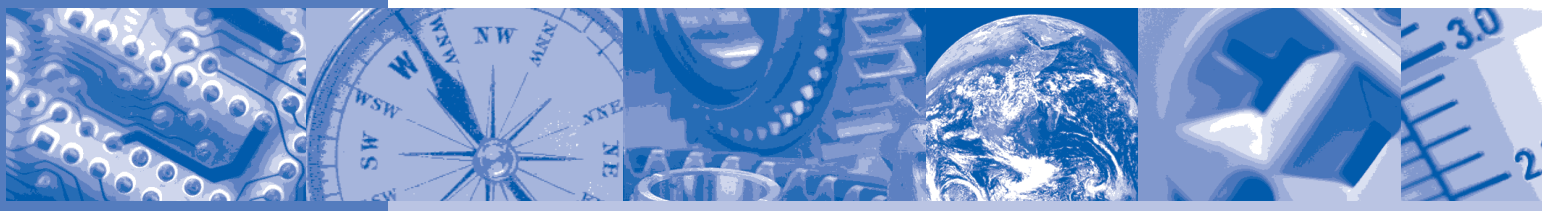
This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

ISA–RP67.04.02–2000

Equivalent to ISA–RP67.04, Part II–1994



Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation

Approved 1 January 2000

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

ISA–RP67.04.02-2000
Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation

ISBN: 1-55617-720-8

Copyright © 2000 by the Instrument Society of America. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), without the prior written permission of the publisher.

ISA
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, North Carolina 27709

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

Preface

This preface is included for informational purposes and is not part of ISA-RP67.04.02.

This recommended practice has been prepared as part of the service of ISA, the international society for measurement and control, toward a goal of uniformity in the field of instrumentation. To be of real value, this document should not be static but should be subject to periodic review. Toward this end, the Society welcomes all comments and criticisms and asks that they be addressed to the Secretary, Standards and Practices Board; ISA; 67 Alexander Drive; P. O. Box 12277; Research Triangle Park, NC 27709; Telephone (919) 549-8411; Fax (919) 549-8288; E-mail: standards@isa.org.

It is the policy of ISA to encourage and welcome the participation of all concerned individuals and interests in the development of ISA standards, recommended practices, and technical reports. Participation in the ISA standards-making process by an individual member in no way constitutes endorsement by the employer of that individual, of ISA, or of any of the standards that ISA develops.

The ISA Standards and Practices Department is aware of the growing need for attention to the metric system of units in general and the International System of Units (SI) in particular, in the preparation of instrumentation standards, recommended practices, and technical reports. However, since this recommended practice does not provide constants or dimensional values for use in the manufacture or installation of equipment, English units are used in the examples provided.

Before utilizing this recommended practice, it is important that the user understand the relevance of instrument channel uncertainty and safety-related setpoint determination for nuclear power plants. Safety-related instrument setpoints are chosen so that potentially unsafe or damaging process excursions (transients) can be avoided and/or terminated prior to exceeding safety limits (process-design limits). The selection of a setpoint requires that consideration be given to much more than just instrumentation.

Experience has shown that an operational limit should be placed on critical process parameters to ensure that, given the most severe operating or accident transient, the plant's design safety limits will not be exceeded. Performance of an accident analysis establishes the analytical limits for critical process parameters. Typically, the accident analysis models include the thermodynamic, hydraulic, and mechanical dynamic response of the processes as well as assumptions regarding the time response of instrumentation. The analytical limits, as established by an accident analysis, do not normally include considerations for the accuracy (uncertainty) of installed instrumentation. To ensure that the actual trip setpoint of an instrument channel is appropriate, additional analysis may be necessary.

Instrument channel uncertainty should be determined, based on the characteristics of installed instrumentation, the environmental conditions present at the plant locations associated with the instrumentation, and on process conditions. A properly calculated setpoint will initiate a plant protective action before the process parameter exceeds its analytical limit, which, in turn, ensures that the transient will be avoided and/or terminated before the process parameter exceeds the established safety limit.

