



# Directors Corner

It has been 15 years since I joined the Mary Kay O'Connor Process Safety Center. As they say, "time passes quickly when you are doing something you like." Yes, it has been hard work but I have enjoyed it so much that it seems just like it was just yesterday that I and my family and moved to College Station. It has been a journey of many challenges and opportunities; however, at the same time this trek has been filled with many occasions of enjoyment and accomplishment. The April 18, 2012 recognition with the Bush Excellence Award for Faculty in Public Service was preceded by the Doctor Honoris Causa from the Technical University of Lodz, Poland in September 2011. These are not personal triumphs, but truly a recognition of the significant accomplishments by Center researchers, graduate students, and staff for all the cumulative efforts over the past 15 years. It has indeed been an absolutely delightful journey of teaching, advising as well as learning from and working with many of my bright, enthusiastic, diligent and conscientious students and associates. I would also like to take this opportunity to thank two individuals who have provided more than moral support and encouragement. They are Trevor Kletz and Mike O'Connor. First, I really appreciate Trevor's support for our work at the Mary Kay O'Connor Process Safety Center. I also want to thank him for his pioneering leadership in many areas of process safety. Trevor is really a giant

in this field, and as Roy Sanders likes to say, "Trevor does cast a long shadow in the field of process safety." We will be celebrating Trevor's 90th birthday this year at the 15th International Symposium of the Mary Kay O'Connor Process Safety Center. I am proud to have Trevor's friendship and his support. I also want to take this opportunity to thank Mike O'Connor. He has converted his personal tragedy into an opportunity to integrate process safety into education, research, and service activities at universities. He has been a true friend and supporter of the mission and goals of the Center.

During these 15 years the Center has grown in reputation and credibility and it is now recognized and sought out by other universities world-wide. We are called on to provide public service at the national and international level, and multinational companies seek help from the Center for help in making safety second nature. These accomplishments of the Center in research, service and education are the cumulative result of the hard work of many. In this respect, I must recognize the hard work of the students, researchers, staff, and many faculty all over the world and industry leaders supporting process safety. The commitment of the many individuals who have contributed selflessly by working on the Steering Committee and Technical Advisory Committee has also been of significant impact. We are also indebted to our wider constituencies who have

supported our continuing education programs, workshops and symposia.

So, where are we today? At Texas A&M University, we have a very vibrant program of education, research and service. Process safety is now a core requirement for the chemical engineering curriculum. In addition, we have strengthened the safety certificate program. All undergraduate majors in all 12 engineering disciplines can take safety as a minor. To fulfill the minor requirements, they must take five safety courses (15 credit hours) within their degree program. BS engineering graduates with the safety certificate are in high demand within the industry. Based on this success, we have also developed a graduate safety certificate for MS and PhD degrees. Finally, we have also developed a professional safety certificate program for professionals in the industry. Individuals taking the professional safety certificate program do not have to enroll in a degree program at Texas A&M University and can fulfill the requirements through a combination of semester long courses, short courses, and symposia (either on-site or via distance learning). The Masters in Safety Engineering Program has also been expanded and strengthened extensively for both onsite and distance learning (thesis and non-thesis option). Individuals with a BS in any engineering discipline can apply for and get admitted to the program. The degree program is based on the individual's major and interest, e.g., a nuclear engineering major would have the degree program tailored to radiation safety engineering. We also have a large PhD program of about 30 students who are working on various safety engineering research projects under faculty fellows/professors from various departments. Our current focus is to enlarge the footprint to diverse and multi-disciplinary areas. We are also currently seeking approval from the Texas Higher Education Coordinating Board for a focused PhD program in Process Safety Engineering. In the service area, we have major programs in continuing education, workshops and symposia. We also provide service to national and international organizations. In this

respect, I must mention that the US Congress has sought our counsel and input a number of times through appearances at public hearings and written testimony.

During these years, process safety has also grown in recognition at the national and international level. To name some of the advances, process safety is a dominating theme at the AIChE Spring National Conference. In fact, because of the mainstream interest in process safety research, the AIChE Fall National Conference also includes major sessions on process safety. In addition there are many other national and international conferences that emphasize process safety research both thematically and topically. The Annual Mary Kay O'Connor Process Safety Center International Symposium has become a staple for both industry and academia. Finally, the recent ABET requirements for universities to reinforce their chemical engineering curriculum to include process safety, and reactive chemicals clearly represents a huge step forward in academia for the importance of the field of process safety.

Texas A&M University is at the forefront of a sea change in process safety education, research and practice. Industry, for a long time, and more so now recognizes the need for graduates with a strong background in process safety. The demand for our students is far greater than the number of students graduating from the Center. In order to meet this demand for students educated in process safety engineering, the agenda for the Center's future must include more tenured faculty performing research in process safety across all disciplines in engineering in industrial and fundamental research. Other universities must also support the development of similar programs.

Where does process safety go from here? My personal opinion is that despite the tremendous progress we have made, we still have a long way to go. Our engineering education today lacks integration of knowledge needed for modern industry practice, and is inadequate in providing students with an understanding of societal impact

and global role of engineering. My vision for engineering education brings together elements of manufacturing, design and sustainable engineering in an integrated form. And interwoven through this new paradigm is the consideration of risk in every aspect. An engineer must function as a member of the global community. This means not only competing in the global marketplace, but also acting as a professional who shares the global responsibilities. These responsibilities entail proper account of the finite world resources, sensitivity to the impact on the environment, ethical conduct, process safety, risk consideration and much more. Today's engineering education largely neglects preparing our graduates to meet these challenges. This "extra", but much needed aspect may be called "the sustainability dimension," to engineering education and practice, and can be summarized as, "The design of materials, processes, products and systems to sustain good and safe conditions for human health and environment."

In summary we have come a long way, but we still have much more to do. In this respect, on October 21-22, 2011, the Mary Kay O'Connor Process Safety Center convened an unprecedented gathering of a distinguished panel of select process safety experts to participate in the "Workshop on Process Safety Research Agenda for the 21st Century," with the intent of preparing a roadmap for process safety in the next century. During the deliberations, 19 areas were identified to focus future research: hazardous phenomena; inherently safer design; risk management; consequence analysis; critical infrastructure protection; complex systems; resilience engineering; integration of process safety with occupational safety; organizational/human factors: distinguish between

technology and people; safety culture; mechanism to import process safety into emerging technologies; safety technologies; layers of protection, mitigation system; life cycle/maintenance; process safety



*Workshop Attendees*

management knowledge: transfer, improved access; dissemination; standardization of process safety methods; integration of databases for improvement of process safety; easy-to-implement process safety methods for the industry; application of process safety to drilling operation; and natural hazard triggering technological disasters (NaTech). Efforts were made to further categorize this list in terms of technical and organizational initiatives, recognizing that the list needs to be prioritized in terms of a set of criteria. The report from this distinguished panel will be forthcoming in the near future as a publication from the Center.

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