Unclassified **ENV/JM/MONO(2009)8**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **21-Jul-2009**

English - Or. English

ENVIRONMENT DIRECTORATE
JOINT MEETING OF THE CHEMICALS COMMITTEE AND
THE WORKING PARTY ON CHEMICALS, PESTICIDES AND BIOTECHNOLOGY

ENV/JM/MONO(2009)8
Unclassified

SERIES ON TESTING AND ASSESSMENT
Number 104

PERFORMANCE ASSESSMENT: COMPARISON OF 403 AND CxT PROTOCOLS VIA SIMULATION AND FOR SELECTED REAL DATA SETS

English - Or. English

JT03268119

Document complet disponible sur OLIS dans son format d'origine
Complete document available on OLIS in its original format

OECD Environment, Health and Safety Publications

Series on Testing and Assessment

No. 104

PERFORMANCE ASSESSMENT: COMPARISON OF 403 AND CxT PROTOCOLS VIA SIMULATION AND FOR SELECTED REAL DATA SETS

IOMC

INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS

A cooperative agreement among UNEP, ILO, FAO, WHO, UNIDO, UNITAR and OECD

Environment Directorate

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

Paris 2009

Also published in the Series on Testing and Assessment:

No. 1, *Guidance Document for the Development of OECD Guidelines for Testing of Chemicals (1993; reformatted 1995, revised 2006)*

No. 2, *Detailed Review Paper on Biodegradability Testing (1995)*

No. 3, *Guidance Document for Aquatic Effects Assessment (1995)*

No. 4, *Report of the OECD Workshop on Environmental Hazard/Risk Assessment (1995)*

No. 5, *Report of the SETAC/OECD Workshop on Avian Toxicity Testing (1996)*

No. 6, *Report of the Final Ring-test of the Daphnia magna Reproduction Test (1997)*

No. 7, *Guidance Document on Direct Phototransformation of Chemicals in Water (1997)*

No. 8, *Report of the OECD Workshop on Sharing Information about New Industrial Chemicals Assessment (1997)*

No. 9, *Guidance Document for the Conduct of Studies of Occupational Exposure to Pesticides during Agricultural Application (1997)*

No. 10, *Report of the OECD Workshop on Statistical Analysis of Aquatic Toxicity Data (1998)*

No. 11, *Detailed Review Paper on Aquatic Testing Methods for Pesticides and industrial Chemicals (1998)*

No. 12, *Detailed Review Document on Classification Systems for Germ Cell Mutagenicity in OECD Member Countries (1998)*

No. 13, *Detailed Review Document on Classification Systems for Sensitising Substances in OECD Member Countries 1998)*

No. 14, *Detailed Review Document on Classification Systems for Eye Irritation/Corrosion in OECD Member Countries (1998)*

No. 15, *Detailed Review Document on Classification Systems for Reproductive Toxicity in OECD Member Countries (1998)*

No. 16, *Detailed Review Document on Classification Systems for Skin Irritation/Corrosion in OECD Member Countries (1998)*

No. 17, *Environmental Exposure Assessment Strategies for Existing Industrial Chemicals in OECD Member Countries (1999)*

No. 18, *Report of the OECD Workshop on Improving the Use of Monitoring Data in the Exposure Assessment of Industrial Chemicals (2000)*

No. 19, *Guidance Document on the Recognition, Assessment and Use of Clinical Signs as Humane Endpoints for Experimental Animals used in Safety Evaluation (1999)*

No. 20, *Revised Draft Guidance Document for Neurotoxicity Testing (2004)*

No. 21, *Detailed Review Paper: Appraisal of Test Methods for Sex Hormone Disrupting Chemicals (2000)*

No. 22, *Guidance Document for the Performance of Out-door Monolith Lysimeter Studies (2000)*

No. 23, *Guidance Document on Aquatic Toxicity Testing of Difficult Substances and Mixtures (2000)*

No. 24, *Guidance Document on Acute Oral Toxicity Testing (2001)*

No. 25, *Detailed Review Document on Hazard Classification Systems for Specifics Target Organ Systemic Toxicity Repeated Exposure in OECD Member Countries (2001)*

No. 26, *Revised Analysis of Responses Received from Member Countries to the Questionnaire on Regulatory Acute Toxicity Data Needs (2001)*

No 27, *Guidance Document on the Use of the Harmonised System for the Classification of Chemicals which are Hazardous for the Aquatic Environment (2001)*

No 28, *Guidance Document for the Conduct of Skin Absorption Studies (2004)*

No 29, *Guidance Document on Transformation/Dissolution of Metals and Metal Compounds in Aqueous Media (2001)*

No 30, *Detailed Review Document on Hazard Classification Systems for Mixtures (2001)*

No 31, *Detailed Review Paper on Non-Genotoxic Carcinogens Detection: The Performance of In-Vitro Cell Transformation Assays (2007)*

No. 32, *Guidance Notes for Analysis and Evaluation of Repeat-Dose Toxicity Studies (2000)*

No. 33, *Harmonised Integrated Classification System for Human Health and Environmental Hazards of Chemical Substances and Mixtures (2001)*

No. 34, *Guidance Document on the Development, Validation and Regulatory Acceptance of New and Updated Internationally Acceptable Test Methods in Hazard Assessment (2005)*

No. 35, *Guidance notes for analysis and evaluation of chronic toxicity and carcinogenicity studies (2002)*

No. 36, *Report of the OECD/UNEP Workshop on the use of Multimedia Models for estimating overall Environmental Persistence and long range Transport in the context of PBTS/POPS Assessment (2002)*

No. 37, *Detailed Review Document on Classification Systems for Substances Which Pose an Aspiration Hazard (2002)*

No. 38, *Detailed Background Review of the Uterotrophic Assay Summary of the Available Literature in Support of the Project of the OECD Task Force on Endocrine Disrupters Testing and Assessment (EDTA) to Standardise and Validate the Uterotrophic Assay (2003)*

No. 39, *Guidance Document on Acute Inhalation Toxicity Testing (2009)*

No. 40, *Detailed Review Document on Classification in OECD Member Countries of Substances and Mixtures Which Cause Respiratory Tract Irritation and Corrosion (2003)*

No. 41, *Detailed Review Document on Classification in OECD Member Countries of Substances and Mixtures which in Contact with Water Release Toxic Gases (2003)*

No. 42, *Guidance Document on Reporting Summary Information on Environmental, Occupational and Consumer Exposure (2003)*

No. 43, *Guidance Document on Mammalian Reproductive Toxicity Testing and Assessment (2008)*

No. 44, *Description of Selected Key Generic Terms Used in Chemical Hazard/Risk Assessment (2003)*

No. 45, *Guidance Document on the Use of Multimedia Models for Estimating Overall Environmental Persistence and Long-range Transport (2004)*

No. 46, *Detailed Review Paper on Amphibian Metamorphosis Assay for the Detection of Thyroid Active Substances (2004)*

No. 47, *Detailed Review Paper on Fish Screening Assays for the Detection of Endocrine Active Substances (2004)*

No. 48, *New Chemical Assessment Comparisons and Implications for Work Sharing (2004)*

No. 49, *Report from the Expert Group on (Quantitative) Structure-Activity Relationships [(Q)SARs] on the Principles for the Validation of (Q)SARs (2004)*

No. 50, *Report of the OECD/IPCS Workshop on Toxicogenomics (2005)*

No. 51, *Approaches to Exposure Assessment in OECD Member Countries: Report from the Policy Dialogue on Exposure Assessment in June 2005 (2006)*

No. 52, *Comparison of emission estimation methods used in Pollutant Release and Transfer Registers (PRTRs) and Emission Scenario Documents (ESDs): Case study of pulp and paper and textile sectors (2006)*

No. 53, *Guidance Document on Simulated Freshwater Lentic Field Tests (Outdoor Microcosms and Mesocosms) (2006)*

No. 54, *Current Approaches in the Statistical Analysis of Ecotoxicity Data: A Guidance to Application (2006)*

No. 55, *Detailed Review Paper on Aquatic Arthropods in Life Cycle Toxicity Tests with an Emphasis on Developmental, Reproductive and Endocrine Disruptive Effects (2006)*

No. 56, *Guidance Document on the Breakdown of Organic Matter in Litter Bags (2006)*

No. 57, *Detailed Review Paper on Thyroid Hormone Disruption Assays (2006)*

No. 58, *Report on the Regulatory Uses and Applications in OECD Member Countries of (Quantitative) Structure-Activity Relationship [(Q)SAR] Models in the Assessment of New and Existing Chemicals (2006)*

No. 59, *Report of the Validation of the Updated Test Guideline 407: Repeat Dose 28-Day Oral Toxicity Study in Laboratory Rats (2006)*

No. 60, *Report of the Initial Work Towards the Validation of the 21-Day Fish Screening Assay for the Detection of Endocrine Active Substances (Phase 1A) (2006)*

No. 61, *Report of the Validation of the 21-Day Fish Screening Assay for the Detection of Endocrine Active Substances (Phase 1B) (2006)*

No. 62, *Final OECD Report of the Initial Work Towards the Validation of the Rat Hershberger Assay: Phase-1, Androgenic Response to Testosterone Propionate, and Anti-Androgenic Effects of Flutamide (2006)*

No. 63, *Guidance Document on the Definition of Residue (2006)*

No. 64, *Guidance Document on Overview of Residue Chemistry Studies (2006)*

No. 65, *OECD Report of the Initial Work Towards the Validation of the Rodent Utertrophic Assay - Phase 1 (2006)*

No. 66, *OECD Report of the Validation of the Rodent Uterotrophic Bioassay: Phase 2. Testing of Potent and Weak Oestrogen Agonists by Multiple Laboratories (2006)*

No. 67, *Additional data supporting the Test Guideline on the Uterotrophic Bioassay in rodents (2007)*

No. 68, *Summary Report of the Uterotrophic Bioassay Peer Review Panel, including Agreement of the Working Group of the National Coordinators of the Test Guidelines Programme on the follow up of this report (2006)*

No. 69, *Guidance Document on the Validation of (Quantitative) Structure-Activity Relationship [(Q)SAR] Models (2007)*

No. 70, *Report on the Preparation of GHS Implementation by the OECD Countries (2007)*

No. 71, *Guidance Document on the Uterotrophic Bioassay - Procedure to Test for Antioestrogenicity (2007)*

No. 72, *Guidance Document on Pesticide Residue Analytical Methods (2007)*

No. 73, *Report of the Validation of the Rat Hershberger Assay: Phase 3: Coded Testing of Androgen Agonists, Androgen Antagonists and Negative Reference Chemicals by Multiple Laboratories. Surgical Castrate Model Protocol (2007)*

No. 74, *Detailed Review Paper for Avian Two-generation Toxicity Testing (2007)*

No. 75, *Guidance Document on the Honey Bee (Apis Mellifera L.) Brood test Under Semi-field Conditions (2007)*

No. 76, *Final Report of the Validation of the Amphibian Metamorphosis Assay for the Detection of Thyroid Active Substances: Phase 1 - Optimisation of the Test Protocol (2007)*

No. 77, *Final Report of the Validation of the Amphibian Metamorphosis Assay: Phase 2 - Multi-chemical Interlaboratory Study (2007)*

No. 78, *Final Report of the Validation of the 21-day Fish Screening Assay for the Detection of Endocrine Active Substances. Phase 2: Testing Negative Substances (2007)*

No. 79, *Validation Report of the Full Life-cycle Test with the Harpacticoid Copepods Nitocra Spinipes and Amphiascus Tenuiremis and the Calanoid Copepod Acartia Tonsa - Phase 1 (2007)*

No. 80, *Guidance on Grouping of Chemicals (2007)*

No. 81, *Summary Report of the Validation Peer Review for the Updated Test Guideline 407, and Agreement of the Working Group of National Coordinators of the Test Guidelines Programme on the follow-up of this report (2007)*

No. 82, *Guidance Document on Amphibian Thyroid Histology (2007)*

No. 83, *Summary Report of the Peer Review Panel on the Stably Transfected Transcriptional Activation Assay for Detecting Estrogenic Activity of Chemicals, and Agreement of the Working Group of the National Coordinators of the Test Guidelines Programme on the Follow-up of this Report (2007)*

No. 84, *Report on the Workshop on the Application of the GHS Classification Criteria to HPV Chemicals, 5-6 July Bern Switzerland (2007)*

No. 85, *Report of the Validation Peer Review for the Hershberger Bioassay, and Agreement of the Working Group of the National Coordinators of the Test Guidelines Programme on the Follow-up of this Report (2007)*

No. 86, *Report of the OECD Validation of the Rodent Hershberger Bioassay: Phase 2: Testing of Androgen Agonists, Androgen Antagonists and a 5 α-Reductase Inhibitor in Dose Response Studies by Multiple Laboratories (2008)*

No. 87, *Report of the Ring Test and Statistical Analysis of Performance of the Guidance on Transformation/Dissolution of Metals and Metal Compounds in Aqueous Media (Transformation/ Dissolution Protocol) (2008)*

No.88 *Workshop on Integrated Approaches to Testing and Assessment (2008)*

No.89 *Retrospective Performance Assessment of the Test Guideline 426 on Developmental Neurotoxicity (2008)*

No.90 *Background Review Document on the Rodent Hershberger Bioassay (2008)*

No.91 *Report of the Validation of the Amphibian Metamorphosis Assay (Phase 3) (2008)*

No.92 *Report of the Validation Peer Review for the Amphibian Metamorphosis Assay and Agreement of the Working Group of the National Coordinators of the Test Guidelines Programme on the Follow-Up of this Report (2008)*

No.93 *Report of the Validation of an Enhancement of OECD TG 211: Daphnia Magna Reproduction Test (2008)*

No.94 *Report of the Validation Peer Review for the 21-Day Fish Endocrine Screening Assay and Agreement of the Working Group of the National Coordinators of the Test Guidelines Programme on the Follow-up of this Report (2008)*

No.95 *Detailed Review Paper on Fish Life-Cycle Tests (2008)*

No.96 *Guidance Document on Magnitude of Pesticide Residues in Processed Commodities (2008)*

No.97 *Detailed Review Paper on the use of Metabolising Systems for In Vitro Testing of Endocrine Disruptors (2008)*

No. 98 *Considerations Regarding Applicability of the Guidance on Transformation/Dissolution of Metals Compounds in Aqueous Media (Transformation/Dissolution Protocol) (2008)*

No. 99 *Comparison between OECD Test Guidelines and ISO Standards in the Areas of Ecotoxicology and Health Effects (2008)*

No.100 *Report of the Second Survey on Available Omics Tools (2009)*

No.101 *Report on the Workshop on Structural Alerts for the OECD (Q)SAR Application Toolbox (2009)*

No.102 *Guidance Document for using the OECD (Q)SAR Application Toolbox to Develop Chemical Categories According to the OECD Guidance on Grouping of Chemicals (2009)*

No.103 *Detailed Review Paper on Transgenic Rodent Mutation Assays (2009)*

No.104 *Performance Assessment: Conparsion of 403 and CxT Protocols via Simulation and for Selected Real Data Sets (2009)*

ABOUT THE OECD

The Organisation for Economic Co-operation and Development (OECD) is an intergovernmental organisation in which representatives of 30 industrialised countries in North America, Europe and the Asia and Pacific region, as well as the European Commission, meet to co-ordinate and harmonise policies, discuss issues of mutual concern, and work together to respond to international problems. Most of the OECD's work is carried out by more than 200 specialised committees and working groups composed of member country delegates. Observers from several countries with special status at the OECD, and from interested international organisations, attend many of the OECD's workshops and other meetings. Committees and working groups are served by the OECD Secretariat, located in Paris, France, which is organised into directorates and divisions.

The Environment, Health and Safety Division publishes free-of-charge documents in ten different series: **Testing and Assessment**; **Good Laboratory Practice and Compliance Monitoring**; **Pesticides and Biocides**; **Risk Management**; **Harmonisation of Regulatory Oversight in Biotechnology**; **Safety of Novel Foods and Feeds; Chemical Accidents; Pollutant Release and Transfer Registers; Emission Scenario Documents; and the Safety of Manufactured Nanomaterials.** More information about the Environment, Health and Safety Programme and EHS publications is available on the OECD's World Wide Web site (http://www.oecd.org/ehs/).

This publication was developed in the IOMC context. The contents do not necessarily reflect the views or stated policies of individual IOMC Participating Organizations.

The Inter-Organisation Programme for the Sound Management of Chemicals (IOMC) was established in 1995 following recommendations made by the 1992 UN Conference on Environment and Development to strengthen co-operation and increase international co-ordination in the field of chemical safety. The participating organisations are FAO, ILO, OECD, UNEP, UNIDO, UNITAR and WHO. The World Bank and UNDP are observers. The purpose of the IOMC is to promote co-ordination of the policies and activities pursued by the Participating Organisations, jointly or separately, to achieve the sound management of chemicals in relation to human health and the environment.

This publication is available electronically, at no charge.

For this and many other Environment, Health and Safety publications, consult the OECD's World Wide Web site (www.oecd.org/ehs/)

or contact:

OECD Environment Directorate,
Environment, Health and Safety Division

2 rue André-Pascal
75775 Paris Cedex 16
France

Fax: (33-1) 44 30 61 80
E-mail: ehscont@oecd.org

FOREWORD

This document includes a performance assessment of the C x t Approach compared with the traditional Test Guideline (TG) 403 LC_{50} protocol by biostatistical simulations with real data. The development of this report was part of an acute inhalation toxicity package, also including the draft new TG 436, the updated Test Guideline 403, the draft Guidance Document No. 39 and the draft Performance Assessment report for TG 436.

The need for a performance assessment of the Cxt approach was raised at the acute inhalation expert meeting held at US EPA in Washington DC in November 2006, where a Cxt Performance Assessment Group (PAG) was established to outline the further work. The actual biostatistical simulations and the compilation of the report have been prepared by a consultant engaged by the Secretariat. A first Cxt Performance Assessment Report was made available in early 2008 and was discussed in detail at the last acute inhalation toxicity expert meeting in Washington DC in April 2008. With a recommendation for one change in the conclusions (as outlined by this document), the expert meeting approved the Cxt report and its conclusion that the Cxt protocol can be used interchangeably with the LC_{50} protocol of the TG 403.

No specific comments were received on the draft Cxt Performance Assessment Report from the Working Group of National Coordinators of the Test Guidelines Programme (WNT) in the November 2008 commenting round. At its meeting held on 30 March -2 April 2009, the WNT approved the report and the change proposed by the expert meeting. The eight supporting annexes to the Cxt Performance Assessment report are available at the Secretariat on request. This document is published on the responsibility of the Joint Meeting of the Chemicals Committee and the Working Party on Chemicals, Pesticides and Biotechnology.

Contact for further details:
Environment, Health and Safety Division
Environment Directorate
Organisation for Economic Co-Operation and Development
2, rue André-Pascal
75775 Paris Cedex 16, France

Tel: 33-1-45-24-16-74
E-mail : env.edcontact@oecd.org

TABLE OF CONTENTS

Recommendations from the Expert Consultation Meeting in Washington DC on 15-17 April 2008 Regarding the C*T Performance Assessment Report

After review of the C*T Performance Assessment documents, the Expert Consultation Meeting concurs that the C*T protocol is fit-for-purpose as being an alternative approach to the traditional protocol of the TG 403 for testing acute inhalation toxicity. The meeting agrees to the conclusions presented in the Performance Assessment with one exception: normally, two animals per C*T interval (one per sex using both sexes or two of the most sensitive sex) will be adequate. Under some circumstances, the investigator may elect to utilize two rats per sex per C*T interval. The recommendation added below in italics refers to the text from page 42 in document "Performance Assessment; Comparison of 403 and C*T Protocols Via Simulations and for Selected Real Data Sets".

*Normally, two animals per C*T interval (one per sex using both sexes or two of the most sensitive sex) will be adequate. Under some circumstances, the Investigator may elect to utilize two rats per sex per C*T interval. A simulation analysis demonstrated that testing 1 animal per sex per C*T combination may not be sufficient, even when testing 4 concentrations and 5 durations per concentration (OECD, 2008). The results supporting that conclusion relate to the fact that, when comparing the designs with 4 concentrations and 5 durations per concentration, using 2 animals per sex per C*T combination is better than using 1 animal per sex per C*T combination for one or more of the following criteria;*

- *Bias is reduced: the median ratio of the MLE estimates to the true value tends to be closer to 1;*
- *Variability is reduced: for example the ratio of the 95th percentile to the 5th percentile of the MLEs estimates is reduced;*
- *Success rate is increased: the number of data sets for which LC estimates and their lower bounds could be estimated is greater; and*
- *Coverage rate is improved: that rate is generally closer to the target value of 0.95 and substantially increased when coverage tends to be low (e.g., for P2, P7, P8 (probit), W1, W2, W7, and W8 (Weibull)).*

*Often, more than one of these effects is noted and the differences can be substantial in particular instances. Performing a C*T protocol with 1 animal/sex per C*T combination will provide estimates (LC50) that are comparable with a traditional TG403 protocol in terms of bias and precision; the performance with respect to LC10 and LC01 estimates is greater than with a traditional TG403 protocol. In addition, it will provide estimates (e.g., 1-h LC50 values) not estimable from a traditional TG403 protocol. However, the addition of 1 extra animal per sex per C*T combination will reward the experimenter with better estimates.*

The C*T Performance Assessment Report; Comparison of 403 and C*T Protocols via Simulation and for Selected Real Data Sets, and it's 8 annexes with supporting information are all available at the OECD Public website:

http://www.oecd.org/document/30/0,3343,en_2649_34377_1916638_1_1_1_1,00.html

Annexes:

Annex 1; Performance assessment: comparison of 403 and C*T protocols via simulation and for selected real data sets: Supplement: results from analysis of real data, 14 March 2008

Annex 2; Real data from the rat acute inhalation database

Annex 3: Descriptive statistics for data base of acute toxicity inhalation studies, including raw data from rat inhalation data base, 4 September 2007.

Annex 4: Draft performance assessment simulation plan, 17 September 2007.

Annex 5: Rat acute inhalation database.

Annex 6. Responses by Bruce Allen to comments from the acute inhalation expert group on the descriptive statistics document (September 2007 version) prepared for the C*T PAG.

Annex 7. Box-and-whisker plots of the probit and Weibull distributions, a selection of results.

Annex 8. C*T graphical tool for picking concentrations and durations.

CxT PERFORMANCE ASSESSMENT REPORT: COMPARISON OF 403 AND CxT PROTOCOLS FOR SELECTED REAL DATA AND VIA SIMULATION

INTRODUCTION

As part of the effort to evaluate acute inhalation toxicity test guidelines, specifically TG 403 and the concentration-time (CxT) protocol within TG 403, a simulation comparison of those two protocols has been completed. This document describes the results of the conduct and analysis of the simulations.

This report focuses specifically on the results obtained via simulation. The companion document shows the comparison of lethal concentration (LC) estimates obtained from real data sets that exist for seven compounds. The advantage of these simulation results is that the estimates obtained from the analysis of the simulated data can be compared to the true values being estimated.

The Methods section that follows describes the process for generating the data and analyzing it. The results (a large set of table in Appendices 1-3) summarize the set of estimates obtained for each simulation set relative to the true values. The Discussion section offers some observations about the ability of the tested experimental designs to provide reliable estimates, and it compares the 403 and CxT protocols in light of those observations.

METHODS

True Concentration-Time-Response

The simulation approach hypothesized eighteen sets of known, true concentration-time-response relationship. Those concentration-time-response relationships were defined as follows. One of two general forms was hypothesized, either a probit function or a Weibull function, as defined by the following equations:

Probit: $P(C, T) = \Phi((b_0\text{-}5) + b_1\bullet\ln(C) + b_2\bullet\ln(T)) = \Phi((b_0\text{-}5) + b_2\bullet\ln(C^n\bullet T)$

Weibull: $P(C, T) = 1 - \exp\{-q\bullet C^m\bullet T^k\}$.

In the above, P(C,T) is the probability of lethality given exposure to concentration C (mg/m^3) for duration T (hours) and Φ is the standard normal cumulative distribution function. For the Probit model, b_0, b_1, and b_2 (or b_0, $n = b_1/b_2$, and b_2) are parameters to be specified; similarly, for the Weibull model, q, m, and k are parameters to be specified.

For the purposes of this simulation, and for ease of specifying the variations of the probit and Weibull functions that defined the true concentration-time-response relationship, the above equations were re-parameterized as follows:

Probit: $P(C, T) = \Phi((b_0\text{-}5)*(1 - [\ln(T) + n*\ln(C)]/[\ln(4) + n*\ln(LC50(4))]))$

Weibull: $P(C, T) = 1 - \exp\{C^m*T^k/(LC50(4)^m*4^k) * \ln(.5)\}$.

In both of those re-parameterizations, the concentration giving 50% lethality when duration of exposure is 4 hours, LC50(4), has been substituted for one other parameter. Here, an in all of the following, “LCxx(y)” is used to denote the concentration at which xx% of exposed animals would die when exposed for y hours. These re-parameterized versions of the models were used to define the true conditions because they were more closely related to conditions that we wanted to specify, such as the LC50’s and the slopes of the contour lines for any given probability of response in a plot of ln(C) vs. ln(T).

The eighteen sets of known, true concentration-time-response relationships were specified by selecting parameter values for the two models, as presented in the following two tables.

Table 1: Parameter Values Selected for Defining the Hypothesized Conditions when the True Concentration-Time-Response Relationship is Defined by the Probit Model[1]

[1] The Probit relationships shown in Table 1 were selected from Table 3 in the document “DESCRIPTIVE STATISTICS FOR DATA BASE OF ACUTE TOXICITY INHALATION STUDIES” delivered to OECD on Sept. 4, 2007. That table included the results of fitting the Probit model to 39 data sets that were actually obtained from real acute toxicity CxT experiments. The selection proposed in Table 1 above was obtained by looking at percentiles of values for b_0, n, and LC50(4) over all the Probit fits and selecting some sets that had low values for one or more of

Identifier	(b_0-5)	n	LC50(4)	LC90/LC10
P1	-43.5	1.7	45820	1.84
P2	-31.8	2.5	49240	2.21
P3	-28.6	1.1	7452	2.17
P4	-27.9	1.9	371	1.68
P5	-14.6	1.2	126	2.19
P6	-12.6	0.8	7.41	1.71
P7	-6.9	1.1	2067	6.79
P8	-6.6	1.0	1437	6.77
P9	-2.0	1.7	2.94	2.00

Table 2: Parameter Values Selected for Defining the Hypothesized Conditions when the True Concentration-Time-Response Relationship is Defined by the Weibull Model

Identifier	k	m	LC50(4)	LC90/LC10	"1/slope"
W1	2.9	5	45820	1.85	1.7
W2	1.6	3.9	49240	2.21	2.5
W3	3.6	4.0	7452	2.16	1.1
W4	3.1	5.9	371	1.69	1.9
W5	3.2	3.9	126	2.21	1.2
W6	7.2	5.8	7.41	1.70	0.8
W7	1.5	1.6	2067	6.87	1.1
W8	1.7	1.7	1437	6.14	1.0
W9	2.6	4.4	2.94	2.02	1.7

The last column in Table 1 shows the calculated ratio of LC90 to LC10 (which is constant for any duration of exposure). That ratio was used to identify "corresponding" Weibull model parameter sets. Note that the W1-W9 conditions have the same LC50(4) values and approximately the same LC90/LC10 and "1/slope" values as the corresponding P1-P9 conditions (e.g., those parameters are approximately the same for P1 and W1). The parameters k and m were selected so that LC90/LC10 and "1/slope" (which is equal to n for the Probit model) in the corresponding Weibull and Probit conditions would have roughly the same LC50 contour when plotted on a ln(T)-ln(C) graph. In this way, we have simulated results over pairs of conditions that are similar with respect to LC50 values, for example, but differ with respect to the real probability distribution functions P(C,T).

