

ANSI/ASQ E4-2004

AMERICAN NATIONAL STANDARD

**Quality systems for environmental data and
technology programs –
Requirements with guidance for use**



**AMERICAN SOCIETY FOR QUALITY
P.O. BOX 3005
MILWAUKEE, WI 53201-3005**

ANSI/ASQ E4-2004

AMERICAN NATIONAL STANDARD

Quality systems for environmental data and technology programs – Requirements with guidance for use

Approved as an American National Standard by:
ASC Z1 on Quality, Environment, Dependability and Statistics,
Subcommittee on Quality Management
Secretariat, American Society for Quality

An American National Standard Approved on February 4, 2004

American National Standards: An American National Standard implies a consensus of those substantially concerned with its scope and provisions. An American National Standard is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an American National Standard does not in any respect preclude anyone, whether he or she has approved the standard or not, from manufacturing, purchasing, or using products, processes, or procedures not conforming to the standard. American National Standards are subject to periodic review and users are cautioned to obtain the latest edition.

Caution Notice: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

©2004 by ASQ

Copyright Protection Notice for the ANSI/ASQ E4-2004 Standard.

This publication is subject to copyright claims of ASQ. Not for resale. No part of this publication may be reproduced in electronic form, including an electronic retrieval system, without the prior written permission of ASQ. All requests pertaining to the ANSI/ASQ E4-2004 Standard should be submitted to ASQ.

ASQ will consider requests for change and information on the submittal of such requests regarding this Standard. All requests should be in writing to the attention of the Standards Administrator at the address below.

ASQ Mission: The American Society for Quality advances individual and organizational performance excellence worldwide by providing opportunities for learning, quality improvement, and knowledge exchange.

Published by:



Quality Press
600 N. Plankinton Avenue
Milwaukee, Wisconsin 53203
Call toll free 800-248-1946
Fax 414-272-1734
www.asq.org
<http://qualitypress.asq.org>
<http://standardsgroup.asq.org>
E-mail: authors@asq.org

AMERICAN NATIONAL STANDARD

ANSI/ASQ E4-2004

Contents

..... Foreword	v
0 Introduction	vii
0.1 General	vii
0.2 Compatibility with Other Management Systems	vii
1 Scope	1
2 General Principles and Applications	1
2.1 General Principles	1
2.2 Applications	3
3 Normative References	3
4 Terms and Definitions	4
4.1 Environmental Data	4
4.2 Environmental Data Operations	4
4.3 Environmental Processes	4
4.4 Environmental Programs	4
4.6 Environmental Technology	4
5 Management Systems	5
5.1 General	5
5.2 Management and Organization	5
5.3 Quality System and Description	6
5.4 Personnel Qualification and Training	7
5.5 Procurement of Items and Services	8
5.6 Documents and Records	8
5.7 Computer Hardware and Software	9
5.8 Planning	10
5.9 Implementation of Work Processes	10
5.10 Assessment and Response	11
5.11 Quality Improvement	12
6 Collection and Evaluation of Environmental Data	12
6.1 General	12
6.2 Planning and Scoping	13
6.3 Design of Data Collection Operations	14
6.4 Implementation of Planned Operations	16
6.5 Assessment and Response	17
6.6 Assessment and Verification of Data Usability	17
7 Design, Construction and Operation of Environmental Technology	17
7.1 General	17
7.2 Planning	18
7.3 Design of Systems	19
7.4 Construction/Fabrication of Systems and Components	20
7.5 Operation of Environmental Technology	22

AMERICAN NATIONAL STANDARD	ANSI/ASQ E4-2004
7.6.....Assessment and Response	23
7.7..... Verification and Acceptance of Systems	23
Annex A..... Terms and Definitions (Normative)	24
Annex B..... Guidelines on the Use of ANSI/ASQ E4 (Informative)	31
Annex C..... Crosswalk between ANSI/ASQ E4 and ISO 9001	40

AMERICAN NATIONAL STANDARD

ANSI/ASQ E4-2004

Foreword

The American National Standards Institute (ANSI) is the national standards-setting body for the United States of America and is the U.S. member body to the International Organization for Standardization (ISO). In carrying out the development of American National Standards, ANSI often delegates the preparation of standards to accredited technical organizations. The American Society for Quality (ASQ) is recognized by ANSI for the preparation of quality-related standards.

The ASQ Mission is to facilitate continuous improvement and increase customer satisfaction by identifying, communicating, and promoting the use of quality principles, concepts, and technologies; and thereby be recognized throughout the world as the leading authority on, and champion for, quality.

ANSI/ASQ E4 was prepared by the Energy and Environmental Division of ASQ under the auspices of the ANSI ASC Z1 Committee. The Energy and Environmental Division wishes to thank the following members of the Work Group:

Gary L. Johnson, <i>Convenor</i>	U.S. Environmental Protection Agency
Larry D. Becker	U.S. Army Corps of Engineers
Stanley M. Blacker	MAC Technical Services
John R. Gelzer, Jr.	Consultant
Myrna Goss	Florida International University
RoseMary Gustin	CDM Federal Corporation
Terrell E. Horne	Consultant
Donald C. Johnson	U.S. Environmental Protection Agency
Paul C. Mills	DynCorp
Charles H. Moseley, Jr.	BWXT Y12
Michael F. Nicol	Duke Engineering Services
Steve Stubbs	Texas Commission on Environmental Quality
Martin Stutz	U.S. Army Environmental Center
Dean W. Wolfe	Consultant
Jeffrey C. Worthington	U.S. Environmental Protection Agency

The Energy and Environmental Division also wishes to thank the members of the ANSI Z1 Committee on Quality, Environment, Dependability, and Statistics, Subcommittee on Quality Management, for their contributions to the consensus process by which this standard was approved.

