

# BioPetroClean's News

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## QUICK THOUGHT FROM DAVID AMIR

“Despite operating in continually challenging global economic conditions, we at BPC are encouraged by our recent progress and maintain an optimistic outlook on the near- and long-term.”

## SEE OUR BPC-ACT SYSTEM

## DEMONSTRATION

We invite you to a demonstration of our recently installed BPC-ACT system at Heros Sluiskil in the Netherlands. For further details see [Page 4](#).

## INVITATION TO NETWORKING EVENT



We invite you to join us in **Antwerp, Belgium** for **T3**, the third annual Oil and Chemical Logistics Networking Event hosted by TankBank.com, taking place **June 16-18**. For more information and to register for the event, please visit:

[http://www.tankbank.com/t3\\_index.php](http://www.tankbank.com/t3_index.php)

## DOW-BPC PARTNERSHIP

See a Dow Chemical [video animation](#) explaining our BPC-ACT technology.



## A MESSAGE FROM DAVID AMIR, CEO

Dear Reader,

BioPetroClean (“BPC”) continues to make significant headway. Upon completing a pilot study at Dow Chemical (where professionals from Dow took part in analyzing the performance of the system), the Automated Chemostat Treatment (“ACT”) process has gained increasing validation as a viable and advantageous alternative to conventional bioremediation solutions for petroleum wastewater. Dow Chemical, our distribution partner in North and South America, confirmed extremely positive results from the pilot study and gave accolades to our team and technology. We expect an official report from Dow to be published soon.

We are in the process of rolling out further implementations of the BPC-ACT technology at several sites.

BPC has integrated a system at Heros Sluiskil (in the Netherlands), following a successful pilot conducted last year. The customer’s system will come into operation in June 2010. Heros agreed to be our reference and demo site in Europe, and we welcome customers and professionals to visit our installation and experience our technology in action.

Despite operating in continually challenging global economic conditions, we at BPC are encouraged by our recent progress and maintain an optimistic outlook on the near- and long-term.

BPC is positioned to gain increased traction with the oil and gas industry. We are prepared to face the challenges ahead and execute on our growth strategy.

We look forward to hearing from you in the future.

Sincerely,

David Amir, CEO



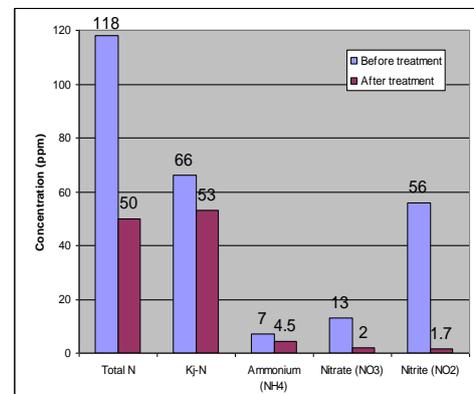
# BIOLOGICAL UPTAKE OF NITROGEN

## AEROBIC DENITRIFICATION

Nitrogen is a common contaminant in industrial wastewater, mainly found in three forms: ammonium ( $\text{NH}_4^+$ ), nitrate ( $\text{NO}_3^-$ ) and nitrite ( $\text{NO}_2^-$ ). These forms can be removed by a variety of physicochemical and biological processes. However, because biological nitrogen removal is effective and inexpensive, it has been adopted widely in favor of the physico-chemical processes. Biological nitrogen removal can be carried out in two approaches. One is the assimilation of ammonium by microorganisms. Becoming an integral part of the cells, the nitrogen is removed from the water, when the biomass is removed, usually by sedimentation. Another approach is the formation of gas, mainly in the form of  $\text{N}_2$ . In this case, the total nitrogen level decreases as a result of evaporation of the gaseous compounds out of the system. The nitrogen gas formation is a result of two sequential biological processes: nitrification and denitrification. Nitrification is the oxidation of ammonia to nitrate. In the next step, denitrification, nitrate is reduced to gaseous nitrogen. This step is known to occur in an anaerobic environment, due to the high sensitivity of the denitrifying bacteria to oxygen. Nevertheless, it has been previously reported that denitrification under aerobic conditions has been

observed (Lukow et al. Aerobic denitrification by a newly isolated heterotrophic bacterium strain TL1). Based on BioPetroClean's experience, this phenomenon of aerobic denitrification was also observed among some of our clients. The following figure demonstrates a decrease in the total nitrogen level that is mainly a result of the nitrate depletion, in water taken from a refinery. Since the biological process was not performed under oxygen restricted conditions, this indicates an aerobic de-