The remaining assumptions used to complete the specification of the true condition were the following. Each animal was assumed to respond independently with a binomial probability of being affected (dying) defined by the Probit or Weibull model for the condition under consideration. Males and females were assumed to respond based on the same concentration-time-response relationship.

those three parameters, other sets that had medium values for one or more of those three parameters, and other sets that had high values for one or more of those three parameters. For example, P1 represents the results of fitting the Probit model to the female data for bromochloromethane; the fit to that data set had a b_0 value close to the 90th percentile of b_0 values over all the data sets analyzed. Conversely, P9 is from the Probit fit to female data for sarin, which had a b_0 value close to the 10th percentile of b_0 values over all the data sets analyzed. Similar selections were based on percentiles of n and LC50(4).

Experimental Designs

The major experimental design component was the protocol. The two protocols of interest which were examined were the "403" and "CxT." It can be assumed that the same exposure generating mechanism (e.g., nose-only or whole body) was used for all the simulated experiments for both protocols. It was also assumed that actual concentrations achieved in the simulated experiments were always equal to the nominal (designed) concentrations and that the actual durations of exposure always equaled the designed durations. It was assumed that a gas or vapor (as opposed to an aerosol) is being tested; thus, a 20 mg/L (20,000 mg/m^3) limit concentration was relevant and was a starting point for selection of concentrations for both protocols as described below.

403 Protocol

The 403 protocol was defined for this performance assessment as one that tests *D* concentrations with *N* animals per concentration per sex, only at 4 hours duration. Only balanced alternatives (those with the same number of animals per concentration) were evaluated. Table 3 summarizes the variations on the 403 protocol that were considered in this simulation. It also shows the sample size (total number of animals per sex on test) that would be required to complete any given variation. For example, the protocol as it is typically carried out now tests 4 concentrations and 5 animals per sex per concentration, for a total of 20 animals per sex.

Table 3: Number of Animals Tested (per Sex) for the Variations in the 403 Protocol; Variations Defined by D (Number of Concentrations Tested) and N (Number of Animals per Concentration)

Number of Concentrations Tested (D)	**Number of Animals per Sex per Tested Concentration (N)**				
	2	**3**	**4**	**5**	**6**
3	6	9	12	15	18
4	8	12	16	20	24

As indicated in Table 3, a total of 10 variations of the 403 protocol were evaluated.

CxT Protocol

The CxT protocol was defined for this performance assessment as one that tests *F x E* distinct concentration-duration combinations (not all having the same duration) and *M* animals per combination. The F x E combinations were selected by specifying how many concentrations were to be sequentially chosen (F), with each chosen concentration being tested at E different durations. Only balanced alternatives (those with the same number of durations per concentration and the same number of animals per combination) were evaluated. Table 4 summarizes the variations on that protocol that were considered in this simulation. It also shows the sample size (total number of animals per sex on test) that would be required to complete any given variation. For example, the protocol as it is typically carried out now tests 4 concentrations, 5 durations per concentration, and 1 animal per sex per concentration, for a total of 20 animals per sex.

Table 4: Number of Animals Tested (per Sex) for the Variations in the CxT Protocol; Variations Defined by F (Number of Concentrations Tested), E (Number of Durations per Concentration) and M (Number of Animals per Concentration)

No. of Concentrations (F)	**No. of Animals per Sex per Concentration-Duration (M)**	**Number of Durations per Concentration (E)**	
		4	**5**
3	**1**	12	15
	2	24	30
	3	36	45
4	**1**	16	20
	2	32	40
	3	48	60

As indicated in Table 4, 12 variations of the CxT protocol were evaluated.

Selection of Concentrations for 403 Protocol

For the purposes of this simulation, the selection of concentrations to use in the 403 protocol was automated so that the requisite number of iterations over all the design variations could be carried for the many thousands of simulated data sets to be generated and analyzed. The following describes the automated procedure that was implemented, intended to reflect how an actual 403-protocol experiment might be carried out, or as close as possible given the automated nature of the specification (lack of expert judgment input to the process).

It was assumed that there existed information available regarding an estimate of the LC50(4) value. That information was assumed to be equivalent to (and for the purposes of this simulation analysis, was derived from) a sighting study carried out as follows. The sighting study started with 3 animals per sex, tested at a concentration of 20,000 mg/m3 (the limit concentration referred to above). Based on the observed proportion dying after that exposure, a second sighting-study concentration may have been selected as follows (results from both sexes pooled):

- 0/6 – second concentration = 80,000 mg/m3
- 1/6 or 2/6 – second concentration = 40,000 mg/m3
- 3/6 – no second concentration (LC50(4) starting point has been estimated)
- 4/6 or 5/6 – second concentration = 10,000 mg/m3
- 6/6 – second concentration = 5,000 mg/m3

If required, the second concentration was also tested on 3 animals per sex. In some cases (e.g., if both concentrations produced 0% mortality or both produced 100% mortality) a third concentration (and possibly more) were required. When more than 1 concentration was tested, the stopping point was whenever there were two concentrations that yielded two different response rates or a tested concentration resulted in 50% mortality.[2]

[2] In most real-life situations, if no mortality were observed at the first, 20,000 mg/m3 concentration then no further testing would be carried out (because 20,000 mg/m3 is a limit concentration with respect to gases and vapors), unless there was a special need to do so. For the purposes of this performance assessment, we assumed that there was a special need to do so, i.e., the derivation of LCxx values.

From those sighting study results, an initial concentration for the full 403 experiment was selected. If a sighting-study concentration yielded 50% mortality response, that concentration was the initial concentration for the full 403 experiment. Otherwise, the last two concentrations tested (called SC_1 and SC_2 in the following) and their corresponding response rates (SP_1 and SP_2, respectively) were used to define the initial concentration for the full 403 experiment. Based on the probit concentration-response relationship (the one that is fit to the data from the 403 inhalation protocol), one can derive an estimate of the LC50(4) as follows:

Set $b_1 = [\Phi^{-1}(SP_1) - \Phi^{-1}(SP_2)] / [\ln(SC_1) - \ln(SC_2)]$ Eq. 1

Set $b_0 = [\Phi^{-1}(SP_1) - b_1\ln(SC_1)]$ Eq. 2

Then, the estimate of the LC50(4) = $\exp(-b_0/b_1)$ Eq. 3

The initial concentration was set equal to that LC50(4) estimate.[3]

Following selection of the initial concentration for the 403 experiment, the simulation reflected a sequential selection of the additional concentrations to test. The following tables represent the choices of concentrations based on the observed rates of response at earlier concentrations, assuming that the initial concentration is 20 “units”. The sequence of concentrations is labeled C_1, C_2, C_3, and (when the variation calls for 4 concentrations) C_4. The actual sequence used in any iteration was given by multiplying the values selected from the following tables by (initial concentration/20), for the initial concentration as derived above. It is important to note that the selection of the initial concentration and then the sequential selection of additional concentrations was carried out separately and independently for every iteration of every simulation set, so that no two iterations necessarily started at the same initial concentration (reflecting uncertainty about the presumed “existing” information about the LC50) nor did they necessarily test the same subsequent concentrations even if they did have the same initial concentration.

[3] If SP_1 or SP_2 equal 0 or 1.0, then they were set to 0.08 and 0.92, respectively, for the approximation described here. Those substitutions are half way between 0 and the lowest positive response rate possible (1/6 = 0.17) or between 100% and the next lower possible response rate (5/6 = 0.83), respectively.

Table 5: Response Rate at Initial Concentration (C_1) between 0 and 25%

C_1	C_2	Response rate at C_2	C_3	Response rate at C_3	C_4
20	40	0-25	80	0-25	160
				25-50	120
				50-75	70
				75-100	60
		25-50	60	0-25	120
				25-50	90
				50-75	55
				75-100	45
		50-75	30	0-25	37
				25-50	35
				50-75	27
				75-100	25
		75-100	25	0-25	35
				25-50	30
				50-75	23
				75-100	21

Table 6: Response Rate at Initial Concentration (C_1) between 25 and 50%

C_1	C_2	Response rate at C_2	C_3	Response rate at C_3	C_4
20	30	0-25	55	0-25	80
				25-50	70
				50-75	50
				75-100	45
		25-50	45	0-25	60
				25-50	55
				50-75	38
				75-100	33
		50-75	25	0-25	28
				25-50	26
				50-75	23
				75-100	22
		75-100	23	0-25	28
				25-50	26
				50-75	22
				75-100	21

Table 7: Response Rate at Initial Concentration (C_1) between 50 and 75%

C_1	C_2	Response rate at C_2	C_3	Response rate at C_3	C_4
20	12	0-25	18	0-25	19
				25-50	19
				50-75	16
				75-100	14
		25-50	16	0-25	18
				25-50	17
				50-75	14
				75-100	13
		50-75	9	0-25	11
				25-50	10
				50-75	6
				75-100	4
		75-100	7.5	0-25	10
				25-50	8
				50-75	5
				75-100	4

Table 8: Response Rate after Initial Concentration (C_1) between 75 and 100%

C_1	C_2	Response rate at C_2	C_3	Response rate at C_3	C_4
20	10	0-25	15	0-25	18
				25-50	17
				50-75	13
				75-100	11
		25-50	13	0-25	17
				25-50	15
				50-75	12
				75-100	11
		50-75	7	0-25	9
				25-50	8
				50-75	5
				75-100	3
		75-100	5	0-25	8
				25-50	7
				50-75	3
				75-100	1.5

Selection of Concentration-Duration Combinations for CxT Protocol

For the purposes of this simulation, the selection of concentration-duration combinations to use in the CxT protocol was automated so that the requisite number of iterations over all the design variations could be carried for the many thousands of simulated data sets to be generated and analyzed. The following describes the automated procedure that was implemented, intended to reflect how an actual CxT-protocol experiment might be carried out, or as close as possible given the automated nature of the specification (lack of expert judgment input to the process).

Similar to the situation described above for the 403 experiments, it was assumed that there existed information available regarding an estimate of the LC50(1) value. Note here that we assumed the existence information relevant to the one-hour LC50 (as opposed to the four-hour LC50 for the 403 implementations); it seemed more appropriate for a CxT protocol-experiment to assume that there were data relevant to that duration because the "center" for durations typically chosen at the initial concentration tested in a CxT experiment is one hour (see the selection procedure defined below). That information was assumed to be equivalent to (and for the purposes of this simulation analysis, was derived from) a sighting study carried out exactly as for the 403 sighting study described above, except that a one-hour duration was assumed (i.e., the sighting study started with 3 animals per sex, exposed to a concentration of 20,000 mg/m3 for one hour). The LC50(1) estimate used as the initial concentration was obtained from the sequential testing of additional sets of 3 animals per sex until such an estimate could be derived, as shown in Equations 1-3 above.[4]

Given the starting concentration C_1, and supposing there were 5 durations (15, 30, 60, 120, and 240 minutes) tested at that concentration, there were 6 possible choices for C_2, depending on the shortest duration at which mortality was observed for C_1. Table 9 shows the possible values for C_2 and the corresponding durations, assuming that C_1 had a value of 20 "units." The actual sequence of concentrations used in any iteration was given by multiplying the values selected from the following tables by (initial concentration/20), for the initial concentration as derived above.

Table 9: Choices for C_2 given results of C_1: 5 Durations per Concentration

Shortest Duration with Mortality at C_1	C_2	Durations for C_2 (min)
15	2.5	31, 43, 60, 84, 118
30	5	31, 43, 60, 84, 118
60	10	60, 84, 118, 165, 230
120	40	31, 43, 60, 84, 118
240	80	31, 43, 60, 84, 118
none	160	31, 43, 60, 84, 118

The following tables show the selection of C_3 and (if required by the variation under consideration) C_4, with associated durations, depending on the choice of C_2, again assuming 5 durations per concentration.

[4] As noted above for the 403 protocol, in most real-life situations, if no mortality was observed for the initial 20,000 mg/m3 tested concentration for the assumed sighting study, or if no mortality was observed at durations of 0.25, 0.5, 1, 2, or 4 hours when starting a CxT experiment at 20,000 mg/m3, no further testing would be carried out (because 20,000 mg/m3 is a limit concentration with respect to gases and vapors), unless there was a special need to do so. For the purposes of this performance assessment, we assumed that there was a special need to do so, i.e., the derivation of LCxx values for four-hour and one-hour durations.

Table 10: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 2.5 (Durations = 31, 43, 60, 84, 118 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
31	.625	16, 22, 31, 43, 60	16	.156	11, 16, 22, 31, 43
			22	.31	11, 16, 22, 31, 43
			31	.31	16, 22, 31, 43, 60
			43	.31	31, 43, 60, 84, 118
			60	.31	43, 60, 84, 118, 165
			none	1.8	31, 43, 60, 84, 118
43	1.25	22, 31, 43, 60, 84	22	.625	11, 16, 22, 31, 43
			31	.625	22, 31, 43, 60, 84
			43	.625	31, 43, 60, 84, 118
			60	.625	43, 60, 84, 118, 165
			84	.625	60, 84, 118, 165, 230
			none	.625	84, 118, 165, 230, 323
60	1.25	31, 43, 60, 84, 118	31	.625	31, 43, 60, 84, 118
			43	.625	43, 60, 84, 118, 165
			60	.625	43, 60, 84, 118, 165
			84	.625	60, 84, 118, 165, 230
			118	.625	84, 118, 165, 230, 323
			none	5	22, 31, 43, 60, 84
84	5	22, 31, 43, 60, 84	22	1.25	60, 84, 118, 165, 230
			31	10	8, 11, 16, 22, 31
			43	10	11, 16, 22, 31, 43
			60	10	16, 22, 31, 43, 60
			84	1.25	84, 118, 165, 230, 323
			none	1.25	84, 118, 165, 230, 323
118	5	22, 31, 43, 60, 84	22	1.25	84, 118, 165, 230, 323
			31	10	8, 11, 16, 22, 31
			43	10	11, 16, 22, 31, 43
			60	10	11, 16, 22, 31, 43
			84	10	16, 22, 31, 43, 60
			none	10	22, 31, 43, 60, 84
none	10	8, 11, 16, 22, 31	8	5	8, 11, 16, 22, 31
			11	5	16, 22, 31, 43, 60
			16	5	22, 31, 43, 60, 84
			22	5	22, 31, 43, 60, 84
			31	5	31, 43, 60, 84, 118
			none	15	11, 16, 22, 31, 43

Table 11: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 5 (Durations = 31, 43, 60, 84, 118 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
31	10	11, 16, 22, 31, 43	11	15	6, 8, 11, 16, 22
			16	15	6, 8, 11, 16, 22
			22	15	8, 11, 16, 22, 31
			31	15	11, 16, 22, 31, 43
			43	15	11, 16, 22, 31, 43
			none	15	16, 22, 31, 43, 60
43	10	16, 22, 31, 43, 60	16	15	8, 11, 16, 22, 31
			22	15	11, 16, 22, 31, 43
			31	2.5	31, 43, 60, 84, 118
			43	2.5	31, 43, 60, 84, 118
			60	2.5	43, 60, 84, 118, 165
			none	2.5	43, 60, 84, 118, 165
60	10	16, 22, 31, 43, 60	16	15	8, 11, 16, 22, 31
			22	15	8, 11, 16, 22, 31
			31	2.5	43, 60, 84, 118, 165
			43	2.5	60, 84, 118, 165, 230
			60	2.5	60, 84, 118, 165, 230
			none	2.5	60, 84, 118, 165, 230
84	10	22, 31, 43, 60, 84	22	2.5	60, 84, 118, 165, 230
			31	2.5	60, 84, 118, 165, 230
			43	2.5	84, 118, 165, 230, 323
			60	2.5	84, 118, 165, 230, 323
			84	15	22, 31, 43, 60, 84
			none	15	22, 31, 43, 60, 84
118	10	22, 31, 43, 60, 84	22	15	8, 11, 16, 22, 31
			31	15	11, 16, 22, 31, 43
			43	2.5	84, 118, 165, 230, 323
			60	2.5	84, 118, 165, 230, 323
			84	15	22, 31, 43, 60, 84
			none	15	22, 31, 43, 60, 84
none	10	31, 43, 60, 84, 118	31	15	8, 11, 16, 22, 31
			43	15	16, 22, 31, 43, 60
			60	15	16, 22, 31, 43, 60
			84	15	22, 31, 43, 60, 84
			118	15	22, 31, 43, 60, 84
			none	15	22, 31, 43, 60, 84

Table 12: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 10 (Durations = 60, 84, 118, 165, 230 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
60	5	43, 60, 84, 118, 165	43	40	11, 16, 22, 31, 43
			60	40	11, 16, 22, 31, 43
			84	40	16, 22, 31, 43, 60
			118	40	16, 22, 31, 43, 60
			165	40	11, 16, 22, 31, 43
			none	40	11, 16, 22, 31, 43
84	5	60, 84, 118, 165, 230	60	40	16, 22, 31, 43, 60
			84	40	16, 22, 31, 43, 60
			118	40	16, 22, 31, 43, 60
			165	40	11, 16, 22, 31, 43
			230	40	8, 11, 16, 22, 31
			none	40	6, 8, 11, 16, 22
118	5	84, 118, 165, 230, 323	84	40	22, 31, 43, 60, 84
			118	40	22, 31, 43, 60, 84
			165	40	16, 22, 31, 43, 60
			230	40	11, 16, 22, 31, 43
			323	40	11, 16, 22, 31, 43
			none	40	8, 11, 16, 22, 31
165	40	16, 22, 31, 43, 60	16	80	3, 4, 6, 8, 11
			22	80	6, 8, 11, 16, 22
			31	80	8, 11, 16, 22, 31
			43	80	11, 16, 22, 31, 43
			60	80	16, 22, 31, 43, 60
			none	80	22, 31, 43, 60, 84
230	40	8, 11, 16, 22, 31	8	60	2, 3, 4, 6, 8
			11	60	3, 4, 6, 8, 11
			16	80	3, 4, 6, 8, 11
			22	80	4, 6, 8, 11, 16
			31	80	6, 8, 11, 16, 22
			none	80	11, 16, 22, 31, 43
none	40	8, 11, 16, 22, 31	8	60	2, 3, 4, 6, 8
			11	60	3, 4, 6, 8, 11
			16	60	4, 6, 8, 11, 16
			22	80	6, 8, 11, 16, 22
			31	80	11, 16, 22, 31, 43
			none	80	16, 22, 31, 43, 60

Table 13: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 40 (Durations = 31, 43, 60, 84, 118 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
31	80	6, 8, 11, 16, 22	6	100	2, 3, 4, 6, 8
			8	120	2, 3, 4, 6, 8
			11	160	3, 4, 6, 8, 11
			16	160	4, 6, 8, 11, 16
			22	160	6, 8, 11, 16, 22
			none	160	8, 11, 16, 22, 31
43	80	8, 11, 16, 22, 31	8	120	2, 3, 4, 6, 8
			11	160	3, 4, 6, 8, 11
			16	160	4, 6, 8, 11, 16
			22	160	6, 8, 11, 16, 22
			31	160	8, 11, 16, 22, 31
			none	160	11, 16, 22, 31, 43
60	80	11, 16, 22, 31, 43	11	160	3, 4, 6, 8, 11
			16	160	4, 6, 8, 11, 16
			22	160	6, 8, 11, 16, 22
			31	160	8, 11, 16, 22, 31
			43	160	11, 16, 22, 31, 43
			none	160	16, 22, 31, 43, 60
84	80	22, 31, 43, 60, 84	22	160	6, 8, 11, 16, 22
			31	160	11, 16, 22, 31, 43
			43	160	11, 16, 22, 31, 43
			60	160	16, 22, 31, 43, 60
			84	160	31, 43, 60, 84, 118
			none	160	31, 43, 60, 84, 118
118	80	22, 31, 43, 60, 84	22	160	6, 8, 11, 16, 22
			31	160	8, 11, 16, 22, 31
			43	160	11, 16, 22, 31, 43
			60	160	16, 22, 31, 43, 60
			84	160	22, 31, 43, 60, 84
			none	160	31, 43, 60, 84, 118
none	80	31, 43, 60, 84, 118	31	160	8, 11, 16, 22, 31
			43	160	11, 16, 22, 31, 43
			60	160	16, 22, 31, 43, 60
			84	160	31, 43, 60, 84, 118
			118	160	31, 43, 60, 84, 118
			none	160	31, 43, 60, 84, 118

Table 14: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 80 (Durations = 31, 43, 60, 84, 118 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
31	160	4, 6, 8, 11, 16	4	40	16, 22, 31, 43, 60
			6	40	16, 22, 31, 43, 60
			8	40	22, 31, 43, 60, 84
			11	40	31, 43, 60, 84, 118
			16	40	31, 43, 60, 84, 118
			none	40	22, 31, 43, 60, 84
43	160	11, 16, 22, 31, 43	11	320	3, 4, 6, 8, 11
			16	320	4, 6, 8, 11, 16
			22	320	6, 8, 11, 16, 22
			31	320	8, 11, 16, 22, 31
			43	320	11, 16, 22, 31, 43
			none	320	16, 22, 31, 43, 60
60	160	16, 22, 31, 43, 60	16	320	4, 6, 8, 11, 16
			22	320	6, 8, 11, 16, 22
			31	320	8, 11, 16, 22, 31
			43	320	11, 16, 22, 31, 43
			60	320	16, 22, 31, 43, 60
			none	320	22, 31, 43, 60, 84
84	160	22, 31, 43, 60, 84	22	320	6, 8, 11, 16, 22
			31	320	8, 11, 16, 22, 31
			43	320	11, 16, 22, 31, 43
			60	320	16, 22, 31, 43, 60
			84	320	22, 31, 43, 60, 84
			none	320	31, 43, 60, 84, 118
118	160	31, 43, 60, 84, 118	31	320	11, 16, 22, 31, 43
			43	320	11, 16, 22, 31, 43
			60	320	16, 22, 31, 43, 60
			84	320	22, 31, 43, 60, 84
			118	320	31, 43, 60, 84, 118
			none	320	43, 60, 84, 118, 165
none	160	43, 60, 84, 118, 165	43	320	11, 16, 22, 31, 43
			60	320	22, 31, 43, 60, 84
			84	320	31, 43, 60, 84, 118
			118	320	43, 60, 84, 118, 165
			165	10	84, 118, 165, 230, 323
			none	10	84, 118, 165, 230, 323

Table 15: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 160 (Durations = 31, 43, 60, 84, 118 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
31	80	22, 31, 43, 60, 84	22	40	22, 31, 43, 60, 84
			31	40	31, 43, 60, 84, 118
			43	40	43, 60, 84, 118, 165
			60	40	60, 84, 118, 165, 230
			84	40	84, 118, 165, 230, 323
			none	320	8, 11, 16, 22, 31
43	80	31, 43, 60, 84, 118	31	320	6, 8, 11, 16, 22
			43	320	8, 11, 16, 22, 31
			60	320	11, 16, 22, 31, 43
			84	320	11, 16, 22, 31, 43
			118	320	11, 16, 22, 31, 43
			none	320	11, 16, 22, 31, 43
60	80	43, 60, 84, 118, 165	43	320	11, 16, 22, 31, 43
			60	320	11, 16, 22, 31, 43
			84	320	16, 22, 31, 43, 60
			118	320	16, 22, 31, 43, 60
			165	320	11, 16, 22, 31, 43
			none	320	11, 16, 22, 31, 43
84	80	60, 84, 118, 165, 230	60	320	16, 22, 31, 43, 60
			84	320	16, 22, 31, 43, 60
			118	320	22, 31, 43, 60, 84
			165	320	22, 31, 43, 60, 84
			230	320	16, 22, 31, 43, 60
			none	320	16, 22, 31, 43, 60
118	80	84, 118, 165, 230, 323	84	320	22, 31, 43, 60, 84
			118	320	22, 31, 43, 60, 84
			165	320	31, 43, 60, 84, 118
			230	320	22, 31, 43, 60, 84
			323	320	22, 31, 43, 60, 84
			none	320	16, 22, 31, 43, 60
none	320	60, 84, 118, 165, 230	60	640	11, 16, 22, 31, 43
			84	640	22, 31, 43, 60, 84
			118	640	31, 43, 60, 84, 118
			165	640	43, 60, 84, 118, 165
			230	640	84, 118, 165, 230, 323
			none	640	84, 118, 165, 230, 323

The sequences of concentrations and durations used when the experimental design called for 4 durations per concentration are given in the following set of tables. As above, C_1 was assumed to start at 20 "units" and the actual sequence of concentrations used in any iteration can be derived by multiplying the C_i values by (initial concentration/20). The initial durations selected for the 4-durations-per-concentration designs were 25, 60, 144, and 345 minutes; the spacing was somewhat greater than the spacing for the 5-durations-per-concentration (spacing of 2.4 fold) because of fewer durations and the desire to cover about the same range of durations (with 60 minutes being the key, "center" of the set) and not wanting to include durations greater than 6 hours (360 minutes) because of known limitation associated with tests conducted with a nose-only apparatus.

Table 16: Choices for C_2 given results of C_1: 4 Durations per Concentration

Shortest Duration with Mortality at C_1	C_2	Durations for C_2 (min)
25	3	8, 13, 21, 36
60	10	21, 36, 60, 101
144	10	60, 101, 169, 284
345	40	60, 101, 169, 284
none	80	60, 101, 169, 284

The following tables show the selection of C_3 and (if required by the variation under consideration) C_4, with associated durations, depending on the choice of C_2, again, for the 4-duration-per-concentration designs.

