

## PSE CELEBRATES 15<sup>TH</sup> YEAR

With this issue of the PSE newsletter, PSE enters our 15<sup>th</sup> year as an engineering firm.

PSE expertise is well established for consulting on process-mechanical design, analysis and specification of process equipment and piping systems.

In addition to our equipment design expertise, PSE has completed the overall engineering and management of several multi-discipline projects, each ranging from \$300K to \$8.5M (TIC). Such projects are accomplished by a matrix team approach through our alliance with other specialty engineering firms to provide multi-discipline detailed design engineering.

PSE continues to emphasize attention to detail, technical correctness, and proper documentation.

We appreciate the opportunities given by our clients for PSE to prove our engineering capabilities.

William E. Short II, Ph.D., P.E.  
Fellow ASME  
President/Principal Engineer



Bill Short

## PROCESS REACTOR MODIFICATIONS LEAD TO IMPROVED PRODUCTION



Agitator Section

At the heart of every chemical process, there is a key equipment item, the chemical process reactor. These reactors are vertical or horizontal pressure vessels. Typically, the reactors have an external jacket and are fitted with an agitator. Most often, such existing process reactors were designed

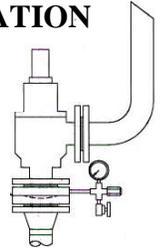
as ASME Section VIII Div. 1 vessels for static pressure-temperature conditions, but the reactors actually experience cyclic thermal-pressure operation.

PSE has evaluated many existing process reactors to determine the replacement vs. refurbish economics. Most of these reactors have been in service for 20 years or more. In all cases, whether replaced or refurbished, PSE recommended design improvements that were

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## PRESSURE-RELIEF DEVICE SIZING VERIFICATION AND DOCUMENTATION

By statute, pressure containing equipment and piping systems must be protected from excessive overpressure. For low pressure tanks and equipment, pressure-vacuum conservation vents are used; and for vessels and piping above 15 psig, pressure-relief valves and/or rupture disks are used.



Relief Valve/Rupture Disk

In his studies, Mr. Short shows that a significant number of pressure-relief devices presently installed in many existing production facilities likely are undersized. This presents serious potential danger to the facility and personnel, the environment, and public safety. From his published data, Mr. Short concludes that the fire exposure case governs 50% or less of the time, and he recommends seven relief contingencies that always should be considered when sizing relief devices. A copy of Mr. Short's February 2006 paper on this topic published in the ASME Journal of Pressure Vessel Technology can be requested on the PSE website. Copies of his related papers cited in the Journal paper also can be requested.

## SHORT ELECTED TO BOARD ON ASME CODES AND STANDARDS

The ASME Board on Pressure Technology Codes and Standards (BPTCS) oversees all activities related to ASME codes, standards, guidelines and accreditation programs for non-nuclear pressure containing equipment.

In June 2006, Dr. William Short II, P.E. was elected to a 5-year term on the BPTCS. He was nominated by the ASME Pressure Vessels and Piping Division (PVPD). Bill began his term in October 2006.

The members of the BPTCS have the opportunity to comment on all changes proposed by the committees of the ASME codes and standards (e.g., BPV Code, B31 Piping Codes, Post-Construction Code, API-579 FFS Standard, etc.). The BPTCS considers and votes on all changes proposed from the various codes and standards committees. For more information, visit the ASME website at [www.asme.org](http://www.asme.org).

## 'SHORT' NOTES

By statute in most states, an individual engaged in the practice of engineering must be a licensed Professional Engineer, or "P.E.". Engineering firms must have a P.E. on staff. In some states, including Delaware and New Jersey, an engineering firm also must have a Certificate of Authorization (C/A) for the firm to practice engineering in that state. Some states exempt operating companies from the licensed P.E. and C/A requirements

Consider that an attorney has a law degree, but cannot practice law unless admitted to the bar; teachers have degrees in education, but must be state-certified to teach; and a degreed nurse must be licensed to practice nursing. It follows then that an individual who practices and/or is in responsible charge of engineering should have an engineering degree and also be a licensed P.E. After all, which of these professions has the most direct influence on public safety?

## PROCESS REACTOR MODIFICATIONS LEAD TO IMPROVED PRODUCTION

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incorporated. This has provided dividends to PSE clients by reduced downtime and, in some cases, improved production capacity.

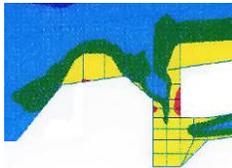
For new or refurbished reactors and agitators, PSE prepares the engineering specification, obtains competitive quotations, handles or assists in procurement, and performs the in-process inspections.

For one case, a thermal-mechanical stress analysis of a 30 year old vertical chemical reactor determined that the reactor could remain in service at modified operating conditions. The remaining life was estimated by finite element analysis (FEA) per ASME Section VIII Div. 2 fatigue criteria. This fitness-for-service assessment extended the reactor life and avoided the major expense of immediate replacement.

In another case, the jacket cooling/heating fluid flow pattern and rates were modified, and the reactor and agitator lengths were extended. This reactor retrofit provided a cost-effective increased capacity for the chemical production plant without the need for a new reactor and agitator.

To engineer and specify such reactor design improvements, a skilled engineer is needed with experience in pressure vessel design, agitators, machine design, stress analysis, fluid mechanics and heat transfer. Experience with qualified vessel fabrication shops also is needed.

For assistance on new or existing chemical reactor designs, or information about other PSE experience that could be of benefit to your company, contact Bill Short at PSE.



FEA Stress Contour

## ADMINISTRATIVE ASSISTANT IS MORE THAN A SECRETARY

While perhaps no longer "PC", a firm's administrative assistant once was referred to as a "Girl Friday". This meant that the position handled many different tasks and responsibilities, requiring a wide range of skills. This holds true for PSE's Administrative Assistant, Kimberly S. Keller.



Kim Keller

Ms. Keller is a certified secretary, and she also supervises the administrative and clerical functions on large projects. Kim is highly skilled with MS Word, Excel, Access and Power Point and other business software.

On all PSE consulting work and projects, Ms. Keller maintains the procurement logs, performs telephone expediting, and maintains all the electronic and manual file systems. Yes, Kim is an efficient multi-tasker.

At the risk of political correctness, it is easy to see that Kim Keller is PSE's "Girl Friday". Kim has been with PSE nearly 12 years. She can be reached at [kkeller@PSEIncDE.com](mailto:kkeller@PSEIncDE.com)

## PSE SUPPORTS OVARIAN CANCER EVENT

PSE is a proud sponsor of the annual Run/Walk for the Whisper, organized and directed by the Delaware Chapter of the National Ovarian Cancer Coalition (NOCC-DE).

Ovarian cancer is the 5<sup>th</sup> leading cause of cancer related deaths in women age 35-74. It can affect women and girls of all ages and ethnic backgrounds. To date, there is no reliable diagnostic screening; and, contrary to popular belief, a Pap Test CAN NOT detect ovarian cancer.

The 4<sup>th</sup> Annual NOCC-DE Run/Walk was held in May at the Riverfront in Wilmington, Delaware. The 2007 event had record participation, attendance and revenues. Nearly \$22,000 was raised for awareness, education and research. Dorianne Short is the NOCC-DE President and an ovarian cancer survivor.

We take this opportunity to express our appreciation to all PSE clients, business associates and friends who contributed to this year's event.

For more information on ovarian cancer, or our NOCC-DE events, visit the NOCC website at [www.ovarian.org](http://www.ovarian.org) (DE Chapter).

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