc.

Lloyd Elkins
Amoco Production Company

Robert M. Forrest
Columbia Gas System Service Corp.

Claude Hocott
University of Texas

John M. McCollam
Gordon, Arata, McCollam
and Watters

Walter Mead
University of California

Fred H. Poettmann
Marathon Oil Company

Lyle St. Amant
Louisiana Wildlife and
Fisheries Commission

Hal Scott
Florida Audubon Society

A. B. Waters
Halliburton Services

Ex officio

John Redmond, Retired
Shell Oil Company

NOTE: The Advisory Panel provided advice, critique, and material assistance throughout this assessment, for which the OTA staff is deeply grateful. The panel, however, does not necessarily approve, disapprove or endorse this report. OTA assumes full responsibility for the report and the accuracy of its content.

OTA Energy Program Staff

OTA Energy Program

Lionel S. Johns, *Program Manager*
Robert J. Rebel, *Project Leader*
Thomas A. Cotton, *Asst. Project Leader*

Major Contributors

Russell F. Darr
Don W. Green
Robert J. Kalter
Patrick H. Martin
Floyd W. Preston
Wallace E. Tyner
G. Paul Willhite

External Support

John Eldon, Martin Frey,
Joy Jones, Colleen Knehans,
Edward La Roe, Cindy Pierce,
Raj Raghaven, Roy Savoian,
James Smith, and Marcia Wolf

Administrative Staff

Lisa Jacobson
Linda Parker
Cindy pierce
Joanne Seder

Analytical Contractors:

Lewin & Associates, Inc.
National Energy Law and Policy Inst.
Wright Water Engineers., Inc.

OTA Publications Staff

john C. Holmes, *Publications Officer*
Kathie S. Boss Joanne Heming Cynthia M. Stern