

A LABORATORY & ANALYST DEVELOPMENT PROGRAM BY ALLOWAY





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## INTRODUCTION TO BEACON

Laboratories are held to rigorous standards, whether those standards come from increased review of data or full-scale accreditation requirements. Regardless of the motive, laboratories must strive for continuous improvement. Although several states have implemented mandatory accreditation, and others are expected to follow suit, many laboratories are not prepared to meet (and continue to meet) accreditation standards. Accrediting bodies expect laboratories to have an established quality system, controlled documents and procedures, and legally defensible data output. The accreditation process is meant to ensure defensible data generation, as well as to inspire competence, confidence, and professional growth in a laboratory. Without a helping hand, accreditation can be a daunting task. But laboratories can seize this opportunity to get on the right track, and they do not have to do the work alone: Beacon can illuminate the path to accreditation and laboratory excellence.

Alloway's Beacon addresses the core issues of accreditation. Beacon provides the documents, forms, software, and training necessary for a laboratory to successfully obtain and maintain accreditation status, pass audits and regulatory visits, and generate defensible data. Beacon was originally developed for internal use in an environmental laboratory; however, Beacon has been implemented in municipal laboratories with great success. Designed to comply with national and state-recognized program requirements, Beacon is comprised of four integrated sets of products and services: Quality Assurance System, Analytical Process System, Process-Control Software, and Service and Support. When implemented, Beacon functions as a total laboratory solution, enabling a laboratory to meet the challenges of accreditation and move forward with greater confidence in its operations.

If your laboratory is facing accreditation, or if you simply want to be a better laboratory, let Beacon be your guiding light. This reference guide will outline the Beacon system and show you how easy it is to put your laboratory on the path to excellence.

BEACON COMPONENTS

**Quality Assurance System**  
**Analytical Process System**  
**Process-Control Software**  
**Service & Support**





## QUALITY ASSURANCE SYSTEM

The goals of any quality assurance system are continuous improvement, compliance with standards, and defensible data output. Beacon supports these key objectives by incorporating a fully functioning Quality Assurance System.

The data generated by a municipal laboratory must meet environmental laws and regulations. A quality assurance system sets a precedent of excellence for a laboratory, helping the laboratory to consistently produce high-quality data, meet the requirements of accreditation, and measure up to public health and environmental standards.

Beacon provides the necessary components of a quality assurance system in an integrated offering. Beacon comes with a Quality Assurance Manual and corresponding Standard Operating Procedures (SOPs) that outline everything a laboratory needs for a quality system, from corrective action to sample tracking, document control, and training. These documents will be configured for your laboratory's unique needs.

Accrediting bodies expect laboratories to have established quality assurance systems. If your laboratory does not have a quality assurance system, starting from scratch – particularly if an audit is impending – is sure to cause undue stress and chaos. Beacon's Quality Assurance System meets regulatory expectations and establishes a foundation for laboratory development, and the system works seamlessly with the other components of Beacon.

QUALITY ASSURANCE SYSTEM

## QUALITY ASSURANCE MANUAL

The Quality Assurance Manual defines the scope and elements of the Quality Assurance System. Accrediting bodies require a laboratory to create and maintain the standard elements of a quality assurance manual and to assign responsibility for these elements. During your on-site training, Beacon's Quality Assurance Manual will be tailored to your laboratory, allowing you to comply with your accreditation requirements while maintaining a controlled document. Listed below are the required elements of a quality assurance manual, all of which are provided by Beacon's Quality Assurance Manual.

- 1.0 City of (name) WPC Laboratory Quality Policy
- 2.0 Organization and Management Structure
- 3.0 Document Control
- 4.0 Critical Staff Positions
- 5.0 Traceability of Analytical Measurements
- 6.0 Methods
- 7.0 Capabilities Review
- 8.0 Traceability of Calibration and Verification of Test Procedures
- 9.0 Sample Receipt and Handling
- 10.0 Facility and Equipment
- 11.0 Equipment Calibration and Maintenance
- 12.0 Data Verification and Internal Quality-Control Activities
- 13.0 Corrective Actions
- 14.0 Control of Data Generated from Non-Conforming Activities
- 15.0 Complaints
- 16.0 Confidentiality and Public Access
- 17.0 Data Review and Audits
- 18.0 Training and Demonstration of Capability
- 19.0 Ethical Conduct
- 20.0 Reporting of Data

## QUALITY ASSURANCE STANDARD OPERATING PROCEDURES

Accreditation requirements specify the use of quality assurance standard operating procedures. Standard Operating Procedures (SOPs) are documents that give detailed, written instructions for performing a specific task. Quality Assurance SOPs address support activities necessary to achieve the requirements outlined in the Quality Assurance Manual.