Table 17: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 3 (Durations = 8, 13, 21, 36 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
8	0.3	2, 3, 4, 8	2	.03	1, 2, 3, 4
			3	.06	2, 3, 4, 8
			4	.06	3, 4, 8, 13
			8	.06	4, 8, 13, 21
			none	1	4, 8, 13, 21
13	1	8, 13, 21, 36	8	.3	4, 8, 13, 21
			13	.3	8, 13, 21, 36
			21	.3	13, 21, 36, 60
			36	.6	21, 36, 60, 101
			none	.6	36, 60, 101, 169
21	1	13, 21, 36, 60	13	.6	13, 21, 36, 60
			21	.6	13, 21, 36, 60
			36	1.5	13, 21, 36, 60
			60	1.7	13, 21, 36, 60
			none	1.5	21, 36, 60, 101
36	1.5	21, 36, 60, 101	21	.6	21, 36, 60, 101
			36	.6	21, 36, 60, 101
			60	.6	36, 60, 101, 169
			101	.6	60, 101, 169, 284
			none	1	101, 169, 284, 478
none	10	8, 13, 21, 36	8	2	36, 60, 101, 169
			13	1	60, 101, 169, 284
			21	1	60, 101, 169, 284
			36	5	36, 60, 101, 169
			none	8	60, 101, 169, 284

Table 18: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 10 (Durations = 21, 36, 60, 101 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
21	30	8, 13, 21, 36	8	5	21, 36, 60, 101
			13	5	36, 60, 101, 169
			21	5	21, 36, 60, 101
			36	5	21, 36, 60, 101
			none	5	36, 60, 101, 169
36	5	36, 60, 101, 169	36	40	8, 13, 21, 36
			60	40	13, 21, 36, 60
			101	2.5	60, 101, 169, 284
			169	40	8, 13, 21, 36
			none	40	4, 8, 13, 21
60	5	21, 36, 60, 101	21	2.5	21, 36, 60, 101
			36	2.5	36, 60, 101, 169
			60	2.5	36, 60, 101, 169
			101	2.5	60, 101, 169, 284
			none	40	4, 8, 13, 21
101	5	60, 101, 169, 284	60	2.5	36, 60, 101, 169
			101	2.5	60, 101, 169, 284
			169	40	13, 21, 36, 60
			284	40	8, 13, 21, 36
			none	40	4, 8, 13, 21
none	40	13, 21, 36, 60	13	30	3, 4, 8, 13
			21	80	3, 4, 8, 13
			36	60	4, 8, 13, 21
			60	60	8, 13, 21, 36
			none	80	21, 36, 60, 101

Table 19: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 10 (Durations = 60, 101, 169, 284 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
60	40	21, 36, 60, 101	21	5	60, 101, 169, 284
			36	5	36, 60, 101, 169
			60	5	36, 60, 101, 169
			101	5	60, 101, 169, 284
			none	80	21, 36, 60, 101
101	40	21, 36, 60, 101	21	80	8, 13, 21, 36
			36	80	8, 13, 21, 36
			60	80	13, 21, 36, 60
			101	80	21, 36, 60, 101
			none	80	36, 60, 101, 169
169	40	36, 60, 101, 169	36	80	13, 21, 36, 60
			60	80	13, 21, 36, 60
			101	80	21, 36, 60, 101
			169	80	36, 60, 101, 169
			none	80	60, 101, 169, 284
284	40	21, 36, 60, 101	21	80	4, 8, 13, 21
			36	80	4, 8, 13, 21
			60	80	8, 13, 21, 36
			101	80	13, 21, 36, 60
			none	80	36, 60, 101, 169
none	40	21, 36, 60, 101	21	80	3, 4, 8, 13
			36	80	4, 8, 13, 21
			60	80	8, 13, 21, 36
			101	80	13, 21, 36, 60
			none	80	21, 36, 60, 101

Table 20: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 40 (Durations = 60, 101, 169, 284 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
60	80	8, 13, 21, 36	8	120	2, 3, 4, 8
			13	160	2, 3, 4, 8
			21	160	4, 8 , 13, 21
			36	160	8, 13, 21, 36
			none	160	8, 13, 21, 36
101	80	13, 21, 36, 60	13	120	3, 4, 8, 13
			21	160	3, 4, 8, 13
			36	120	8, 13, 21, 36
			60	160	8, 13, 21, 36
			none	160	13, 21, 36, 60
169	80	21, 36, 60, 101	21	120	4, 8 , 13, 21
			36	160	4, 8 , 13, 21
			60	160	8, 13, 21, 36
			101	160	13, 21, 36, 60
			none	160	21, 36, 60, 101
284	80	60, 101, 169, 284	60	160	13, 21, 36, 60
			101	160	13, 21, 36, 60
			169	160	21, 36, 60, 101
			284	160	60, 101, 169, 284
			none	160	60, 101, 169, 284
none	120	60, 101, 169, 284	60	80	21, 36, 60, 101
			101	240	21, 36, 60, 101
			169	240	36, 60, 101, 169
			284	240	60, 101, 169, 284
			none	640	60, 101, 169, 284

Table 21: Choices for C_3 and C_4 (and Associated Durations) for C_2 = 80 (Durations = 60, 101, 169, 284 min)

Shortest Duration with Mortality at C_2	C_3	Durations for C_3	Shortest Duration with Mortality at C_3	C_4	Durations for C_4
60	40	36, 60, 101, 169	36	30	13, 21, 36, 60
			60	30	36, 60, 101, 169
			101	60	13, 21, 36, 60
			169	60	13, 21, 36, 60
			none	160	13, 21, 36, 60
101	160	13, 21, 36, 60	13	40	60, 101, 169, 284
			21	120	13, 21, 36, 60
			36	120	21, 36, 60, 101
			60	40	60, 101, 169, 284
			none	320	21, 36, 60, 101
169	160	36, 60, 101, 169	36	120	21, 36, 60, 101
			60	320	8, 13, 21, 36
			101	320	21, 36, 60, 101
			169	320	21, 36, 60, 101
			none	320	36, 60, 101, 169
284	160	36, 60, 101, 169	36	120	13, 21, 36, 60
			60	120	21, 36, 60, 101
			101	120	36, 60, 101, 169
			169	320	36, 60, 101, 169
			none	1280	60, 101, 169, 284
none	320	60, 101, 169, 284	60	160	60, 101, 169, 284
			101	640	21, 36, 60, 101
			169	640	36, 60, 101, 169
			284	1280	36, 60, 101, 169
			none	1280	60, 101, 169, 284

Simulation Sets

There were a total of 18 hypothesized true relationships (9 with the relationship described by a probit function and 9 with the relationship described by a Weibull function). There were 10 variations of the 403 protocol and 12 variations of the CxT protocol. Thus there were a total of 180 (18x10) simulation sets for the 403 design and 216 (18x12) simulation sets for the CxT design. Each simulation set differs from any other by either the hypothesized true concentration-time-response relationship or the experimental design variation.

Each simulation set consisted of 500 replications. A replication was defined as one assignment of response/non-response to all animals included in a particular variation of a protocol (see Tables 3 and 4 above). Each animal in a replication was determined to be a responder if a uniform random number was less than or equal to the probability of being affected, as defined by the hypothesized true relationship and the concentration-time combination to which that animal was assigned. Each replication included the entire process, including simulating sighting-study results and determination of an initial concentration and the sequential selection of subsequent concentrations (and durations for the variations of the CxT protocol) based on prior response rates. Thus, although the experimental design variation was the same for any particular simulation set, the replications within that set differed with respect to the concentrations and/or durations selected because they were conditional on the observed results, which will vary in a random way conditional on the underlying concentration-time-response probabilities.

Once each animal in a replicate was assigned a response (live or dead), the probit model was fit to the simulated data for that replicate. For the 403 protocol variations, the U.S. EPA BMDS probit model program was used to fit that model. Because the duration of exposure for all groups in those protocols was 4 hours, there was no T term in the models, and the only parameters to be estimated were b_0 and b_1. The LC01(4), LC10(4), and LC50(4) values and their 95% lower bounds were output for each replicate of each simulation set.

For the simulation sets using a variation of the CxT protocol, once responses have been assigned to each animal in the replicate, a program developed by Dr. Wil ten Berge was used to fit the probit model. A version of that program that has been developed for the U.S. EPA was used. The program developed for the U.S. EPA has been validated on a set of test data sets and found to give the same results as the spreadsheet/Visual Basic-based program available from Dr. ten Berge. The parameters to be estimated from the fitted Probit results will include LC01(4), LC10(4), LC50(4), as well as LC01(1), LC10(1), LC50(1), i.e., the 1%, 10% and 50% LC values for both 4-hour and 1-hour durations, as well as their 95% lower bounds.

Performance Evaluations

For each simulation set, the measurement of performance was based on distributions of the estimates derived (LCxx values), relative to the corresponding true, known value for the parameter in question. The distribution for an estimate was estimated from the results across all of the replicates for any given simulation run. For example, for the parameter LC50(4), suppose that for a given hypothesized true relationship, the correct value is $LC50(4)_t$. The performance of a particular design variation (e.g., a CxT protocol with 4 concentrations, 5 durations per concentration, and 1 animal per sex per concentration-duration combination) was evaluated as follows:

1. For replicate i (i = 1, …500) of the simulation set having that true relationship and design variation, an estimate of LC50(4) was derived, call it $LC50(4)_i$.
2. $LC50(4)_i$ / $LC50(4)_t$ was calculated.
3. The first two steps were repeated over all 500 iterations.
4. The summary of the distribution (consisting of the 5^{th}, 10^{th}, 25^{th}, 50^{th}, 75^{th}, 90^{th} and 95^{th} percentiles) of the ratios was tabulated.

In this way, each design variation had a tabulated distribution summary for each hypothesized true relationship. The distributions were examined to determine if the estimates were close to the target (were the median, 50^{th} percentile, ratios close to 1) and how discrepant the estimates could be (how different from 1 were the 5^{th} and 95^{th} percentiles).

It was sometimes the case that some calculations could not be completed (due to the structure of the data or because of software issues). Tabulations are provided of the frequency with which LCxx values (or the lower confidence limits for LCxx values) could not be obtained, as a function of experimental design.

In addition, the "coverage" provided by the lower confidence bounds was assessed by determining the proportion of the ratios of the lower bound estimates over the true LCxx values that were less than 1. The target for coverage was 0.95, because we have calculated 95% lower bounds in each case.

RESULTS

A total of 198,000 data sets were created and analyzed (90,000 403 experiments and 108,000 CxT experiments). The input and output files for those data sets will be made available electronically.

403 Protocol

The sets of tables in Appendix 1 summarize the results of the procedure described above, sorted by the known, true concentration-time-response relationship and the design variation for the simulated 403 protocol experiments. In each table are the percentiles of the ratios of the estimated LCxx(4) values over the true LCxx(4) value (xx = 50, 10 and 01), as well as summary information about the number of times the software ran to completion, the number of times 95% lower bounds on the LCxx(4) could be obtained, and (among those times with lower bound estimates obtained) the proportion of the time the estimated lower bound was less than the corresponding true value (the coverage, which one desires to be close to 0.95). For the parameters associated with the underlying concentration-time-response relationships, see Tables 1 and 2 above.

CxT Protocol

The summary results for the CxT designs that test 5 durations per concentration are shown in Appendix 2. Similarly, the summary results for the designs that test 4 durations per concentration are shown in Appendix 3. As for the 403 summary results, the CxT summaries are grouped by underlying true concentration-time-response, and then by the experimental design variations of number of concentrations tested and number of animals per sex per CxT combination.

DISCUSSION

There were two classes of true underlying concentration-time-response relationships examined in this simulations study. As in real-world situations, regardless of the functions generating the data, the analyses that were conducted in this simulation analysis consisted of fitting the probit model and estimating the parameters of interest (e.g., LC50's, LC10's, and LC01's). The set of probit concentration-time-response functions (functions P1- P9) generates data that are known to have a true concentration-time-response relationships that is the same as the model being fit to those data and from which LC estimates are being derived.

The true conditions that are described by Weibull functions (W1 – W9) are important for this simulation because they represent conditions that generate observations in accordance with a model that is *not* the same one being fit in the analysis of the 403 or CxT observations. It was considered important to include conditions that do not conform exactly to the model being fit, so that the robustness of the probit assumption to alternative "realities" can be evaluated. The Weibull functions satisfied that need.

After data were generated in accordance with the underlying true concentration-time-response relationship and the experimental design under consideration, the data sets (500 per simulation set) were input into existing dose-response model software. Use of the existing programs (the EPA's BMDS log-probit model and a C version of the ten Berge CxT model) as they exist now (and as they would be available to current users) makes sure that the protocols are compared to one another relative to the software that is available to analyze them. Limitations associated with one or the other of these approaches were revealed by this simulation approach. The ability of designed experiments coupled with existing software to generate the desired estimates is an important feature; failure of the models to run on data that would be routinely generated suggests either that the experimental design is not generating data capable of deriving the estimates of interest, or that there are limitations in the software that need to be addressed in the near future. Either way, such instances would very likely require additional testing and therefore additional expenditures of test animals.

It should be noted also that all of the LC estimates presented above and discussed here were derived by pooling the males and females within any given simulated data set. That is appropriate for these simulated data, because one assumption for the data generation was that males and females had the same underlying concentration-time-response relationships. By pooling, we are perhaps inherently crediting the experimenter with good judgment that might not always be applied in real cases. That is, we implicitly assume that the experimenter has recognized that pooling is appropriate and that s/he can therefore increase the sample sizes for the analyses by combining the male and female results. Somewhat less optimal results might be expected if males and females are analyzed separately, because the group sizes will be smaller. One can get a sense of the impact of separate analyses of the males and females by considering the results for groups sizes equal to one half the values presented in the tables (Appendices 1-3). For example, the results for 3 animals per sex per concentration in Appendix 1 give an indication of what one would expect if, instead of pooling 6 animals per sex per concentration, the analyses were done separately for males and females (which would then have 3 animals per concentration, each). The discussion below does not further address this issue.

The remainder of this discussion highlights the main findings concerning the ability of the 403 protocol (and the variations of it with respect to number of concentrations tested and the number of animals per sex per concentration) and the CxT protocol (and its variations with respect to number of concentrations, number of durations per concentration, and number of animals per sex per CxT combination) to provide estimates of interest (LC values).

403 Protocol

All the variations of the 403 protocol could estimate the LC50(4) value fairly well, across all true concentration-time-response relationships. In terms of the maximum likelihood estimates (MLEs), the ratios of the estimated LC50(4) to the true LC50(4) were centered around 1 as one would hope they would be (50^{th} percentiles were always close to 1). However for some of the concentration-time-response (see P7, P8, P9, W7, and W8), larger group sizes (number of animals per sex per concentration) and (in a few cases) more concentrations tested (4 rather than 3) were needed to bring the 50th percentile close to 1. When the underlying concentration-time-response relationship was defined by a Weibull function, the overall tendency may have been for the LC50(4) MLEs to be very slightly less (on average) than the true LC50(4); across all of W1-W9, the 50th percentiles were more often just slightly less than 1 rather than slightly above 1.

A bigger beneficial effect of the group size can be seen on the MLEs in relation to the tendency for the variation in the MLEs to decrease as group size increased (e.g., looking at the ratio of the 95th percentile to the 5th percentile, which tended to decrease as group size increased from 2 to 6 animals per sex per concentrations). There was not much effect of the number of concentrations tested on this variation.

Another big effect of group size was seen on the ability of the software used for concentration-response analysis to successfully estimate lower bounds on the LC50(4). There were a total of 500 iterations of each simulation set, so ideally one would get 500 LC50(4) and lower bound estimates per set. The number of lower bounds actually obtained could be very low (e.g., less than 400) for several of the concentration-time-response relationships when the group size was less than about 5 animals per sex per concentration. The number of concentrations tested also helped increase the ability to obtain lower bound estimates, but its effect was not as great as the effect of increasing the group size. For some concentration-response relationships, the rates at which lower bounds were obtained were low no matter what the group size or whether 3 or 4 concentrations were tested (P7, P8, W7, W8), though the overall tendency for a higher rate of bound estimation with larger group size and more concentrations is evident here as well.

The coverage rate for the LC50(4) lower bounds (the proportion of time lower bounds were less than the true LC50(4) value) should be close to 0.95. For the probit concentration-response relationships, the observed coverage rate would be at or close to that target for most of those relationships, when group size was large enough (sometimes 5-6 animals per sex per concentration). Increasing the number of concentrations had notable beneficial effect on coverage in only a few instances (P5, P7 and P8) and those tended to be ones where coverage was low in any case.

For the Weibull concentration-response relationships, coverage rates exceeding 0.95 were often observed, for those concentration-response relationships that tended to have relatively good MLE estimates (e.g., W1, W2 and W4). That was true regardless of the group size or the number of concentrations tested. There was some effect of the underlying concentration-response relationship, however, as cases such as W7 and W8 had coverage rates that ranged roughly between 0.90 and 0.93, for example. Those rates were not too much below the target value, but they were notably lower than the coverage rates for other Weibull concentration-response relationships.

The above observations suggest that 403 protocols with 5-6 animals per sex per concentration for 3 concentrations would tend to yield satisfactory LC50(4) estimates. Even for the more “difficult” concentration-response relationships (P7, P8, W7, W8), adding a fourth concentration appears to be have some notably beneficial effect in terms of bringing MLEs closer to the true estimates, raising the rate of success in calculating the lower bounds, and yielding a coverage rate closer to 0.95. In most cases then, LC50(4) estimates can be reliably determined when testing roughly 15-20 animals per sex (5-6 at three concentrations or about 5 at four concentrations). The results for LC10(4) and LC01(4) estimation are not nearly as good.

Across all concentration-response relationships, and no matter the group size or number of concentrations tested, the LC10(4) and LC01(4) estimates must be considered to be problematic. In many instances, when the true concentration-response relationship is defined by a probit function, with a groups size of 6 the MLE estimates might be considered acceptable; the 50th percentiles for the ratios of the LC10(4) or

LC01(4) estimates to the corresponding true values get close to 1 (most often tending to be slightly larger, with 50th percentile ratios at around 1.1, implying MLEs that may be about 10% too large on average). But in certain cases (P7-P9), the 50th percentile ratios never get closer to 1 than about 1.4. LC01(4) estimates tend to be worse than LC10(4) estimates. When a Weibull function defines the true concentration-response relationship, the MLE estimates for LC10(4) and LC01(4) are even worse.

The coverage of the lower bound estimates never achieves the nominal 0.95 for LC10(4) or LC01(4). In most cases, coverage is more in the range of 0.8-0.9 or less. This is true across all tested true concentration-response relationships, group sizes, and number of concentrations. For the probit concentration-response relationships, the difference between coverage for LC10(4) and LC01(4) was evident but not too great. But for the Weibull concentration-response relationships, which tended to have slightly elevated (higher than 0.95) coverage rates for the LC50(4), the coverage rates for LC10(4) and, especially, LC01(4) were quite low, reaching levels in the range of 0.5 to 0.55 even for 6 animals per sex per concentration. The number of concentrations had very little effect on coverage for these estimates.

The 403 protocol variations examined did a reasonable job of estimating LC50(4) values and getting the correct coverage, when the groups size is 5 or greater (typically with 3 concentrations tested). Some problematic cases might be expected based on the simulation results, especially when the concentration-response tends to be fairly flat (larger range from LC10(4) to LC90(4)), as exemplified by P7 and P8, as well as W7 and W8. However, the ability of the 403 protocol to obtain reliable LC10(4) or LC01(4) estimates must be seriously questioned. Upward biases (estimates that tend to be greater than the true value) and coverage rates of lower bounds that are substantially less than the target value of 0.95 were observed in almost all simulations, regardless of group size or number of concentrations tested. All these results were observed even when a sighting study (or an assumption of some prior information) provided some information about the LC50(4), which was used as the initial concentration in the 403 experiments. It appears that other (lower) initial concentrations might be needed to get better estimates of LC10(4) and LC01(4), but the optimal value for such a revised initial concentration would need to be determined in other simulations.

CxT Protocol

It should first be noted that the CxT-protocol-based data generation differed from that proposed in the original simulation plan. That plan had called for starting all experiments with a 20,000 mg/m3 concentrations and durations for 15, 30, 60, 120, and 240 minutes. Preliminary results (data not shown) indicated that such a plan did not produce data that were interpretable (i.e., could be fit by a concentration-time-response model) in a very large percentage of simulated data sets. This was because the scheme for picking subsequent concentrations and durations (based on results observed at the previously tested concentrations and durations) often resulted in CxT combinations such that all of them had 100% response. This was especially true when the LC50(4) was substantially lower than the 20,000 mg/m3 starting concentration.

Thus, the results discussed here are those that had an initial sighting study conducted, where 3 animals per sex per concentration were tested for a one-hour duration. As described above in the Methods section, all initial concentrations for the CxT experiments were based on an LC50 estimate from a relatively small-scale sighting study (which can also be interpreted as any prior information about the LC50(1). The 403 and CxT protocols are “on even ground” with respect to such prior information.

It should also be noted that the experimental design variations for the CxT protocol that had 4 durations per concentration (a design not proposed in the current CxT protocol specifications) had the following characteristics. Because of fewer durations per concentration (compared to 5 per concentration for the current CxT protocol) the spacing between durations was greater. The durations for the initial concentration were always 25, 60, 144, and 345 minutes. Those durations were chosen to have 60 minutes as one of the intermediate durations and to have durations that included 240 minutes (4 hours) while not exceeding 6 hours (to reflect exposure limitations associated with the nose-only exposure apparatus). Subsequent concentrations had a duration spacing of 1.68 (as opposed to the 1.41 spacing used with 5 durations per concentration) and this spacing is just a scaling up of the 1.41 spacing based on the wider initial spacing. While this version of the CxT protocol has not been proposed in any guidance, it does give some insight into what might happen were one to try to reduce animal use by testing fewer durations (as opposed to other animal-use-minimizing steps such as testing fewer concentrations).

The following general observations and trends concerning the CxT protocol were determined on the basis of the tables in Appendices 2 and 3.

Unlike the case of the 403 protocol, there is a clear indication that increasing the number of concentrations tested from 3 to 4 has a significant beneficial effect on the estimation procedure. This is supported by the generally better coverage of the true LCxx values by the lower bound estimates; the coverage is greater and closer to target value of 0.95 when 4 concentrations are tested. And this is true for all the LCxx values estimated at both 4 hours and 1 hour. Furthermore, the "success rate," i.e., the ability of the models to run to successful completion and return both MLE and lower bound estimates, also tends to be greater when 4 concentrations are tested. That effect is primarily seen when the group size (number of animals per sex per CxT combination) is smaller (e.g., 1), but it is also seen for the groups sizes of 2 and 3. Further discussion will focus on those designs testing four concentrations.

The designs that have only 4 durations per concentration tend to be notably inferior to the corresponding designs with 5 durations per concentration. There were some underlying concentration-time-response relationships for which the 4 duration designs performed particularly poorly. Notable among those were P1, P6, W1, W6 and to a lesser extent W2 and W3; for those concentration-time-response relationships, no choice of number of concentrations or group size allowed the models to run successfully in a vast majority of cases. At the very least, failure of the model to provide LC estimates after an experiment has been completed means additional testing and utilization of more test animals, an undesirable feature. Better a design that will tend to provide reliable estimates from a known and fixed sample of animals.

Moreover, comparison of corresponding designs having 4 or 5 durations per concentration shows a trend for the latter to have much better coverage rates. Those rates are greater and closer to the target of 0.95, especially for the designs testing 4 concentrations and 2 animals per sex per CxT combination.

The current CxT protocol proposes testing 1 animal per sex per CxT combination. The results of this simulation analysis suggest that that is not sufficient, even when testing 4 concentrations and 5 durations per concentration. The results supporting that conclusion relate to the fact that, when comparing the designs with 4 concentrations and 5 durations per concentration, using 2 animals per sex per CxT combination is better than using 1 animal per sex per CxT combination for one or more of the following criteria:

- Bias is reduced: the median ratio of the MLE estimates to the true value tends to be closer to 1;
- Variability is reduced: for example the ratio of the 95th percentile to the 5th percentile of the MLEs estimates is reduced;
- Success rate is increased: the number of data sets for which LC estimates and their lower bounds could be estimated is greater; and
- Coverage rate is improved: that rate is generally closer to the target value of 0.95 and substantially increased when coverage tends to be low (e.g., for P2, P7, P8, W1, W2, W7, and W8).

Often, more than one of these effects is noted and the differences can be substantial in particular instances. Especially if one is interested in the additional estimates available from a CxT experiment (the one-hour LC values) not estimable from a 403 experiment, the addition of 1 extra animal per sex per CxT combination will reward the experimenter with better estimates.

The above general observations are true across all six of the estimates derived (LC50, LC10, LC01 for both a 4-hour and a 1-hour duration). In fact, the ability of the CxT protocol to provide useful estimates of all of those parameters is striking and significant. Additional comments about that ability are provided in the next subsection, where the results of the CxT protocol are compared to those of the 403 protocol.

Comparison of 403 and CxT Protocols

The experimental designs for the 403 protocol provided generally reliable estimates of the LC50(4). Group size of 5 or 6 and either 3 or 4 concentrations tested were needed to give robust results (reliable results across all of the concentration-time-response relationships). Even with those design features, the LC50(4) estimates for the Weibull relationships tended to be biased very slightly on the low side. Coverage was still sometimes low for certain concentration-time-response relationships.

However, the 403 protocol gave very poor estimates of the LC10(4) and the LC01(4). The estimates derived for those parameters tended to be biased (on the high side) and the coverage was extremely poor.

In contrast, if we focus attention on the design with 4 concentrations, 5 durations per concentration, and 2 animals per sex per CxT combination, the CxT protocol provides quite good estimates of all six LC values. The LC50(4) estimates and their coverage are not seriously different from those attained with the 403 protocol, which tests all animals only at 4 hours. And, unlike the 403 protocol, the LC10(4) and LC01(4) estimates from the CxT protocol are quite good in general. The coverage rates for those estimates were no worse than about .83, a significant improvement over the rates obtained by the 403 protocol for some concentration-time-response relationships. The MLE estimates for those LC values also tend to be unbiased and show reasonably small variation. The above observations are true whether the true concentration-time-response relationship is defined by a probit function or a Weibull function.

The CxT protocol also provides estimates of the 1-hour LC values. The estimates of those values that were derived from the CxT experiments with 4 concentrations, 5 durations per concentration, and 2 animals per sex per concentration were even better than their corresponding 4-hour estimates. That is undoubtedly due to the fact that the 1-hour duration is generally within the range of durations tested in those experiments, whereas a 4-hour duration tends to be toward the high end of tested durations.

The benefits associated with use of the CxT protocol do require more animals to be tested. The 403 protocol, even with 4 concentrations and 6 animals per concentration, uses 24 animals per sex. The recommended CxT protocol would test 40 animals per sex. The added animal usage may be considered worth the gain in reliability of 4-hour LC values and the addition of LC estimates for a 1-hour duration. Alternatively, a CxT protocol with 1 animal per sex per CxT combination (20 animals total) could be run (as currently proposed), with the noted decrease in reliability of the estimates. Even with only 1 animal per sex per CxT combination, however, the performance with respect to LC10(4) and LC01(4) estimates is greater than what one would expect from the 403 protocol, and reasonably reliable LCxx(1) estimates would usually be obtained.

It should be noted that the CxT protocol provides estimates of LC values at more than just 1 and 4 hours. In fact, it can provide estimates for any duration of exposure (perhaps limited to the range of durations tested to avoid extrapolating beyond the data). Though not tested in this simulation, the reliability of the CxT-based estimates for durations between 1 hour and 4 hours would be expected to be comparable to that observed for the estimates examined here.

