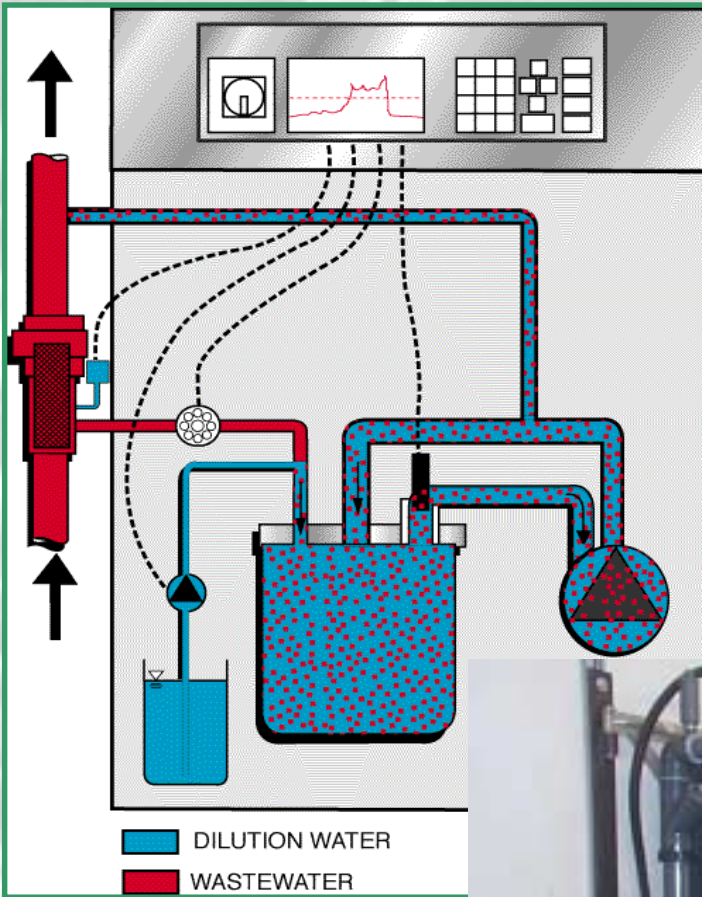


Using The STIP BIOX 1010 To Monitor Airport Run-off



June 2002 Update



Case Studies From Envitech Ltd, UK distributors for Isco-STIP Environmental Monitoring Equipment.

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Graph comparing BOD results

Schematic of East Midlands Airport Surface Water Control System



Airport applications

Introduction

Envitech has now supplied a number of Isco-STIP monitoring instruments to airport operators throughout the UK. The following provides some background to each of these installations.

1) Gatwick Airport

Summary Data:

Instrument type:	BIOX 1010, standard form apart from fitting a high concentration package.
Serial Number(s):	BI2004
Measurement Range:	0-500 mg/l
Date Commissioned:	May 1996

Approximately eight years ago Envitech Ltd had discussions with personnel from British Airports Authority - BAA who own and run Gatwick, Heathrow, Stansted, Southampton and three Scottish Airports about possible applications for STIP equipment for airport runoff monitoring. Even though the application was strictly to provide a measure of BOD, primarily due to cost differences, a UV persulphate TOC instrument was purchased and installed for this application at Gatwick.

There followed a period where the instrument required major manpower input, and even when successfully running, the data generated did not provide the required relationship to look at the suitability of a BIOX BOD monitor for this application. We supplied a trailer-mounted unit for a prolonged evaluation period. The results were sufficiently convincing for BAA to place an order for a new unit. This was eventually delivered and installed in May 1996. Since then the unit has given excellent service, requiring only minimal operator and maintenance input. We have a service contract in place on the instrument and visit every four months in order to ensure reliable operation.

The unit is being used to monitor the quality of the runoff as it leaves the collecting pond and to determine whether it may be permitted to enter the local river or has to be discharged to the local sewage works. The latter approach incurs significant cost penalties.

Graphs of comparative results from the instrument and from the Lab are attached for 1997.

Over the last year, a further three BIOX BOD analysers have been installed at Gatwick. We have also supplied a COD analyser to monitor the flow entering the nearby sewage treatment works.

2) East Midlands Airport

Summary Data:	
Instrument type:	BIOX 1010 in standard form
Serial Number(s):	BI2166 and BI2167
Measurement Range:	0 – 500 mg/l
Date Commissioned:	January 1998

Following the successful installation at Gatwick we had discussions with the consultants operating on behalf of this airport, Balfour Maunsell, who were keen to use the BIOX to control the runoff. The airport is not part of BAA but is privately owned.