Beacon provides the Quality Assurance Manual and the corresponding SOPs. These SOPs are completed documents that will be customized for your laboratory and issued as controlled documents. Accrediting bodies look for SOPs as evidence that a laboratory has established procedures and that these procedures correspond with the Quality Assurance Manual.

The following is a partial example of a Quality Assurance SOP:

(City) SOP No:	Revision: 0	Title:	Effective Date:
(Title #1):			Date:
(Title #2):			Date:
(Title #3):			Date:

### 1.0 Scope and Application

- 1.1 This document defines the format for Standard Operating Procedures (SOPs) and Forms.
- 1.2 This procedure defines the procedure for the approval of an SOP or Form.
- 1.3 This procedure defines the distribution of SOPs and Forms.
- 1.4 This procedure defines the activities required in order to control copies of SOPs and Forms.

### 2.0 Summary of Method

- 2.1 Documents are formatted to ensure that documents address regulatory requirements.
- 2.2 Documents are reviewed and approved prior to release.
- 2.3 Affected personnel are notified of a new issue or revision so that it may be put into use.
- 2.4 Controls are in place to allow only one revision of each document to be active.
- 2.5 Obsolete documents and revisions are archived for future reference.

### 3.0 Definitions

- 3.1 SOP – detailed written work instructions to be followed in order to complete an assigned task. SOPs are to supply sufficient detail that individuals of competence can duplicate activities.
- 3.2 Form – documents used for recording data and activities. Forms may also contain limited instructions.
- 3.3 QA – quality assurance
- 3.4 QC – quality control



## AVAILABLE QUALITY ASSURANCE SOPs

Listed below are the Quality Assurance Standard Operating Procedures (SOPs) provided with Beacon. These are completed documents that have withstood the challenges of many audits in an environmental laboratory setting. They will be configured to your unique laboratory operations. When combined with the Beacon Quality Assurance Manual, these SOPs support the quality system accreditation requirement.

- Corrective Action
- SOP Control
- Documentation and Labeling of Standards and Reagents
- Sample Tracking
- QC Performance Requirements – General
- Training of Lab Personnel
- Ethical Conduct
- QA Assignments





## ANALYTICAL PROCESS SYSTEM

Just as Beacon's Quality Assurance System establishes guidelines and procedures for its overall performance and response to events, Beacon's Analytical Process System is an integrated sequence of actions that ensures accuracy and consistency of laboratory tests. The Analytical Process System standardizes the procedure for sample handling, data generation, documentation, data evaluation, and reporting. In order to create accurate and defensible test results, it is necessary that the entire process – from sample handling through analysis – be developed as an integrated system. Beacon provides a complete Analytical Process System that works hand-in-hand with the Quality Assurance System.

Beacon begins with Standard Operating Procedures (SOPs) that present, in detail, the entire analytical process. These SOPs are written in clear language that is directed at trained laboratory professionals. These SOPs are accompanied by forms, logs, calculators, and software that make accurate data calculation as streamlined as possible. These SOPs are completed documents that will be customized for your laboratory. They are, however, controlled documents and should be treated accordingly once issued.

Included in Beacon are:

- SOPs with step-by-step instructions for method compliance
- Forms for collecting necessary information and data
- Software calculators that process data according to the SOP's directions
- Integrated Process-Control SOPs for data validation
- Process-Control Software for tracking required quality-control activities

With Beacon's expert guidance, your laboratory will generate accurate and defensible results for every test, every time.

## ANALYTICAL STANDARD OPERATING PROCEDURES

All accrediting bodies mandate the use of analytical standard operating procedures (SOPs) when performing laboratory tests. Analytical SOPs are detailed documents that provide precise instructions for performing specific analytical tests. Creating an analytical SOP is a lengthy process that requires a focused and experienced analyst performing significant research to generate the detailed document. Beacon has done all the hard work so you can receive a fully functional and understandable SOP for each analytical test you perform. These SOPs will be configured for your unique laboratory operations. Beacon's SOPs are proven documents that allow your laboratory personnel to effectively perform their tests and generate accreditation-worthy data.

