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## Advancing Process Knowledge at px Biodiesel using MS2 Process Diagnostics

Operations at the two Greenergy biodiesel production facilities at the port of Immingham on the East coast of England are handled by px Biodiesel Ltd.

With a combined capacity of 200,000 tonnes/228 million litres a year, both biodiesel plants are located on a brown-field site at Immingham West Terminal which has existing sea, rail and road access as well as pipeline links to local petroleum oil refineries. Its sea-fed location enables effective logistics and trading with the UK and European vegetable oil and biodiesel markets as well as the wider world vegetable oil markets.



The plants are capable of using a variety of feedstocks including rapeseed, soy, palm and used cooking oils. A mix of different feedstocks is used to get the best balance of quality, price, carbon and environmental impact. Optimum management of this highly complex and innovative process requires a deep understanding of the production variables. To assist in understanding how these interact to affect plant performance, the company has invested in the MS2 Process Diagnostics System from AJM Consulting.



Data sets acquired by the Wonderware control systems are analysed by MS2 using a unique combination of advanced diagnostic algorithms and visualisation techniques. The knowledge gained is used by the plant management and technologists to increase the yield and quality performance of the plants.

*"We recognised during plant commissioning that there were substantial opportunities for performance improvement to be achieved by identifying the causes of subtle variability in this complex production process. It was clearly a situation in which many variables interact, so we knew that we required a tool that could handle multivariate problems.*

*We initially assessed the MS2 system by applying it to a known issue and it proved that it could identify and visualise the cause. We have now invested in the system and are using its powerful multivariate visualisation functions to further identify the opportunities to reduce variability, enabling us to optimise the profitability of the manufacturing operation."*

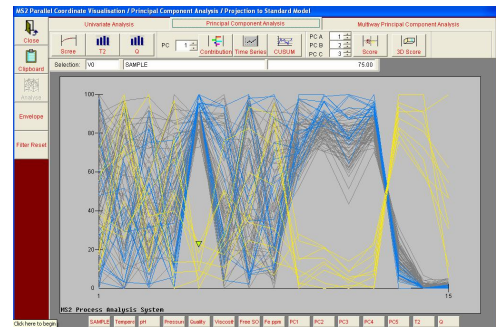
**Martin Milburn, px Biodiesel**

## The MS2 Process Diagnostics System

MS2 is a sophisticated, integrated system which models the production process, either batch or continuous, to help identify the causes of variability which can affect issues such as quality and yield. A wide range of analysis tools and visualisation methods have been developed to pinpoint critical process influences. The system incorporates powerful techniques such as multivariate principal component analysis, Manhattan significant change detection and parallel co-ordinate visualisation.

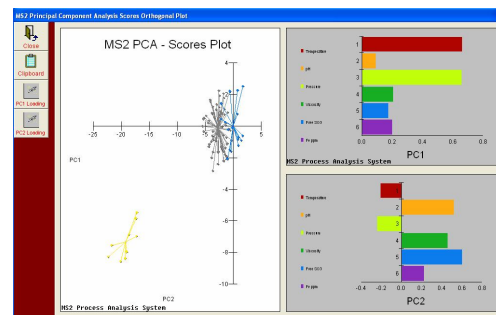
### Parallel co-ordinate visualisation

This technique provides a view of relationships between many diverse process variables, for instance quality parameters such as pH and viscosity, process parameters such as maximum pressure and temperature and calculated values such as time to peak exotherm or shift identity.



### Principal Component Analysis

The complex multivariate analysis and visualisation tools needed for this powerful technique were developed in conjunction with the world-renowned Centre for Process Analytics and Control Technology (CPACT) at the University of Newcastle. PCA provides a method of reducing the apparent complexity of large data sets to identify the principal causes of variability. It is proven to provide substantial bottom line benefits in major organisations and, through MS2, is now available to all sizes of company.



### Ease of Use

The MS2 Process Analysis System was developed by AJM Consulting to bring advanced techniques within the reach of all companies, recognising the need for low ownership cost and limited on-site personnel involvement. Technologies developed for and applied to large organisations are often just too complex and expensive for most process manufacturers and the philosophy behind the MS2 Process Analysis System is to make advanced technologies accessible and affordable with immense potential benefits to competitiveness.

### Latest Developments

AJM Consulting was selected to receive European Union funding, to enable it, in conjunction with CPACT, to design and build a unique tool, able to analyse existing data or monitor current production, by integrating to a wide range of process control or data historian systems.



Available at several levels of cost and complexity, and easily upgradeable, MS2 is ideal for all process manufacturers who need better knowledge of their processes to achieve improved production performance and a sustainable future.

AJM Consulting is working in conjunction with Newcastle University to continue development of the advanced MS2 system

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AJM Consulting is a member of:

- Institute of Measurement and Control
- Humber Chemical Focus
- Yorkshire Chemical Focus
- North East Process Industry Cluster
- Chemicals NorthWest
- CPACT



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