Appendix 1

Summary of 403 Protocol Simulation Sets

P1: Probit Relationship 1

Estimates Related to LC50(4); True LC50(4) = 45820 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.798	0.845	0.857	0.863	0.872	0.828	0.849	0.859	0.871	0.873
10	0.857	0.861	0.872	0.873	0.877	0.842	0.859	0.871	0.886	0.900
25	0.877	0.899	0.936	0.941	0.953	0.886	0.902	0.943	0.948	0.961
50	0.978	0.994	0.993	0.987	0.998	0.975	0.982	0.989	0.995	0.999
75	1.061	1.073	1.051	1.032	1.041	1.049	1.033	1.037	1.038	1.033
90	1.091	1.119	1.091	1.076	1.077	1.101	1.079	1.074	1.072	1.069
95	1.168	1.156	1.127	1.099	1.108	1.174	1.123	1.104	1.112	1.092
Number of LC50(4) Estimates Obtained	498	500	500	500	500	500	500	499	500	500
Number of Lower Bounds Obtained	446	454	480	480	480	470	464	480	483	488
Coverage of Lower Bounds	0.955	0.930	0.929	0.958	0.952	0.923	0.946	0.946	0.942	0.945

Estimates Related to LC10(4); True LC10(4) = 32606 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.636	0.790	0.837	0.803	0.790	0.712	0.721	0.835	0.797	0.839
10	0.868	0.852	0.906	0.860	0.869	0.933	0.880	0.919	0.892	0.899

25	1.009	0.974	0.983	0.971	0.964	1.039	1.019	1.002	0.984	0.978
50	1.148	1.111	1.076	1.071	1.054	1.116	1.119	1.091	1.094	1.052
75	1.238	1.173	1.169	1.143	1.147	1.222	1.173	1.161	1.149	1.127
90	1.428	1.278	1.234	1.227	1.191	1.301	1.245	1.218	1.205	1.176
95	1.428	1.394	1.376	1.254	1.245	1.427	1.288	1.256	1.238	1.216
Number of LC10(4) Estimates Obtained	498	500	500	500	500	500	500	499	500	500
Number of Lower Bounds Obtained	441	447	471	479	475	447	450	475	477	487
Coverage of Lower Bounds	0.748	0.828	0.849	0.875	0.880	0.790	0.833	0.848	0.889	0.897

Estimates related to LC01(4); True LC01(4) = 24708 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.481	0.648	0.732	0.654	0.643	0.643	0.568	0.713	0.678	0.721
10	0.807	0.692	0.861	0.784	0.779	0.926	0.793	0.863	0.827	0.824
25	1.055	1.015	1.001	0.964	0.935	1.136	1.069	1.034	0.996	0.954
50	1.318	1.259	1.161	1.180	1.079	1.309	1.283	1.212	1.200	1.099
75	1.468	1.384	1.349	1.277	1.276	1.451	1.374	1.340	1.310	1.248
90	1.778	1.523	1.444	1.423	1.387	1.563	1.497	1.431	1.387	1.356
95	1.778	1.736	1.713	1.452	1.461	1.716	1.555	1.471	1.416	1.407
Number of LC01(4) Estimates Obtained	498	500	500	500	499	500	500	499	500	500
Number of Lower Bounds Obtained	441	447	471	479	475	447	450	475	477	487
Coverage of Lower Bounds	0.796	0.821	0.847	0.864	0.869	0.792	0.827	0.844	0.899	0.881

P2: Probit Relationship 2

Estimates Related to LC50(4); True LC50(4) = 49240 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.782	0.800	0.805	0.816	0.812	0.771	0.805	0.808	0.816	0.827
10	0.811	0.812	0.816	0.881	0.877	0.798	0.823	0.835	0.869	0.882
25	0.881	0.908	0.923	0.936	0.932	0.854	0.899	0.919	0.929	0.933
50	0.988	0.998	1.004	0.996	0.991	0.968	0.986	0.995	0.989	0.994
75	1.122	1.092	1.069	1.055	1.050	1.093	1.071	1.056	1.048	1.054
90	1.284	1.181	1.142	1.139	1.142	1.197	1.162	1.136	1.098	1.108
95	1.511	1.272	1.222	1.181	1.192	1.427	1.230	1.205	1.163	1.172
Number of LC50(4) Estimates Obtained	495	500	499	496	499	499	499	498	500	498
Number of Lower Bounds Obtained	405	435	421	421	456	425	434	454	449	462
Coverage of Lower Bounds	0.874	0.924	0.945	0.943	0.941	0.878	0.917	0.943	0.927	0.946

Estimates Related to LC10(4); True LC10(4) = 31154 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.686	0.674	0.659	0.649	0.657	0.608	0.650	0.712	0.696	0.687
10	0.831	0.805	0.768	0.764	0.766	0.738	0.796	0.772	0.806	0.778
25	1.056	0.994	0.948	0.923	0.919	0.990	0.936	0.956	0.939	0.929
50	1.200	1.144	1.107	1.068	1.067	1.179	1.139	1.107	1.081	1.067
75	1.372	1.268	1.243	1.190	1.174	1.332	1.243	1.246	1.204	1.179
90	1.552	1.390	1.314	1.284	1.298	1.503	1.353	1.316	1.306	1.268
95	1.891	1.495	1.396	1.334	1.332	1.762	1.453	1.375	1.357	1.319

Number of LC10(4) Estimates Obtained	495	500	499	496	499	499	499	498	500	498
Number of Lower Bounds Obtained	392	411	393	406	436	380	401	414	433	441
Coverage of Lower Bounds	0.745	0.849	0.842	0.855	0.869	0.745	0.796	0.831	0.831	0.844

Estimates related to LC01(4); True LC01(4) = 21450 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.474	0.349	0.513	0.430	0.490	0.461	0.406	0.536	0.529	0.484
10	0.655	0.736	0.613	0.634	0.616	0.603	0.630	0.644	0.680	0.634
25	1.171	1.012	0.933	0.871	0.888	1.048	0.929	0.946	0.917	0.877
50	1.381	1.333	1.215	1.137	1.128	1.461	1.312	1.248	1.165	1.154
75	1.819	1.553	1.507	1.398	1.364	1.724	1.537	1.504	1.445	1.362
90	2.127	1.755	1.647	1.580	1.526	1.963	1.727	1.655	1.626	1.572
95	2.591	2.000	1.776	1.671	1.640	2.414	1.806	1.745	1.695	1.666
Number of LC01(4) Estimates Obtained	495	500	499	496	499	499	499	498	500	498
Number of Lower Bounds Obtained	295	347	326	344	367	291	318	335	349	363
Coverage of Lower Bounds	0.753	0.844	0.830	0.847	0.842	0.766	0.793	0.809	0.806	0.827

P3: Probit Relationship 3

Estimates Related to LC50(4); True LC50(4) = 7452 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.764	0.824	0.837	0.862	0.854	0.785	0.845	0.845	0.848	0.875
10	0.843	0.864	0.877	0.888	0.897	0.853	0.870	0.895	0.882	0.896
25	0.919	0.915	0.934	0.933	0.947	0.934	0.929	0.942	0.932	0.945
50	1.025	0.995	1.015	1.003	1.017	1.054	0.996	1.011	0.987	1.004
75	1.144	1.090	1.115	1.063	1.081	1.149	1.072	1.087	1.050	1.052
90	1.292	1.184	1.201	1.129	1.138	1.280	1.162	1.183	1.112	1.114
95	1.321	1.255	1.293	1.207	1.208	1.283	1.228	1.243	1.149	1.182
Number of LC50(4) Estimates Obtained	497	499	497	498	497	499	500	499	500	500
Number of Lower Bounds Obtained	350	445	416	454	466	368	434	441	474	474
Coverage of Lower Bounds	0.903	0.912	0.923	0.907	0.951	0.891	0.915	0.907	0.932	0.941

Estimates Related to LC10(4); True LC10(4) = 4723 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.652	0.672	0.529	0.641	0.615	0.649	0.669	0.621	0.684	0.703
10	0.741	0.723	0.646	0.765	0.763	0.764	0.773	0.741	0.774	0.792
25	0.948	0.918	0.883	0.906	0.927	0.963	0.905	0.947	0.919	0.915
50	1.247	1.076	1.069	1.055	1.058	1.253	1.051	1.097	1.046	1.026
75	1.429	1.280	1.272	1.181	1.190	1.520	1.222	1.251	1.179	1.169
90	1.671	1.473	1.544	1.338	1.332	1.730	1.389	1.424	1.309	1.308
95	1.864	1.521	1.808	1.413	1.498	1.881	1.494	1.603	1.371	1.380

Number of LC10(4) Estimates Obtained	497	499	497	498	497	499	500	499	500	500
Number of Lower Bounds Obtained	325	413	393	447	452	341	405	425	466	464
Coverage of Lower Bounds	0.828	0.857	0.870	0.861	0.885	0.783	0.832	0.831	0.873	0.888

Estimates related to LC01(4); True LC01(4) = 3257 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.440	0.507	0.329	0.472	0.454	0.454	0.462	0.438	0.518	0.493
10	0.500	0.587	0.456	0.648	0.610	0.603	0.626	0.581	0.624	0.660
25	0.943	0.883	0.822	0.844	0.882	0.976	0.841	0.902	0.875	0.871
50	1.446	1.150	1.098	1.087	1.131	1.452	1.121	1.166	1.116	1.069
75	1.877	1.563	1.490	1.324	1.334	1.993	1.429	1.457	1.324	1.280
90	2.287	1.932	2.024	1.615	1.619	2.339	1.783	1.776	1.601	1.550
95	2.480	2.073	2.410	1.739	1.841	2.573	1.970	2.059	1.703	1.727
Number of LC01(4) Estimates Obtained	497	499	497	498	497	499	500	499	500	500
Number of Lower Bounds Obtained	325	413	393	447	450	341	405	425	466	463
Coverage of Lower Bounds	0.809	0.826	0.852	0.866	0.880	0.739	0.827	0.826	0.852	0.896

P4: Probit Relationship 4

Estimates Related to LC50(4); True LC50(4) = 371 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	2	3	4	5	6	2	3	4	5	6
5	0.842	0.842	0.857	0.887	0.900	0.828	0.854	0.883	0.886	0.914
10	0.844	0.892	0.901	0.906	0.917	0.848	0.893	0.917	0.926	0.936
25	0.911	0.935	0.948	0.950	0.960	0.938	0.945	0.952	0.961	0.967
50	1.032	1.019	1.028	1.000	0.997	1.029	0.993	0.989	0.999	1.003
75	1.110	1.086	1.092	1.052	1.057	1.106	1.044	1.047	1.039	1.038
90	1.194	1.112	1.126	1.096	1.102	1.208	1.099	1.099	1.080	1.073
95	1.285	1.159	1.183	1.122	1.123	1.414	1.131	1.144	1.112	1.100
Number of LC50(4) Estimates Obtained	499	496	497	499	499	499	499	497	499	499
Number of Lower Bounds Obtained	439	489	496	497	499	424	491	491	492	499
Coverage of Lower Bounds	0.911	0.947	0.921	0.932	0.964	0.920	0.943	0.931	0.927	0.938

Estimates Related to LC10(4); True LC10(4) = 273 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	2	3	4	5	6	2	3	4	5	6
5	0.818	0.820	0.814	0.814	0.817	0.748	0.842	0.821	0.841	0.823
10	0.901	0.862	0.854	0.883	0.871	0.897	0.900	0.880	0.894	0.889
25	0.986	0.969	0.970	0.935	0.949	1.014	0.984	0.952	0.961	0.966
50	1.147	1.093	1.081	1.033	1.027	1.128	1.051	1.040	1.039	1.036
75	1.350	1.299	1.304	1.124	1.110	1.320	1.132	1.127	1.114	1.105
90	1.459	1.396	1.419	1.312	1.256	1.445	1.236	1.210	1.167	1.166
95	1.534	1.408	1.483	1.385	1.374	1.787	1.332	1.326	1.221	1.209

Number of LC10(4) Estimates Obtained	498	499	496	497	499	499	499	499	497	499
Number of Lower Bounds Obtained	437	487	492	496	499	416	490	490	492	499
Coverage of Lower Bounds	0.858	0.867	0.894	0.871	0.908	0.817	0.890	0.920	0.882	0.882

Estimates related to LC01(4); True LC01(4) = 213 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.753	0.719	0.724	0.734	0.729	0.608	0.755	0.708	0.749	0.720
10	0.900	0.807	0.754	0.817	0.820	0.885	0.837	0.805	0.827	0.835
25	1.014	0.973	0.954	0.913	0.914	1.065	0.981	0.918	0.940	0.951
50	1.337	1.180	1.171	1.073	1.069	1.295	1.112	1.095	1.076	1.071
75	1.632	1.572	1.578	1.246	1.184	1.546	1.265	1.220	1.208	1.180
90	1.749	1.682	1.718	1.546	1.403	1.749	1.433	1.351	1.310	1.293
95	1.854	1.701	1.794	1.677	1.662	2.162	1.593	1.549	1.385	1.355
Number of LC01(4) Estimates Obtained	498	499	496	497	499	499	499	499	497	499
Number of Lower Bounds Obtained	437	487	488	496	499	415	490	489	492	499
Coverage of Lower Bounds	0.858	0.842	0.848	0.869	0.896	0.829	0.855	0.873	0.882	0.890

P5: Probit Relationship 5

Estimates Related to LC50(4); True LC50(4) = 126 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.727	0.796	0.719	0.822	0.789	0.756	0.832	0.820	0.861	0.848
10	0.811	0.831	0.828	0.862	0.849	0.818	0.859	0.868	0.889	0.885
25	0.908	0.909	0.926	0.932	0.934	0.917	0.916	0.944	0.943	0.944
50	1.041	1.020	1.024	0.997	1.013	1.016	0.998	1.008	1.004	1.000
75	1.160	1.124	1.112	1.089	1.083	1.146	1.094	1.087	1.076	1.064
90	1.319	1.214	1.218	1.184	1.165	1.290	1.196	1.196	1.154	1.156
95	1.380	1.305	1.293	1.239	1.242	1.465	1.250	1.277	1.190	1.197
Number of LC50(4) Estimates Obtained	467	465	470	480	477	490	499	497	500	500
Number of Lower Bounds Obtained	332	396	417	424	424	362	427	429	454	456
Coverage of Lower Bounds	0.831	0.886	0.887	0.915	0.901	0.854	0.906	0.904	0.910	0.925

Estimates Related to LC10(4); True LC10(4) = 74.5 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.655	0.487	0.322	0.639	0.496	0.508	0.671	0.516	0.645	0.546
10	0.744	0.728	0.610	0.725	0.686	0.689	0.745	0.709	0.791	0.697
25	0.951	0.932	0.885	0.889	0.891	0.912	0.939	0.917	0.932	0.894
50	1.268	1.112	1.078	1.062	1.076	1.216	1.136	1.106	1.109	1.069
75	1.527	1.366	1.332	1.232	1.216	1.497	1.338	1.294	1.284	1.245
90	1.796	1.557	1.592	1.406	1.369	1.778	1.545	1.450	1.416	1.401
95	1.972	1.697	1.810	1.543	1.491	1.863	1.671	1.638	1.556	1.496

Number of LC10(4) Estimates Obtained	467	465	470	480	477	490	499	497	500	500
Number of Lower Bounds Obtained	302	352	380	393	398	325	388	389	433	431
Coverage of Lower Bounds	0.685	0.815	0.839	0.840	0.867	0.782	0.802	0.833	0.861	0.858

Estimates related to LC01(4); True LC01(4) = 48.5 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.465	0.215	0.178	0.439	0.291	0.333	0.449	0.292	0.458	0.336
10	0.525	0.585	0.424	0.571	0.536	0.469	0.584	0.522	0.632	0.518
25	0.970	0.928	0.849	0.848	0.851	0.849	0.913	0.847	0.904	0.831
50	1.563	1.206	1.151	1.121	1.123	1.496	1.273	1.204	1.213	1.148
75	2.123	1.738	1.646	1.435	1.407	2.003	1.749	1.577	1.537	1.488
90	2.557	2.105	2.125	1.799	1.708	2.472	2.043	1.918	1.846	1.837
95	2.726	2.348	2.447	1.970	1.856	2.673	2.247	2.160	1.978	1.939
Number of LC01(4) Estimates Obtained	467	465	470	480	477	490	499	497	500	500
Number of Lower Bounds Obtained	302	348	342	382	390	317	388	389	433	431
Coverage of Lower Bounds	0.675	0.810	0.836	0.819	0.838	0.763	0.802	0.820	0.850	0.858

P6: Probit Relationship 6

Estimates Related to LC50(4); True LC50(4) = 7.41 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	2	3	4	5	6	2	3	4	5	6
5	0.831	0.850	0.852	0.885	0.897	0.810	0.873	0.880	0.888	0.897
10	0.876	0.887	0.890	0.913	0.925	0.855	0.898	0.905	0.914	0.914
25	0.948	0.951	0.939	0.959	0.960	0.932	0.941	0.948	0.951	0.962
50	1.023	1.009	1.016	1.002	1.018	1.032	1.005	1.004	0.996	1.004
75	1.152	1.085	1.106	1.061	1.091	1.140	1.065	1.074	1.045	1.052
90	1.273	1.166	1.274	1.108	1.179	1.261	1.131	1.145	1.092	1.102
95	1.274	1.224	1.274	1.162	1.274	1.262	1.198	1.215	1.121	1.165
Number of LC50(4) Estimates Obtained	498	496	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	336	458	461	482	486	403	459	466	490	487
Coverage of Lower Bounds	0.878	0.878	0.946	0.925	0.949	0.881	0.913	0.925	0.918	0.928

Estimates Related to LC10(4); True LC10(4) = 5.07 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	2	3	4	5	6	2	3	4	5	6
5	0.611	0.668	0.734	0.725	0.736	0.669	0.718	0.702	0.800	0.744
10	0.784	0.813	0.811	0.826	0.827	0.791	0.803	0.837	0.862	0.849
25	0.924	0.930	0.948	0.936	0.956	0.954	0.933	0.934	0.929	0.929
50	1.255	1.083	1.077	1.035	1.047	1.154	1.074	1.055	1.040	1.033
75	1.393	1.282	1.317	1.173	1.181	1.385	1.217	1.183	1.164	1.136
90	1.734	1.374	1.735	1.296	1.500	1.582	1.337	1.309	1.265	1.282
95	1.734	1.486	1.735	1.342	1.735	1.718	1.413	1.454	1.314	1.376

Number of LC10(4) Estimates Obtained	498	496	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	317	446	451	479	481	385	448	459	489	484
Coverage of Lower Bounds	0.826	0.857	0.894	0.904	0.917	0.779	0.795	0.876	0.881	0.903

Estimates related to LC01(4); True LC01(4) = 3.72 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.396	0.492	0.596	0.584	0.561	0.479	0.550	0.545	0.702	0.619
10	0.564	0.727	0.699	0.707	0.753	0.663	0.701	0.729	0.771	0.738
25	0.958	0.869	0.936	0.898	0.937	0.958	0.899	0.917	0.898	0.903
50	1.513	1.154	1.142	1.069	1.089	1.307	1.139	1.115	1.088	1.064
75	1.791	1.531	1.600	1.293	1.312	1.727	1.418	1.368	1.285	1.258
90	2.230	1.726	2.231	1.488	1.816	2.034	1.635	1.558	1.482	1.506
95	2.230	1.821	2.231	1.719	2.231	2.210	1.745	1.773	1.574	1.658
Number of LC01(4) Estimates Obtained	498	496	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	317	446	451	479	481	385	448	459	489	484
Coverage of Lower Bounds	0.830	0.888	0.876	0.896	0.906	0.766	0.801	0.865	0.871	0.895

P7: Probit Relationship 7

Estimates Related to LC50(4); True LC50(4) = 2067 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	2	3	4	5	6	2	3	4	5	6
5	0.277	0.391	0.444	0.448	0.464	0.294	0.419	0.439	0.482	0.439
10	0.452	0.452	0.486	0.509	0.504	0.451	0.511	0.561	0.615	0.592
25	0.495	0.598	0.654	0.713	0.762	0.655	0.731	0.747	0.788	0.813
50	0.976	0.874	0.956	0.976	1.014	0.966	0.960	0.998	1.017	1.014
75	1.487	1.251	1.418	1.310	1.352	1.427	1.325	1.417	1.318	1.344
90	2.496	1.759	2.797	1.890	2.467	2.361	2.087	2.484	1.873	1.866
95	18.475	3.966	6.967	5.121	9.017	2.865	2.882	3.115	2.729	2.632
Number of LC50(4) Estimates Obtained	374	397	415	433	438	437	479	471	491	484
Number of Lower Bounds Obtained	245	258	265	290	292	312	346	345	356	365
Coverage of Lower Bounds	0.812	0.891	0.891	0.907	0.901	0.859	0.890	0.922	0.907	0.918

Estimates Related to LC10(4); True LC10(4) = 396 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	2	3	4	5	6	2	3	4	5	6
5	0.547	0.292	0.198	0.177	0.200	0.229	0.227	0.141	0.090	0.127
10	0.865	0.496	0.523	0.516	0.491	0.531	0.409	0.398	0.368	0.446
25	1.443	1.067	0.962	0.982	0.963	1.084	1.010	0.910	0.865	0.915
50	2.170	1.944	1.772	1.644	1.586	1.982	1.738	1.664	1.511	1.410
75	4.140	2.630	2.804	2.544	2.496	3.833	3.063	2.830	2.514	2.407
90	6.430	4.750	4.616	4.040	4.086	6.061	4.705	5.508	3.843	3.938
95	9.450	6.023	6.429	5.202	7.165	11.051	6.454	9.262	5.226	8.522

Number of LC10(4) Estimates Obtained	371	393	414	430	438	437	479	471	491	484
Number of Lower Bounds Obtained	148	196	173	193	217	224	272	263	303	320
Coverage of Lower Bounds	0.527	0.821	0.572	0.756	0.779	0.629	0.761	0.779	0.838	0.819

Estimates related to LC01(4); True LC01(4) = 103 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.206	0.134	0.079	0.027	0.057	0.026	0.025	0.038	0.012	0.032
10	0.899	0.230	0.206	0.240	0.150	0.349	0.200	0.132	0.131	0.190
25	2.265	1.289	1.166	0.963	0.922	1.751	1.023	0.804	0.868	0.815
50	6.810	3.887	2.992	2.564	2.419	4.538	3.142	2.510	2.294	2.047
75	10.161	7.458	7.195	6.475	5.670	10.582	7.208	6.104	5.319	4.847
90	20.789	11.409	13.420	9.073	10.246	19.994	13.299	14.635	9.320	10.172
95	30.913	17.746	20.018	13.443	18.273	33.217	20.585	27.081	15.553	24.697
Number of LC01(4) Estimates Obtained	371	393	414	430	438	437	479	471	491	484
Number of Lower Bounds Obtained	148	168	166	190	216	222	271	263	302	319
Coverage of Lower Bounds	0.473	0.685	0.633	0.800	0.782	0.559	0.731	0.779	0.825	0.818

P8: Probit Relationship 8

Estimates Related to LC50(4); True LC50(4) = 1437 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.316	0.324	0.387	0.375	0.464	0.324	0.390	0.372	0.415	0.527
10	0.325	0.438	0.474	0.558	0.562	0.448	0.512	0.522	0.587	0.621
25	0.604	0.631	0.653	0.741	0.740	0.651	0.678	0.720	0.765	0.782
50	0.870	0.862	0.948	0.958	0.976	1.004	0.957	0.988	0.986	1.014
75	1.356	1.222	1.333	1.340	1.311	1.402	1.291	1.346	1.312	1.322
90	2.726	1.941	2.030	1.902	2.408	2.037	2.103	2.456	2.099	2.056
95	26.575	2.440	4.976	5.369	4.373	3.210	3.779	3.573	3.431	3.323
Number of LC50(4) Estimates Obtained	377	412	420	441	438	439	468	466	485	489
Number of Lower Bounds Obtained	247	310	291	332	316	311	364	362	364	379
Coverage of Lower Bounds	0.915	0.935	0.897	0.907	0.911	0.875	0.937	0.914	0.909	0.937

Estimates Related to LC10(4); True LC10(4) = 268 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.388	0.319	0.101	0.103	0.138	0.246	0.135	0.087	0.075	0.125
10	0.713	0.512	0.492	0.400	0.295	0.421	0.534	0.420	0.279	0.409
25	1.408	1.015	0.917	0.889	0.832	1.277	1.059	0.968	0.853	0.916
50	2.295	1.634	1.485	1.536	1.408	2.074	1.690	1.714	1.520	1.316
75	3.327	2.980	2.581	2.514	2.298	3.255	2.949	2.845	2.397	2.209
90	5.256	4.186	3.720	3.575	3.456	5.894	4.525	4.176	3.817	3.675
95	8.643	5.795	4.717	4.904	4.790	9.007	7.379	13.715	11.901	8.536

Number of LC10(4) Estimates Obtained	377	407	420	441	438	438	468	466	485	489
Number of Lower Bounds Obtained	141	219	166	225	213	212	274	283	304	318
Coverage of Lower Bounds	0.610	0.671	0.747	0.747	0.812	0.590	0.748	0.781	0.832	0.855

Estimates related to LC01(4); True LC01(4) = 68.0 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.232	0.153	0.020	0.008	0.013	0.028	0.027	0.010	0.010	0.015
10	0.392	0.240	0.173	0.173	0.074	0.216	0.287	0.178	0.111	0.161
25	1.784	1.421	1.143	0.898	0.738	1.841	1.194	1.083	0.693	0.801
50	4.852	3.139	2.885	2.602	2.130	4.350	3.274	3.285	2.338	1.733
75	10.732	7.988	5.091	4.986	4.450	9.036	7.348	6.531	5.209	4.027
90	15.302	11.306	10.092	10.011	8.384	19.595	13.014	11.471	9.761	9.082
95	27.945	16.382	11.923	12.693	11.775	28.282	21.278	41.056	35.722	24.909
Number of LC01(4) Estimates Obtained	377	407	420	441	438	438	468	466	485	489
Number of Lower Bounds Obtained	141	203	159	222	212	212	274	283	301	315
Coverage of Lower Bounds	0.468	0.680	0.635	0.707	0.792	0.571	0.737	0.781	0.827	0.863

P9: Probit Relationship 9

Estimates Related to LC50(4); True LC50(4) = 2.94 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.331	0.345	0.354	0.361	0.352	0.569	0.593	0.602	0.632	0.648
10	0.527	0.345	0.354	0.361	0.367	0.612	0.648	0.638	0.663	0.672
25	0.764	0.714	0.741	0.803	0.785	0.671	0.704	0.717	0.771	0.787
50	0.912	0.918	0.905	0.957	0.949	0.873	0.890	0.893	0.953	0.951
75	1.181	1.130	1.133	1.105	1.106	1.157	1.138	1.083	1.134	1.086
90	1.517	1.340	1.375	1.270	1.332	1.538	1.540	1.286	1.304	1.313
95	1.672	1.457	1.564	1.361	1.671	1.960	1.716	1.536	2.694	1.540
Number of LC50(4) Estimates Obtained	336	381	394	422	407	451	472	487	494	497
Number of Lower Bounds Obtained	206	277	296	331	330	346	393	407	432	417
Coverage of Lower Bounds	0.893	0.949	0.943	0.946	0.952	0.913	0.957	0.946	0.938	0.938

Estimates Related to LC10(4); True LC10(4) = 0.874 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.717	0.609	0.452	0.713	0.670	0.608	0.758	0.680	0.747	0.717
10	0.931	0.758	0.727	0.977	0.886	0.871	0.950	0.891	0.915	0.926
25	1.195	0.991	1.013	1.044	1.044	1.322	1.163	1.179	1.286	1.206
50	1.811	1.562	1.483	1.604	1.495	1.857	1.760	1.760	1.714	1.631
75	2.540	2.211	2.080	1.923	1.944	2.293	1.985	2.007	1.953	1.931
90	3.510	2.539	2.618	2.329	2.313	2.865	2.538	2.423	2.322	2.179
95	4.586	2.831	2.902	2.523	2.659	3.981	2.778	2.658	2.469	2.422

Number of LC10(4) Estimates Obtained	336	380	394	422	407	451	472	487	494	497
Number of Lower Bounds Obtained	159	233	246	289	300	282	312	336	380	381
Coverage of Lower Bounds	0.566	0.738	0.776	0.792	0.797	0.745	0.744	0.705	0.642	0.643

Estimates related to LC01(4); True LC01(4) = 0.325 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.510	0.453	0.202	0.304	0.098	0.544	0.352	0.453	0.559	0.497
10	1.236	0.613	0.476	0.974	0.575	0.653	0.696	0.853	0.717	0.832
25	2.102	1.698	1.756	1.841	1.596	1.698	1.403	1.440	1.346	1.424
50	2.993	2.500	2.385	2.423	2.448	4.012	3.068	2.958	2.581	2.381
75	5.335	3.894	3.381	3.392	3.113	4.559	4.348	4.293	4.152	3.886
90	8.367	5.451	5.202	4.390	4.030	6.430	5.266	4.644	4.528	4.419
95	10.313	6.290	5.888	5.050	4.696	8.737	6.175	5.515	4.787	4.780
Number of LC01(4) Estimates Obtained	336	380	394	422	407	451	472	487	494	497
Number of Lower Bounds Obtained	159	192	187	239	236	282	312	336	362	364
Coverage of Lower Bounds	0.547	0.677	0.701	0.741	0.716	0.709	0.715	0.717	0.729	0.692