The following is a partial example of an Analytical SOP:

(City) SOP No.: 4500-PE	Revision: 0	Title: Phosphorus, Total	Effective Date:
(Title #1):		Date:	
(Title #2):		Date:	
(Title #3):		Date:	

### 1.0 Test Method for the Determination of Following Analyte(s)

#### 1.1 Phosphorus, Total

### 2.0 Applicable Matrix (s)

#### 2.1 Wastewater

#### 2.2 Groundwater

#### 2.3 Surface Waters

### 3.0 Method Detection Limit

#### 3.1 Method Detection Limit (MDL) is determined annually.

#### 3.2 Practical Quantitation Limit (PQL) for Phosphorus is 0.02 mg/L.

### 4.0 Scope and Application

#### 4.1 Method covers the determination of phosphorus in the specified matrices.

#### 4.2 Method is based on reactions that are specific for the orthophosphate ion.

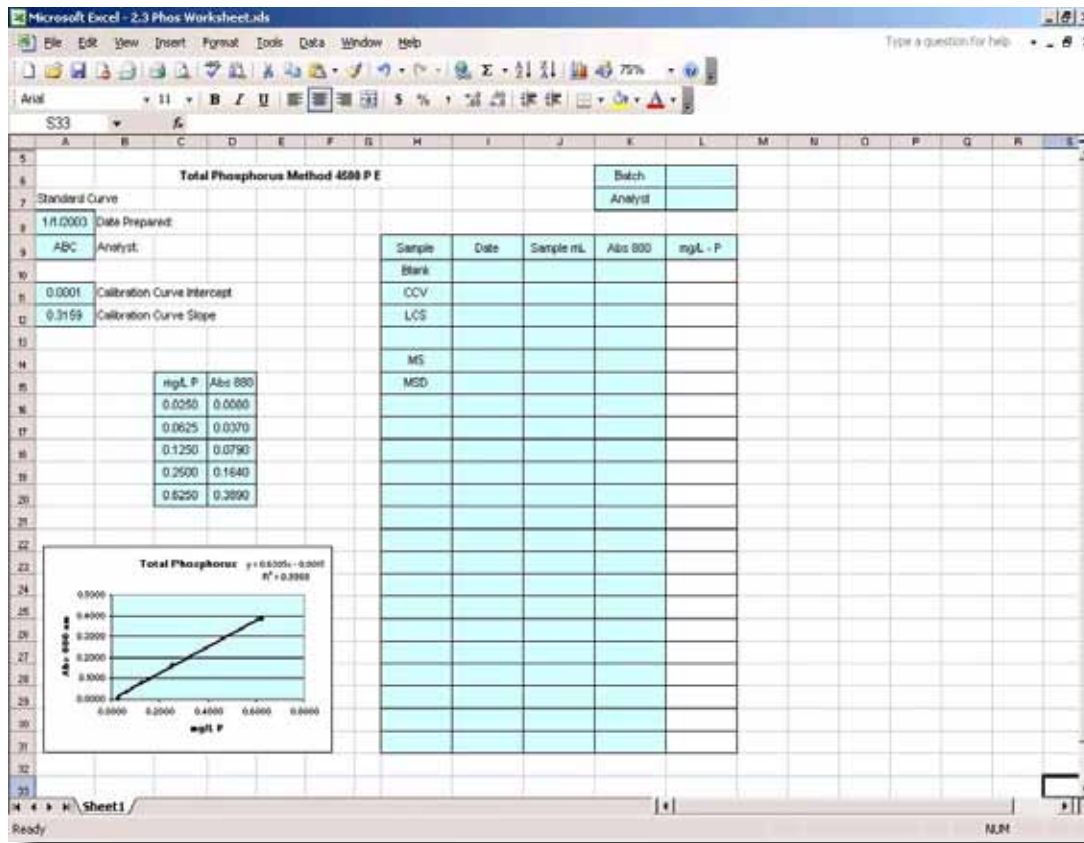
Depending on the prescribed pretreatment of the sample, the various forms may be determined.

#### 4.3 Method is usable in the 0.02 to approximately 1.0 mg/L range.

## ANALYTICAL PROCESS SYSTEM WORKSHEET

Accreditation requirements mandate that all information pertinent to the generation of laboratory results be recorded. Beacon's worksheets were designed to capture essential information in a manner that is consistent with accreditation requirements. When a worksheet is needed in conjunction with an analytical procedure, it is included in Beacon. These worksheets improve the efficiency and accuracy of the test, as well as the performance of laboratory personnel.

