



PERF Newsletter

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Environmental
Technical
Solutions for the
Petroleum Industry

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Welcome Petrozyme Technologies Inc.!

We are pleased to announce that Petrozyme Technologies Inc., of Guelph, Ontario, Canada has joined PERF as an Associate Member on May 19, 2000.

Petrozyme is a company that possesses a proprietary fermentation technology for the on-line remediation of sludge from treatment streams at oil refineries and chemical

plants.

We welcome representative Bill Mullin and Petrozyme to the PERF family, which is listed in full on Page 4.

Petrozyme
TECHNOLOGIES INC.

Project 97-04, FCC Regenerator SO_x/NO_x Emissions Database and Correlations

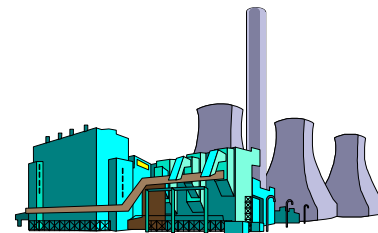
A predictive tool for estimating SO_x and NO_x emissions based on feed quality and operating conditions has been developed for refinery fluid catalytic cracking units (FCCUs). Together with a database, the tool is available to project participants.

In June 1997, ExxonMobil proposed a \$180k project to collect and correlate data on FCC regenerators to provide a database and the predictive tool. ExxonMobil was the contractor, with partners sharing data and funding. Participants ExxonMobil, Marathon, Amerada-Hess, BP Amoco, and BOC Gases each provided one member on a Program Advisory Committee and available data sets for their affiliated FCCUs. A total of nineteen data sets from thirteen units, with significant representation

of both partial burn and full burn regeneration were included in the database and correlations.

Results are incorporated in a desktop estimating application as an Excel workbook which develops a material and energy balance around the regenerator with user inputs. Provision is made for specific unit calibration factors to allow for variability around the correlations.

The project was completed at year end 1999.



Highlights of Spring Meeting in Houston

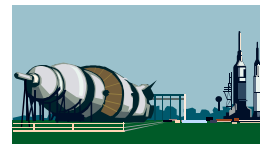
The Quarterly Spring meeting of PERF was very successfully held on March 8-9, 2000 in Houston. The minutes of the meeting and agenda are available on our web site at: <http://www.perf.org/>

Peter Robison represented the host organizations Equilon Enterprises LLC, and Shell International E&P at their Westhollow Technology Center, in Houston. The theme of the meeting was two-fold: synthetic drilling fluids; and downstream emissions. Forty-two people attended the meeting.

On the first day, in the General Session, two hours were devoted to drilling fluid issues in the North Sea and the United States. Two hours was also devoted to estimating emissions in downstream facilities. The group then broke up into con-

current Upstream and Downstream Sessions:

- The Upstream Session focused on drilling fluid issues in more detail, and included a brainstorming session.
- The Downstream Session went into more detail on emissions estimating, and included a discussion of emissions from combustion, persistent bioaccumulating toxics, and control of NO_x.



Successful meeting hosted by Equilon/Shell in Houston

On the second day, several new projects were proposed, and summaries of each of the previous day's concurrent sessions were presented.

New Project Proposals

During the Spring meeting in Houston, two new projects were proposed and three projects that had been proposed at the October, 1999 meeting were presented with additional detail:

- 99-13 Expanding the Science Basis for Risk
- 99-14 Characterization of Dioxin from Combustion Sources
- 99-15 Improving Critical Parameters for Estimating Free Product Recovery
- 2000-01 Best Practices for E&P Waste Treatment
- 2000-02 Identify/Evaluate Flaring Best Practices

Additional information on some of the proposals is given elsewhere in this Newsletter. But, for more detailed information on any of these proposals, please visit our web site, where you will also find a way to contact the project leader.

“. . . details of all of the projects . . . since our formation in 1986 are presented on the web site.”

Note that details of all of the projects performed under the PERF umbrella since our formation in 1986 are presented on the web site. Also note that specific results of projects are generally not published, as these remain proprietary to the participating companies.

Next Quarterly Meeting in Stavanger June 29-30

The 53rd PERF Quarterly Meeting will be co-hosted by Statoil and Phillips in Stavanger, Norway, June 29-30, 2000.

There will be three "themes" at the meeting:

- A General Session on the morning of June 29 that will highlight presentations from several international environmental research organizations
- An Upstream Session on the afternoon of June 29 that will focus on treatment of produced water and on



flaring

- A concurrent Downstream Session on the afternoon of June 29 that will feature discussions of a proposal to form a transatlantic group of experts on remediation of petroleum hydrocarbons in groundwater, and on developing environmental regulations in Europe. CONCAWE will participate in this session.

Details of the meeting and of accommodations are posted on our web site: <http://www.perf.org/>
See you in Stavanger!

Project 94-05 Clean Air Program

The objective of this completed PERF project was to develop approaches, data, and technologies leading to cost-effective compliance with the 1990 Clean Air Act and its Amendments. Activities carried out under this program included the collection, exchange, and analysis of research, development of basic engineering techniques, and systematic study of phenomena related to achieving this objective.

