



2017

Year End Report to Members

COMMENTS FROM CHAIRMAN OF GMRC BOARD OF DIRECTORS

I am pleased to announce that 2017 was another successful year for GMRC. We continue to be a premier natural gas industry organization and I am very proud of where we are and how we got here, as should you.

Membership numbers have remained relatively steady at 74 full and associate member companies. The 2017 Gas Machinery Conference held in Pittsburgh drew over 1,100 people, who took advantage of the many technical presentations and short courses. GMRC sponsored over \$490,000 in research in 2017 with \$682,000 in research planned for 2018.



GMRC was founded in 1952 to address pulsation and vibration concerns in our industry. However, this subject has matured and many tools are now available to address these issues. Looking at the suite of projects for the last few years, we now see many research dollars focused on solving issues with dry gas seals and dealing with wet gas.

Last year marked the beginning of a resurgence in the energy industry in general, and the natural gas industry, in particular, after a prolonged downturn. Companies are approaching this most recent recovery with caution and restraint – keeping resource levels low and limiting non-capital budgets.

One of the results of this most recent downturn has been the loss of a great deal of industry knowledge due to retirements and individuals making the decision to move to other industries. Ongoing training and professional development are both key to the success of our industry, and I urge you to consider a robust training program as a requirement for your personnel. Remember, training your people and having them leave is not an ideal situation, but it is better than not training them and having them stay.

GMRC is financially healthy with a research reserve balance over \$3 million and a robust research plan moving forward. In unison with our parent organization, the Southern Gas Association, and working with complementary organizations such as PRCI, GMRC continues to advance technologies for improvements in safety, reliability, efficiency and cost effectiveness.

It has been an honor to once again serve as your chairman and to work with the many volunteers that make up the board of directors and various committees. These volunteers are individuals who have a passion for the industry, have the desire to be involved and continue to volunteer their time to GMRC and the natural gas industry, while supported by their member companies.

Remember that you, the membership of GMRC, are the main reason for our continued success. Your support and dedication of the organization and your willingness to become involved have helped bring about positive change in our industry and within the organization.

On behalf of the GMRC Board of Directors, Project Supervisory Committee and the Gas Machinery Conference Planning Committee, I want to thank you for your commitment and support.

Michael A. Smith
Vice President, EnSite USA
Chairman, GMRC Board of Directors

COMMENTS FROM GMRC PRESIDENT & CEO

I want to thank everyone for welcoming me into the role that Mike Grubb served for so many years. I enjoyed getting to learn a lot about GMRC last year and am looking forward to 2018 and beyond.

The GMRC is a truly valuable organization with talented and energetic professionals continuously looking for innovative solutions to challenges facing our great industry. I've witnessed a very involved board driving research priorities to successful outcomes.

The GMRC is a great example of a member-driven organization with dedicated volunteers serving on the Project Supervisory Committee, Gas Machinery Conference Planning Committee and the Board of Directors.

I attended my first GMC in Pittsburgh last year and was incredibly impressed with the preparation, the engagement of over 1100 attendees, the number and variety of technical sessions and papers, the exhibition area, the special events and the enthusiasm of everyone involved.

Thank you for the opportunity and the honor of serving the GMRC and our industry.



William N. Cantrell
President & CEO
Gas Machinery Research Council



Your [Gas Machinery Research Council](#) enjoyed a successful year in 2017. This report provides a summary of 2017 and a look ahead to 2018.

OVERVIEW

- Annual operating budget: \$1.5 million
- Healthy reserve balance: \$3.6 million
- Invested \$2.9 million in research projects over the past 7 years

RESEARCH PROJECTS - 2017

GMRC invested \$491,970 in research projects during 2017, including:

- High Speed Package Guideline for Gathering Compression – Phase III
- Dry Gas Seal Reliability (co-funded with PRCI and ExxonMobil)
- Guideline for the Selection of Filtration Equipment – Phase I
- Guideline for Successful Installation of Pipe to Minimize Piping Vibration, Strain, and Fatigue Failures
- Direct Enthalpy Rise Measurement – Phase I
- Development of a Robust Scrubber Level Controls – Phase I
- Wet Gas Formation and Carryover in Suction Equipment – Phase II

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GMRC approved \$682,000 in research projects for 2018, including:

- Direct Enthalpy Rise Measurement – Phase II
- Guideline for the Selection of Filtration Equipment – Phase II
- Wet Gas Formation and Carryover in Suction Equipment – Phase III
- Development of a Robust Scrubber Level Controls – Phase II
- Dry Gas Seal Reliability (co-funded with PRCI)
 - CFD Analysis of Liquid: in Dry Gas Seals
 - Liquid Contamination under Dry Gas Seals: Modelling & Testing
- Field Test Verification PAN Filter System

Recent Research Projects GMRC and PRCI Co-Funded Programs:

- Effect of Variability in Fuel on Operations and Reliability of Turbines
- Portable Analyzer Lab Tests to Support Simplified Test Method
- Effect of Variability in Fuel on Operations and Reliability of Turbines
- Portable Analyzer Lab Tests to Support Simplified Test Method
- GHG Database to Support Emission Factor Improvement – “Methane Data and Super Emitters”
- Control of Fugitive Methane Emissions from Compressor Stations through Combustion of Compressor and Engine Crankcase Emissions
- Methane Reduction Data Analysis for 2-Stroke Lean Burn Natural Gas Engines
- Dry Gas Seal Reliability