The following is an example of an Analytical Worksheet:





## AVAILABLE ANALYTICAL SOPs

Listed below are the Analytical Standard Operating Procedures (SOPs) available through Beacon. These SOPs are complete, functional, and audit-tested documents. Depending on your laboratory, these SOPs will need only minor tailoring. Beacon comes with three default SOPs: pH determination; Solids, Total Suspended; and BOD. You can chose **six** additional instrumental or general chemistry SOPs and data-handling systems. All SOPs include appropriate forms, logs, calculators, and training necessary to maintain your quality program.

SOP Title
Conductivity
Hardness, Total Titrimetric
pH Determination
Solids, Total Dissolved
Solids, Total Suspended
Solids, Total
Solids, Volatile
Turbidity
ICP for Trace Element Analysis of Water
Alkalinity, Potentiometric
Chloride, Titrimetric
Cyanide, Total
Nitrogen, Ammonia
Nitrogen, Total Kjeldahl
Nitrogen, Nitrate-Nitrite
Oxygen, Dissolved
Phosphorus, Total
Sulfate, Turbidimetric
Biochemical Oxygen Demand
Chemical Oxygen Demand, Mid-Level
Chemical Oxygen Demand, Low-Level
Oil & Grease, Total Recoverable
Total Petroleum Hydrocarbons
Phenolics, Total Recoverable
Purgeable Aromatics
Organochlorine Pesticides and PCBs
Volatile Organic Compounds by GC/MS
Semi-Volatile Organics by GC/MS
TCLP/ZHE Extraction
Oil & Grease
Alkalinity, Color Change
Calcium Carbonate Saturation
Specific Gravity

**AVAILABLE ANALYTICAL SOPs (CONTINUED)**

<b>SOP Title</b>
Digestion for Total Metals for Analysis by FLAA or ICP
Digestion of Sediments, Sludges and Soils
Iron and Manganese in Drinking Water
Chromium, Hexavalent
Separatory Funnel Liquid-Liquid Extraction
Continuous Liquid-Liquid Extraction
Soxhlet Extraction
Pressurized Liquid Extraction
Cyanide, Weak Acid Dissociable
Chlorine, DPD
Fluoride
Metals by FLAA
Manual Peak Integration
Cyanide, Reactive
Sulfide Reactive
Mercury-Cold Vapor Technique (Liquid Waste or Semi-Solid Waste)
Mercury in Solids or Semi-Solids Waste
COD, Reactor Method
Acceptance/Rejection of Calibration Data Points
Manual Peak Integration
Volatile Organic Storage Monitoring
Cyanide, Total & Amenable
Total Organic Halides
Extractable Organic Halides
Sulfide
pH, Aqueous Waste
pH, Soil and Waste
Determination of Inorganic Anions
Total Organic Carbon
Phenolics, Total Recoverable
Oil & Grease Extraction
Paint Filter Liquids Test
Total Coliform Bacteria
Total Fecal Coliform Bacteria
Oil & Grease, Soxhlet
Diesel Range Organics/Gasoline Range Organics
BTEX Purgeable Aromatics
Organochlorine Pesticides and PCBs
Volatiles by GC/MS
Semi-Volatiles by GC/MS



## PROCESS-CONTROL SOFTWARE

A fundamental tenet of an accreditation process is the assurance that all tests have been, and will continue to be, performed within specified control limits. Process control includes the supporting activities that ensure the analytical process is “in control” and operating within specified limits. Process control is an integrated sequence of actions that determines method performance. Beacon has developed automated process-control tools that meet process-control requirements in an accurate and timely way.

Typically, a laboratory will perform process-control tracking and evaluation manually. Process-control data can be voluminous, and the evaluation steps are tedious, making it easy for errors to occur. Beacon process-control software reduces the error factor and the tedium of data handling, graphing, and evaluating, ultimately improving the defensibility of your test results.

Beacon supplies the following process-control software products:

### **Microsoft Access®-based Advanced Method Detection Limit Calculator**

This software calculates Method Detection Limits (MDLs) and generates management reports and historical information.