This followed a period where an instrument was sourced, purchased and installed from one of our competitors. The instrument proved to require high maintenance and the values it gave did not relate to the BOD of the effluent. Discharge of this effluent is constrained on the basis of its BOD. The BIOX was selected as a direct replacement for this instrument.

We received an order for the supply of two BIOX instruments and these were installed in January 1998. They are each being used to monitor the quality of runoff and to determine whether it is of sufficiently good quality to be allowed into the local watercourse or must be disposed of elsewhere.

One instrument is being used to divert the flow either to local water coarse or to the collecting pond being monitored by the second instrument. This second unit is being used to provide data needed to operate a load-based consent. For the winter season the airport is allowed to discharge a certain volume, and quantity of BOD, via a long pipeline directly to the river Trent, a major waterway with considerable capacity. This license to discharge is limited on an hourly basis and is adjusted depending on the flow in the river. The units have been operating very successfully over the period since commissioning and have required minimal operator and service input.

3) Stansted Airport

Summary Data:	
Instrument type:	BIOX 1010 in standard form
Serial Number(s):	BI2195
Measurement Range:	0 – 500 mg/l
Date Commissioned:	December 1998

This airport is part of BAA and, as such, experience from Gatwick was readily available to the environmental manager at Stansted. The application is very similar to that at Gatwick, the reading from the instrument being used directly to control penstocks which determine whether the flow goes to a “clean” or a “dirty” pond.

4) East Midlands Airport

Summary Data:	
Instrument type:	BIOX 1010 in standard form
Serial Number(s):	BI2213, BI2214, BI 2215
Measurement Range:	0 – 500mg/l
Date Commissioned:	October 1999

Following the successful installation and operation of the first two BIOX instruments at this site we have now installed a further three instruments. The airport is expanding its runway and parcel processing facilities which will give rise to several other runoff containment and discharge systems. These new instruments are being used in conjunction with flow diversion chambers in order to determine which route the runoff should take.

These instruments were installed and commissioned during autumn 1999 and have been in operation ever since. Performance has been reliable and the customer has assessed “up-time” as being around 98%.

Attached is a schematic of the arrangement at this airport showing the three main catchments systems and the control strategy using the five BIOX instruments currently in operation.

5) Manchester Airport

Summary Data:	
Instrument type:	BIOX 1010 two in standard form, one in high-concentration form
Serial Number(s):	BI2200, BI2264, BI2309
Measurement Range:	0 – 500mg/l
Date Commissioned:	Jan 1999, Nov 2000, Feb 2002

This is another independent airport. We have carried out two trials of BIOX instruments over the last three years. Following the latest such trial we received a purchase order for a BIOX. The instrument was installed in January 1999 and is being used to replace an unsuccessful installation of a competitors unit.

The applications are essentially similar to Gatwick. Since the installation of the first unit, we supplied a second BIOX in 2000 and a third early in 2002.

6) Birmingham International Airport

Summary Data:	
Instrument type:	BIOX 1010 in standard form
Serial Number(s):	BI2245, BI2246
Measurement Range:	0 – 500 mg/l
Date Commissioned:	Aug 2000

Two BIOX units have now been in operation at the airport for almost two years. Again, the application is to control penstocks determining whether flow should go to sewer or, if clean enough, to go to watercourse.

7) Aberdeen Airport

Summary Data:

Instrument type: BIOX 1010 in standard form

Serial Number(s): BI2263

Measurement Range: 0 – 500 mg/l

Date Commissioned: Oct 2000

A BIOX was delivered and installed in 2000 for an application at this site. High maintenance costs of existing TOC systems, and proven excellent experience from the Government regulator, SEPA, of the use of the BIOX at other sites for some years, led them to move towards on-line BOD.

8) Heathrow Airport

Summary Data:

Instrument type: BIOX 1010 in standard form

Serial Number(s): BI2266, BI2274, BI2275, BI2276, BI2277, BI2278, BI2279, BI2280

Measurement Range(s): 0 – 500 mg/l and 0 – 2000mg/l

Date Commissioned: December 2000

Eight BIOX-1010 monitors have now been installed at Heathrow. After many months of discussions with existing users, looking at cheaper TOC alternatives this customer is convinced that the BIOX on-line BOD is the ideal technology for this type of application.

The eight units at Heathrow form an integrated control system. There are two main catchment systems and each is equipped with a unit which measures the BOD of the flow as it enters the pollution control system. These units can control penstocks based on BOD value measures to determine whether flow goes to river or to the treatment system. The treatment system installed is a novel floating reed bed system which has been developed following an extensive Research and Development programme. BOD monitors follow the quality of water as it passes through the various stages in the process. One BOD monitor acts as consent compliance measurement for the water after the whole treatment process has been completed.