W1: Weibull Relationship 1

Estimates Related to LC50(4); True LC50(4) = 45820 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.828	0.845	0.857	0.868	0.873	0.828	0.844	0.860	0.875	0.876
10	0.841	0.863	0.872	0.885	0.894	0.849	0.865	0.883	0.894	0.915
25	0.877	0.929	0.936	0.945	0.949	0.886	0.913	0.950	0.953	0.951
50	0.978	0.976	0.978	0.976	0.982	0.970	0.971	0.987	0.987	0.982
75	1.051	1.035	1.032	1.023	1.018	1.030	1.028	1.030	1.018	1.013
90	1.091	1.086	1.068	1.064	1.055	1.062	1.072	1.064	1.047	1.044
95	1.133	1.132	1.084	1.086	1.073	1.119	1.112	1.101	1.071	1.067
Number of LC50(4) Estimates Obtained	499	495	495	498	500	498	496	498	500	500
Number of Lower Bounds Obtained	467	483	489	493	500	488	490	494	498	499
Coverage of Lower Bounds	0.959	0.965	0.953	0.990	0.954	0.955	0.953	0.960	0.978	0.958

Estimates Related to LC10(4); True LC10(4) = 31436 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.792	0.820	0.871	0.847	0.942	0.876	0.876	0.884	0.917	0.924
10	0.926	0.941	0.952	0.946	1.001	1.011	0.982	0.996	0.985	0.969
25	1.097	1.107	1.070	1.032	1.076	1.095	1.093	1.089	1.090	1.075
50	1.195	1.171	1.139	1.144	1.142	1.183	1.169	1.155	1.152	1.148
75	1.325	1.227	1.215	1.187	1.210	1.252	1.226	1.226	1.192	1.201
90	1.481	1.404	1.256	1.272	1.258	1.303	1.286	1.277	1.239	1.239
95	1.481	1.446	1.427	1.273	1.289	1.402	1.335	1.312	1.263	1.272

Number of LC10(4) Estimates Obtained	499	495	495	498	500	498	496	498	500	500
Number of Lower Bounds Obtained	461	465	475	490	498	458	472	482	491	497
Coverage of Lower Bounds	0.701	0.789	0.829	0.833	0.771	0.747	0.782	0.761	0.804	0.742

Estimates related to LC01(4); True LC01(4) = 19648 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.912	0.815	0.959	0.903	1.128	1.012	1.034	1.005	1.022	1.058
10	1.188	1.102	1.118	1.118	1.186	1.305	1.260	1.209	1.172	1.183
25	1.429	1.559	1.350	1.305	1.387	1.453	1.480	1.421	1.395	1.378
50	1.720	1.587	1.572	1.527	1.559	1.692	1.599	1.583	1.546	1.539
75	2.000	1.740	1.684	1.621	1.662	1.793	1.721	1.703	1.642	1.652
90	2.236	2.120	1.798	1.776	1.781	1.913	1.885	1.799	1.740	1.732
95	2.236	2.183	2.154	1.824	1.814	2.061	1.955	1.879	1.796	1.788
Number of LC01(4) Estimates Obtained	499	495	495	498	500	498	496	498	500	500
Number of Lower Bounds Obtained	461	465	475	490	498	458	472	482	491	497
Coverage of Lower Bounds	0.681	0.684	0.539	0.659	0.496	0.607	0.655	0.552	0.521	0.459

W2: Weibull Relationship 2

Estimates Related to LC50(4); True LC50(4) = 49240 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.771	0.801	0.811	0.814	0.836	0.771	0.798	0.810	0.808	0.824
10	0.808	0.812	0.816	0.879	0.888	0.797	0.812	0.825	0.857	0.895
25	0.836	0.887	0.924	0.921	0.933	0.833	0.881	0.926	0.934	0.933
50	0.978	0.965	0.988	0.978	0.972	0.962	0.967	0.979	0.975	0.976
75	1.015	1.039	1.020	1.023	1.024	1.014	1.020	1.025	1.023	1.020
90	1.087	1.097	1.092	1.080	1.077	1.114	1.078	1.087	1.078	1.074
95	1.202	1.153	1.151	1.117	1.139	1.206	1.137	1.123	1.114	1.107
Number of LC50(4) Estimates Obtained	491	498	496	489	500	495	499	496	499	500
Number of Lower Bounds Obtained	430	450	443	450	482	442	452	456	466	480
Coverage of Lower Bounds	0.970	0.973	0.957	0.960	0.971	0.934	0.949	0.963	0.957	0.979

Estimates Related to LC10(4); True LC10(4) = 30376 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.730	0.753	0.741	0.765	0.814	0.617	0.732	0.759	0.798	0.823
10	0.862	0.848	0.857	0.833	0.897	0.735	0.928	0.893	0.907	0.902
25	1.083	1.062	1.011	1.017	1.036	1.098	1.088	1.052	1.054	1.025
50	1.232	1.232	1.145	1.208	1.135	1.223	1.225	1.185	1.189	1.145
75	1.453	1.300	1.296	1.279	1.259	1.331	1.311	1.290	1.280	1.257
90	1.533	1.497	1.446	1.379	1.344	1.541	1.420	1.359	1.354	1.336
95	1.591	1.568	1.533	1.489	1.393	1.589	1.487	1.451	1.385	1.365

Number of LC10(4) Estimates Obtained	491	498	496	489	500	495	499	496	499	500
Number of Lower Bounds Obtained	415	433	414	439	460	413	428	430	453	462
Coverage of Lower Bounds	0.651	0.732	0.739	0.736	0.635	0.700	0.689	0.674	0.673	0.688

Estimates related to LC01(4); True LC01(4) = 16629 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.775	0.850	0.689	0.815	0.818	0.494	0.721	0.710	0.846	0.848
10	0.845	0.968	0.872	0.947	1.026	0.754	1.053	0.969	1.054	1.040
25	1.567	1.509	1.303	1.326	1.362	1.540	1.544	1.428	1.421	1.315
50	1.958	1.876	1.673	1.798	1.582	1.945	1.889	1.733	1.758	1.646
75	2.430	2.056	1.984	1.976	1.895	2.186	2.082	2.000	1.962	1.902
90	2.642	2.580	2.316	2.121	2.085	2.495	2.313	2.209	2.107	2.071
95	2.743	2.688	2.642	2.509	2.142	2.740	2.406	2.369	2.207	2.151
Number of LC01(4) Estimates Obtained	491	498	496	489	500	495	499	496	499	500
Number of Lower Bounds Obtained	415	433	411	438	459	413	428	430	453	461
Coverage of Lower Bounds	0.511	0.561	0.535	0.434	0.542	0.513	0.479	0.502	0.435	0.534

W3: Weibull Relationship 3

Estimates Related to LC50(4); True LC50(4) = 7452 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.718	0.812	0.836	0.852	0.851	0.794	0.834	0.856	0.868	0.884
10	0.816	0.849	0.859	0.871	0.878	0.855	0.872	0.872	0.894	0.899
25	0.886	0.907	0.929	0.924	0.918	0.931	0.929	0.926	0.938	0.942
50	1.006	0.972	0.997	0.978	0.974	1.023	0.980	0.991	0.984	0.991
75	1.091	1.036	1.069	1.029	1.025	1.129	1.039	1.052	1.031	1.036
90	1.179	1.105	1.138	1.085	1.090	1.280	1.114	1.113	1.072	1.084
95	1.292	1.134	1.293	1.111	1.137	1.280	1.158	1.208	1.099	1.118
Number of LC50(4) Estimates Obtained	499	500	500	500	500	499	500	499	500	500
Number of Lower Bounds Obtained	387	479	477	488	494	388	473	475	493	491
Coverage of Lower Bounds	0.925	0.952	0.948	0.969	0.970	0.930	0.949	0.952	0.953	0.949

Estimates Related to LC10(4); True LC10(4) = 4653 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.752	0.750	0.765	0.817	0.805	0.748	0.747	0.768	0.816	0.833
10	0.872	0.822	0.856	0.871	0.892	0.863	0.847	0.871	0.893	0.915
25	1.014	0.970	0.975	0.967	0.990	1.043	0.980	0.997	0.984	1.001
50	1.321	1.092	1.130	1.110	1.106	1.316	1.131	1.118	1.096	1.096
75	1.525	1.353	1.407	1.261	1.246	1.545	1.308	1.294	1.214	1.230
90	1.696	1.470	1.696	1.378	1.446	1.805	1.400	1.504	1.348	1.350
95	1.817	1.537	1.927	1.480	1.696	1.909	1.494	1.656	1.409	1.492

Number of LC10(4) Estimates Obtained	498	500	500	500	500	499	499	499	500	500
Number of Lower Bounds Obtained	380	456	457	481	486	369	459	457	485	485
Coverage of Lower Bounds	0.745	0.783	0.796	0.792	0.823	0.713	0.797	0.816	0.808	0.810

Estimates related to LC01(4); True LC01(4) = 2586 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.732	0.730	0.844	0.872	0.904	0.707	0.754	0.824	0.883	0.897
10	1.100	0.960	0.946	1.023	1.061	0.991	0.927	0.972	1.043	1.091
25	1.419	1.207	1.262	1.246	1.261	1.417	1.248	1.264	1.222	1.262
50	2.153	1.480	1.575	1.510	1.501	2.047	1.598	1.543	1.477	1.488
75	2.549	2.087	2.262	1.807	1.820	2.575	1.985	1.949	1.750	1.770
90	2.880	2.488	2.880	2.194	2.349	3.058	2.235	2.411	2.075	2.054
95	3.085	2.610	3.272	2.445	2.880	3.241	2.434	2.740	2.248	2.388
Number of LC01(4) Estimates Obtained	498	500	500	500	500	499	499	499	500	500
Number of Lower Bounds Obtained	380	456	457	481	486	369	458	457	485	485
Coverage of Lower Bounds	0.508	0.691	0.661	0.626	0.634	0.610	0.631	0.632	0.633	0.627

W4: Weibull Relationship 4

Estimates Related to LC50(4); True LC50(4) = 371 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.837	0.833	0.844	0.869	0.875	0.824	0.838	0.876	0.891	0.895
10	0.844	0.863	0.899	0.887	0.892	0.846	0.861	0.910	0.908	0.912
25	0.908	0.904	0.911	0.923	0.926	0.910	0.925	0.937	0.938	0.938
50	1.014	0.960	0.988	0.975	0.969	0.987	0.969	0.977	0.971	0.973
75	1.070	1.050	1.040	1.031	1.025	1.071	1.024	1.013	1.010	1.011
90	1.123	1.088	1.094	1.063	1.086	1.112	1.064	1.065	1.041	1.042
95	1.204	1.112	1.123	1.084	1.112	1.135	1.082	1.071	1.053	1.071
Number of LC50(4) Estimates Obtained	500	498	500	498	499	500	500	500	499	497
Number of Lower Bounds Obtained	456	491	499	498	499	459	497	498	498	496
Coverage of Lower Bounds	0.947	0.988	0.976	0.984	0.988	0.946	0.970	0.968	0.984	0.988

Estimates Related to LC10(4); True LC10(4) = 270 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.912	0.815	0.881	0.876	0.884	0.850	0.855	0.864	0.879	0.892
10	0.937	0.883	0.918	0.923	0.913	0.943	0.900	0.934	0.917	0.943
25	1.043	0.974	0.999	0.989	0.974	1.060	1.003	1.005	0.996	0.991
50	1.164	1.095	1.096	1.057	1.065	1.144	1.085	1.066	1.069	1.060
75	1.369	1.294	1.195	1.159	1.158	1.311	1.170	1.152	1.124	1.128
90	1.439	1.391	1.400	1.350	1.368	1.425	1.255	1.246	1.178	1.189
95	1.479	1.425	1.439	1.384	1.425	1.425	1.350	1.373	1.219	1.243

Number of LC10(4) Estimates Obtained	500	498	500	498	499	500	500	500	499	497
Number of Lower Bounds Obtained	455	487	496	498	499	454	496	498	498	496
Coverage of Lower Bounds	0.818	0.844	0.869	0.819	0.818	0.808	0.815	0.803	0.861	0.802

Estimates related to LC01(4); True LC01(4) = 181 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	1.060	0.866	0.962	0.981	0.969	0.949	0.938	0.941	0.970	0.975
10	1.100	0.966	1.031	1.019	1.060	1.097	1.015	1.045	1.022	1.066
25	1.279	1.138	1.210	1.166	1.145	1.299	1.195	1.194	1.181	1.184
50	1.635	1.391	1.405	1.295	1.316	1.535	1.402	1.337	1.317	1.323
75	1.922	1.814	1.668	1.556	1.592	1.821	1.552	1.519	1.442	1.452
90	2.022	1.955	1.967	1.889	1.919	2.003	1.720	1.676	1.547	1.552
95	2.079	2.002	2.023	1.945	2.002	2.003	1.898	1.929	1.601	1.678
Number of LC01(4) Estimates Obtained	500	498	500	498	499	500	500	500	499	497
Number of Lower Bounds Obtained	455	487	493	498	499	452	496	498	498	496
Coverage of Lower Bounds	0.705	0.632	0.653	0.663	0.669	0.555	0.601	0.635	0.576	0.552

W5: Weibull Relationship 5

Estimates Related to LC50(4); True LC50(4) = 126 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.759	0.795	0.826	0.838	0.852	0.798	0.831	0.844	0.869	0.878
10	0.805	0.828	0.864	0.866	0.871	0.856	0.862	0.888	0.889	0.908
25	0.918	0.898	0.929	0.926	0.923	0.928	0.919	0.936	0.930	0.947
50	0.996	0.962	0.996	0.981	0.984	1.035	0.980	0.993	0.983	0.990
75	1.112	1.055	1.098	1.050	1.052	1.156	1.045	1.049	1.035	1.049
90	1.194	1.140	1.194	1.117	1.194	1.182	1.117	1.135	1.095	1.123
95	1.220	1.183	1.194	1.138	1.194	1.238	1.173	1.182	1.123	1.166
Number of LC50(4) Estimates Obtained	500	500	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	366	457	462	482	490	398	454	473	482	490
Coverage of Lower Bounds	0.896	0.928	0.924	0.909	0.935	0.889	0.907	0.951	0.929	0.941

Estimates Related to LC10(4); True LC10(4) = 77.7 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.634	0.686	0.722	0.750	0.762	0.730	0.721	0.784	0.736	0.745
10	0.730	0.784	0.807	0.828	0.856	0.830	0.805	0.863	0.844	0.849
25	0.936	0.938	0.985	0.948	0.956	1.013	0.960	0.999	0.960	0.983
50	1.287	1.120	1.123	1.077	1.100	1.292	1.117	1.127	1.076	1.103
75	1.458	1.334	1.373	1.270	1.324	1.588	1.316	1.315	1.232	1.243
90	1.802	1.554	1.697	1.445	1.631	1.745	1.479	1.512	1.366	1.383
95	1.803	1.626	1.803	1.561	1.803	1.785	1.577	1.670	1.461	1.564

Number of LC10(4) Estimates Obtained	500	500	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	333	422	438	466	476	368	429	454	467	474
Coverage of Lower Bounds	0.718	0.794	0.815	0.749	0.807	0.736	0.776	0.835	0.794	0.795

Estimates related to LC01(4); True LC01(4) = 42.6 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.571	0.693	0.650	0.731	0.763	0.643	0.670	0.780	0.729	0.722
10	0.695	0.836	0.924	0.918	0.998	0.879	0.867	1.019	0.944	0.959
25	1.280	1.167	1.269	1.195	1.214	1.363	1.181	1.239	1.205	1.240
50	1.970	1.637	1.545	1.447	1.502	1.973	1.564	1.581	1.445	1.492
75	2.513	2.142	2.131	1.932	2.020	2.596	2.049	2.017	1.799	1.838
90	3.106	2.554	2.851	2.288	2.735	3.008	2.362	2.495	2.153	2.176
95	3.107	2.691	3.107	2.507	3.107	3.077	2.566	2.793	2.372	2.458
Number of LC01(4) Estimates Obtained	500	500	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	333	422	438	466	476	368	429	454	467	474
Coverage of Lower Bounds	0.532	0.576	0.689	0.627	0.670	0.641	0.594	0.661	0.653	0.658

W6: Weibull Relationship 6

Estimates Related to LC50(4); True LC50(4) = 7.41 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.808	0.850	0.843	0.867	0.875	0.846	0.850	0.868	0.884	0.896
10	0.864	0.878	0.878	0.885	0.900	0.875	0.880	0.906	0.903	0.914
25	0.948	0.930	0.928	0.924	0.931	0.944	0.916	0.936	0.933	0.944
50	0.985	0.982	0.985	0.971	0.976	0.986	0.965	0.972	0.968	0.973
75	1.023	1.009	1.021	1.001	1.009	1.085	1.019	1.025	1.008	1.009
90	1.141	1.040	1.118	1.041	1.072	1.133	1.053	1.080	1.043	1.040
95	1.195	1.085	1.118	1.066	1.118	1.262	1.078	1.106	1.059	1.068
Number of LC50(4) Estimates Obtained	500	500	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	444	495	496	498	500	437	497	498	500	500
Coverage of Lower Bounds	0.930	0.976	0.968	0.978	0.976	0.922	0.974	0.962	0.980	0.968

Estimates Related to LC10(4); True LC10(4) = 5.35 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.823	0.793	0.839	0.830	0.865	0.837	0.805	0.858	0.872	0.883
10	0.871	0.834	0.895	0.864	0.900	0.878	0.873	0.889	0.908	0.915
25	1.113	0.937	0.967	0.947	0.969	1.016	0.950	0.972	0.977	0.980
50	1.270	1.169	1.191	1.051	1.074	1.223	1.074	1.076	1.045	1.040
75	1.318	1.270	1.291	1.252	1.255	1.304	1.182	1.189	1.138	1.146
90	1.441	1.300	1.440	1.288	1.311	1.425	1.271	1.295	1.228	1.228
95	1.471	1.340	1.441	1.307	1.441	1.626	1.330	1.358	1.270	1.266
Number of	500	500	500	500	500	500	500	500	500	500

LC10(4) Estimates Obtained										
Number of Lower Bounds Obtained	440	490	489	498	500	432	497	498	500	500
Coverage of Lower Bounds	0.864	0.908	0.820	0.825	0.856	0.787	0.829	0.817	0.818	0.804

Estimates related to LC01(4); True LC01(4) = 3.57 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.961	0.841	0.950	0.899	0.939	0.972	0.835	0.932	0.944	0.969
10	0.997	0.904	0.997	0.982	1.026	1.009	0.962	0.998	1.011	1.039
25	1.560	1.054	1.129	1.127	1.169	1.268	1.110	1.148	1.154	1.143
50	1.722	1.599	1.635	1.272	1.322	1.703	1.371	1.356	1.282	1.276
75	1.865	1.796	1.826	1.740	1.775	1.798	1.557	1.574	1.486	1.486
90	2.038	1.840	2.038	1.822	1.840	2.017	1.761	1.769	1.649	1.653
95	2.081	1.895	2.038	1.849	2.038	2.300	1.816	1.867	1.722	1.730
Number of LC01(4) Estimates Obtained	500	500	500	500	500	500	500	500	500	500
Number of Lower Bounds Obtained	440	490	489	498	500	432	497	498	500	500
Coverage of Lower Bounds	0.691	0.612	0.548	0.624	0.650	0.648	0.674	0.624	0.606	0.602

W7: Weibull Relationship 7

Estimates Related to LC50(4); True LC50(4) = 2067 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.452	0.478	0.495	0.509	0.517	0.554	0.632	0.619	0.695	0.723
10	0.495	0.519	0.536	0.576	0.560	0.624	0.711	0.703	0.762	0.772
25	0.713	0.743	0.766	0.829	0.828	0.803	0.834	0.845	0.864	0.887
50	0.938	0.931	0.951	1.004	0.985	0.960	0.965	0.980	0.988	1.007
75	1.192	1.155	1.127	1.187	1.162	1.174	1.145	1.150	1.142	1.175
90	1.631	1.345	1.483	2.567	1.418	1.513	1.471	1.421	1.366	1.362
95	18.475	1.886	1.915	45.167	3.275	4.259	2.237	2.253	2.241	2.069
Number of LC50(4) Estimates Obtained	428	461	466	497	485	487	499	493	499	499
Number of Lower Bounds Obtained	280	342	341	407	383	362	397	407	406	418
Coverage of Lower Bounds	0.893	0.927	0.927	0.929	0.922	0.890	0.897	0.924	0.921	0.907

Estimates Related to LC10(4); True LC10(4) = 637 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.581	0.494	0.417	0.468	0.422	0.559	0.523	0.477	0.599	0.535
10	0.804	0.632	0.547	0.659	0.664	0.744	0.671	0.709	0.768	0.695
25	1.172	1.038	0.986	1.131	1.002	1.219	1.079	1.018	1.023	0.984
50	1.584	1.433	1.438	1.485	1.401	1.781	1.515	1.439	1.366	1.339
75	2.457	2.082	1.939	2.004	1.819	2.505	2.058	1.972	1.792	1.792
90	3.354	2.619	2.498	2.642	2.329	3.221	2.621	2.535	2.291	2.188
95	4.401	3.091	2.850	146.6	2.601	3.485	2.849	2.721	2.570	2.595
Number of	424	454	464	495	485	483	496	492	499	497

LC10(4) Estimates Obtained										
Number of Lower Bounds Obtained	169	257	251	301	291	259	286	329	331	347
Coverage of Lower Bounds	0.509	0.708	0.697	0.757	0.777	0.614	0.605	0.736	0.789	0.818

Estimates related to LC01(4); True LC01(4) = 147 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.310	0.128	0.299	0.196	0.239	0.517	0.304	0.272	0.356	0.323
10	0.803	0.791	0.548	0.632	0.567	1.193	0.739	0.700	0.706	0.731
25	2.538	1.687	1.661	1.802	1.526	2.452	2.094	1.790	1.782	1.570
50	4.837	4.718	4.055	4.203	3.568	5.029	3.824	3.245	3.072	2.879
75	8.128	6.085	5.521	5.432	5.235	9.181	6.336	5.586	4.922	4.760
90	12.302	9.161	7.984	7.728	7.151	11.681	9.602	8.276	7.177	6.715
95	14.746	10.071	9.762	9.698	8.109	13.143	10.478	9.851	8.800	8.220
Number of LC01(4) Estimates Obtained	413	448	463	478	483	476	496	491	499	497
Number of Lower Bounds Obtained	169	224	229	273	277	259	286	329	331	345
Coverage of Lower Bounds	0.379	0.598	0.576	0.652	0.592	0.436	0.542	0.660	0.634	0.675

W8: Weibull Relationship 8

Estimates Related to LC50(4); True LC50(4) = 1437 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.474	0.621	0.664	0.711	0.689	0.552	0.645	0.622	0.738	0.741
10	0.630	0.716	0.735	0.777	0.760	0.674	0.724	0.748	0.788	0.792
25	0.813	0.820	0.857	0.878	0.859	0.834	0.828	0.874	0.885	0.878
50	1.048	0.966	0.992	1.009	0.986	1.030	0.973	1.003	1.006	0.987
75	1.305	1.170	1.194	1.130	1.123	1.218	1.123	1.129	1.120	1.102
90	1.686	1.345	1.413	1.256	1.273	1.461	1.282	1.315	1.256	1.253
95	16.242	1.496	2.038	1.351	1.474	1.565	1.385	1.499	1.356	1.389
Number of LC50(4) Estimates Obtained	472	483	493	483	495	482	494	486	492	498
Number of Lower Bounds Obtained	284	360	343	368	388	320	381	386	388	402
Coverage of Lower Bounds	0.880	0.894	0.895	0.927	0.925	0.859	0.921	0.899	0.920	0.896

Estimates Related to LC10(4); True LC10(4) = 474 mg/m3

	Number of Concentrations									
	3					4				
	Number of Animals per sex per Concentration					Number of Animals per sex per Concentration				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.462	0.585	0.340	0.333	0.341	0.537	0.487	0.410	0.577	0.505
10	0.786	0.751	0.453	0.640	0.616	0.727	0.743	0.738	0.773	0.724
25	1.204	1.159	1.050	1.040	1.125	1.180	1.184	1.089	1.078	0.999
50	1.844	1.486	1.504	1.464	1.453	1.715	1.615	1.531	1.463	1.410
75	2.645	2.028	2.094	1.881	1.820	2.418	2.068	1.960	1.829	1.774
90	3.861	2.576	2.864	2.249	2.290	3.238	2.424	2.511	2.224	2.219
95	49.193	3.000	4.159	2.485	2.749	3.933	2.611	2.835	2.521	2.721
Number of	463	480	491	481	494	480	494	485	492	497

LC10(4) Estimates Obtained										
Number of Lower Bounds Obtained	217	300	286	313	346	258	317	321	341	345
Coverage of Lower Bounds	0.576	0.733	0.692	0.757	0.769	0.597	0.640	0.704	0.748	0.759

Estimates related to LC01(4); True LC01(4) = 119 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.499	0.673	0.224	0.216	0.274	0.463	0.360	0.295	0.569	0.494
10	1.535	0.966	0.392	0.913	0.722	1.084	0.975	0.730	0.986	0.872
25	2.536	2.237	1.769	1.746	2.094	2.401	2.385	2.107	1.954	1.814
50	5.022	3.664	3.664	3.322	3.273	4.520	4.078	3.672	3.346	3.160
75	9.164	5.736	6.183	5.010	4.940	7.752	5.916	5.321	4.750	4.553
90	14.245	8.236	8.678	6.528	6.553	11.262	7.779	7.332	6.394	6.246
95	195.975	9.729	15.427	7.246	8.286	14.212	8.877	8.651	7.724	8.012
Number of LC01(4) Estimates Obtained	461	478	490	480	493	480	494	484	492	494
Number of Lower Bounds Obtained	217	298	266	310	328	258	317	321	335	339
Coverage of Lower Bounds	0.396	0.621	0.571	0.639	0.637	0.473	0.536	0.586	0.621	0.628

W9: Weibull Relationship 9

Estimates Related to LC50(4); True LC50(4) = 2.94 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC50(4) Estimates over True LC50(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.785	0.795	0.816	0.816	0.836	0.782	0.806	0.809	0.820	0.819
10	0.816	0.810	0.817	0.877	0.897	0.799	0.825	0.824	0.863	0.889
25	0.823	0.894	0.923	0.928	0.928	0.836	0.911	0.921	0.931	0.940
50	0.972	0.973	0.972	0.981	0.973	0.973	0.968	0.974	0.975	0.977
75	1.022	1.028	1.027	1.017	1.017	1.029	1.028	1.010	1.014	1.010
90	1.095	1.082	1.080	1.051	1.054	1.133	1.098	1.057	1.054	1.045
95	1.178	1.084	1.084	1.078	1.084	1.236	1.125	1.094	1.078	1.072
Number of LC50(4) Estimates Obtained	498	497	493	494	494	494	498	495	499	500
Number of Lower Bounds Obtained	458	464	464	469	478	457	449	472	481	484
Coverage of Lower Bounds	0.921	0.957	0.970	0.983	0.977	0.912	0.947	0.975	0.967	0.973

Estimates Related to LC10(4); True LC10(4) = 1.92 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC10(4) Estimates over True LC10(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.722	0.798	0.785	0.749	0.819	0.660	0.744	0.806	0.812	0.849
10	0.870	0.907	0.925	0.846	0.877	0.902	0.862	0.927	0.897	0.922
25	1.074	1.036	1.010	1.006	0.999	1.061	1.042	1.048	1.037	1.020
50	1.172	1.176	1.122	1.158	1.106	1.170	1.163	1.135	1.151	1.121
75	1.326	1.202	1.229	1.194	1.196	1.290	1.250	1.225	1.219	1.209
90	1.507	1.471	1.275	1.270	1.276	1.454	1.339	1.299	1.281	1.265
95	1.564	1.507	1.480	1.331	1.308	1.515	1.428	1.322	1.303	1.315
Number of	498	497	493	494	494	494	496	495	499	500