### **Microsoft Excel®-based Quality Control System**

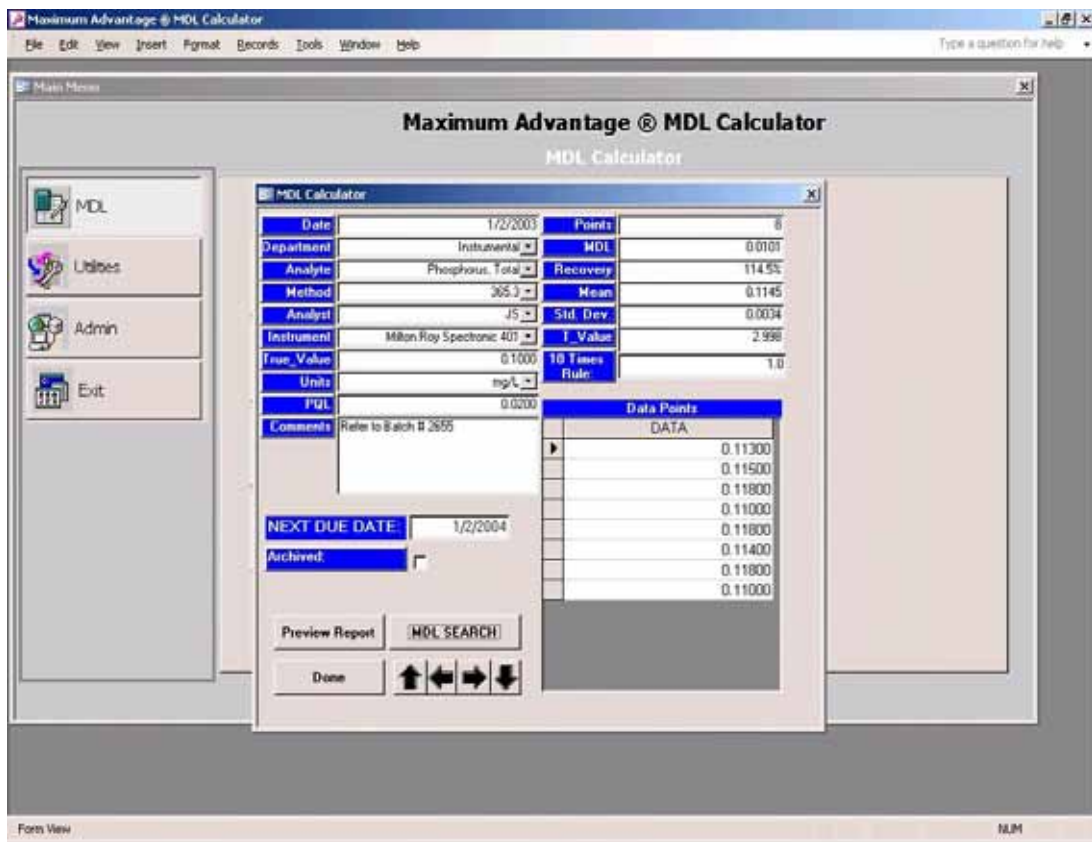
This system generates control charts and batch records.





## ADVANCED METHOD DETECTION LIMIT CALCULATOR

Accrediting bodies require laboratories to properly perform analytical methods. An integral part of method success is to determine the Method Detection Limit (MDL). Beacon supplies Microsoft Access®-based software that automates timely MDL calculations, and generates management reports and historical information. The MDL calculator measures a laboratory's ability to produce accurate, defensible data within a specified confidence level.

