



DQO-PRO Tutorial

Introduction

A PowerPoint Tutorial

by

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Tutorial Basis

- This tutorial is based on a very easy to use electronic calculation program named *DQO-PRO Version 2*
 - The program was written by Dr. Keith and two other scientists at Radian International LLC for the US Government.
 - DQO-PRO is free and may be copied and freely distributed.
 - This tutorial, however, is copyright protected and may not be freely copied and distributed.

DQO-PRO

- ***DQO-PRO*** is a series of statistical equations in the form of a simple calculator interface.
 - They can be used to help plan the minimum number of samples that should be collected in order to resolve three possible objectives in studies that require environmental sampling and analysis in order to make decisions.

The Purpose of DQO-PRO

- The statistical equations can also be used to assess the sufficiency of existing data to resolve decisions after sampling and analyses have taken place.
- Their purpose is to help optimize sampling designs so that objectives are met the first time and decisions are defensible to all relevant parties (e.g., clients, regulatory agencies, etc).

The DQO-Process

- There are seven steps in the Data Quality Objective (DQO) Process. These are reviewed in the second tutorial module.
 - The 6th step determines how many samples are required to meet your objectives based on the desired confidence levels you need.
 - Iteration of this step is usually necessary in order to optimize the number of samples required to meet DQOs and meet budget, time and other study requirements.

Seven Stages of DQO Planning

1 State the Problem to be Resolved

2 Identify the Decision to be Made

3 Identify All the Inputs to the Decision

4 Narrow the Boundaries of the Study

5 Develop a Decision Rule

6 **Develop Uncertainty Constraints**

7 Optimize the Design for Obtaining Data

DQO-PRO

Makes Calculations Easy

- The 6th step determines **how many** samples are required to meet your objectives.
 - Iteration of this step is usually necessary in order to optimize the number of samples required to meet DQOs and meet budget, time and other study requirements.
 - *DQO-PRO* was developed to help make what are normally manual statistical calculation iterations easy to perform. It focuses on three common study objectives out of an almost infinite number of them.

DQO-PRO Background

- Programmed using Windows Visual Basic, ***DQO-PRO*** is accessed using Microsoft Windows.
- ***DQO-PRO Version 2.0***, which cost \$15,000 to develop and update, can be freely copied and distributed.

DQO-PRO Use

- ***DQO-PRO*** provides answers for three common scenarios:
 - 1 determining the rate at which an event occurs,
 - 2 determining an estimate of an average within a tolerable error, and
 - 3 determining the sampling grid necessary to detect “hot spots”.
- The three associated tutorials show how easy it is to use *DQO-PRO Version 2* to estimate the numbers of samples you need for each of the above three scenarios based on **your personal** Data Quality Objectives.

The Data Quality Objective Process

- To effectively use *DQO-PRO* you first need to understand the DQO Process.
 - The next tutorial segment will provide you with background information to help understand and utilize this systematic process of determining what you need in order to produce environmental analytical data of a quality that will meet your specific needs.
 - Examples are also provided.

One Thing to Remember!

- Remember, information on the equations, assumptions used with the equations, and references to the equations and these assumptions are available from the DQO-PRO program by clicking on

HELP

which is at the top of the program screen.

How to Contact the Author

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