LC10(4) Estimates Obtained										
Number of Lower Bounds Obtained	445	451	449	465	474	420	433	454	478	480
Coverage of Lower Bounds	0.683	0.765	0.875	0.755	0.800	0.690	0.695	0.731	0.711	0.750

Estimates related to LC01(4); True LC01(4) = 1.12 mg/m3

	Number of Concentrations									
	3					**4**				
	Number of Animals per sex per Concentration					**Number of Animals per sex per Concentration**				
Percentiles of LC01(4) Estimates over True LC01(4)	**2**	**3**	**4**	**5**	**6**	**2**	**3**	**4**	**5**	**6**
5	0.704	0.825	0.791	0.750	0.832	0.548	0.687	0.818	0.880	0.934
10	0.909	1.117	1.034	0.975	1.027	0.881	0.932	1.090	1.023	1.074
25	1.365	1.439	1.278	1.275	1.247	1.469	1.434	1.374	1.352	1.310
50	1.752	1.678	1.560	1.582	1.504	1.749	1.660	1.604	1.602	1.546
75	2.134	1.785	1.755	1.791	1.682	1.937	1.855	1.802	1.773	1.719
90	2.425	2.368	1.827	1.844	1.847	2.266	2.044	1.911	1.869	1.868
95	2.518	2.425	2.383	2.142	1.906	2.439	2.203	2.043	1.925	1.942
Number of LC01(4) Estimates Obtained	498	497	493	494	494	494	496	495	499	500
Number of Lower Bounds Obtained	445	451	449	465	474	420	433	454	478	480
Coverage of Lower Bounds	0.546	0.681	0.543	0.585	0.515	0.538	0.564	0.515	0.479	0.488

Appendix 2

Summary of CxT Protocol Simulation Sets

5 Durations per Concentration

P1: Probit Relationship 1; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 45820 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.694	0.746	0.740	0.660	0.748	0.761
10	0.727	0.844	0.811	0.755	0.826	0.819
25	0.872	0.917	0.887	0.888	0.921	0.910
50	0.981	1.051	1.010	1.039	1.030	1.027
75	1.176	1.616	2.134	1.195	1.139	1.174
90	1.880	2.619	2.507	1.455	1.348	1.452
95	2.770	2.645	2.655	1.648	1.724	1.612
Number of LC50(4) Estimates Obtained	187	251	255	221	276	267
Number of Lower Bounds Obtained	162	247	253	217	274	266
Coverage of Lower Bounds	0.926	0.765	0.818	0.926	0.967	0.981

Estimates Related to LC50(1); True LC50(1) = 103564 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True	**1**	**2**	**3**	**1**	**2**	**3**

LC50(1)						
5	0.847	0.906	0.899	0.876	0.899	0.890
10	0.899	0.933	0.935	0.902	0.928	0.921
25	0.976	0.978	0.973	0.949	0.962	0.956
50	1.057	1.044	1.039	1.016	1.009	1.010
75	1.183	1.268	1.233	1.073	1.062	1.055
90	1.305	1.386	1.358	1.152	1.118	1.124
95	1.391	1.391	1.390	1.193	1.174	1.150
Number of LC50(1) Estimates Obtained	187	251	255	221	276	267
Number of Lower Bounds Obtained	172	248	253	209	274	265
Coverage of Lower Bounds	0.930	0.770	0.806	0.952	0.956	0.977

Estimates Related to LC10(4); True LC10(4) = 32606 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(4) Estimates over True LC10(4)	1	2	3	1	2	3
5	0.659	0.709	0.723	0.628	0.732	0.751
10	0.735	0.820	0.790	0.719	0.804	0.802
25	0.886	0.951	0.894	0.893	0.922	0.912
50	1.014	1.078	1.065	1.033	1.058	1.035
75	1.207	2.043	2.669	1.277	1.230	1.225
90	2.285	3.361	3.190	1.584	1.459	1.632
95	3.551	3.413	3.369	1.781	2.006	1.817
Number of LC10(4) Estimates Obtained	187	251	255	221	276	267
Number of Lower Bounds Obtained	187	249	253	221	274	266
Coverage of Lower Bounds	0.765	0.755	0.779	0.919	0.971	0.981

Estimates Related to LC10(1); True LC10(1) = 73698 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.853	0.888	0.878	0.847	0.882	0.879
10	0.903	0.915	0.915	0.888	0.919	0.904
25	0.986	0.995	0.989	0.944	0.965	0.975
50	1.071	1.082	1.083	1.025	1.037	1.031
75	1.209	1.484	1.540	1.132	1.122	1.119
90	1.617	1.761	1.726	1.239	1.203	1.211
95	1.784	1.788	1.764	1.337	1.309	1.274
Number of LC10(1) Estimates Obtained	187	251	255	221	276	267
Number of Lower Bounds Obtained	186	249	253	221	275	266
Coverage of Lower Bounds	0.806	0.771	0.830	0.919	0.967	0.992

Estimates Related to LC01(4); True LC01(4) = 24708 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.602	0.687	0.678	0.589	0.696	0.726
10	0.708	0.783	0.772	0.702	0.766	0.789
25	0.864	0.945	0.893	0.873	0.927	0.901
50	1.041	1.134	1.092	1.070	1.095	1.059
75	1.319	2.474	3.203	1.339	1.323	1.312
90	2.682	4.116	3.883	1.770	1.577	1.819
95	4.351	4.205	4.063	1.983	2.196	2.011
Number of LC01(4)	187	251	255	221	276	267

Estimates Obtained						
Number of Lower Bounds Obtained	187	249	253	221	275	267
Coverage of Lower Bounds	0.765	0.755	0.763	0.919	0.967	0.978

Estimates Related to LC01(1); True LC01(1) = 55847mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.802	0.823	0.813	0.781	0.835	0.801
10	0.876	0.878	0.881	0.852	0.880	0.876
25	0.976	0.997	0.987	0.909	0.963	0.960
50	1.107	1.130	1.129	1.064	1.066	1.053
75	1.305	1.612	1.877	1.186	1.196	1.189
90	1.875	2.134	2.101	1.389	1.306	1.337
95	2.186	2.202	2.152	1.501	1.498	1.403
Number of LC01(1) Estimates Obtained	187	251	255	221	276	267
Number of Lower Bounds Obtained	187	249	253	221	275	267
Coverage of Lower Bounds	0.802	0.759	0.830	0.919	0.975	0.985

P2: Probit Relationship 2; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 49240 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.583	0.568	0.612	0.698	0.720	0.718
10	0.695	0.689	0.695	0.765	0.780	0.809
25	0.884	0.904	0.884	0.873	0.922	0.905
50	1.091	1.118	1.055	1.014	1.053	1.021
75	1.414	1.477	1.414	1.207	1.199	1.155
90	2.327	2.329	1.611	1.476	1.462	1.317
95	2.602	2.447	2.285	1.694	1.645	1.476
Number of LC50(4) Estimates Obtained	322	380	390	353	407	412
Number of Lower Bounds Obtained	308	376	386	332	398	403
Coverage of Lower Bounds	0.747	0.694	0.803	0.937	0.967	0.953

Estimates Related to LC50(1); True LC50(1) = 85732 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.776	0.720	0.727	0.806	0.811	0.828
10	0.811	0.776	0.815	0.842	0.847	0.872
25	0.913	0.919	0.924	0.913	0.933	0.936
50	0.995	0.998	0.985	1.013	1.015	0.998
75	1.150	1.123	1.090	1.112	1.087	1.064
90	1.536	1.536	1.260	1.226	1.193	1.146
95	1.574	1.576	1.508	1.289	1.245	1.197

Number of LC50(1) Estimates Obtained	322	380	390	353	407	412
Number of Lower Bounds Obtained	314	379	386	338	401	400
Coverage of Lower Bounds	0.857	0.823	0.915	0.964	0.985	0.988

Estimates Related to LC10(4); True LC10(4) = 31154 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.559	0.499	0.577	0.687	0.706	0.712
10	0.651	0.666	0.665	0.769	0.813	0.794
25	0.838	0.907	0.865	0.903	0.934	0.924
50	1.181	1.173	1.092	1.097	1.112	1.059
75	1.969	2.097	1.684	1.340	1.339	1.246
90	3.332	3.334	2.169	1.644	1.603	1.458
95	3.714	3.521	3.277	1.924	1.909	1.732
Number of LC10(4) Estimates Obtained	322	380	390	353	407	412
Number of Lower Bounds Obtained	312	378	385	348	403	404
Coverage of Lower Bounds	0.667	0.677	0.777	0.899	0.960	0.946

Estimates Related to LC10(1); True LC10(1) = 54242 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.743	0.744	0.754	0.787	0.852	0.839
10	0.827	0.804	0.825	0.850	0.900	0.884
25	0.945	0.965	0.945	0.947	0.973	0.960
50	1.112	1.115	1.064	1.060	1.057	1.041
75	1.340	1.341	1.315	1.240	1.173	1.117
90	2.198	2.198	1.385	1.424	1.328	1.204
95	2.276	2.255	2.174	1.530	1.422	1.267
Number of LC10(1) Estimates Obtained	322	380	390	353	407	412
Number of Lower Bounds Obtained	312	378	385	348	401	401
Coverage of Lower Bounds	0.708	0.693	0.805	0.899	0.960	0.958

Estimates Related to LC01(4); True LC01(4) = 21450 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.505	0.483	0.542	0.592	0.683	0.687
10	0.579	0.596	0.627	0.733	0.788	0.769
25	0.822	0.881	0.847	0.920	0.972	0.903
50	1.219	1.259	1.134	1.161	1.167	1.089
75	2.655	2.786	2.085	1.534	1.454	1.334
90	4.462	4.466	2.885	1.886	1.842	1.625
95	4.967	4.743	4.390	2.390	2.253	1.989
Number of LC01(4)	322	380	390	353	407	412

Estimates Obtained						
Number of Lower Bounds Obtained	318	379	386	348	404	405
Coverage of Lower Bounds	0.654	0.678	0.767	0.899	0.953	0.938

Estimates Related to LC01(1); True LC01(1) = 37347 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.670	0.685	0.722	0.685	0.814	0.795
10	0.737	0.755	0.779	0.783	0.872	0.838
25	0.908	0.938	0.923	0.958	0.979	0.944
50	1.224	1.237	1.125	1.120	1.119	1.077
75	1.763	1.787	1.518	1.401	1.296	1.223
90	2.945	2.945	1.850	1.707	1.503	1.356
95	3.067	3.028	2.924	1.898	1.676	1.470
Number of LC01(1) Estimates Obtained	322	380	390	353	407	412
Number of Lower Bounds Obtained	320	379	386	348	404	405
Coverage of Lower Bounds	0.653	0.681	0.782	0.899	0.955	0.943

P3: Probit Relationship 3; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7452 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.733	0.759	0.798	0.737	0.812	0.824
10	0.799	0.827	0.844	0.802	0.863	0.865
25	0.950	0.935	0.919	0.930	0.941	0.938
50	1.114	1.036	1.012	1.063	1.027	1.019
75	1.347	1.207	1.142	1.259	1.169	1.132
90	1.606	1.383	1.312	1.518	1.368	1.285
95	1.832	1.547	1.476	1.699	1.528	1.446
Number of LC50(4) Estimates Obtained	375	472	497	436	487	494
Number of Lower Bounds Obtained	362	472	497	435	486	493
Coverage of Lower Bounds	0.931	0.970	0.954	0.982	0.973	0.978

Estimates Related to LC50(1); True LC50(1) = 26278 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.769	0.806	0.834	0.842	0.858	0.883
10	0.815	0.846	0.866	0.879	0.897	0.905
25	0.904	0.925	0.920	0.948	0.948	0.949
50	1.015	1.012	0.994	1.021	1.000	0.996
75	1.148	1.110	1.088	1.116	1.059	1.046
90	1.268	1.217	1.188	1.240	1.136	1.099
95	1.349	1.301	1.276	1.315	1.165	1.140

Number of LC50(1) Estimates Obtained	375	472	497	436	487	494
Number of Lower Bounds Obtained	367	472	497	435	486	493
Coverage of Lower Bounds	0.978	0.981	0.958	0.982	0.986	0.982

Estimates Related to LC10(4); True LC10(4) = 4723 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.664	0.695	0.742	0.709	0.782	0.794
10	0.773	0.813	0.808	0.763	0.848	0.841
25	0.979	0.942	0.920	0.940	0.953	0.950
50	1.214	1.105	1.066	1.139	1.078	1.056
75	1.548	1.298	1.222	1.408	1.261	1.207
90	1.910	1.567	1.426	1.726	1.534	1.406
95	2.147	1.808	1.623	1.909	1.733	1.643
Number of LC10(4) Estimates Obtained	375	472	497	436	487	494
Number of Lower Bounds Obtained	375	471	497	436	487	494
Coverage of Lower Bounds	0.899	0.979	0.954	0.989	0.975	0.980

Estimates Related to LC10(1); True LC10(1) = 16656 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.797	0.823	0.850	0.815	0.867	0.893
10	0.850	0.881	0.896	0.867	0.909	0.918
25	0.945	0.955	0.943	0.974	0.968	0.959
50	1.085	1.057	1.022	1.082	1.045	1.027
75	1.265	1.165	1.116	1.242	1.127	1.100
90	1.485	1.276	1.222	1.402	1.235	1.186
95	1.604	1.416	1.326	1.532	1.308	1.243
Number of LC10(1) Estimates Obtained	375	472	497	436	487	494
Number of Lower Bounds Obtained	371	472	497	436	487	494
Coverage of Lower Bounds	0.911	0.977	0.964	0.991	0.986	0.980

Estimates Related to LC01(4); True LC01(4) = 3257 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.598	0.640	0.684	0.607	0.706	0.740
10	0.710	0.764	0.746	0.730	0.810	0.804
25	1.011	0.940	0.912	0.945	0.958	0.935
50	1.322	1.157	1.107	1.245	1.138	1.098
75	1.730	1.422	1.326	1.571	1.379	1.301
90	2.218	1.752	1.581	1.954	1.707	1.569
95	2.572	2.116	1.815	2.159	1.948	1.835
Number of LC01(4)	375	472	497	436	487	494

Estimates Obtained						
Number of Lower Bounds Obtained	374	471	497	436	487	494
Coverage of Lower Bounds	0.904	0.981	0.960	0.991	0.982	0.982

Estimates Related to LC01(1); True LC01(1) = 11484 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.727	0.758	0.793	0.708	0.789	0.829
10	0.806	0.843	0.847	0.803	0.848	0.872
25	0.973	0.966	0.953	0.976	0.967	0.953
50	1.181	1.106	1.058	1.162	1.099	1.057
75	1.448	1.264	1.195	1.400	1.230	1.174
90	1.764	1.478	1.341	1.617	1.407	1.310
95	1.890	1.613	1.497	1.786	1.495	1.395
Number of LC01(1) Estimates Obtained	375	472	497	436	487	494
Number of Lower Bounds Obtained	374	472	497	436	487	494
Coverage of Lower Bounds	0.904	0.979	0.966	0.991	0.988	0.980

P4: Probit Relationship 4; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 371 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.788	0.847	0.871	0.805	0.839	0.877
10	0.817	0.884	0.902	0.845	0.883	0.903
25	0.915	0.953	0.950	0.921	0.942	0.950
50	1.041	1.040	1.033	1.037	1.018	1.013
75	1.143	1.142	1.129	1.156	1.090	1.081
90	1.257	1.211	1.218	1.257	1.184	1.145
95	1.333	1.274	1.292	1.316	1.235	1.197
Number of LC50(4) Estimates Obtained	360	469	484	423	484	495
Number of Lower Bounds Obtained	291	454	453	401	479	494
Coverage of Lower Bounds	0.938	0.947	0.934	0.993	0.985	0.988

Estimates Related to LC50(1); True LC50(1) = 770 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.785	0.855	0.821	0.883	0.899	0.911
10	0.859	0.890	0.875	0.914	0.920	0.932
25	0.940	0.957	0.953	0.957	0.967	0.969
50	1.009	1.021	1.004	1.034	1.014	1.010
75	1.086	1.077	1.061	1.091	1.058	1.045
90	1.141	1.109	1.107	1.158	1.107	1.083
95	1.161	1.146	1.127	1.197	1.139	1.115

Number of LC50(1) Estimates Obtained	360	469	484	423	484	495
Number of Lower Bounds Obtained	296	456	453	407	479	494
Coverage of Lower Bounds	0.936	0.980	0.978	0.985	0.990	0.986

Estimates Related to LC10(4); True LC10(4) = 273 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.796	0.841	0.866	0.802	0.848	0.866
10	0.871	0.895	0.907	0.847	0.893	0.902
25	0.941	0.977	0.970	0.945	0.960	0.951
50	1.073	1.098	1.054	1.071	1.048	1.025
75	1.236	1.214	1.209	1.239	1.154	1.113
90	1.439	1.344	1.405	1.390	1.257	1.222
95	1.539	1.440	1.570	1.460	1.347	1.270
Number of LC10(4) Estimates Obtained	360	469	484	423	484	495
Number of Lower Bounds Obtained	333	456	449	405	479	493
Coverage of Lower Bounds	0.814	0.945	0.940	0.973	0.990	0.990

Estimates Related to LC10(1); True LC10(1) = 567 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.823	0.864	0.871	0.874	0.901	0.908
10	0.873	0.919	0.922	0.913	0.922	0.926
25	0.969	0.984	0.975	0.972	0.975	0.968
50	1.057	1.067	1.030	1.061	1.046	1.025
75	1.136	1.137	1.114	1.170	1.116	1.080
90	1.262	1.221	1.190	1.291	1.198	1.149
95	1.315	1.277	1.264	1.333	1.247	1.202
Number of LC10(1) Estimates Obtained	360	469	484	423	484	495
Number of Lower Bounds Obtained	339	455	448	407	479	493
Coverage of Lower Bounds	0.802	0.976	0.971	0.968	0.990	0.990

Estimates Related to LC01(4); True LC01(4) = 213 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.761	0.795	0.823	0.771	0.812	0.821
10	0.827	0.870	0.875	0.830	0.873	0.876
25	0.983	0.998	0.975	0.953	0.958	0.951
50	1.126	1.158	1.085	1.112	1.082	1.043
75	1.324	1.314	1.302	1.325	1.224	1.159
90	1.595	1.475	1.625	1.518	1.357	1.288
95	1.794	1.706	1.903	1.618	1.459	1.354
Number of LC01(4)	360	469	484	423	484	495

Estimates Obtained						
Number of Lower Bounds Obtained	341	457	453	409	480	494
Coverage of Lower Bounds	0.795	0.943	0.934	0.963	0.988	0.988

Estimates Related to LC01(1); True LC01(1) = 442 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.801	0.844	0.862	0.820	0.856	0.858
10	0.873	0.903	0.905	0.860	0.901	0.905
25	0.984	1.003	0.976	0.964	0.979	0.963
50	1.110	1.114	1.066	1.120	1.083	1.042
75	1.281	1.229	1.210	1.274	1.189	1.121
90	1.420	1.314	1.322	1.412	1.303	1.228
95	1.478	1.418	1.412	1.510	1.367	1.297
Number of LC01(1) Estimates Obtained	360	469	484	423	484	495
Number of Lower Bounds Obtained	339	456	451	410	480	494
Coverage of Lower Bounds	0.802	0.945	0.938	0.961	0.990	0.986

P5: Probit Relationship 5; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 126 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.622	0.663	0.700	0.715	0.764	0.796
10	0.705	0.728	0.764	0.765	0.821	0.835
25	0.853	0.888	0.884	0.899	0.911	0.925
50	1.037	1.031	1.013	1.088	1.022	1.019
75	1.342	1.202	1.201	1.326	1.158	1.150
90	1.663	1.494	1.578	1.573	1.413	1.385
95	2.205	2.919	3.519	1.764	1.643	1.683
Number of LC50(4) Estimates Obtained	417	480	494	462	489	498
Number of Lower Bounds Obtained	388	474	489	458	486	497
Coverage of Lower Bounds	0.881	0.937	0.920	0.965	0.975	0.978

Estimates Related to LC50(1); True LC50(1) = 400 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.781	0.822	0.831	0.815	0.842	0.861
10	0.830	0.869	0.867	0.859	0.873	0.899
25	0.930	0.937	0.930	0.918	0.931	0.940
50	1.022	1.026	1.013	1.009	0.994	0.988
75	1.176	1.128	1.115	1.114	1.065	1.055
90	1.341	1.267	1.266	1.239	1.136	1.110
95	1.447	1.329	1.324	1.309	1.198	1.168

Number of LC50(1) Estimates Obtained	417	480	494	462	489	498
Number of Lower Bounds Obtained	398	475	489	454	484	494
Coverage of Lower Bounds	0.940	0.947	0.922	0.963	0.983	0.982

Estimates Related to LC10(4); True LC10(4) = 74.5 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.536	0.613	0.666	0.645	0.722	0.773
10	0.634	0.691	0.743	0.731	0.807	0.838
25	0.897	0.876	0.894	0.925	0.908	0.952
50	1.166	1.105	1.061	1.177	1.066	1.068
75	1.511	1.338	1.309	1.526	1.300	1.255
90	2.028	1.708	1.799	1.911	1.587	1.548
95	2.617	4.548	5.359	2.234	2.011	1.946
Number of LC10(4) Estimates Obtained	417	480	494	462	489	498
Number of Lower Bounds Obtained	414	477	489	460	486	496
Coverage of Lower Bounds	0.829	0.933	0.912	0.970	0.979	0.974

Estimates Related to LC10(1); True LC10(1) = 236 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.779	0.838	0.866	0.770	0.859	0.881
10	0.852	0.876	0.906	0.832	0.895	0.914
25	0.972	0.970	0.973	0.955	0.957	0.977
50	1.115	1.086	1.053	1.108	1.035	1.045
75	1.293	1.213	1.154	1.270	1.148	1.126
90	1.522	1.361	1.366	1.454	1.274	1.206
95	1.862	1.684	1.982	1.607	1.332	1.267
Number of LC10(1) Estimates Obtained	417	480	494	462	489	498
Number of Lower Bounds Obtained	410	476	489	460	486	497
Coverage of Lower Bounds	0.837	0.947	0.922	0.974	0.984	0.976

Estimates Related to LC01(4); True LC01(4) = 48.5 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.456	0.506	0.617	0.544	0.655	0.734
10	0.562	0.638	0.697	0.680	0.759	0.807
25	0.906	0.859	0.873	0.911	0.892	0.956
50	1.266	1.169	1.107	1.280	1.132	1.125
75	1.757	1.479	1.444	1.778	1.430	1.381
90	2.399	2.068	2.153	2.339	1.819	1.724
95	3.339	6.530	7.550	2.723	2.378	2.264
Number of LC01(4)	417	480	494	462	489	498

Estimates Obtained						
Number of Lower Bounds Obtained	414	477	490	460	486	497
Coverage of Lower Bounds	0.829	0.935	0.908	0.976	0.979	0.976

Estimates Related to LC01(1); True LC01(1) = 154 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.653	0.703	0.790	0.679	0.771	0.811
10	0.746	0.797	0.865	0.773	0.844	0.870
25	0.989	0.946	0.967	0.947	0.945	0.977
50	1.218	1.141	1.093	1.205	1.079	1.090
75	1.489	1.364	1.276	1.465	1.275	1.237
90	1.854	1.633	1.598	1.781	1.486	1.367
95	2.344	2.417	2.785	1.981	1.621	1.519
Number of LC01(1) Estimates Obtained	417	480	494	462	489	498
Number of Lower Bounds Obtained	414	477	490	460	486	497
Coverage of Lower Bounds	0.829	0.941	0.916	0.978	0.984	0.976

P6: Probit Relationship 6; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7.41 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.734	0.780	0.807	0.720	0.779	0.836
10	0.808	0.837	0.846	0.792	0.834	0.867
25	0.928	0.918	0.922	0.961	0.922	0.938
50	1.159	1.059	1.012	1.107	1.011	1.006
75	1.416	1.217	1.121	1.276	1.123	1.092
90	1.748	1.592	1.222	1.540	1.255	1.164
95	1.831	1.822	1.337	1.799	1.369	1.236
Number of LC50(4) Estimates Obtained	238	398	399	331	418	469
Number of Lower Bounds Obtained	166	385	394	321	417	469
Coverage of Lower Bounds	0.783	0.984	0.980	0.988	0.986	0.983

Estimates Related to LC50(1); True LC50(1) = 41.9 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.743	0.810	0.832	0.852	0.878	0.904
10	0.796	0.839	0.857	0.888	0.906	0.919
25	0.884	0.906	0.924	0.954	0.950	0.951
50	1.022	1.009	0.995	1.042	1.001	0.998
75	1.118	1.146	1.088	1.155	1.066	1.055
90	1.211	1.252	1.189	1.278	1.162	1.113
95	1.249	1.294	1.247	1.340	1.208	1.157

Number of LC50(1) Estimates Obtained	238	398	399	331	418	469
Number of Lower Bounds Obtained	157	385	394	321	417	469
Coverage of Lower Bounds	0.968	0.995	0.997	0.997	0.986	0.972

Estimates Related to LC10(4); True LC10(4) = 5.07 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.652	0.728	0.734	0.663	0.743	0.792
10	0.766	0.797	0.798	0.753	0.781	0.832
25	0.939	0.905	0.914	0.922	0.905	0.916
50	1.214	1.092	1.032	1.136	1.013	1.013
75	1.490	1.295	1.194	1.394	1.179	1.132
90	1.992	1.728	1.337	1.709	1.347	1.238
95	2.135	2.034	1.515	1.949	1.499	1.310
Number of LC10(4) Estimates Obtained	238	398	399	331	418	469
Number of Lower Bounds Obtained	197	385	395	321	417	469
Coverage of Lower Bounds	0.660	1.000	0.992	0.988	0.993	0.991

Estimates Related to LC10(1); True LC10(1) = 28.7 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.772	0.814	0.848	0.824	0.860	0.876
10	0.808	0.855	0.885	0.870	0.885	0.911
25	0.904	0.929	0.937	0.945	0.938	0.956
50	1.045	1.024	1.012	1.072	1.016	1.010
75	1.193	1.164	1.103	1.222	1.104	1.077
90	1.314	1.349	1.196	1.347	1.176	1.142
95	1.414	1.414	1.247	1.430	1.259	1.174
Number of LC10(1) Estimates Obtained	238	398	399	331	418	469
Number of Lower Bounds Obtained	192	388	394	320	417	469
Coverage of Lower Bounds	0.682	0.992	0.997	0.991	0.998	0.989

Estimates Related to LC01(4); True LC01(4) = 3.72 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.555	0.661	0.670	0.621	0.672	0.720
10	0.723	0.735	0.741	0.718	0.734	0.783
25	0.990	0.894	0.893	0.915	0.887	0.908
50	1.225	1.110	1.065	1.203	1.024	1.032
75	1.574	1.382	1.267	1.458	1.236	1.178
90	2.163	1.909	1.435	1.901	1.461	1.326
95	2.421	2.282	1.716	2.157	1.603	1.431
Number of LC01(4)	238	398	399	331	418	469

Estimates Obtained						
Number of Lower Bounds Obtained	212	385	395	321	417	469
Coverage of Lower Bounds	0.613	1.000	0.995	0.988	0.998	0.994

