

# Historical Structures and Bristol® Harvester Tool Suite by Emerson

Even if you are an experienced ACCOL programmer, you may not have worked with Emerson Process Management's historical structure functionality. The ease and flexibility of ACCOL not only allows for a wide range of programming concepts, it was also designed to allow the user to build retained historical data structures within the product's memory. Complex control schemes combined with stored records for periods of time are one of the best features of ACCOL. ACCOL has three methods of data storage within the 33XX/ControlWave® product line.

- Data Arrays – 2 dimensional tables that are indexed to store and retrieve data. They may be analog or logical arrays. Analog arrays hold floating-point numerical values and logical data arrays hold on/off status data.
- Archives – Time stamped and sequenced groupings of stored data that resides in memory. The numeric sequencing improves data collections schemes by decreasing the amount of data that is required during connection. (i.e. only return data that has not previously been collected). Archives can be configured to be time-weighted averages, instantaneous, minimum or maximum of the signal value stored over the defined storage period.
- Audits - Provide a history of alarms and significant events. This history is stored in a portion of memory known as the Alarm/Event Buffer and can be readily displayed and historically collected. The storage can occur for any signal built in the load.

The Bristol® OpenBSI tools suite, from Emerson Process Management, has been developed to allow a user to have full read access to all of our historical structures listed above. OpenBSI Harvester was designed specifically for collection, conversion and visual display of our historical data in combination with many third party software packages. With simple menu wizards, a user can:

- Collect archives, arrays, audits and live data lists at periodic intervals.
- Schedule via hardware and group number specific times of day to collect data to reduce power consumption (solar applications)
- Configure up to 10 on times per day to collect remote data
- Convert collected data to many common formats such as:
  - Open Database Connectivity (ODBC)
  - SQL database
  - Common Separated Variable
- Demand collection to occur immediately

Delving in deeper, Harvester works hand-in-hand with the ACCOL historical functionality to improve power handling in complex communication networks.

## Reference of Specific Applications

Application:	TC Rate application
Customer:	Phil Digiglio Keyspan Energy 175 East Old Country Road Hicksville, NY 11801 (516) 545-5858 pdigiglio@keyspanenergy.com
Products Used:	Bristol OpenBSI Tools / Harvester, 3530-50B TeleCorrector, Microsoft® ACCESS and Visual Basic
Application Size:	(1) Controlroom PC + mul tiple LAN PC interactivity (180+) TeleCorrector units

### Design:

The design concept was to use the Bristol linear meter corrector at large meter locations where the customer utilizes two-fuel sources at location. (i.e. natural gas and oil) Keyspan provides the natural gas to commercial accounts within their piping grid. At these specific dual fuel locations, they offer aggressive gas rates based on degree-day contracts. If the ambient temperature gets below the negotiated contract, Keyspan has the right to implement the use of the alternative fuel source. Keyspan employees physically control this ability.

This project had two main goals

- Incorporate standard monthly billing practices and historical data basing
- Provide the ability for Keyspan marketing to force a user to their alternative fuel source

As for hardware, Emerson employed a one-piece standard solution with an integral communication medium ( 9600 baud modem) The 3530-50B TeleCorrector is a Bristol linear meter device that has an integral pressure, temperature and uncorrected rate calculation (high speed counter). The TeleCorrector meets all requirements as a natural gas billing device, as well as New York State approval. The product was submitted to the PUC and approved by the staff at Keyspan. Included in the previous statement is the fact that the unit meets all historical requirements necessary as per the API specifications. Since it is an ACCOL device this feat was very easy to accomplish. The units are installed in the field with standard dial telephone communications. This means that the devices are not online constantly, but called when data is required from the unit.

