

PROCESS ECONOMICS PROGRAM

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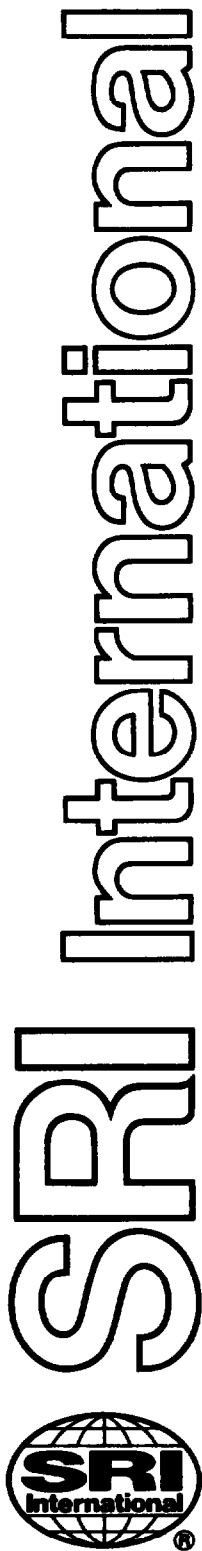
Abstract

Process Economics Program Report No. 190A MEMBRANE GAS SEPARATION PROCESSES (January 1990)

Advances in membrane technology in areas such as reverse osmosis and ultrafiltration have led to the development and commercial introduction of membranes for large-scale industrial gas separations. This report studies four major applications—nitrogen production from air, oxygen-enriched air, hydrogen recovery from ammonia purge gas, and carbon dioxide separation from methane. Process economics for each application is presented, based on a preliminary process design. Competing separation operations are reviewed and competitive economics are evaluated for air separation by pressure swing adsorption.

A technical review presents the essential criteria for designing on-site systems and membrane system attributes that affect economic competitiveness. Process design features required for the different industrial gas separations are also summarized, and the types of procedures employed to determine membrane area requirements are briefly described.

Finally, gas membrane system development activity by major world regions is presented, along with a review of the main market segments and a listing of current and potential applications for gas membrane separation technology. Also, a look at the major supplier's technology and market position is presented along with an SRI estimate of the number of currently installed units.



Report No. 190A

MEMBRANE GAS SEPARATION PROCESSES

SUPPLEMENT A

by **RONALD SMITH**

February 1990

A private report by the
PROCESS ECONOMICS PROGRAM

Menlo Park, California 94025

For detailed marketing data and information, the reader is referred to one of the SRI programs specializing in marketing research. The *CHEMICAL ECONOMICS HANDBOOK* Program covers most major chemicals and chemical products produced in the United States and the *WORLD PETROCHEMICALS* Program covers major hydrocarbons and their derivatives on a worldwide basis. In addition, the SRI *DIRECTORY OF CHEMICAL PRODUCERS* services provide detailed lists of chemical producers by company, product, and plant for the United States and Western Europe

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