Estimates Related to LC01(1); True LC01(1) = 21.0 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.701	0.753	0.798	0.740	0.772	0.816
10	0.775	0.816	0.833	0.792	0.826	0.870
25	0.903	0.927	0.929	0.960	0.917	0.937
50	1.028	1.062	1.029	1.093	1.025	1.024
75	1.329	1.203	1.166	1.323	1.154	1.124
90	1.568	1.498	1.252	1.491	1.259	1.210
95	1.603	1.639	1.330	1.567	1.341	1.262
Number of LC01(1) Estimates Obtained	238	398	399	331	418	469
Number of Lower Bounds Obtained	213	388	395	321	417	469
Coverage of Lower Bounds	0.615	0.992	0.995	0.988	1.000	0.996

P7: Probit Relationship 7; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2067 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.118	0.271	0.321	0.209	0.398	0.417
10	0.260	0.395	0.441	0.383	0.499	0.557
25	0.591	0.611	0.660	0.635	0.737	0.753
50	1.091	0.948	0.961	1.015	1.046	1.024
75	1.972	1.428	1.422	1.753	1.572	1.367
90	3.255	2.100	1.973	2.741	2.093	1.736
95	4.593	2.451	2.571	3.601	2.503	2.033
Number of LC50(4) Estimates Obtained	495	499	500	498	500	500
Number of Lower Bounds Obtained	320	446	479	383	469	492
Coverage of Lower Bounds	0.688	0.825	0.914	0.862	0.917	0.961

Estimates Related to LC50(1); True LC50(1) = 7289 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.411	0.603	0.586	0.508	0.551	0.636
10	0.526	0.652	0.676	0.575	0.647	0.686
25	0.727	0.791	0.820	0.728	0.786	0.798
50	0.983	0.967	0.987	0.949	0.956	0.955
75	1.390	1.264	1.186	1.238	1.158	1.130
90	2.002	1.789	1.568	1.718	1.527	1.396
95	3.028	2.399	1.841	2.425	1.877	1.571

Number of LC50(1) Estimates Obtained	495	499	500	498	500	500
Number of Lower Bounds Obtained	372	470	492	429	485	497
Coverage of Lower Bounds	0.946	0.981	0.984	0.965	0.967	0.992

Estimates Related to LC10(4); True LC10(4) = 396 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.008	0.056	0.183	0.038	0.197	0.279
10	0.105	0.191	0.327	0.223	0.420	0.505
25	0.619	0.531	0.633	0.672	0.774	0.764
50	1.521	1.084	0.989	1.319	1.222	1.151
75	3.347	1.923	1.586	2.691	1.948	1.652
90	7.065	3.144	2.587	5.784	3.086	2.122
95	13.156	4.460	3.526	8.217	4.081	2.639
Number of LC10(4) Estimates Obtained	494	499	500	498	500	500
Number of Lower Bounds Obtained	474	498	495	489	496	499
Coverage of Lower Bounds	0.460	0.727	0.881	0.658	0.861	0.936

Estimates Related to LC10(1); True LC10(1) = 1397 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.138	0.342	0.505	0.182	0.480	0.546
10	0.376	0.502	0.615	0.447	0.671	0.698
25	0.812	0.789	0.812	0.813	0.862	0.855
50	1.326	1.104	1.007	1.211	1.124	1.049
75	2.109	1.485	1.267	1.889	1.447	1.303
90	3.336	1.932	1.657	2.858	1.794	1.515
95	4.355	2.244	1.861	3.448	2.111	1.704
Number of LC10(1) Estimates Obtained	495	499	500	498	500	500
Number of Lower Bounds Obtained	442	476	485	487	493	496
Coverage of Lower Bounds	0.498	0.765	0.899	0.671	0.872	0.938

Estimates Related to LC01(4); True LC01(4) = 103 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.001	0.015	0.100	0.008	0.103	0.184
10	0.034	0.097	0.216	0.099	0.328	0.330
25	0.486	0.470	0.558	0.620	0.726	0.734
50	2.095	1.252	1.061	1.760	1.406	1.244
75	6.074	2.601	1.864	4.696	2.583	2.006
90	16.558	4.925	3.541	12.356	4.467	3.119
95	45.836	8.515	5.301	20.935	7.625	4.227
Number of LC01(4)	495	499	500	498	500	500

Estimates Obtained						
Number of Lower Bounds Obtained	489	496	497	495	497	500
Coverage of Lower Bounds	0.444	0.728	0.873	0.655	0.859	0.934

Estimates Related to LC01(1); True LC01(1) = 363 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.015	0.088	0.299	0.046	0.277	0.315
10	0.134	0.254	0.430	0.242	0.509	0.513
25	0.645	0.667	0.681	0.662	0.785	0.793
50	1.865	1.203	1.043	1.548	1.247	1.135
75	4.143	2.074	1.562	3.506	1.956	1.618
90	7.828	3.129	2.309	6.542	2.997	2.217
95	15.018	4.415	3.169	8.388	4.069	2.745
Number of LC01(1) Estimates Obtained	495	499	500	498	500	500
Number of Lower Bounds Obtained	487	498	498	496	498	499
Coverage of Lower Bounds	0.450	0.729	0.873	0.661	0.859	0.930

P8: Probit Relationship 8; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 1437 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.136	0.220	0.332	0.252	0.355	0.428
10	0.270	0.331	0.464	0.404	0.508	0.522
25	0.653	0.574	0.685	0.669	0.686	0.741
50	1.149	0.961	0.991	1.095	1.003	1.035
75	1.955	1.601	1.424	1.806	1.460	1.411
90	3.252	2.657	1.901	2.978	2.029	1.878
95	4.264	4.028	2.251	3.966	2.654	2.079
Number of LC50(4) Estimates Obtained	492	498	499	493	500	500
Number of Lower Bounds Obtained	342	445	486	388	476	491
Coverage of Lower Bounds	0.699	0.813	0.916	0.832	0.899	0.937

Estimates Related to LC50(1); True LC50(1) = 5748 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.448	0.531	0.570	0.527	0.587	0.616
10	0.553	0.621	0.649	0.581	0.662	0.689
25	0.722	0.785	0.794	0.733	0.781	0.818
50	0.954	0.984	0.965	0.938	0.950	0.968
75	1.291	1.246	1.200	1.282	1.198	1.183
90	1.819	1.855	1.502	1.730	1.463	1.489
95	2.616	2.567	1.774	2.473	1.738	1.735

Number of LC50(1) Estimates Obtained	492	498	499	493	500	500
Number of Lower Bounds Obtained	371	478	495	417	481	491
Coverage of Lower Bounds	0.957	0.971	0.992	0.950	0.977	0.990

Estimates Related to LC10(4); True LC10(4) = 268 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.030	0.048	0.214	0.066	0.142	0.281
10	0.161	0.160	0.325	0.214	0.387	0.433
25	0.634	0.490	0.633	0.722	0.704	0.717
50	1.697	1.061	1.074	1.511	1.152	1.137
75	3.908	1.991	1.772	3.049	1.788	1.650
90	7.616	3.963	2.794	6.518	3.024	2.269
95	10.981	6.432	3.982	9.634	4.324	2.954
Number of LC10(4) Estimates Obtained	492	498	499	493	500	500
Number of Lower Bounds Obtained	477	487	496	473	492	498
Coverage of Lower Bounds	0.495	0.725	0.887	0.662	0.860	0.924

Estimates Related to LC10(1); True LC10(1) = 1070 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.264	0.299	0.496	0.240	0.435	0.512
10	0.458	0.477	0.641	0.504	0.559	0.689
25	0.826	0.791	0.845	0.864	0.808	0.856
50	1.401	1.034	1.057	1.218	1.085	1.044
75	2.247	1.424	1.326	2.045	1.404	1.297
90	3.504	2.021	1.660	3.066	1.806	1.528
95	4.913	2.493	2.089	3.949	2.160	1.715
Number of LC10(1) Estimates Obtained	492	498	499	493	500	500
Number of Lower Bounds Obtained	445	467	494	471	491	495
Coverage of Lower Bounds	0.533	0.760	0.895	0.671	0.870	0.933

Estimates Related to LC01(4); True LC01(4) = 68.0 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.010	0.012	0.109	0.012	0.062	0.124
10	0.094	0.082	0.214	0.136	0.259	0.302
25	0.638	0.415	0.580	0.714	0.639	0.673
50	2.388	1.222	1.186	1.988	1.361	1.225
75	6.752	2.585	2.308	6.048	2.417	2.040
90	17.883	6.028	4.183	14.565	4.787	3.124
95	29.482	11.559	7.311	24.567	8.176	4.241
Number of LC01(4)	492	497	499	493	500	500

Estimates Obtained						
Number of Lower Bounds Obtained	488	497	496	484	497	500
Coverage of Lower Bounds	0.484	0.710	0.891	0.643	0.853	0.920

Estimates Related to LC01(1); True LC01(1) = 272 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.082	0.069	0.241	0.063	0.188	0.248
10	0.269	0.258	0.449	0.304	0.364	0.471
25	0.826	0.630	0.735	0.793	0.730	0.775
50	2.016	1.107	1.161	1.631	1.216	1.169
75	4.318	1.947	1.747	3.785	1.914	1.600
90	8.418	3.203	2.494	7.219	2.881	2.222
95	13.817	5.856	3.513	10.769	4.070	2.670
Number of LC01(1) Estimates Obtained	492	498	499	493	500	500
Number of Lower Bounds Obtained	486	497	498	486	497	499
Coverage of Lower Bounds	0.488	0.714	0.888	0.648	0.861	0.918

P9: Probit Relationship 9; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2.94 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.424	0.546	0.604	0.536	0.627	0.639
10	0.531	0.639	0.694	0.635	0.719	0.701
25	0.789	0.823	0.865	0.819	0.847	0.849
50	1.080	1.070	1.094	1.069	1.053	1.035
75	1.649	1.498	1.510	1.420	1.333	1.291
90	2.296	2.175	1.945	1.951	1.768	1.593
95	2.887	2.618	2.215	2.459	2.030	1.809
Number of LC50(4) Estimates Obtained	483	497	497	487	497	494
Number of Lower Bounds Obtained	368	467	487	445	489	487
Coverage of Lower Bounds	0.731	0.884	0.912	0.912	0.943	0.969

Estimates Related to LC50(1); True LC50(1) = 6.65 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.687	0.734	0.739	0.663	0.751	0.768
10	0.735	0.776	0.778	0.726	0.790	0.805
25	0.858	0.879	0.900	0.856	0.867	0.879
50	1.000	1.014	0.999	0.994	0.976	0.989
75	1.224	1.177	1.137	1.146	1.092	1.109
90	1.464	1.312	1.310	1.371	1.258	1.276
95	1.970	1.518	1.469	1.549	1.380	1.420

Number of LC50(1) Estimates Obtained	483	497	497	487	497	494
Number of Lower Bounds Obtained	436	485	488	448	485	490
Coverage of Lower Bounds	0.878	0.922	0.949	0.967	0.988	0.986

Estimates Related to LC10(4); True LC10(4) = .874 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.378	0.617	0.766	0.693	0.813	0.786
10	0.595	0.800	0.869	0.832	0.924	0.907
25	1.116	1.106	1.149	1.176	1.166	1.121
50	1.708	1.612	1.549	1.725	1.532	1.424
75	2.960	2.404	2.316	2.390	2.084	1.867
90	6.587	4.816	4.124	3.630	2.993	2.672
95	7.815	6.929	6.217	4.533	3.891	3.135
Number of LC10(4) Estimates Obtained	483	497	497	487	497	494
Number of Lower Bounds Obtained	437	478	476	472	484	483
Coverage of Lower Bounds	0.597	0.801	0.857	0.816	0.888	0.911

Estimates Related to LC10(1); True LC10(1) = 1.97 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.854	1.018	1.014	0.918	1.006	1.038
10	0.963	1.091	1.107	1.044	1.085	1.106
25	1.274	1.274	1.281	1.279	1.248	1.229
50	1.665	1.513	1.462	1.591	1.455	1.404
75	2.223	1.821	1.767	1.985	1.679	1.607
90	3.207	2.344	2.237	2.426	1.968	1.862
95	3.895	3.212	3.013	2.638	2.285	2.017
Number of LC10(1) Estimates Obtained	483	497	497	487	497	494
Number of Lower Bounds Obtained	434	468	474	465	485	485
Coverage of Lower Bounds	0.604	0.803	0.819	0.806	0.843	0.806

Estimates Related to LC01(4); True LC01(4) = .325 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.288	0.602	0.711	0.679	0.796	0.743
10	0.560	0.851	0.916	0.927	1.002	0.992
25	1.409	1.329	1.419	1.486	1.459	1.329
50	2.658	2.228	2.151	2.596	2.083	1.928
75	5.231	3.750	3.510	4.050	3.131	2.761
90	16.537	11.530	7.405	6.925	5.125	4.186
95	19.422	17.463	15.246	8.985	6.769	5.408
Number of LC01(4)	483	497	497	487	497	494

Estimates Obtained						
Number of Lower Bounds Obtained	463	488	486	480	495	486
Coverage of Lower Bounds	0.564	0.783	0.837	0.792	0.848	0.885

Estimates Related to LC01(1); True LC01(1) = .734 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.564	0.891	1.029	0.781	0.981	1.020
10	0.913	1.133	1.203	1.071	1.163	1.160
25	1.519	1.547	1.511	1.592	1.539	1.465
50	2.493	2.125	2.040	2.429	1.991	1.859
75	4.039	2.941	2.741	3.437	2.640	2.400
90	8.117	5.528	4.125	4.784	3.456	2.977
95	9.409	7.967	7.410	5.338	4.193	3.466
Number of LC01(1) Estimates Obtained	483	497	497	487	497	494
Number of Lower Bounds Obtained	460	488	486	482	496	490
Coverage of Lower Bounds	0.570	0.762	0.807	0.778	0.810	0.806

W1: Weibull Relationship 1; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 45820 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	1	2	3	1	2	3
5	0.610	0.614	0.595	0.693	0.738	0.734
10	0.690	0.688	0.700	0.773	0.775	0.781
25	0.806	0.859	0.841	0.864	0.891	0.875
50	0.988	1.013	1.005	1.016	1.018	0.981
75	1.207	1.676	2.259	1.183	1.180	1.166
90	2.770	2.580	2.525	1.428	1.489	1.526
95	2.770	2.645	2.651	2.016	1.825	1.683
Number of LC50(4) Estimates Obtained	184	244	270	226	275	287
Number of Lower Bounds Obtained	166	240	253	218	271	284
Coverage of Lower Bounds	0.873	0.758	0.791	0.917	0.967	0.986

Estimates Related to LC50(1); True LC50(1) = 102388 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	1	2	3	1	2	3
5	0.511	0.521	0.545	0.687	0.730	0.666
10	0.559	0.641	0.669	0.738	0.783	0.717
25	0.831	0.873	0.823	0.913	0.899	0.890
50	1.070	1.112	1.090	1.107	1.085	1.016
75	1.406	2.275	2.988	1.320	1.320	1.263
90	3.684	3.388	3.343	1.614	1.727	1.719
95	3.684	3.541	3.500	2.360	2.120	2.014

Number of LC50(1) Estimates Obtained	184	244	270	226	275	287
Number of Lower Bounds Obtained	180	243	255	223	271	285
Coverage of Lower Bounds	0.722	0.745	0.714	0.897	0.967	0.975

Estimates Related to LC10(4); True LC10(4) = 31346 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.511	0.521	0.545	0.687	0.730	0.666
10	0.559	0.641	0.669	0.738	0.783	0.717
25	0.831	0.873	0.823	0.913	0.899	0.890
50	1.070	1.112	1.090	1.107	1.085	1.016
75	1.406	2.275	2.988	1.320	1.320	1.263
90	3.684	3.388	3.343	1.614	1.727	1.719
95	3.684	3.541	3.500	2.360	2.120	2.014
Number of LC10(4) Estimates Obtained	184	244	270	226	275	287
Number of Lower Bounds Obtained	180	243	255	223	271	285
Coverage of Lower Bounds	0.722	0.745	0.714	0.897	0.967	0.975

Estimates Related to LC10(1); True LC10(1) = 70246 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.698	0.674	0.718	0.820	0.835	0.799
10	0.781	0.810	0.795	0.863	0.879	0.841
25	0.951	0.938	0.935	0.958	0.963	0.955
50	1.094	1.103	1.056	1.083	1.050	1.034
75	1.357	1.472	1.670	1.169	1.150	1.126
90	1.872	1.847	1.825	1.278	1.264	1.257
95	1.872	1.876	1.851	1.365	1.372	1.345
Number of LC10(1) Estimates Obtained	184	244	270	226	275	287
Number of Lower Bounds Obtained	184	243	256	223	271	286
Coverage of Lower Bounds	0.788	0.753	0.785	0.897	0.967	0.976

Estimates Related to LC01(4); True LC01(4) = 19648 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.517	0.555	0.575	0.764	0.816	0.719
10	0.611	0.664	0.734	0.869	0.922	0.811
25	0.978	1.029	0.952	1.065	1.071	1.042
50	1.362	1.415	1.363	1.373	1.350	1.248
75	1.824	3.434	4.392	1.764	1.690	1.633
90	5.471	4.976	4.945	2.164	2.321	2.219
95	5.476	5.288	5.151	3.022	2.817	2.695
Number of LC01(4)	184	244	270	226	275	287

Estimates Obtained						
Number of Lower Bounds Obtained	184	243	256	223	271	286
Coverage of Lower Bounds	0.707	0.741	0.695	0.897	0.945	0.927

Estimates Related to LC01(1); True LC01(1) = 43906 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.659	0.692	0.765	0.914	0.897	0.815
10	0.817	0.838	0.842	0.959	0.972	0.925
25	1.105	1.101	1.102	1.175	1.153	1.104
50	1.368	1.396	1.339	1.362	1.297	1.293
75	1.856	2.146	2.469	1.546	1.508	1.448
90	2.781	2.715	2.692	1.763	1.717	1.664
95	2.781	2.793	2.738	1.877	1.868	1.817
Number of LC01(1) Estimates Obtained	184	244	270	226	275	287
Number of Lower Bounds Obtained	184	244	256	223	271	287
Coverage of Lower Bounds	0.788	0.750	0.746	0.897	0.934	0.895

W2: Weibull Relationship 2; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 49240 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.569	0.494	0.457	0.601	0.583	0.584
10	0.620	0.594	0.526	0.670	0.647	0.648
25	0.770	0.781	0.723	0.804	0.814	0.795
50	0.943	0.952	0.938	0.967	0.961	0.932
75	1.246	1.383	1.180	1.109	1.113	1.057
90	1.553	1.764	1.445	1.380	1.359	1.222
95	2.327	2.234	1.641	1.629	1.510	1.394
Number of LC50(4) Estimates Obtained	255	347	386	321	367	400
Number of Lower Bounds Obtained	243	336	379	302	352	388
Coverage of Lower Bounds	0.782	0.771	0.805	0.940	0.966	0.961

Estimates Related to LC50(1); True LC50(1) = 86960 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.682	0.697	0.694	0.743	0.750	0.745
10	0.740	0.735	0.720	0.797	0.793	0.809
25	0.866	0.855	0.843	0.866	0.870	0.865
50	0.918	0.933	0.928	0.956	0.954	0.933
75	1.050	1.032	1.023	1.058	1.033	1.001
90	1.171	1.431	1.153	1.138	1.126	1.072
95	1.514	1.471	1.410	1.201	1.185	1.135

Number of LC50(1) Estimates Obtained	255	347	386	321	367	400
Number of Lower Bounds Obtained	247	340	382	303	352	384
Coverage of Lower Bounds	0.883	0.853	0.898	0.960	0.994	0.997

Estimates Related to LC10(4); True LC10(4) = 30376 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.535	0.499	0.449	0.547	0.553	0.568
10	0.616	0.586	0.505	0.646	0.635	0.623
25	0.824	0.766	0.709	0.860	0.848	0.812
50	1.076	1.090	0.995	1.078	1.058	0.996
75	1.640	1.789	1.540	1.315	1.274	1.185
90	2.211	2.332	2.077	1.606	1.619	1.417
95	3.417	3.299	2.185	2.054	1.830	1.591
Number of LC10(4) Estimates Obtained	255	347	386	321	367	400
Number of Lower Bounds Obtained	251	338	381	313	354	390
Coverage of Lower Bounds	0.713	0.737	0.782	0.904	0.938	0.928

Estimates Related to LC10(1); True LC10(1) = 53646 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.705	0.712	0.684	0.726	0.704	0.726
10	0.754	0.767	0.732	0.782	0.779	0.800
25	0.905	0.881	0.854	0.920	0.902	0.891
50	1.114	1.047	1.025	1.063	1.039	1.000
75	1.288	1.317	1.224	1.227	1.157	1.116
90	1.478	1.664	1.354	1.411	1.322	1.230
95	2.222	2.170	1.396	1.514	1.440	1.290
Number of LC10(1) Estimates Obtained	255	347	386	321	367	400
Number of Lower Bounds Obtained	251	335	378	313	349	387
Coverage of Lower Bounds	0.741	0.758	0.791	0.904	0.951	0.941

Estimates Related to LC01(4); True LC01(4) = 16629 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.613	0.577	0.503	0.590	0.614	0.645
10	0.733	0.685	0.617	0.766	0.708	0.723
25	1.038	0.932	0.821	1.099	1.034	0.977
50	1.513	1.477	1.283	1.476	1.397	1.314
75	2.584	2.800	2.104	1.929	1.826	1.625
90	3.704	4.024	3.494	2.389	2.350	2.038
95	5.756	5.584	3.630	3.076	2.833	2.366
Number of LC01(4)	255	347	386	321	367	400

Estimates Obtained						
Number of Lower Bounds Obtained	252	340	382	315	356	391
Coverage of Lower Bounds	0.702	0.694	0.738	0.886	0.879	0.829

Estimates Related to LC01(1); True LC01(1) = 29368 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.791	0.808	0.746	0.766	0.750	0.783
10	0.889	0.896	0.845	0.909	0.864	0.891
25	1.114	1.085	1.030	1.148	1.127	1.082
50	1.600	1.465	1.332	1.445	1.381	1.311
75	2.000	2.083	1.748	1.758	1.693	1.565
90	2.320	2.685	2.249	2.168	1.953	1.795
95	3.746	3.668	2.355	2.423	2.187	1.927
Number of LC01(1) Estimates Obtained	255	347	386	321	367	400
Number of Lower Bounds Obtained	252	341	383	315	359	393
Coverage of Lower Bounds	0.710	0.698	0.723	0.886	0.852	0.799

W3: Weibull Relationship 3; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7452 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.683	0.716	0.727	0.728	0.762	0.806
10	0.752	0.781	0.781	0.774	0.815	0.834
25	0.878	0.878	0.874	0.877	0.890	0.910
50	1.009	0.987	0.959	1.018	0.992	0.999
75	1.252	1.134	1.066	1.200	1.150	1.123
90	1.582	1.333	1.325	1.441	1.341	1.345
95	1.934	1.479	1.574	1.642	1.543	1.502
Number of LC50(4) Estimates Obtained	338	443	479	406	467	484
Number of Lower Bounds Obtained	330	437	472	404	466	480
Coverage of Lower Bounds	0.900	0.968	0.953	0.983	0.985	0.979

Estimates Related to LC50(1); True LC50(1) = 25949 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.744	0.776	0.813	0.809	0.828	0.840
10	0.780	0.822	0.847	0.844	0.855	0.870
25	0.862	0.871	0.897	0.909	0.902	0.912
50	0.961	0.955	0.965	0.972	0.960	0.954
75	1.064	1.041	1.030	1.045	1.021	1.006
90	1.202	1.129	1.131	1.157	1.081	1.059
95	1.277	1.189	1.196	1.225	1.129	1.107

Number of LC50(1) Estimates Obtained	338	443	479	406	467	484
Number of Lower Bounds Obtained	330	440	475	400	466	480
Coverage of Lower Bounds	0.958	0.991	0.973	1.000	0.991	0.992

Estimates Related to LC10(4); True LC10(4) = 4653 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.595	0.680	0.655	0.719	0.746	0.803
10	0.769	0.764	0.749	0.781	0.793	0.848
25	0.917	0.910	0.889	0.944	0.937	0.950
50	1.162	1.084	1.055	1.168	1.102	1.090
75	1.451	1.290	1.228	1.410	1.297	1.241
90	2.000	1.592	1.484	1.691	1.560	1.513
95	2.584	1.743	1.859	2.058	1.830	1.708
Number of LC10(4) Estimates Obtained	338	443	479	406	467	484
Number of Lower Bounds Obtained	338	442	477	404	466	483
Coverage of Lower Bounds	0.879	0.959	0.927	0.983	0.974	0.963

Estimates Related to LC10(1); True LC10(1) = 16203 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.771	0.789	0.802	0.796	0.841	0.858
10	0.819	0.834	0.861	0.860	0.881	0.889
25	0.909	0.922	0.938	0.960	0.944	0.961
50	1.053	1.023	1.037	1.092	1.047	1.029
75	1.247	1.169	1.143	1.249	1.165	1.105
90	1.468	1.304	1.271	1.418	1.261	1.215
95	1.613	1.420	1.334	1.520	1.349	1.298
Number of LC10(1) Estimates Obtained	338	443	479	406	467	484
Number of Lower Bounds Obtained	337	440	475	404	466	483
Coverage of Lower Bounds	0.884	0.968	0.937	0.983	0.981	0.963

Estimates Related to LC01(4); True LC01(4) = 2586 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.686	0.762	0.726	0.848	0.838	0.949
10	0.896	0.890	0.837	0.929	0.956	1.020
25	1.162	1.125	1.109	1.214	1.178	1.202
50	1.622	1.437	1.393	1.581	1.505	1.435
75	2.095	1.778	1.701	2.038	1.843	1.721
90	2.798	2.234	2.083	2.490	2.211	2.074
95	3.872	2.538	2.645	3.012	2.583	2.390
Number of LC01(4)	338	443	479	406	467	484

Estimates Obtained						
Number of Lower Bounds Obtained	338	443	478	404	466	484
Coverage of Lower Bounds	0.879	0.946	0.879	0.983	0.888	0.841

Estimates Related to LC01(1); True LC01(1) = 9005 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.859	0.886	0.906	0.915	0.954	0.972
10	0.954	0.973	0.980	1.020	1.048	1.058
25	1.143	1.155	1.163	1.220	1.204	1.191
50	1.444	1.336	1.356	1.499	1.410	1.352
75	1.753	1.619	1.579	1.795	1.639	1.525
90	2.216	1.874	1.855	2.101	1.836	1.713
95	2.486	2.106	2.022	2.295	1.945	1.850
Number of LC01(1) Estimates Obtained	338	443	479	406	467	484
Number of Lower Bounds Obtained	338	443	478	404	466	484
Coverage of Lower Bounds	0.882	0.944	0.860	0.983	0.876	0.771

W4: Weibull Relationship 4; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 371 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.776	0.823	0.838	0.804	0.831	0.845
10	0.803	0.855	0.859	0.845	0.876	0.876
25	0.896	0.917	0.912	0.903	0.928	0.919
50	0.960	1.005	0.982	0.985	0.996	0.976
75	1.101	1.106	1.085	1.096	1.074	1.057
90	1.211	1.257	1.456	1.185	1.133	1.133
95	1.361	1.487	1.478	1.227	1.171	1.176
Number of LC50(4) Estimates Obtained	294	408	457	355	452	471
Number of Lower Bounds Obtained	223	406	450	351	452	464
Coverage of Lower Bounds	0.937	0.911	0.876	0.991	0.998	0.991

Estimates Related to LC50(1); True LC50(1) = 769 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.806	0.826	0.822	0.860	0.889	0.865
10	0.836	0.851	0.833	0.894	0.907	0.903
25	0.918	0.921	0.911	0.937	0.943	0.935
50	0.960	0.977	0.960	0.975	0.986	0.973
75	1.031	1.037	1.012	1.048	1.039	1.018
90	1.091	1.086	1.068	1.097	1.076	1.053
95	1.143	1.113	1.085	1.127	1.097	1.076