ISA-S67.04 was initially developed in the middle 1970s by the industry in response to large numbers of licensee event reports (LER). These LERs were attributed to the lack of adequate consideration of equipment drift characteristics when establishing the trip setpoints for the limiting safety system settings (LSSS) and engineered safety features actuation system (ESFAS) setpoints. These setpoints are included as part of a nuclear power plant's operating license in their technical specifications. Hence, bistable trip setpoints were found beyond the allowable values identified in the technical specifications.

The scope of the standard was focused on LSSS and ESFAS setpoints. As the standard evolved, it continued to focus on those key safety-related setpoints noted previously. It may also be noted that as the technical specifications have evolved, the values now included in the technical specifications may be the

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

trip setpoint or the allowable value or both depending on the setpoint methodology philosophy used by the plant and/or the Nuclear Steam Supply Systems (NSSS) vendor. The methodologies, assumptions, and conservatism associated with performing accident analyses and setpoint determinations, like other nuclear power plant technologies, have also evolved. This evolution has resulted in the present preference for explicit evaluation of instrument channel uncertainties and resulting setpoints rather than implicitly incorporating such uncertainties into the overall safety analyses. Both the explicit and implicit approaches can achieve the same objective of assuring that design safety limits will not be exceeded. During the process of developing the 1988 revision of ISA-S67.04, it was determined that, because of the evolving expectations concerning setpoint documentation, additional guidance was needed concerning methods for implementing the requirements of the standard. In order to address this need, standard Committees SP67.15 and SP67.04 were formed and prepared ISA-RP67.04, Part II, 1994. It is the intent of the Committees that the scope of the recommended practice be consistant with the scope of the standard. The recommended practice is to be utilized in conjunction with the standard. The standard is ISA-S67.04.01, and the recommended practice is ISA-RP67.04.02.

During the development of this recommended practice, a level of expectation for setpoint calculations has been identified, which, in the absence of any information on application to less critical setpoints, leads some users to come to expect that all setpoint calculations will contain the same level of rigor and detail. The lack of specific treatment of less critical setpoints has resulted in some potential users expecting the same detailed explicit consideration of all the uncertainty factors described in the recommended practice for all setpoints. It is not the intent of the recommended practice to suggest that the methodology described is applicable to all setpoints. Although it may be used for most setpoint calculations, it is by no means necessary that it may be used for all setpoints. In fact, in some cases, it may not be appropriate.

Setpoints associated with the analytical limits determined from the accident analyses are considered part of the plant’s safety-related design since they are critical to ensuring the integrity of the multiple barriers to the release of fission products. This class of setpoints and their determination have historically been the focus of ISA-S67.04.01 as discussed above.

Also treated as part of many plants’ safety-related designs are setpoints that are not determined from the accident analyses and are not required to maintain the integrity of the fission product barriers. These setpoints may provide anticipatory inputs to, or reside in, the reactor protection or engineered safeguards initiation functions but are not credited in any accident analysis. Alternatively, there are setpoints that support operation of, not initiation of, the engineered safety features.

In applying the standard to the determination of setpoints, a graduated or "graded" approach may be appropriate for setpoints that are not credited in the accident analyses to initiate reactor shutdown or the engineered safety features.

While it is the intent that the recommended practice will provide a basis for consistency in approach and terminology to the determination of setpoint uncertainty, it is acknowledged that the recommended practice is not an all-inclusive document. Other standards exist that contain principles and terminology, which, under certain circumstances, may be useful in estimating instrument uncertainty. It is acknowledged therefore that concerns exist as to whether the recommended practice is complete in its presentation of acceptable methods. The user is encouraged to review several of the references in the recommended practice that contain other principles and terminology.

The uncertainty and setpoint calculations discussed in this recommended practice may be prepared either manually or with a computer software program. The documentation associated with these calculations is discussed in clause 10; however, the design control and documentation requirements of manual calculations or computer software are outside the scope of the recommended practice.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

This recommended practice is intended for use primarily by the owners/operating companies of nuclear power plant facilities or their agents (NSSS, architects, engineers, etc.) in establishing setpoint methodology programs and preparing safety-related instrument setpoint calculations.