Value of the products from this project total almost \$8 million. Project participants were Amoco Oil, Atlantic Richfield, BP Oil, Chevron Research and Technology, Exxon Research and Engineering, Mobil R&D, Philips Petroleum, Texaco, and API as a cosociate participant. The project was coordinated by Shell Oil.

A key achievement of this project was the development of a

comprehensive database of speciated refinery process streams. The database was assembled using information from 31 refineries involving over 50 process streams.

The database has proven to be a powerful tool for improving emissions estimates, acquiring permits and developing realistic risk assessments. It is now available commercially. This project was completed in 1999.

Please contact Ed Brost of Equilon Enterprises LLC if you have any questions. His telephone number can be found on our web site: <http://www.perf.org/>



Speciation of Petroleum Refinery Process Streams

Interested in Joining PERF?

There are many reasons to join PERF. As explained in the box on Page 4, PERF provides a forum for members to come together to develop new solutions to health environment and safety concerns. Membership is currently \$2,500 p.a.

There are three categories of membership. If you are engaged in the exploration for, or extraction of, or refining of Petroleum Hydrocarbons anywhere in the world you might consider becoming a full member. Full members have full voting rights and benefits of the organization.

Associate membership is open to those companies involved in

supporting petroleum companies in their business. Associate members have all the rights of membership, except those of sitting on the Board of Directors.

A Liaison participant is generally a Trade organization, can attend PERF meetings, participate in discussion and projects, but cannot vote or sit on the Board of Directors. Annual dues are waived.

Please contact us if you are interested in becoming a member or would like more information.

“There are three categories of membership.”

Project 98-04. Manage Water Soluble Organics in Produced Water

Shell and Chevron are leading a project which began in March 2000 to improve the management of water soluble organics in produced water. The participants Chevron, Phillips, Shell, Statoil, and Oak Ridge National Laboratory will exchange information in two areas: characterization of the soluble organics and models which predict their formation in produced water; and cost-effective treatment technologies for their removal.



oil-in-water monitoring workshop in Aberdeen, Scotland in May. Per Gerhard Grini, Ståle Johnsen and Toril Bergis presented results of work to compare two methods for detecting oil in produced water: the freon infra red (IR) method and the proposed ISO Standard Method. They showed that the proposed ISO standard technique produced significantly lower values than the conventional IR method.

The in-kind contribution from Statoil was presented at an

If you are interested in participating in this project, please contact one of the coordinators. Details are on our web site.

Environmental Technical
Solutions for the Petroleum Industry

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TEAMWORK: Together we achieve the extraordinary!



PERF

We're on the web:
<http://www.perf.org/>

The Petroleum Environmental Research Forum (PERF)* is a research and development joint venture, formed to provide a stimulus to and a forum for the collection, exchange, and analysis of research information relating to the development of technology for health, environment & safety, waste reduction and system security in the petroleum industry. PERF is a non-profit organization of Members which are corporations engaged in the petroleum industry that recognize the importance of a clean, healthy environment and are committed to support cooperative research and development. PERF does not itself participate in research projects but provides a forum for Members to collect, exchange, and analyze research information relating to practical and theoretical science and technology concerning the petroleum industry, and a mechanism to establish joint research projects in that field.

*The name Petroleum Environmental Research Forum and its acronym PERF are registered service marks

Letter from the Chair

Dear Members and Associates:

Many of our member companies have committed to adopting an HS&E management system, and their assets and operating units are working hard to achieve ISO 14001 status. Thus, there is an ever-increasing need to identify, verify, and effectively implement new technologies for promoting good environmental performance. PERF's quarterly meeting in Stavanger on June 29-30 will address several relevant topics, including presentations on needs for R&D technology by several international environmental research organizations, emissions estimating and reduction, and environmental impact studies and treatment technologies for produced water.

I am happy to tell you that in the past month several new groups and organizations have shown great interest in participating in PERF, and they will be represented at the meeting in Stavanger. I would like to remind you that this and future PERF meetings provide an excellent opportunity for sharing information and initiating new joint industry projects to investigate and evaluate new and developed technologies. What could be better than leveraging our environmental R&D needs using this international forum and a network of global experts! Our goal is to achieve control and management of environmental risks and to adopt sound environmental solutions.

Let's work together!

Member Companies & Representatives

Amerada Hess
Aramco Services Co.
BHP Research
BP Amoco
Chevron Research and Technol.
Conoco, Inc.
Elf Aquitaine
EniTecnologie
ExxonMobil
Marathon Oil
Oryx Energy
PetroCanada
Phillips Petroleum Company
Shell International E&P
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Robert Finley
Nancy Liberts
Colin Grieves
Sara McMillen
Stephen Jester
Elisabeth Adam
Renzo Boni
John Wilkinson
Teresa Monger-McClure
Patrick Grizzle
Bruce Kennedy
William Prevatt
Zara Khatib
Per Gerhard Grini
Sheryl Maruca
Todd Ririe

Associate Members & Representatives

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Petrozyme Technologies

Adolfo Silva
Bill Mullin

Zara I. Khatib