



*Walter G. May*

## WALTER G. MAY

1918–2015

Elected in 1978

*“Contributions to engineering theory and practice in the fields of fluidization, high-energy propellants, LNG technology, and centrifugal isotope separation.”*

BY RICHARD ALKIRE

WALTER GRANT MAY was born in Saskatoon, Saskatchewan, Canada, on November 28, 1918, and passed away in Virginia Beach on February 18, 2015, at the age of 96.

He graduated in 1939 with a bachelor of science degree in chemical engineering from the University of Saskatchewan. His career in the oil industry began that year, when he took a post with British American Oil in Moose Jaw as an assistant chemist (there were only two). He returned the following year to the university, where he received a master of science degree in chemistry (1942), and soon after joined the faculty as a professor of chemical engineering. After the war he continued his studies at the Massachusetts Institute of Technology and earned a doctor of science degree in chemical engineering.

In 1948 he started working with Standard Oil (now Exxon) Research and Engineering Company, where he became knowledgeable about fuel processing and process design, particularly reaction kinetics and reactor design associated with gas-solid fluidized beds. Beginning with coal gasification applications and continuing over many years, he carried out basic studies of fluid motion in bubbles and drops and their relation to mass transfer coefficients in gas-solid contacting in fluidized beds at plant scale. While fluid beds are the most effective way of transporting solids in processes where this is required, they

were not well-defined fluids. May was able to characterize their fluid properties by using mixtures of solids, with coarse solids serving as a probe to evaluate the “fluid” properties of the fine material. He applied these methods to particle separation processes as well as to various kinds of chemically active fluid beds such as those associated with flue gas desulfurization.

Perhaps May’s most publicly visible achievement was his work and leadership in the field of high-energy solid rocket propellants associated with the Advanced Research Projects Agency (ARPA) in 1959–1963. He was the first chair of ARPA’s Joint Army, Navy, Air Force (JANAF) Thermochemical Panel and subsequently arranged a contract with Dow Chemical Co., with funds from the JANAF budget, to publish the JANAF Thermochemical Tables. These publications became arguably the best single compilation of thermodynamic data anywhere.

Safety issues associated with liquefied natural gas (LNG), along with research on the underlying mechanisms and scaling laws, were a priority for May. In 1969 his group began running warranty tests on large-scale LNG plants, including refrigeration, compressor, and plant capacity assessments. Those measurements of radiation from very large fires became the design basis for setting the spacing between storage tanks. Extensive safety tests were carried out to assess vapor dispersion downwind from large spills on water and its dependence on evaporation rate and weather-related mixing conditions. These observations led to the first semiquantitative explanation of flameless explosions.

With Exxon Nuclear starting in 1973, May worked in the area of nuclear fuels, particularly uranium enrichment processes. His work established the general form for design of cascades of centrifuges as well as the principles that influenced internal flow and thus the optimal reflux ratio. He was responsible for organizing Exxon Nuclear’s patent effort on centrifuges.

As senior science advisor at Exxon Research and Engineering Company from 1976 to 1983, he occupied the highest rung on the technical ladder. During that time he started an applied mathematics group that contributed to bringing the Athabasca

Tar Sands work to a reasonable engineering design conclusion. Other engineering projects that benefitted from that group included the design of a laser-isotope enrichment plant and an assessment of costs to the operating variables, and work on magnetically stabilized fluidized beds for separation processes.

Based on his considerable experience he was appointed to serve on a number of National Research Council committees: on Safety of Ship-Transport Liquefied Natural Gas (1978); on Separation Science and Technology (1983–1987); on Alternative Chemical Demilitarization Technologies (1992–1993); on Review and Evaluation of the Army Chemical Stockpile Disposal Program (1993–1999); on Decontamination and Decommissioning of Uranium Enrichment Facilities (1993–1996); on Evaluation of Alternative Chemical Disposal Technologies (1995–1996); on Evaluation of Alternative Technologies for Demilitarization of Assembled Chemical Weapons (1997–2000); and on Evaluation of Chemical Events at Army Chemical Agent Disposal Facilities (2001–2002).

Concurrent with his tenure at Exxon, May held faculty positions at Stevens Institute of Technology (1966–1972) and Rensselaer Polytechnic Institute (1972–1977). He was a fellow of the American Institute of Chemical Engineers, and received its 1989 Award in Chemical Engineering Practice for “substantial lifetime achievement . . . in industrial chemical engineering practice.”

After his retirement from Exxon in 1983 he joined the faculty of the Department of Chemical Engineering at the University of Illinois. With the enthusiasm of a youth, he restudied the undergraduate curriculum and took the examination to become a registered Professional Engineer in the state of Illinois.

Turning his full attention to the undergraduates, he brought world-class expertise to teaching courses in process design, thermodynamics, reactor design, mass transfer, and industrial chemistry. The students responded with enthusiasm and genuine admiration, bordering on awe, to the combination of his extensive experience along with a warm and thoroughly engaging manner.

May had a deadpan look and a sly sense of humor that would reveal itself only after you thought for a moment about what he had just said, at which point he would take gentle delight in watching the realization dawn.

His first wife, the mother of his children, predeceased him; his second wife, Helen Dickerson May, passed away in 2014. He is survived by children Jack (Lea) May, Douglas (Joanne) May, and Caroline (Jay) Baraki, five grandchildren, and one great-grandchild. His son Jack remembers that his father

enjoyed playing golf, usually early Sunday morning, and both water and snow skiing. His hobbies included a love of travel—he traveled around the world, from Canada to Europe to the Middle East, including Libya (for EXXON) and Egypt for pleasure. He also frequented the theater.

He was a master at relating to whoever his audience was even if he was with a 4-year-old, he would make a game of Candyland fun by placing simple bets!

For dad, life was about learning. He loved to learn . . . he even took a French class at the Community College in Champaign, IL, when he was in his mid-80s.