This recommended practice utilizes statistical nomenclature that is customary and familiar to personnel responsible for nuclear power plant setpoint calculations and instrument channel uncertainty evaluations. It should be noted that this nomenclature may have different definitions in other statistical applications and is not universal, nor is it intended to be. Furthermore, in keeping with the conservative philosophy employed in power plants calculations, the combination of uncertainty methodology for both dependent and independent uncertainty components is intended to be bounding. That is, the resultant uncertainty should be correct or overly conservative to ensure safe operation. In cases where precise estimation of measurement uncertainty is required, more sophisticated techniques should be employed.

ISA Standard Committee SP67.04 operates as a Subcommittee under SP67, the ISA Nuclear Power Plant Standards Committee, with W. Sotos as Chairman.

CAUTION — ISA ADHERES TO THE POLICY OF THE AMERICAN NATIONAL STANDARDS INSTITUTE WITH REGARD TO PATENTS. IF ISA IS INFORMED OF AN EXISTING PATENT THAT IS REQUIRED FOR USE OF THE STANDARD, IT WILL REQUIRE THE OWNER OF THE PATENT TO EITHER GRANT A ROYALTY-FREE LICENSE FOR USE OF THE PATENT BY USERS COMPLYING WITH THE STANDARD OR A LICENSE ON REASONABLE TERMS AND CONDITIONS THAT ARE FREE FROM UNFAIR DISCRIMINATION.

EVEN IF ISA IS UNAWARE OF ANY PATENT COVERING THIS STANDARD, THE USER IS CAUTIONED THAT IMPLEMENTATION OF THE STANDARD MAY REQUIRE USE OF TECHNIQUES, PROCESSES, OR MATERIALS COVERED BY PATENT RIGHTS. ISA TAKES NO POSITION ON THE EXISTENCE OR VALIDITY OF ANY PATENT RIGHTS THAT MAY BE INVOLVED IN IMPLEMENTING THE STANDARD. ISA IS NOT RESPONSIBLE FOR IDENTIFYING ALL PATENTS THAT MAY REQUIRE A LICENSE BEFORE IMPLEMENTATION OF THE STANDARD OR FOR INVESTIGATING THE VALIDITY OR SCOPE OF ANY PATENTS BROUGHT TO ITS ATTENTION. THE USER SHOULD CAREFULLY INVESTIGATE RELEVANT PATENTS BEFORE USING THE STANDARD FOR THE USER'S INTENDED APPLICATION.

HOWEVER, ISA ASKS THAT ANYONE REVIEWING THIS STANDARD WHO IS AWARE OF ANY PATENTS THAT MAY IMPACT IMPLEMENTATION OF THE STANDARD NOTIFY THE ISA STANDARDS AND PRACTICES DEPARTMENT OF THE PATENT AND ITS OWNER.

ADDITIONALLY, THE USE OF THIS STANDARD MAY INVOLVE HAZARDOUS MATERIALS, OPERATIONS OR EQUIPMENT. THE STANDARD CANNOT ANTICIPATE ALL POSSIBLE APPLICATIONS OR ADDRESS ALL POSSIBLE SAFETY ISSUES ASSOCIATED WITH USE IN HAZARDOUS CONDITIONS. THE USER OF THIS STANDARD MUST EXERCISE SOUND PROFESSIONAL JUDGMENT CONCERNING ITS USE AND APPLICABILITY UNDER THE USER'S PARTICULAR CIRCUMSTANCES. THE USER MUST ALSO CONSIDER THE APPLICABILITY OF ANY GOVERNMENTAL REGULATORY LIMITATIONS AND ESTABLISHED SAFETY AND HEALTH PRACTICES BEFORE IMPLEMENTING THIS STANDARD.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

The following people served as members of ISA Subcommittee SP67.04, which reaffirmed this standard in 2000.