TRAINING – 2017

GMRC invested in 1,245 people throughout 2017 through the following programs:

- Applied Principles of Engines & Compressors
- Factors in Compressor Station Design
- High Speed Package Design
- Foundation Design & Repair
- Introduction to Gas Turbines and Centrifugal Compressors
- Compressor Station Vibration and the Impact on Performance, Cost & Reliability
- Combustion Characteristics
- Engine Analyzer & Reliability
- [Gas Machinery Conference](#)
 - Chairman: Oscar Smith, EQT Midstream

MEMBERSHIP

- Operating Company Members: 19
- Engineering & Fabricating Members: 13
- Associate Members: 42

FINANCIAL SUMMARY

• Income	
○ Membership dues, research co-funding	\$261,985
○ Training (Net)	591,451
○ Other	<u>5,544</u>
○ Total	\$858,980
• Expense	
○ Total	\$920,613
• Deficiency of Income to Expenses	(61,633)
• Research Expenditures	\$491,970
• Research Reserve	\$3,667,000

LEADERSHIP

- **2017 BOARD OF DIRECTORS**
 - Michael Smith, EnSite USA –Chairman of the Board
 - Kary Saleeby, ExxonMobil Production – Vice Chairman of the Board
 - Doug Bird, Dresser-Rand – Treasurer
 - Quince Och, Enbridge – Secretary
 - Martin Habel, Solar Turbines Incorporated
 - Kriss McDonald, Ariel Corporation
 - Don York, HOERBIGER Services
 - Marlan Jarzombek, Atmos Energy
 - Frank Antoine, Enable Midstream
 - Scott Schubring, Williams – Project Supervisory Committee Chairman
 - Orin Flanigan, Adobe Enterprises
 - Craig Linn, Linn Energy Consulting
 - William N. Cantrell, President & CEO
 - Jane Butler, Vice President, GMRC

- **2017 PROJECT SUPERVISORY COMMITTEE**
 - Scott Schubring, Williams – Chair
 - Richard Fink, Enbridge
 - Everette Johnson, GE Oil & Gas
 - David Krenek, Caterpillar (CAT)
 - Rainer Kurz, Solar Turbines Incorporated
 - Clint Lingel, Ariel Corporation
 - Michael Matheidas, ExxonMobil
 - Christine Scrivner, Kinder Morgan
 - Gary Bourn, Anadarko
 - Scott Delmotte, Dresser-Rand
 - Jane Butler, Vice President, GMRC

- **2017 GAS MACHINERY CONFERENCE COMMITTEE**
 - Oscar Smith, EQT Midstream – Chair
 - Manny Angulo, The Williams Companies
 - David J. Atwood, Siemens
 - Bill Couch, PECO (Parker IPF)
 - Michael Duffy, Advanced Gas Engine Solutions
 - Brenna Geswein, Caterpillar
 - Rainer Kurz, Solar Turbines Incorporated
 - Kenneth Langlois, DCP Midstream
 - John Ladd, Hoerbiger
 - Greg Lortie, Ariel Corp.
 - Reagan Mayces, Enbridge
 - Marybeth McBain, Kinder Morgan
 - Keith W. Schafer, TransCanada
 - Scott Schubring, The Williams Companies
 - Sarah Simons, Southwest Research Institute
 - Jon Tice, DCP Midstream
 - James Trent, Kinder Morgan
 - Mary Beth Whitfield, The Williams Companies
 - Ted Wojcik, CMS Energy
 - Jane Butler, Vice President, GMRC

DISTINGUISHED SERVICE AWARD

Congratulations to Randal Raymer, who received the Distinguished Service (Edward N. Henderson) Award in 2017.

This award is presented for outstanding service not only to GMRC but to the industry. Raymer was recognized for his leadership and contributions to the industry and the organization with the GMRC Edward N. Henderson Award at the 2017 Gas Machinery Conference.

[Read more.](#)



UPDATE ON PHILANTHROPIC EFFORTS

Beginning at the 2016 Gas Machinery Conference, GMRC began working to help support Freedom Service Dogs of America (FSD), a local nonprofit in the conference's host city of Denver. FSD works to unleash the potential of shelter dogs by transforming them into custom-trained, life-changing assistance dogs for people in need. Their clients include children, veterans and active duty military, and other adults. Their clients' disabilities include autism, traumatic brain injury, cerebral palsy, spinal cord injuries, muscular dystrophy, multiple sclerosis and post-traumatic stress disorder.



Between late 2016 and 2017, GMRC in conjunction with the Southern Gas Association raised a total of \$30,849 – enough to rescue, treat, custom train and gift a service dog to an American in need.

GMRC and SGA would like to thank everyone who supported these truly life-changing efforts!

To learn more about Freedom Service Dogs of America, please visit freedom servicedogs.org.



THANK YOU TO THE 2017 GMRC GAS MACHINERY CONFERENCE SPONSORS

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PHOTO GALLERY

- Access to the 2017 Gas Machinery Conference photo gallery can be accessed [here](#).