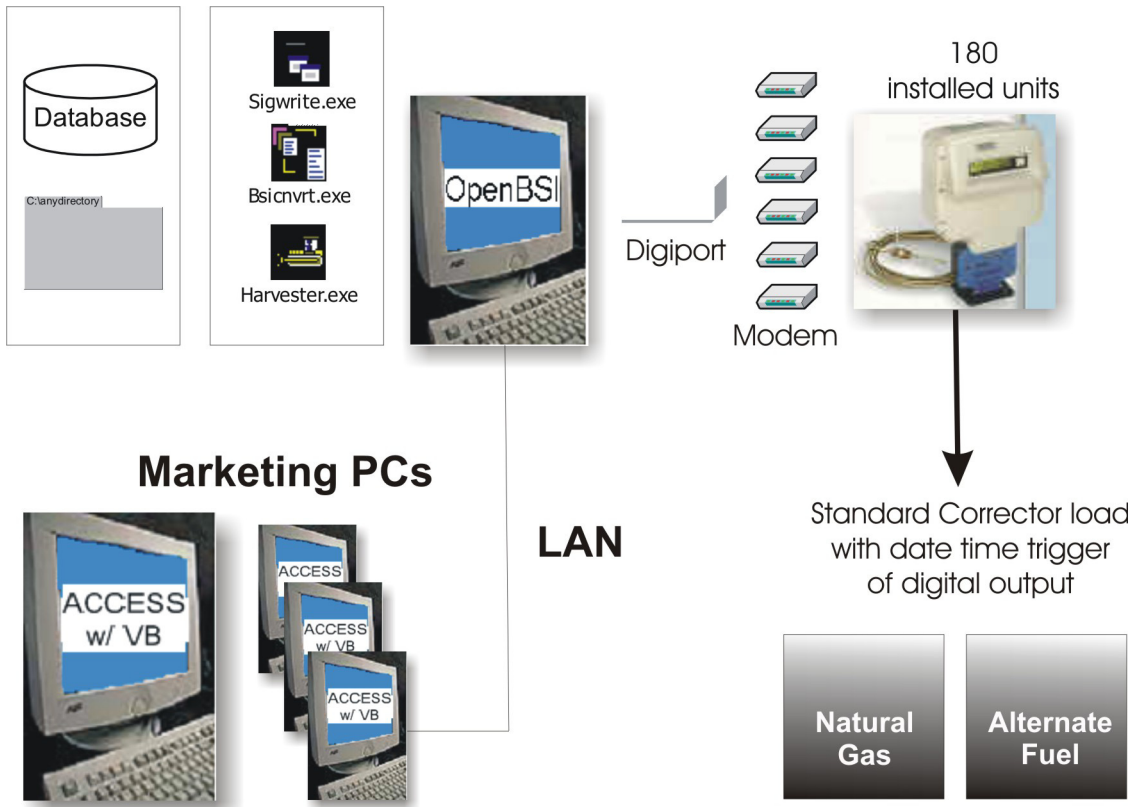
The control room operations are handled by one Pentium based, Windows NT PC. The PC communication capability was extended via the USB port to add six additional serial communication ports. Each port is attached to a Hayes Compatible 9600 dial line modem. This feature was incorporated to increase the bandwidth of the dialing feature by distributing the network across the 6 modems.

Keyspan installed the units initially as pure metering devices. OpenBSI Harvester was installed at the control room to provide them with hands free, scheduled polling and data conversion to Open Database Connectivity format. Microsoft ACCESS is an ODBC client so the historical data is readily available to people within different departments of Keyspan without any required knowledge of our products. This Historical collection is scheduled to occur twice a day to maintain a near actual volume correction database at Keyspan.

Since the control room PC is an intranet device, internal employees are given immediate access to the daily billing data. This also allows for network PC's to have the ability to send information automatically to the field devices. This became an important piece of functionality for this application that many other products could not accommodate. This functionality was completed using Microsoft ACCESS, Visual Basic, Signal Write application (included within the OpenBSI Harvester application) and Harvester scheduling.

The marketing department monitors when the degree-day gets below contractual agreements. When this occurs, they have a window of time to inform the customer that they will be automatically switched over to their alternative fuel source. The marketing department can then send a date and time from the VB macro within the Microsoft ACCESS database to the Control Room PC. (This sounds more complicated than it is, this action occurs with the push of a Windows display button.)

The time and date to control a digital output at each TeleCorrector is stored as a text file and in queue waiting for the normal Harvester collection period. Signal write actively runs in the background, and since it works in relation to OpenBSI, it will notice when a node comes active within its collection interval. When the normal connection occurs the text file parameters are sent to the active unit. The TeleCorrector code accepts the time and date parameters and will activate the digital control when the time has been reached. If required Keyspan also has the ability to demand a poll of the device, hence sending the data and time immediately down to the device.



## Keyspan (Long Island) TC Rate Application

The actual digital outputs are wired directly to a hardware device that acts as a power switch to each fuel source. The simple toggle of a digital output from on to off (vice versa) can enable full switchover to the alternative fuel usage.

Products Used: OpenBSI Tools / Harvester, 3530-50B TeleCorrector, 3310 Remote Terminal Units; Microsoft Access and Visual Basic

Application Size: (1) Controlroom PC; (8) TeleCorrector Units/ (2) Class1, Div1 Area; (2) 3310 Remote Terminal Units; (1) 3305 Remote Terminal Unit

### Reference of Specific Applications

Application: Plant Metering/ Two-Run Sithe Meter Station

Customer: Tim Coye  
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Design: The design concept was to use Emerson's linear meter correctors and 33XX equipment at metering points within a LNG facility. This facility is a marine terminal located in Everett, MA, which supplies gas to Boston Gas, Trans Gas, and many other natural gas companies. It is also a direct feed to the recently built Sithe Power Plant. Some of the design criteria required using solar power solutions to reduce cost and maintenance at key locations inside the plant.

To reduce communication expenses, we selected FreeWave spread spectrum radios to be installed inside the metering devices. DistriGas required live, real-time data access to the entire system, so we incorporated our uniquely designed duty cycle algorithm within our 3530-50B TeleCorrectors. This algorithm can provide a 25% power cycle to the FreeWave radios and switches to dedicated power once data is requested from the node. This provided the customer with live access to data without the real-time overhead and increased power usage. Since remote sites were solar power installations, this was an important consideration of the project.

