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Journal of Hazardous Materials 150 (2008) 187–190
Journal of Hazardous Materials
www.elsevier.com/locate/jhazmat

Book reviews

Proceedings of the Thirtieth Arctic and Marine Oilspill Program (AMOP) Technical Seminar, Environment Canada, Ottawa, Canada, two vols. (2007). 943 pp., available in both English and French

My review of these proceedings of (to the best of my knowledge) the longest running oilspill conference has occurred at the same time as Canada's Prime Minister announced plans for increased government activity in the Arctic in response to actions taken by other foreign governments who indicate interest in the area – reportedly because of significant potential oil reserves. And oil spill in the Arctic has long been (as the title of these proceedings indicates) the interest of Environment Canada scientists.

These proceedings contain 55 papers grouped into the following 11 sections:

- Physical and chemical properties of oil and behaviour of spilled oil (5 papers).
- Oil spill treating agents (6 papers).
- Activity updates in contingency planning (2 papers).
- Biological effects of oil and hydrocarbons and oil biodegradation/BIOSOLR (6 papers).
- Containment and recovery (5 papers).
- Shoreline protection and cleanup/in-situ burning (2 papers).
- Detection, tracking and remote sensing (3 papers).
- Technical seminar on chemical spills (TSOCS) (11 papers).
- Spill modelling (6 papers).
- Special session – DRDC field trial (7 papers).
- Posters with paper (2 papers).

As may be expected, the authors of the papers are mainly from Environment Canada but there are contributions from Russia, the United States, and France. Among the non-governmental presenters were papers contributed by members of oil companies: Exxon-Mobil, Chevron, and BP. I was also pleased to see some university interest in the field with papers contributed from two Canadian and four U.S. universities.

While most of the papers deal with diverse aspects of oil spill behaviour in controlled experiments and its remediation, there were two papers on chemical spills – an HCl incident in Canada and an oil spill burn in Louisiana purposely performed for restoration purposes. These were the only two papers dealing with factual incidents. One other deviation from oil spills was a paper from NOAA discussing the physics of LNG spills. With the increased shipping of LNG world-wide, this topic is of increasing importance.

Finally, I note that my good friend and an editor of this journal, Merv Fingas, was still an active participant in a number of papers. Even though he has retired from Environment Canada, his legacy continues.

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28 August 2007

Available online 1 September 2007

doi:10.1016/j.jhazmat.2007.08.085

Center for Chemical Process Safety (an AIChE Industry Technology Alliance), Guidelines for Risk Based Process Safety, John Wiley & Sons, Inc., Hoboken, NJ (2007). 751 pp., Price: US$ 150.00, ISBN: 978-0-470-16569-0

The American Institute of Chemical Engineers has been a leader in promoting "a safety culture" for the chemical industry since 1985 with the creation of the Center for Chemical Process Safety (CCPS). This book is one of several they have generated by the work of its committee members. Like all other CCPS publications, it has been peer reviewed. Reviewers for this publication were from Environment Canada, the US EPA, the UK Health and Safety Executive, and industry.

"The purpose of the RBPS Guidelines is to provide tools that will help process safety professionals build and operate more effective process safety management systems. These guidelines provide guidance on how to (1) design a process safety management system, (2) correct a deficient system, or (3) improve process safety management practices."

"The RBPS system may encompass all process safety issues for all operations involving the manufacture, use, storage, or handling of hazardous substances or energy."

In the Executive Summary, the authors outline the text's materials: Chapter 1 provides background information and lays the foundation for this new approach to managing process safety.

Chapter 2 defines the risk based process safety approach for applying the RBPS elements to industrial operations. Chapters 3–22 provide the management system framework for each RBPS element. Each element chapter has the same organization:

- Overview
- Key principles and essential features
- Work activities and implementation options
- Performance and efficiency improvement examples
- Possible metrics
- Management review topics

The chapters are grouped into four major sections with the following titles:

1. Commit to process safety: process safety culture; compliance with standards; process safety competency; workforce involvement; stakeholder outreach.
2. Understand hazards and risk: process knowledge management; hazard identification and risk analysis.
3. Manage risk: operating procedures; safe work practices; asset integrity and reliability; contractor management; training and performance assurance; management of change; operational readiness; conduct of operations; emergency management.
4. Learn from experience: incident investigation; measurement and metrics; auditing; management review and continuous improvement.

Chapter 23 describes approaches for initial implementation, correction of deficiencies, and ongoing improvement of an RBPS system at a facility. Chapter 24 sets goals for ongoing improvement of process safety management systems.

A review of the book's Index is a good indication of its contents. First I note that there is an interesting list of accidents that includes explosions (ammonium nitrate, hydrocarbon storage terminal, oil platform, dust, hydroxylamine, and gas plant), BLEVE, Bhopal, commercial aviation, and a runaway chemical reaction.

Other major items found in the index include the following: accident prevention pillar, auditing, check lists, continuous improvement, contractors, corrective action, emergency responders, emergency response, hazard analysis, hazard identification and risk analysis, improvement, incident investigation, inspection test and preventative maintenance, life cycle, operator (this category contains 72 separate entries which is the longest in the index), safe operating limits, safe work practice, and training refresher (this topic has 62 entries).

This book is a very well-written, detailed analysis of industrial chemical plant safety. Following its guidelines, I am sure, will result in many fewer accidents in the future.

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28 August 2007

Available online 1 September 2007

doi:10.1016/j.jhazmat.2007.08.086

Methods and Reagents for Green Chemistry: Introduction, P. Tundo, A. Perosa, F. Zecchini (Eds.). John Wiley & Sons, Inc., Hoboken, NJ (2007). 331 pp., Price: US$ 100.00, ISBN: 978-0-470-75400-8

This book contains 15 papers presented at the Italian Interuniversity Consortium for the Environment summer school which has been operational since 1988. The goal of this partnership is to discuss innovative approaches to the design of clean chemical reactions. Given the ongoing concern for pollution of the environment and the continuing disappearance of raw materials (especially those supplying energy), this book is a welcome addition to the literature as it will markedly enhance our knowledge of sustainable development process.

One author (Scheldon) of Delft University of Technology in the Netherlands has provided a useful definition of green chemistry: "Technologies that efficiently utilize energy and (preferable renewable) raw materials and reduce, or preferably, eliminate the generation of waste and avoid the use of toxic and/or hazardous reagents and solvents."

The above definition is in one of the papers that cover a wide range of topics. The best way, in my opinion, to show this coverage is to list the titles of the papers in the book:

- Part one: Green reagents
  - The four-component reaction and other multicomponent reactions of the isocyanides.
  - Carbohydrates as renewable raw materials: a major challenge of green chemistry.
  - Photoinitiated synthesis: a useful perspective in green chemistry.
  - Dimethyl carbonate as a green reagent.
- Part two: Alternative reaction conditions
  - Ionic liquids: "designer" solvents for green chemistry.
  - Supported liquid-phase systems in transition metal catalysis.
  - Organic chemistry in water: green and fast.
  - Formation, mechanisms, and minimization of chlorinated micropollutants (dioxins) formed in technical incineration processes.
- Part three: Green catalysis and biocatalysis
  - Green chemistry: catalysis and waste minimization.
  - Seamless chemistry for sustainability.
  - Enantioselective metal catalyzed oxidation processes.
  - Zeolite catalysis for cleaner technologies.
  - Acid and superacid solid materials noncontaminant alternative catalysts in refining.