NAME	COMPANY
T. Hurst, Chair	Hurst Technologies Corporation
R. Webb, Managing Director	Altran Corporation
T. Albrigo*	Arizona Public Service Company
D. Alexander	Detroit Edison Company
J. Arpin	ABB Combustion Engineering
I. Baldry	Buhler Inc.
L. Bates	Enstat Inc.
F. Berte	Tetra Engineering Group Inc.
B. Beuchel	North Atlantic Energy Services
W. Brown	ISD Corporation
R. Burnham	Northeast Utilities
M. Burns*	Arizona Public Service Company
T. Burton	Florida Power and Light Company
R. Calvert	Pacific Gas and Electric Company
D. Cottingham	Entergy Operations
C. Cristallo	Consultant
T. Donat	Duke Engineering and Services Inc.
M. Dougherty	Rosemount Nuclear Instruments Inc.
C. Doutt*	U.S. Nuclear Regulatory Commission
M. Eidson	Southern Nuclear Operating Company
R. Fredricksen	Commonwealth Edison
W. Frewin	Nebraska Public Power District
D. Gantt	B&W Hanford Company
R. George	PECO Energy
R. Gotcher	MTI
J. Guider	Rochester Gas and Electric
R. Hakeem	Consultant
D. Harding	Proto-Power Corporation
D. Harris	Triconex Corporation
J. Hartman	Hart Enterprises Inc.
B. Haynes	Terran Technologies Inc.
D. Hooten*	Carolina Power and Light
J. Hunsicker	Illinois Power Company
J. James	Stone and Webster Inc.
R. Jarrett	Tennessee Valley Authority
S. Kincaid	K & K Services
T. Kulaga	Consultant
B. Marrow	Duke Power Company
J. Mauck	U.S. Nuclear Regulatory Commission
C. McNall	Consultant
J. McQuighan	Baltimore Gas and Electric Company
R. Neustadter	Raytheon Engineers and Constructors
R. Nuelk*	Northern States Power Company
D. Ozarowicz	Wisconsin Public Service Corporation
J. Peternel	SOR Inc.

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

R. Profeta	Profeta Consulting
R. Queenan	American Electric Power
E. Quinn	MDM Engineering
D. Ringland	Foxboro Company
B. Rogers*	Northern States Power Company
J. Scheetz	Pacific Engineering Corporation
R. Schwartzbeck	Enercon Services Inc.
T. Slavic	First Energy
J. Snelson*	Carolina Power and Light
C. Sorensen	Southern Company
C. Sossman	MK-W Safety Management Solutions
W. Sotos	STPNOC
C. Tuley	Westinghouse Electric Company
J. Vandenbroek	Southern California Edison Company
T. Verbout*	Northern States Power Company
J. Voss	Isys Consulting Inc.
M. Widmeyer	EG&G
R. Wiegle	CANUS Corporation
V. Willems	Parsons Power

The following people served as members of ISA Subcommittees SP67.04 and SP67.15, both of which approved the 1994 recommended practice:

NAME	COMPANY
R. George, Chairman 67.04*	PECO Energy Company
B. Beuchel, Chairman 67.15	NAESCO
T. Hurst, Vice Chairman 67.04*	Hurst Consulting
M. Widmeyer, Managing Director	The Supply System
J. Adams*	Omaha Public Power District
M. Adler	Volian Enterprises
D. Alexander	Detroit Edison Company
R. Allen	ABB Combustion Engineering, Inc.
J. Alvis*	ABB Impell International
M. Annon	I&C Engineering Associates
J. Arpin*	Combustion Engineering, Inc.
J. Ashcraft*	Tenera
B. Basu*	Southern California Edison Company
L. Bates	Portland General Electric Company
M. Belew	Tennessee Valley Authority
F. Berté	Tetra Engineering Group, Inc.
P. Blanch	Consultant
R. Bockhorst*	Southern California Edison Company
R. Brehm	Tennessee Valley Authority
W. Brown	ISD Corporation
R. Burnham	Consultant
M. Burns	Arizona Public Service
T. Burton	INPO
G. Butera*	Baltimore Gas & Electric