Other Sites//ongoing business

We are currently discussing the expansion of installations with existing customers, and in discussion with a number of other major airports throughout the UK.

Conclusion:

With over seven years of operational experience of using on-line BOD monitoring at a wide variety of UK airports this technology has been well proven. Key benefits are the low maintenance and operational costs, excellent correlation to the BOD-5, when reliable lab analysis can be obtained, and rapid response in minutes. Repeat purchases by users after some years of operation speaks for itself. There are currently twenty-five such units in operation at British Airports. Similar 'take off' in applications has now begun in the United States, the first and most notable of these being at Portland Airport in Oregon.

Dr. Colin Genner / Jim Pickering

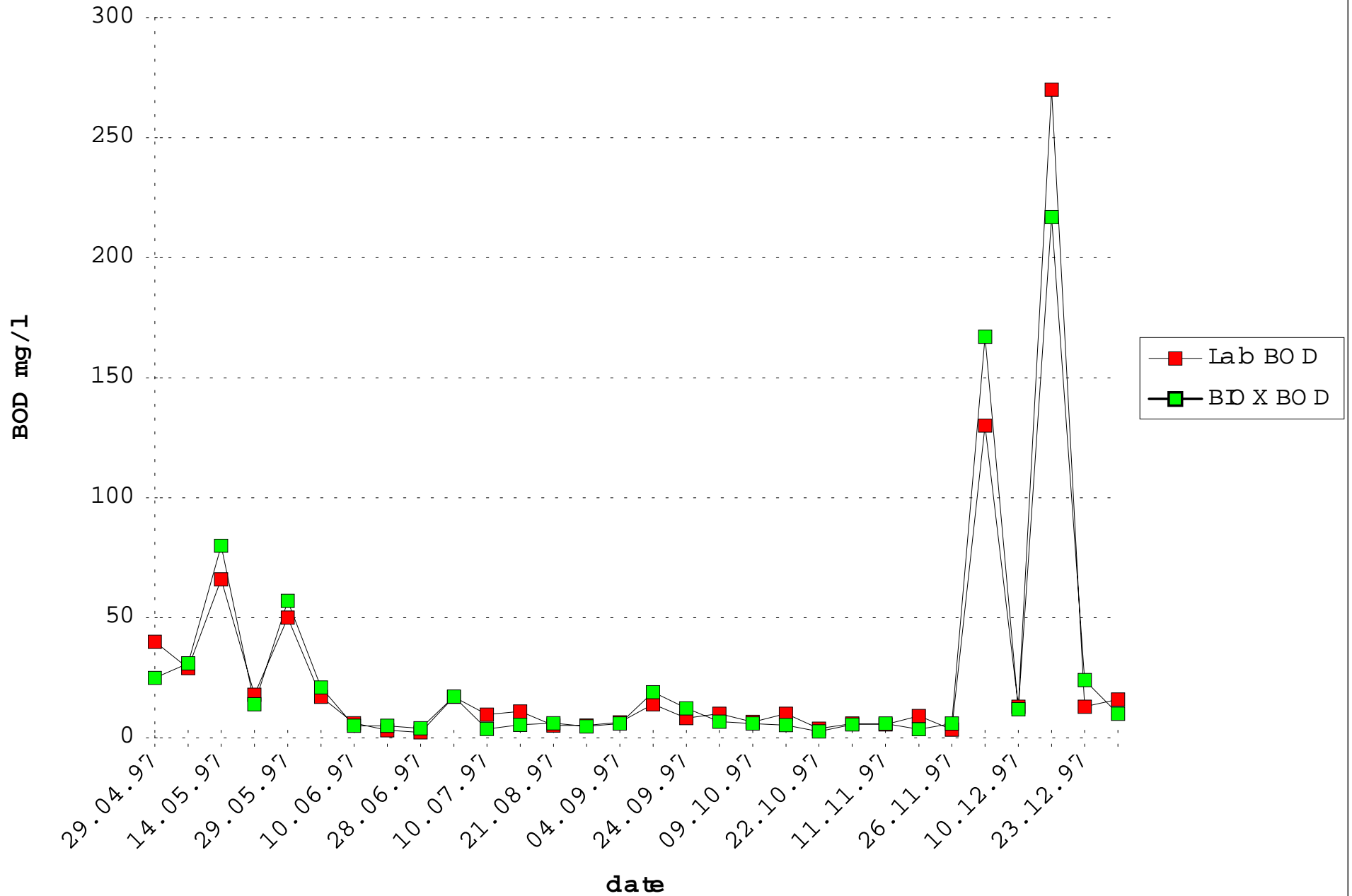
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APPENDIX

BAA Gatwick Results 1997



Surface Water Control System – East Midlands Airport