Annex B and Annex C of this American National Standard are for information only.

This standard replaces ANSI/ASQC E4-1994, *Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs*, in its entirety.

Suggestions for improvement of this standard are welcome. They should be sent to the Standards Administrator, ASQ, P.O. Box 3005, Milwaukee, WI 53201-3005.

AMERICAN NATIONAL STANDARD

ANSI/ASQ E4-2004

(This page intentionally left blank)

AMERICAN NATIONAL STANDARD

ANSI/ASQ E4-2004

0 INTRODUCTION

0.1 General

This American National Standard presents requirements for a quality management system for environmental programs.

A national consensus standard for quality systems for environmental programs involving environmental data and technology has been shown to be a valuable instrument to verify and help to improve the suitability and effectiveness of quality control and quality assurance practices applied to environmental programs. The environmental community has been forced in the past to use several different standards and frequently has required duplicate quality assurance (QA) functions and documentation on the same project or task to satisfy different customers' requirements.

This American National Standard is intended to provide a minimum set of requirements to enable organizations to plan, implement, and assess the suitability and effectiveness of a quality system to support environmental programs involving environmental data and technology. It provides definitions of relevant terms and general principles necessary for any quality management system.

Recognizing the diversity of scope of environmental programs and the breadth of the field of application, this standard also provides non-mandatory guidelines in an annex to enable users of the standard to extend quality beyond the minimum requirements.

0.2 Compatibility with Other Management Systems

This Standard incorporates relevant criteria from other management systems standards and guidelines, including the ISO 9000 series, and presents them from an environmental data and technology perspective. There is some deliberate duplication in the Standard in order to preserve the logical flow of the requirements and to provide a self-contained document that would not require references to other standards. This Standard is intended to be used to create appropriate and effective quality systems to support an organization's mission relative to environmental programs.

This Standard uses the principle of graded approach to foster the development of quality systems. Graded approach provides for a level of applied practices and their comprehensiveness that reflect the importance of the work being performed and that will produce the type and quality of results needed and expected.

This Standard defines and describes quality control and quality assurance activities for environmental programs involving environmental data generation and use, and environmental technology design, development, and operation. This Standard does not provide specifications or guidelines on environmental management systems, rather it may be used to support the quality aspects of environmental management systems and applications. Environmental management is outside the scope and intent of this standard and is addressed in ISO 14001:1996, *Environmental Management Systems - Specification with Guidance for Use*. This Standard may be used by organizations implementing an environmental management system to provide quality control and quality assurance support to the activities supporting the environmental management system.

AMERICAN NATIONAL STANDARD

ANSI/ASQ E4-2004

(This page intentionally left blank)

AMERICAN NATIONAL STANDARD

ANSI/ASQ E4-2004

Quality Systems for Environmental Data and Technology Programs - Requirements with Guidance for Use

1 SCOPE

This American National Standard specifies requirements for a quality system to enable an organization to formulate policies and procedures to plan and implement sufficient and adequate quality management practices for environmental programs.

This Standard is applicable to any organization that wishes to

- a) implement, maintain, and improve a quality system for environmental programs;
- b) specify quality requirements when contracting for work;
- c) assure itself of its conformity with its stated quality policy; and
- d) demonstrate such conformity to others.

All the requirements in this Standard are intended to be incorporated into quality systems supporting environmental programs involving environmental data and environmental technology. The extent of the application will depend on the environmental policy of the organization, the nature of its environmental programs, and the conditions under which it operates.

2 GENERAL PRINCIPLES AND APPLICATIONS

2.1 General Principles

A quality system is the means by which an organization implements quality management in a systematic, organized manner. It is a management system in much the same manner as an organization manages its financial operations or health and safety programs. A Quality System encompasses a variety of technical and administrative elements, including policies and objectives, organizational authority, responsibilities, accountability, and procedures and practices.

The quality system is the "blueprint" or framework by which an organization applies sufficient quality control (QC) and quality assurance (QA) practices to ensure that the results of its environmental programs meet or exceed expectations. The quality system encompasses both management and technical activities pertaining to the planning, implementation, and assessment of environmental programs within the organization's mission and scope.

The business plan model used for implementing a quality system based on this standard encompasses three stages: planning, implementation, and assessment. This model is based on the concept of first planning the work, doing what was planned, and assessing the results against performance criteria, and acting on what was found by such a comparison.

The level of detail and comprehensiveness of the quality system should be based on the principle of *graded approach*. The principle of *graded approach* recognizes that a "one size fits all" approach to quality requirements will not generally work in organizations conducting activities as diverse as environmental programs.