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

R. Calvert	Consultant
J. Carolan*	PECO Energy Company
J. Cash*	Tenera
G. Chambers*	Southern California Edison Company
R. Chan	Salem/Hope Creek Generating Station
G. Cooper*	Commonwealth Edison
L. Costello	Carolina Power & Light Company
W. Cottingham*	Entergy Operations, Inc.
C. Cristallo, Jr.	Northeast Utilities
W. Croft	Westinghouse Electric Corporation
W. Crumbacker*	Sargent & Lundy Engineers
J. Das*	Ebasco Services, Inc.
J. DeMarco*	Sargent & Lundy
D. Desai	Consolidated Edison of New York, Inc.
T. Donat	Consultant
C. Doyel	Florida Power Corporation
M. Durr*	New York Power Authority
M. Eidson	Southern Nuclear Operating Company
R. Ennis*	Tenera
S. Eschbach	B&W Advanced Systems Engineering
R. Estes*	Hurst Consulting
R. Fain	Analysis & Measurement Services
R. Fredricksen	New York Power Authority
V. Fregonese	Carolina Power & Light Company
D. Gantt	Westinghouse Hanford Company
S. Ghbein	Washington PPSS
R. Givan*	Sargent & Lundy
W. Gordon*	Bechtel Company
R. Gotcher	Weed Instrument Company
R. Hakeem*	Gulf States Utilities
R. Hardin	Catawba Nuclear Site
B. Haynes	SAIC
K. Herman*	Pacific Gas & Electric Company
J. Hill*	Northern States Power Company
W. Hinton*	Entergy Operations, Inc.
P. Holzman	Star, Inc.
D. Howard*	Ebasco Services
E. Hubner*	Stone & Webster
P. Hung*	Combustion Engineering
K. Iepson	Iepson Consulting Enterprise, Inc.
J. James*	Stone & Webster, Inc.
S. Jannetty	Proto-Power Engineering
J. Kealy	Consultant
J. Kiely	Northern States Power
S. Kincaid*	Hurst Engineering, Inc.
W. Kramer*	Westinghouse Electric Corporation
T. Kulaga*	Ebasco Services, Inc.
L. Lemons*	Pacific Gas & Electric Company
J. Leong	General Electric Company
L. Lester*	Omaha Public Power District

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

P. Loeser*	U.S. Nuclear Regulatory Commission
J. Long*	Bechtel Company
K. Lyall	Duke Power Company
J. Mauck*	U.S. Nuclear Regulatory Commission
I. Mazza	Trasferimento di Tecnologie
W. McBride	Virginia Power
B. McMillen	Nebraska Public Power District
C. McNall*	Tenera
D. McQuade*	Combustion Engineering
J. McQuighan*	Baltimore Gas & Electric Company
D. Miller	Ohio State University
J. Mock*	Bechtel Company
U. Mondal	Ontario Hydro
R. Morrison	TU Electric - CPSES
R. Naylor*	Commonwealth Edison
R. Neustadter	Raytheon Engineers & Constructors, Inc.
J. O'Connell*	ABB Impell Corporation
J. Osborne	Florida State & Light Company
J. Peternel	SOR, Inc.
A. Petrenko*	New York Power Authority
K. Pitilli*	ABB Impell Corporation
R. Plotnick*	Stone & Webster Corporation
B. Powell*	MDM Engineering
R. Profeta	S. Levy, Inc.
B. Queenan	Vectra
T. Quigley	Northeast Utilities
E. Quinn*	MDM Engineering
S. Rabinovich	Consultant
D. Rahn	Signals & Safeguards, Inc.
T. Reynolds*	Weed Instrument
D. Ringland	Foxboro Company
S. Roberson	Onsite Engineering & Management
D. Sandlin*	Gulf States Utilities
J. Sandstrom	Rosemount, Inc.
R. Sawaya*	Northern States Power Company
J. Scheetz	Pacific Engineering Corporation
R. Schimpf*	New York Power Authority
R. Schwartzbeck	Enercon Services, Inc.
F. Semper	Semper Engineering
J. Shank	Carolina Power & Light Company
T. Slavic	Duquesne Light Company
C. Sorensen	Southern Company Services
W. Sotos	American Electric Power Service Corporation
R. Szoch, Jr.*	Baltimore Gas & Electric Company
B. Sun	Electric Power Research Institute
R. Tanney	Cleveland Illuminating
W. Trenholme	Arizona Public Service
C. Tuley*	Westinghouse Electric Corporation
P. VandeVisse	Consultant
T. Verbout*	Northern States Power Company

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

J. Voss	Tenera LP
J. Wallace	Wisconsin Public Service
R. Webb	Pacific Gas & Electric Company
S. Weldon*	Hurst Engineering, Inc.
R. Westerhoff	Consumers Power Company
P. Wicyk*	Commonwealth Edison
R. Wiegle*	Philadelphia Electric Company
V. Willems	Gilbert Commonwealth
G. Wood*	Entergy Operations, Inc. - Waterford 3
B. Woodruff	Florida Power & Light Company

The following people served as members of ISA Committee SP67, which reaffirmed this recommended practice in 1999.