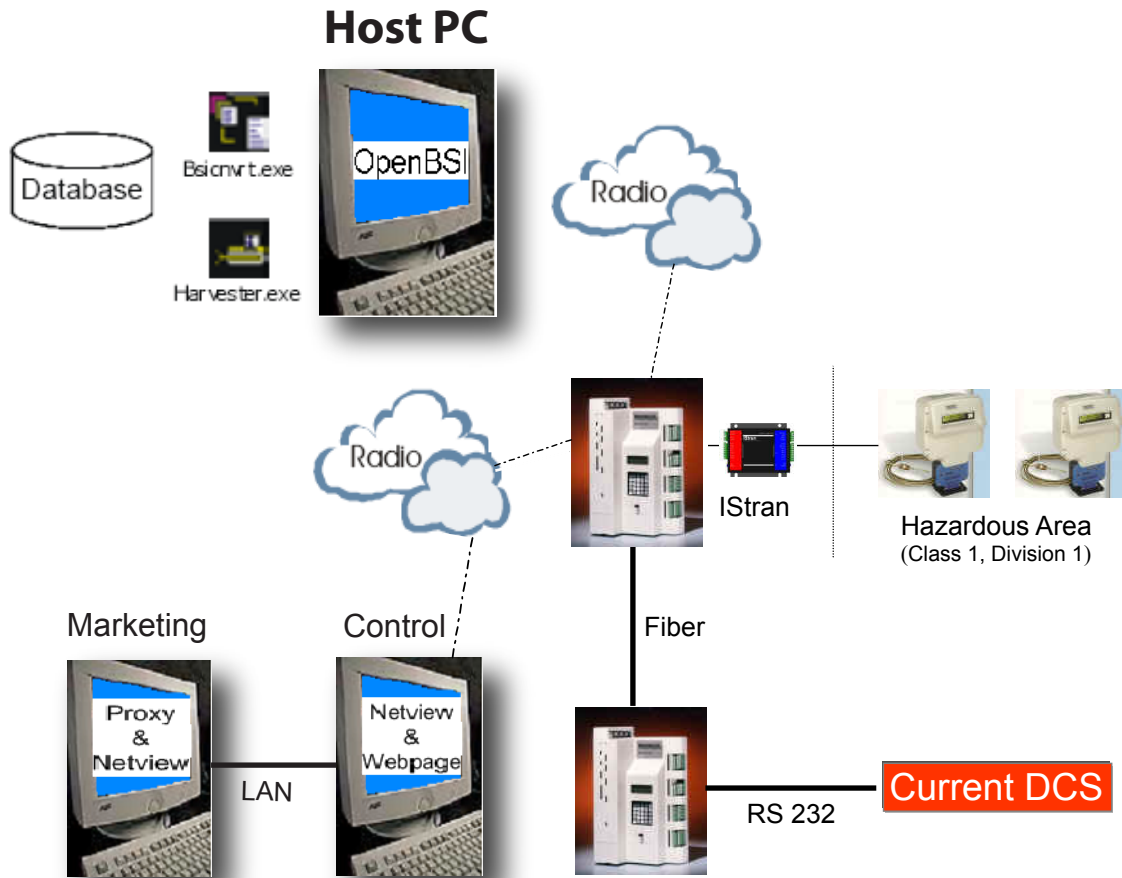
OpenBSI Harvester works seamlessly with the power cycling of the radio as it is based upon the same polling/messaging scheme of our real-time products. Our collection of historical records occurs once a day, but has the ability to operate on a demand basis. The data collected is converted to an ODBC format; it is currently in the process of being converted to an SQL format.

The Sithe power plant has (2) TeleCorrectors in a Class1, Div1 area. There is a 3310 Remote Terminal Unit polling both of the TeleCorrectors using the Bristol Babcock Intrinsicly Safe Barrier (ISTran) on a multi-dropped RS232 (Yes, multi-dropped RS232 network!). The ISTran Barrier allows multi-dropping of up to four devices off (1) RS232 port. The 3310 RTU acts as the station totalizer, as well as communicating directly to a Daniels 2310 Chromatograph, and provides control for run switching. This unit

communicates back to the host PC via a spread spectrum radio as its main link. The Sithe 3310 is also connected to an additional 3310, located in their main control room, via fiber optic modems referred to as the DCS link. The 3310 unit located in the DCS room is talking directly to a Moore APACS System via RS232 Modbus connection.

The Host PC collects the historical information from all these locations and stores the data to the server on this network. It is important to note that the server is not the OpenBSI workstation. Since OpenBSI is a Windows-based product, it utilizes many of the standard file sharing concepts that are inherent.

An additional feature of this project is the reduction of 3rd party graphical display requirements and costs. OpenBSI has built-in functionality to allow the user to design graphical/text web pages via supplied ActiveX controls. The ActiveX structures are designed to display both real-time and historical information throughout the plant on PCs in many different areas. This has been done using our networking (proxy) concepts that are not a part of this detailed description, but a critical piece of the flexibility of our host software, OpenBSI. Also, the cost of this project was dramatically reduced due to the use of the standard Internet Explorer (free of charge on any PC) as a graphical imaging tool. This became very effective at non-critical workstations, reducing the project cost by eliminating additional workstation software.



## Distrigas Metering Application

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