### NITROGEN REDUCTION BY AEROBIC DE-NITRIFICATION



\* The measurements were performed without any sedimentation nitrification. Having a biological system that is able to perform denitrification under aerobic conditions can significantly reduce the costs related to infrastructure and retention time that are required for anaerobic treatment. In conclusion, nitrogen compounds can be biologically eliminated in wastewater. Aerobic denitrification is an advantageous process that has been detected in some of BPC's projects.

# CASE STUDY ABSTRACT

## BPC'S RECENT PROJECT—ONE-OFF SERVICE

BioPetroClean (“BPC”) has recently completed a project in which highly contaminated wastewater was biologically treated in a one-time service model.

The client, Israel's national oil infrastructure company, produces oil-contaminated water on a regular basis. Usually, the mildly contaminated water is transported to wastewater treatment plants where it is treated and subsequently discharged. However, an incident occurred, leading to the accumulation of a large amount (500 m<sup>3</sup>) of highly contaminated water, with over 6,000 ppm TOC level. This imposed a new challenge, as transporting and treating this water would be extremely costly. The client’s goal was to reduce the contamination to a moderate level that would allow for its further treatment at reasonable cost. As a solution to this challenge, BPC devised a simple and elegant solution. BPC converted the storage tank containing the contaminated water into a bioreactor and was able to treat the client's wastewater on-site.

### SYSTEM PERFORMANCE

	Before Treatment	BPC Treatment	Reduction Level
Phenol (ppm)	18	<0.1	99.37%
TPH (ppm)	160	7	95.6%
TOC (ppm)	6560.0	980	85.06%

As a first step, a water sample from the client’s site was analyzed in BPC's lab. This step allowed us to create a bacterial cocktail that was tailored to the treatment of this specific type of wastewater. Furthermore, the biological treatment was tested under different process conditions in our labs in order to identify the optimal conditions for full-scale treatment on our client’s site.

### FAST AND SIMPLE SOLUTION FOR ACCUMULATED WASTEWATER



In the next step, BPC placed an auto-starter unit in which the bacterial cells were cultivated to reach a certain concentration. When a satisfying concentration level was achieved, the bacteria were introduced into the water in the storage tank/bioreactor. The biodegradation was performed within the tank in batch mode for a duration of one week. By the end of the project, the water was transported to a nearby water treatment site for further treatment and discharge.

# PERSONAL PROFILE

## DR. GILI BITTAN-BANIN: DIRECTOR OF R&D



Dr. Gili Bittan-Banin has served as BPC's Director of R&D for the past three years. She is an expert

scientist in the areas of microbiology and bacterial physiology. Dr. Bittan-Banin holds a Ph.D. degree from the Department of Molecular Microbiology and Biotechnology at Tel Aviv University, Israel and completed her postdoctoral fellowship at the

University of Washington. She has received numerous awards and fellowships and published several papers in leading scientific journals, including *Nature*.

Dr. Bittan-Banin oversees all phases of the development of BPC-ACT technology. She is responsible for improving BPC's technology and proprietary solutions. Additionally, Dr. Bittan-Banin is responsible for designing solutions tailored to each client project.

# INVITATION

## VISIT OUR SYSTEM IN THE NETHERLANDS

BPC is pleased to invite you to attend a live demonstration of our Automated Chemostat Treatment (ACT) system in a newly installed wastewater treatment site at Heros Sluiskil in the Netherlands.

In order to accommodate your busy schedule, we are offering several times and dates at which we will demonstrate the BPC-ACT system. Demonstrations will include a brief explanation of the process, followed by a Q&A session. Scheduled dates are as follows:

**June 14-15, 2010**

**June 21-22, 2010**

**Demonstrations will take place at:**

Heros Sluiskil, B.V.  
Oostkade 5, 4541 HH  
Sluiskil, Netherlands

Please note that this invitation is not substitute to a personal clearancethat is required for each visitor.

For more information and scheduling, please contact:

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## BPC'S SYSTEM AT HEROS SLUISKIL