NAME	COMPANY
W. Sotos, Chair	STPNOC
R. Webb, Managing Director	Altran Corporation
R. Wiegle, Managing Director	CANUS Corporation
R. Allen	ABB Combustion Engineering
B. Beuchel	North Atlantic Energy Services
T. Burton	Florida Power and Light Company
C. Doutt	U.S. Nuclear Regulatory Commission
W. Gordon	Consultant
S. Hedden	Commonwealth Edison Company
K. Herman	Pacific Gas and Electric Company
T. Hurst	Hurst Technologies Corporation
S. Kasturi	MOS Inc.
L. McNeil	INPO
G. Minor	MHB Tech Assoc
J. Nay	Consultant
R. Neustadter	Raytheon Engineers and Constructors
J. Peternel	SOR Inc.
R. Profeta	Profeta Consulting
J. Redmon	Southern California Edison
G. Sensmeier	Sargent and Lundy
T. Slavic	First Energy
I. Sturman	Consultant
C. Tuley	Westinghouse Electric Company
T. Verbout	Northern States Power
P. Wicyk	Byron Nuclear Power Station
M. Widmeyer	EG&G

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

The following people served as members of ISA Committee SP67 during the approval of the 1994 recommended practice:

NAME	COMPANY
H. Wiegle, Chairman	PECO Energy Company
W. Sotos, Vice Chairman	American Electric Power Service Corporation
M. Widmeyer, Managing Director	The Supply System
R. Allen	Combustion Engineering, Inc.
M. Annon	I&C Engineering Associates
B. Basu*	Southern California Edison Company
J. Bauer	General Atomics Company
M. Belew	Tennessee Valley Authority
M. Berkovich	Bechtel Power Corporation
B. Beuchel	NAESCO
P. Blanch	Consultant
T. Burton	INPO
G. Cooper*	Commonwealth Edison
N. Dogra	Impell Corporation
A. Ellis*	Westinghouse Electric Corporation
R. Estes	Hurst Engineering, Inc.
H. Evans	Pyco, Inc.
V. Fregonese	Public Service Electric & Gas
R. George	PECO Energy Company
R. Givan*	Sargent & Lundy
W. Gordon*	Bechtel Savannah River, Inc.
R. Gotcher	Weed Instrument Company
T. Grochowski	UNC Engineering Services, Inc.
S. Hedden*	Commonwealth Edison
K. Herman	Pacific Gas & Electric Company
R. Hindia*	Sargent & Lundy
E. Hubner	Stone & Webster
J. Lipka	Consultant
P. Loeser*	US Nuclear Regulatory Commission
J. Mauck*	US Nuclear Regulatory Commission
B. McMillen	Nebraska Public Power District
L. McNeil	INPO
A. Machiels	Electric Power Research Institute
G. Minor	MHB Technical Association
J. Mock*	Bechtel Company
J. Nay*	Westinghouse Electric Corporation
R. Naylor*	Commonwealth Edison
R. Neustadter	Raytheon Engineers & Constructors, Inc.
R. Profeta	S. Levy, Inc.
J. Redmon*	Southern California Edison Company
A. Schager	Consultant
F. Semper	Semper Engineering
T. Slavic*	Duquesne Light Company
I. Smith	AEA Technology
W. Sotos	American Electric Power Service Corporation

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

I. Sturman	Bechtel Company
W. Trenholme	I&C Consultant
C. Tuley	Westinghouse Electric Corporation
K. Utsumi	General Electric Company
R. Webb	Pacific Gas & Electric Company
G. Whitmore*	Duquesne Light Company
P. Wicyk	Commonwealth Edison Company
F. Zikas	Parker-Hannifin Corporation

This recommended practice was approved for reaffirmation by the ISA Standards and Practices Board on 1 January 2000.