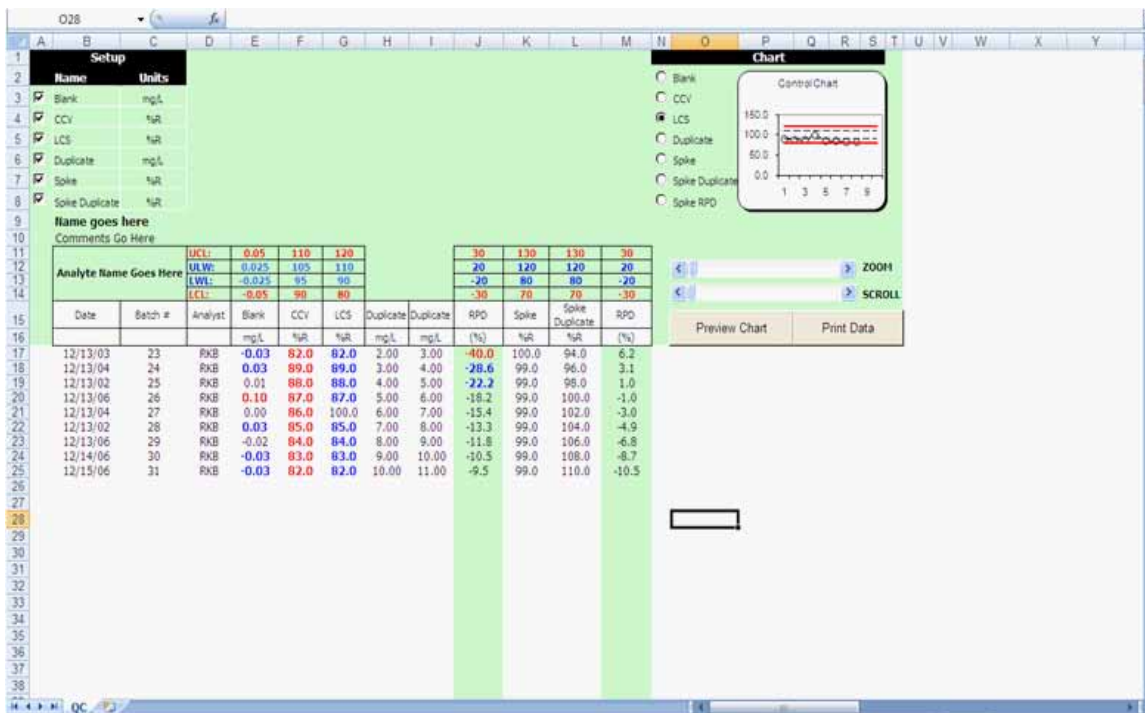


PROCESS-CONTROL SOFTWARE



## QUALITY CONTROL SYSTEM

Accrediting bodies mandate that environmental laboratories generate control charts and batch records to support their test data. Manual quality-control systems are labor intensive, difficult to interpret, and prone to error. Beacon supplies a Microsoft Excel®-based Quality Control System that automates and simplifies the process of meeting these requirements. Control charts are easily updated and can be traced back to specific batches. Your laboratory personnel will become more efficient and accurate, and they will generate data that can withstand the rigors of accreditation.





## SERVICE AND SUPPORT

Beacon supplies the tools you need to get your laboratory on the right path, but these products are ineffective without training. In keeping with Beacon's promise to be a comprehensive solution, your laboratory receives three full days of on-site training, one year of toll-free telephone and e-mail support, and access to a resource network of other Beacon users. You'll never be without qualified support from a trusted resource.

Beacon was developed by Alloway, a trusted commercial environmental laboratory with more than 25 years in the industry. We understand the requirements of accreditation. We know how to prepare your laboratory for accreditation, and we care about doing it right. We are well-versed in installing and operating Beacon's components. The Beacon Support Staff is comprised of experienced environmental laboratory analysts and trained quality-assurance experts. Become part of the Beacon family and you will see that accreditation is manageable when you partner with quality people.

SERVICE & SUPPORT



## ON-SITE TRAINING

The Beacon Support Staff will come to your facility, personally install and train you to use Beacon, and configure Beacon to your specific laboratory operations.

These three days are filled with practical training that is guaranteed to introduce you to the key elements of Beacon, and to give you the skills to utilize Beacon in your laboratory. The Support Staff will cover the use of the Quality Assurance Manual; instituting document control; the provisions of SOPs; using calculators and worksheets, and operating the Process-Control Software. After the Beacon Staff has spent three days in your laboratory, you will be well on your way to accreditation and laboratory excellence.

If at any time you wish to have more on-site training, the Beacon Support Staff will return to your facility for an additional fee.

## CONTINUOUS PHONE AND E-MAIL SUPPORT

Even after Alloway representatives leave your facility, they are still available to answer questions regarding Beacon. For one year after your initial purchase, you are entitled to continuous toll-free phone and e-mail support. The Beacon Support Staff will provide you with qualified advice whenever you need it. After one year, you have the option to renew your annual support contract for long-term Beacon support.

## BEACON RESOURCE NETWORK

Sometimes knowing others are in a similar situation can be comforting and helpful. Beacon connects you to other facilities that use Beacon, enabling you to share information and develop professional relationships through Beacon's common bond.





If your laboratory is looking for an all-inclusive solution to accreditation preparation, or you simply want to be a better laboratory, Beacon can be your guiding light. Beacon provides excellent products and superior service. You will not find a more comprehensive solution to laboratory development. Other laboratory development programs tell you what to accomplish; Beacon tells you how to achieve goals. It is a turnkey approach that will revitalize your laboratory. You owe it to your personnel, your city, and the people who depend on your data to see how Beacon can guide your laboratory to excellence.

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