

## Table of Contents

LECTURES .....	1
ELIMINATION OF CAVITATION-RELATED INSTABILITIES AND DAMAGE IN HIGH-ENERGY PUMP IMPELLERS .....	3
<i>Paul Cooper, Donald P. Sloteman, Edward Graf, and Dirk J. Vlaming</i>	
SOLUTION TO CAVITATION INDUCED VIBRATION PROBLEMS IN CRUDE OIL PIPELINE PUMPS .....	21
<i>Ulrich Bolleter, Diether Schwarz, Brian Carney, and Earl Gordon</i>	
AN INTEGRAL BALANCE PISTON FOR CENTRIFUGAL PUMP IMPELLERS .....	29
<i>Kevin Fairman and William J. Mabe</i>	
EFFICIENT MULTIPHASE PUMP STATION FOR ONSHORE APPLICATION AND PROSPECTS FOR OFFSHORE APPLICATION .....	43
<i>Winfried Neumann</i>	
TANDEM SEALS FOR NEAR ZERO HYDROCARBON EMISSIONS.....	49
<i>William E. Key, George Wang, and Kenneth E. Lavelle</i>	
ANALYSIS OF THE THERMAL BEHAVIOR IN THE SEALING CAVITY OF AN OVERHUNG API PROCESS PUMP .....	57
<i>Lev Nelik</i>	
CHANGES IN PUMP VIBRATION LEVELS CAUSED BY THE MISALIGNMENT OF DIFFERENT STYLE COUPLINGS .....	63
<i>Jerome A. Lorenc</i>	
MEASUREMENT AND PREDICTION OF FULL SCALE ANNULAR SEAL COEFFICIENTS .....	71
<i>Stefan Florjancic and Thomas McCloskey</i>	
DUAL CONTAINMENT SHELLS— ADDED SAFETY FOR MAGNETICALLY DRIVEN PUMPS .....	85
<i>Peter Rix and Ron McLean</i>	
TECHNIQUES FOR EDDY CURRENT REDUCTION IN MAGNETIC DRIVES USING METALLIC CONTAINMENT BARRIERS .....	97
<i>Jeffrey H. Smith and John B. Oliver</i>	
TUTORIAL SESSIONS .....	103
SINGLE PLANE BALANCING.....	105
<i>Charles Jackson</i>	
A USER'S ENGINEERING REVIEW OF SEALLESS PUMP DESIGN LIMITATIONS AND FEATURES.....	129
<i>Terry Hernandez</i>	
SUPPLIER QUALITY IMPROVEMENT PROCESS.....	147
<i>Richard M. Dubner</i>	
PIPING VIBRATION ANALYSIS .....	155
<i>J. C. Wachel, Scott J. Morton, and Kenneth E. Atkins</i>	

PANEL SESSION.....	157
DISCUSSION GROUPS AND LEADERS.....	161
SHORT COURSES.....	185
ADVISORY COMMITTEE.....	195
TURBOMACHINERY STAFF.....	203
TURBOMACHINERY LABORATORY.....	209