NAME	COMPANY
M. Zielinski	Fisher-Rosemount Systems, Inc.
D. Bishop	Chevron Petroleum Technology Company
P. Brett	Honeywell, Inc.
M. Cohen	Senior Flexonics, Inc.
M. Coppler	Ametek, Inc.
B. Dumortier	Schneider Electric SA
W. Holland	Southern Company
A. Iverson	Ivy Optiks
R. Jones	Dow Chemical Company
V. Maggioli	Feltronics Corporation
T. McAvinew	Instrumentation & Control Engineering LLC
A. McCauley, Jr.	Chagrin Valley Controls, Inc.
G. McFarland	Honeywell, Inc.
R. Reimer	Rockwell Automation
J. Rennie	Factory Mutual Research Corporation
H. Sasajima	Advanced Architecture and Technologies
R. Webb	Altran Corporation
W. Weidman	Parsons Energy & Chemicals Group
J. Weiss	EPRI
J. Whetstone	National Institute of Standards & Technology
M. Widmeyer	EG&G
R. Wiegle	CANUS Corporation
C. Williams	Eastman Kodak Company
G. Wood	Graeme Wood Consulting

The 1994 recommended practice was approved for publication by the ISA Standards and Practices Board in September 1994.

NAME	COMPANY
W. Weidman, Vice President	Gilbert Commonwealth, Inc.
H. Baumann	H. D. Baumann & Associates, Ltd.
D. Bishop	Chevron USA Production Company
W. Calder III	Foxboro Company

_____

* One vote per company.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

C. Gross	Dow Chemical Company
H. Hopkins	Utility Products of Arizona
A. Iverson	Lyondell Petrochemical Company
K. Lindner	Endress + Hauser GmbH + Company
T. McAvinew	Metro Wastewater Reclamation District
A. McCauley, Jr.	Chagrin Valley Controls, Inc.
G. McFarland	ABB Power Plant Controls
J. Mock	Bechtel Company
E. Montgomery	Fluor Daniel, Inc.
D. Rapley	Rapley Engineering Services
R. Reimer	Allen-Bradley Company
R. Webb	Pacific Gas & Electric Company
J. Weiss	Electric Power Research Institute
J. Whetstone	National Institute of Standards & Technology
M. Widmeyer	The Supply System
C. Williams	Eastman Kodak Company
G. Wood	Graeme Wood Consulting
M. Zielinski	Fisher-Rosemount

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

This page intentionally left blank.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

CONTENTS

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

This is a preview of "ISA RP67.04.02-2000". Click here to purchase the full version from the ANSI store.

1 Scope

This recommended practice provides guidance for the implementation of ISA-S67.04.01-2000 (equivalent to ANSI/ISA-S67.04, Part I, 1994) in the following areas:

a) Methodologies, including sample equations to calculate total channel uncertainty

b) Common assumptions and practices in instrument uncertainty calculations

c) Equations for estimating uncertainties for commonly used analog and digital modules

d) Methods to determine the impact of commonly encountered effects on instrument uncertainty

e) Application of instrument channel uncertainty in setpoint determination

f) Sources and interpretation of data for uncertainty calculations

g) Discussion of the interface between setpoint determination and plant operating procedures, calibration procedures, and accident analysis

h) Documentation requirements

2 Purpose

The purpose of this recommended practice is to present guidelines and examples of methods for the implementation of ISA-S67.04.01-2000 in order to facilitate the performance of instrument uncertainty calculations and setpoint determination for safety-related instrument setpoints in nuclear power plants.

3 Definitions

3.1 allowable value:
a limiting value that the trip setpoint may have when tested periodically, beyond which appropriate action shall be taken.

3.2 analytical limit:
limit of a measured or calculated variable established by the safety analysis to ensure that a safety limit is not exceeded.

3.3 abnormally distributed uncertainty:
a term used in this recommended practice to denote uncertainties that do not have a normal distribution. See 6.2.1.2.2 for further information.

3.4 as found:
the condition in which a channel, or portion of a channel, is found after a period of operations and before recalibration (if necessary).

3.5 as-left:
the condition in which a channel, or portion of a channel, is left after calibration or final setpoint device setpoint verification.

3.6 bias:
an uncertainty component that consistently has the same algebraic sign and is expressed as an estimated limit of error.