Number of LC50(1) Estimates Obtained	294	408	457	355	452	471
Number of Lower Bounds Obtained	236	408	453	353	452	465
Coverage of Lower Bounds	0.928	0.956	0.978	0.992	0.998	0.998

Estimates Related to LC10(4); True LC10(4) = 270 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.803	0.873	0.854	0.847	0.897	0.873
10	0.897	0.914	0.907	0.907	0.919	0.906
25	0.989	0.999	0.985	0.996	0.983	0.962
50	1.080	1.052	1.038	1.090	1.061	1.027
75	1.142	1.161	1.088	1.169	1.155	1.093
90	1.274	1.262	1.215	1.264	1.232	1.173
95	1.315	1.316	1.257	1.311	1.276	1.220
Number of LC10(4) Estimates Obtained	294	408	457	355	452	471
Number of Lower Bounds Obtained	284	408	451	355	452	469
Coverage of Lower Bounds	0.736	0.909	0.878	0.980	0.998	0.966

Estimates Related to LC10(1); True LC10(1) = 559 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.803	0.873	0.854	0.847	0.897	0.873
10	0.897	0.914	0.907	0.907	0.919	0.906
25	0.989	0.999	0.985	0.996	0.983	0.962
50	1.080	1.052	1.038	1.090	1.061	1.027
75	1.142	1.161	1.088	1.169	1.155	1.093
90	1.274	1.262	1.215	1.264	1.232	1.173
95	1.315	1.316	1.257	1.311	1.276	1.220
Number of LC10(1) Estimates Obtained	294	408	457	355	452	471
Number of Lower Bounds Obtained	284	408	451	355	452	469
Coverage of Lower Bounds	0.736	0.909	0.878	0.980	0.998	0.966

Estimates Related to LC01(4); True LC01(4) = 181 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.843	0.915	0.875	0.919	0.925	0.889
10	0.950	1.019	0.995	1.014	1.043	0.988
25	1.121	1.170	1.137	1.205	1.170	1.118
50	1.408	1.354	1.278	1.356	1.316	1.245
75	1.535	1.658	1.596	1.569	1.496	1.426
90	1.754	2.008	2.470	1.782	1.677	1.595
95	2.230	2.573	2.564	1.882	1.755	1.679
Number of LC01(4)	294	408	457	355	452	471

Estimates Obtained						
Number of Lower Bounds Obtained	284	408	454	355	452	469
Coverage of Lower Bounds	0.732	0.909	0.830	0.980	0.965	0.787

Estimates Related to LC01(1); True LC01(1) = 375 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.889	0.958	0.930	0.964	0.956	0.943
10	1.015	1.031	1.003	1.033	1.044	1.012
25	1.181	1.174	1.164	1.199	1.167	1.121
50	1.360	1.363	1.292	1.379	1.303	1.242
75	1.510	1.507	1.441	1.522	1.476	1.365
90	1.674	1.678	1.590	1.669	1.594	1.499
95	1.692	1.740	1.665	1.739	1.665	1.581
Number of LC01(1) Estimates Obtained	294	408	457	355	452	471
Number of Lower Bounds Obtained	284	408	454	355	452	469
Coverage of Lower Bounds	0.736	0.909	0.826	0.980	0.936	0.710

W5: Weibull Relationship 5; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 126 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.605	0.683	0.685	0.666	0.762	0.738
10	0.682	0.755	0.731	0.734	0.811	0.797
25	0.826	0.842	0.835	0.845	0.896	0.878
50	0.973	0.964	0.965	1.017	1.031	0.983
75	1.205	1.130	1.129	1.187	1.175	1.117
90	1.685	1.396	2.902	1.445	1.430	1.391
95	3.494	3.187	3.255	1.751	1.645	1.689
Number of LC50(4) Estimates Obtained	376	450	482	402	473	491
Number of Lower Bounds Obtained	353	442	468	394	468	483
Coverage of Lower Bounds	0.878	0.925	0.885	0.957	0.951	0.977

Estimates Related to LC50(1); True LC50(1) = 393 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.763	0.791	0.816	0.792	0.848	0.831
10	0.808	0.840	0.852	0.842	0.873	0.855
25	0.893	0.902	0.906	0.903	0.916	0.907
50	0.985	0.983	0.968	0.968	0.966	0.953
75	1.093	1.064	1.047	1.035	1.010	1.000
90	1.271	1.154	1.190	1.104	1.066	1.063
95	1.351	1.271	1.277	1.186	1.120	1.107

Number of LC50(1) Estimates Obtained	376	450	482	402	473	491
Number of Lower Bounds Obtained	358	444	472	386	465	480
Coverage of Lower Bounds	0.913	0.939	0.915	0.990	0.966	0.998

Estimates Related to LC10(4); True LC10(4) = 77.7 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.526	0.662	0.627	0.652	0.696	0.699
10	0.626	0.742	0.719	0.755	0.827	0.773
25	0.882	0.869	0.865	0.929	0.952	0.903
50	1.098	1.057	1.036	1.128	1.129	1.061
75	1.418	1.277	1.293	1.367	1.360	1.260
90	2.218	1.692	4.286	1.703	1.684	1.635
95	5.096	4.693	4.803	2.174	2.063	1.973
Number of LC10(4) Estimates Obtained	376	450	482	402	473	491
Number of Lower Bounds Obtained	373	445	472	395	470	483
Coverage of Lower Bounds	0.831	0.917	0.875	0.957	0.930	0.965

Estimates Related to LC10(1); True LC10(1) = 242 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	1	2	3	1	2	3
5	0.749	0.782	0.763	0.793	0.803	0.813
10	0.817	0.843	0.835	0.859	0.859	0.850
25	0.945	0.934	0.931	0.974	0.968	0.931
50	1.101	1.070	1.045	1.086	1.057	1.026
75	1.268	1.199	1.169	1.201	1.171	1.111
90	1.578	1.395	1.606	1.347	1.291	1.198
95	1.885	1.835	1.880	1.476	1.354	1.308
Number of LC10(1) Estimates Obtained	376	450	482	402	473	491
Number of Lower Bounds Obtained	371	444	474	395	471	485
Coverage of Lower Bounds	0.838	0.930	0.882	0.957	0.932	0.969

Estimates Related to LC01(4); True LC01(4) = 42.6 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	1	2	3	1	2	3
5	0.573	0.733	0.709	0.732	0.786	0.782
10	0.712	0.868	0.833	0.932	0.991	0.919
25	1.115	1.082	1.075	1.215	1.215	1.120
50	1.476	1.402	1.374	1.548	1.506	1.395
75	2.074	1.774	1.823	1.950	1.912	1.714
90	3.410	2.510	7.259	2.567	2.445	2.288
95	8.542	7.929	8.096	3.254	3.036	2.849
Number of LC01(4)	376	450	482	402	473	491

Estimates Obtained						
Number of Lower Bounds Obtained	375	447	475	395	472	489
Coverage of Lower Bounds	0.827	0.902	0.832	0.954	0.858	0.865

Estimates Related to LC01(1); True LC01(1) = 133 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.813	0.865	0.846	0.868	0.907	0.900
10	0.946	0.974	0.961	1.041	1.010	0.995
25	1.169	1.182	1.158	1.284	1.213	1.151
50	1.482	1.424	1.383	1.495	1.412	1.347
75	1.845	1.701	1.644	1.726	1.653	1.532
90	2.515	2.066	2.751	1.999	1.889	1.713
95	3.160	3.090	3.188	2.216	2.048	1.908
Number of LC01(1) Estimates Obtained	376	450	482	402	473	491
Number of Lower Bounds Obtained	375	447	478	395	472	490
Coverage of Lower Bounds	0.827	0.904	0.785	0.957	0.847	0.818

W6: Weibull Relationship 6; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7.41 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.741	0.721	0.738	0.737	0.783	0.798
10	0.813	0.772	0.774	0.783	0.820	0.830
25	0.863	0.852	0.868	0.903	0.889	0.889
50	1.107	0.985	0.943	1.093	0.977	0.962
75	1.329	1.111	1.030	1.387	1.109	1.045
90	1.825	1.547	1.175	1.719	1.341	1.125
95	2.136	1.697	1.361	1.792	1.505	1.278
Number of LC50(4) Estimates Obtained	150	219	239	165	203	264
Number of Lower Bounds Obtained	94	219	237	165	202	261
Coverage of Lower Bounds	0.819	1.000	0.992	0.970	0.985	0.992

Estimates Related to LC50(1); True LC50(1) = 41.4 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.736	0.832	0.825	0.848	0.864	0.872
10	0.800	0.884	0.862	0.856	0.882	0.888
25	0.902	0.928	0.916	0.899	0.919	0.917
50	1.043	1.011	1.002	1.018	0.962	0.958
75	1.067	1.108	1.097	1.131	1.019	0.996
90	1.218	1.199	1.163	1.212	1.108	1.045
95	1.240	1.221	1.223	1.275	1.169	1.086

Number of LC50(1) Estimates Obtained	150	219	239	165	203	264
Number of Lower Bounds Obtained	89	219	237	164	202	260
Coverage of Lower Bounds	0.978	1.000	1.000	1.000	0.995	0.988

Estimates Related to LC10(4); True LC10(4) = 5.35 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.681	0.617	0.642	0.654	0.752	0.745
10	0.797	0.689	0.720	0.727	0.788	0.785
25	0.871	0.803	0.809	0.866	0.867	0.878
50	1.035	0.977	0.934	1.067	0.976	0.977
75	1.272	1.178	1.027	1.409	1.112	1.077
90	1.791	1.619	1.145	1.825	1.387	1.149
95	2.179	1.808	1.305	1.948	1.584	1.296
Number of LC10(4) Estimates Obtained	150	219	239	165	203	264
Number of Lower Bounds Obtained	119	219	238	165	202	263
Coverage of Lower Bounds	0.647	1.000	0.992	0.970	0.990	0.981

Estimates Related to LC10(1); True LC10(1) = 29.9 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.687	0.767	0.769	0.765	0.793	0.820
10	0.780	0.818	0.804	0.793	0.828	0.852
25	0.892	0.914	0.891	0.859	0.898	0.908
50	1.080	0.979	0.984	0.998	0.957	0.964
75	1.143	1.079	1.066	1.165	1.031	1.016
90	1.202	1.240	1.153	1.289	1.129	1.074
95	1.346	1.296	1.196	1.370	1.241	1.130
Number of LC10(1) Estimates Obtained	150	219	239	165	203	264
Number of Lower Bounds Obtained	125	219	236	165	202	263
Coverage of Lower Bounds	0.616	1.000	1.000	0.970	1.000	0.981

Estimates Related to LC01(4); True LC01(4) = 3.57 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.695	0.617	0.659	0.628	0.815	0.797
10	0.877	0.726	0.742	0.769	0.860	0.862
25	1.031	0.895	0.877	0.946	0.963	0.993
50	1.188	1.119	1.055	1.256	1.100	1.118
75	1.539	1.366	1.215	1.689	1.314	1.256
90	2.030	1.967	1.328	2.202	1.620	1.385
95	2.482	2.301	1.471	2.417	1.926	1.555
Number of LC01(4)	150	219	239	165	203	264

Estimates Obtained						
Number of Lower Bounds Obtained	150	219	239	165	203	264
Coverage of Lower Bounds	0.513	1.000	0.987	0.970	0.985	0.970

Estimates Related to LC01(1); True LC01(1) = 20.0 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.756	0.806	0.787	0.770	0.833	0.859
10	0.835	0.861	0.853	0.853	0.900	0.919
25	1.024	1.021	0.958	0.972	1.000	1.021
50	1.278	1.136	1.102	1.119	1.110	1.125
75	1.402	1.242	1.227	1.386	1.212	1.198
90	1.404	1.511	1.351	1.595	1.372	1.286
95	1.629	1.645	1.409	1.714	1.480	1.360
Number of LC01(1) Estimates Obtained	150	219	239	165	203	264
Number of Lower Bounds Obtained	150	219	238	165	203	264
Coverage of Lower Bounds	0.513	1.000	0.992	0.970	0.985	0.970

W7: Weibull Relationship 7; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2067 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.355	0.403	0.462	0.426	0.501	0.513
10	0.494	0.519	0.525	0.558	0.577	0.584
25	0.729	0.676	0.659	0.772	0.741	0.708
50	1.022	0.910	0.873	1.036	0.920	0.878
75	1.429	1.229	1.138	1.461	1.226	1.101
90	2.110	1.678	1.477	2.013	1.659	1.413
95	3.008	2.884	1.937	2.396	2.007	1.632
Number of LC50(4) Estimates Obtained	485	498	500	491	493	498
Number of Lower Bounds Obtained	406	466	487	440	483	494
Coverage of Lower Bounds	0.732	0.893	0.951	0.866	0.921	0.972

Estimates Related to LC50(1); True LC50(1) = 7582 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.527	0.616	0.631	0.596	0.601	0.656
10	0.619	0.666	0.675	0.659	0.674	0.690
25	0.753	0.780	0.781	0.763	0.774	0.779
50	0.910	0.899	0.898	0.912	0.910	0.891
75	1.128	1.079	1.021	1.131	1.042	1.002
90	1.358	1.306	1.210	1.302	1.187	1.118
95	1.581	1.737	1.426	1.433	1.398	1.211

Number of LC50(1) Estimates Obtained	485	498	500	491	493	498
Number of Lower Bounds Obtained	431	492	496	440	472	493
Coverage of Lower Bounds	0.933	0.959	0.982	0.970	0.985	0.998

Estimates Related to LC10(4); True LC10(4) = 637 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.268	0.319	0.359	0.326	0.401	0.418
10	0.444	0.440	0.461	0.580	0.547	0.510
25	0.846	0.681	0.669	0.961	0.794	0.722
50	1.591	1.131	0.983	1.528	1.141	0.996
75	2.535	1.801	1.475	2.624	1.729	1.383
90	4.010	2.613	2.196	3.957	2.825	2.021
95	8.453	7.450	3.335	4.929	3.686	2.611
Number of LC10(4) Estimates Obtained	485	498	500	491	493	498
Number of Lower Bounds Obtained	480	493	497	481	490	496
Coverage of Lower Bounds	0.615	0.817	0.920	0.769	0.880	0.948

Estimates Related to LC10(1); True LC10(1) = 2336 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.500	0.620	0.653	0.565	0.601	0.636
10	0.627	0.712	0.707	0.724	0.686	0.697
25	0.934	0.892	0.848	1.031	0.895	0.840
50	1.301	1.174	1.041	1.343	1.117	1.003
75	1.888	1.450	1.290	1.785	1.395	1.212
90	2.662	1.982	1.575	2.368	1.714	1.434
95	3.315	2.577	1.931	2.696	1.925	1.608
Number of LC10(1) Estimates Obtained	485	498	500	491	493	498
Number of Lower Bounds Obtained	452	468	486	476	489	494
Coverage of Lower Bounds	0.657	0.850	0.918	0.782	0.875	0.945

Estimates Related to LC01(4); True LC01(4) = 147 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.272	0.389	0.388	0.369	0.511	0.513
10	0.631	0.558	0.624	0.859	0.766	0.744
25	1.573	1.142	1.060	1.779	1.391	1.174
50	3.649	2.362	1.905	3.661	2.286	1.855
75	7.066	4.252	3.187	7.015	3.982	2.942
90	13.996	7.549	5.300	12.468	7.357	4.778
95	35.308	29.616	9.155	16.011	10.072	6.868
Number of LC01(4)	485	498	500	491	493	498

Estimates Obtained						
Number of Lower Bounds Obtained	483	494	499	487	490	498
Coverage of Lower Bounds	0.607	0.783	0.882	0.719	0.810	0.873

Estimates Related to LC01(1); True LC01(1) = 538 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.546	0.737	0.764	0.689	0.807	0.755
10	0.958	0.944	0.991	1.063	1.043	0.959
25	1.722	1.470	1.353	1.987	1.513	1.336
50	3.083	2.398	1.929	3.245	2.226	1.867
75	5.095	3.482	2.750	4.897	3.273	2.627
90	9.571	5.764	3.773	7.399	4.456	3.371
95	12.662	9.796	5.456	8.661	5.497	4.136
Number of LC01(1) Estimates Obtained	485	498	500	491	493	498
Number of Lower Bounds Obtained	483	493	498	487	490	497
Coverage of Lower Bounds	0.613	0.748	0.831	0.708	0.747	0.811

W8: Weibull Relationship 8; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 1437 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.325	0.401	0.453	0.463	0.497	0.528
10	0.484	0.490	0.559	0.603	0.612	0.622
25	0.700	0.684	0.685	0.785	0.743	0.766
50	0.993	0.911	0.870	1.065	0.935	0.946
75	1.412	1.193	1.142	1.401	1.185	1.169
90	2.053	1.733	1.615	2.101	1.575	1.523
95	3.236	3.081	2.740	2.319	1.927	2.003
Number of LC50(4) Estimates Obtained	468	496	497	488	493	498
Number of Lower Bounds Obtained	398	471	486	440	481	488
Coverage of Lower Bounds	0.671	0.873	0.920	0.895	0.952	0.953

Estimates Related to LC50(1); True LC50(1) = 5748 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.493	0.571	0.598	0.626	0.642	0.642
10	0.571	0.642	0.691	0.684	0.689	0.700
25	0.768	0.779	0.802	0.799	0.796	0.797
50	0.908	0.895	0.888	0.936	0.914	0.902
75	1.153	1.102	1.041	1.084	1.025	1.023
90	1.391	1.315	1.272	1.237	1.178	1.179
95	1.699	1.564	1.492	1.393	1.356	1.411

Number of LC50(1) Estimates Obtained	468	496	497	488	493	498
Number of Lower Bounds Obtained	400	492	495	444	484	491
Coverage of Lower Bounds	0.950	0.963	0.968	0.991	0.990	0.992

Estimates Related to LC10(4); True LC10(4) = 474 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.230	0.304	0.397	0.419	0.395	0.433
10	0.432	0.417	0.494	0.599	0.536	0.580
25	0.801	0.717	0.683	0.965	0.807	0.782
50	1.473	1.128	1.005	1.576	1.177	1.058
75	2.592	1.661	1.493	2.298	1.623	1.469
90	4.234	3.123	2.267	3.457	2.302	2.043
95	7.563	8.358	5.398	4.459	2.953	2.670
Number of LC10(4) Estimates Obtained	467	496	498	488	493	498
Number of Lower Bounds Obtained	453	486	488	467	487	484
Coverage of Lower Bounds	0.578	0.823	0.889	0.833	0.906	0.932

Estimates Related to LC10(1); True LC10(1) = 1898 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.507	0.597	0.632	0.595	0.667	0.649
10	0.644	0.693	0.731	0.754	0.724	0.720
25	0.926	0.874	0.873	1.016	0.883	0.847
50	1.290	1.105	1.040	1.359	1.111	1.026
75	1.847	1.442	1.273	1.745	1.318	1.234
90	2.592	1.896	1.559	2.089	1.559	1.461
95	2.973	2.333	2.293	2.399	1.819	1.603
Number of LC10(1) Estimates Obtained	468	496	498	488	493	498
Number of Lower Bounds Obtained	427	467	479	461	478	480
Coverage of Lower Bounds	0.635	0.859	0.914	0.839	0.921	0.919

Estimates Related to LC01(4); True LC01(4) = 119 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.218	0.380	0.423	0.481	0.505	0.507
10	0.601	0.553	0.653	0.924	0.755	0.689
25	1.388	1.173	1.040	1.875	1.370	1.249
50	3.233	2.112	1.824	3.623	2.278	1.905
75	6.989	3.835	3.060	5.898	3.511	3.006
90	12.892	7.350	5.309	9.315	5.086	4.515
95	24.027	30.450	17.658	12.855	7.651	5.983
Number of LC01(4)	467	496	498	488	493	498

Estimates Obtained						
Number of Lower Bounds Obtained	457	495	493	480	489	493
Coverage of Lower Bounds	0.569	0.780	0.852	0.760	0.834	0.832

Estimates Related to LC01(1); True LC01(1) = 476 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.545	0.719	0.706	0.726	0.785	0.736
10	0.858	0.922	0.965	1.053	1.038	0.944
25	1.713	1.413	1.350	1.937	1.417	1.350
50	2.939	2.126	1.920	3.087	2.129	1.843
75	4.846	3.285	2.639	4.423	2.861	2.439
90	8.064	4.873	3.690	5.799	3.726	3.302
95	10.504	8.469	5.188	7.211	4.649	3.912
Number of LC01(1) Estimates Obtained	468	496	498	488	493	498
Number of Lower Bounds Obtained	457	491	491	480	490	496
Coverage of Lower Bounds	0.569	0.764	0.811	0.746	0.796	0.776

W9: Weibull Relationship 9; 5 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2.94 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.615	0.583	0.574	0.706	0.688	0.677
10	0.691	0.676	0.680	0.763	0.759	0.736
25	0.825	0.816	0.833	0.863	0.866	0.831
50	0.932	0.973	0.979	1.011	1.003	0.965
75	1.165	1.293	1.828	1.202	1.128	1.109
90	2.550	2.384	2.344	1.549	1.383	1.397
95	3.027	2.483	2.437	1.724	1.586	1.568
Number of LC50(4) Estimates Obtained	349	457	485	409	476	495
Number of Lower Bounds Obtained	294	437	473	400	468	487
Coverage of Lower Bounds	0.905	0.796	0.738	0.913	0.964	0.977

Estimates Related to LC50(1); True LC50(1) = 6.67 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.800	0.812	0.801	0.826	0.847	0.832
10	0.842	0.864	0.869	0.857	0.877	0.864
25	0.934	0.921	0.922	0.916	0.921	0.915
50	1.002	0.995	0.991	0.975	0.969	0.962
75	1.109	1.129	1.128	1.043	1.021	1.014
90	1.305	1.228	1.281	1.125	1.079	1.056
95	1.404	1.324	1.325	1.170	1.109	1.097

Number of LC50(1) Estimates Obtained	349	457	485	409	476	495
Number of Lower Bounds Obtained	307	438	476	375	465	482
Coverage of Lower Bounds	0.915	0.808	0.763	0.979	0.976	0.990

Estimates Related to LC10(4); True LC10(4) = 1.92 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.533	0.522	0.519	0.683	0.648	0.636
10	0.640	0.643	0.618	0.771	0.725	0.697
25	0.845	0.851	0.836	0.916	0.896	0.828
50	1.053	1.075	1.076	1.117	1.086	1.015
75	1.316	1.511	2.510	1.392	1.287	1.250
90	3.534	3.323	3.267	1.797	1.615	1.627
95	4.479	3.448	3.415	2.113	1.937	1.919
Number of LC10(4) Estimates Obtained	349	457	485	409	476	495
Number of Lower Bounds Obtained	328	441	477	402	470	488
Coverage of Lower Bounds	0.811	0.787	0.721	0.905	0.945	0.963

Estimates Related to LC10(1); True LC10(1) = 4.35 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.783	0.775	0.742	0.805	0.813	0.773
10	0.849	0.854	0.814	0.857	0.867	0.841
25	0.961	0.956	0.964	0.951	0.951	0.913
50	1.098	1.091	1.074	1.086	1.049	1.017
75	1.253	1.323	1.357	1.197	1.150	1.109
90	1.704	1.703	1.778	1.326	1.270	1.235
95	2.077	1.837	1.846	1.442	1.326	1.317
Number of LC10(1) Estimates Obtained	349	457	485	409	476	495
Number of Lower Bounds Obtained	329	441	477	402	470	489
Coverage of Lower Bounds	0.815	0.787	0.732	0.905	0.938	0.953

Estimates Related to LC01(4); True LC01(4) = 1.12 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.575	0.599	0.558	0.789	0.711	0.704
10	0.726	0.736	0.686	0.879	0.839	0.796
25	1.039	1.031	1.015	1.155	1.092	0.989
50	1.392	1.429	1.397	1.465	1.384	1.281
75	1.835	2.141	3.911	1.886	1.730	1.649
90	5.548	5.271	5.128	2.503	2.241	2.180
95	7.416	5.432	5.468	2.977	2.765	2.670
Number of LC01(4)	349	457	485	409	476	495

Estimates Obtained						
Number of Lower Bounds Obtained	329	441	478	402	470	489
Coverage of Lower Bounds	0.809	0.785	0.695	0.903	0.881	0.900

Estimates Related to LC01(1); True LC01(1) = 2.55 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.821	0.786	0.775	0.871	0.877	0.834
10	0.936	0.973	0.921	0.994	0.981	0.948
25	1.150	1.167	1.162	1.169	1.142	1.093
50	1.452	1.453	1.406	1.431	1.350	1.286
75	1.779	1.943	2.096	1.649	1.574	1.480
90	2.687	2.714	2.813	1.895	1.818	1.739
95	3.439	2.888	2.898	2.054	1.908	1.886
Number of LC01(1) Estimates Obtained	349	457	485	409	476	495
Number of Lower Bounds Obtained	329	442	481	402	470	493
Coverage of Lower Bounds	0.809	0.774	0.680	0.905	0.862	0.862

Appendix 3

Summary of CxT Protocol Simulation Sets

4 Durations per Concentration

P1: Probit Relationship 1; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 45820 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.603	0.681	0.745	0.680	0.788	0.783
10	0.649	0.712	0.860	0.751	0.826	0.828
25	0.759	0.891	1.020	0.856	0.904	0.922
50	1.006	1.221	2.495	0.998	1.004	0.999
75	2.746	2.669	2.671	1.159	1.122	1.095
90	3.025	2.844	2.842	1.262	1.213	1.169
95	3.134	2.981	2.875	1.356	1.281	1.206
Number of LC50(4) Estimates Obtained	85	122	114	138	230	251
Number of Lower Bounds Obtained	71	122	109	133	230	251
Coverage of Lower Bounds	0.451	0.598	0.578	0.812	0.987	0.996

Estimates Related to LC50(1); True LC50(1) = 103564 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True	**1**	**2**	**3**	**1**	**2**	**3**

LC50(1)						
5	0.878	0.940	0.943	0.844	0.876	0.891
10	0.920	0.986	0.968	0.868	0.896	0.907
25	1.016	1.058	1.055	0.906	0.932	0.943
50	1.144	1.225	1.309	0.987	0.996	0.992
75	1.361	1.424	1.420	1.069	1.052	1.036
90	1.481	1.445	1.442	1.181	1.114	1.085
95	1.481	1.445	1.442	1.236	1.159	1.114
Number of LC50(1) Estimates Obtained	85	122	114	138	230	251
Number of Lower Bounds Obtained	78	120	108	124	230	251
Coverage of Lower Bounds	0.692	0.600	0.565	0.992	0.991	0.984

Estimates Related to LC10(4); True LC10(4) = 32606 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.540	0.586	0.744	0.665	0.704	0.733
10	0.622	0.674	0.833	0.702	0.769	0.775
25	0.730	0.903	1.029	0.805	0.903	0.887
50	0.930	1.292	3.183	1.007	1.006	1.003
75	3.481	3.364	3.391	1.148	1.141	1.143
90	3.877	3.607	3.613	1.312	1.271	1.247
95	4.027	3.818	3.656	1.468	1.323	1.310
Number of LC10(4) Estimates Obtained	85	122	114	138	230	251
Number of Lower Bounds Obtained	83	122	109	138	230	251
Coverage of Lower Bounds	0.349	0.607	0.505	0.783	1.000	1.000

Estimates Related to LC10(1); True LC10(1) = 73698 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.812	0.857	0.919	0.773	0.818	0.842
10	0.878	0.950	0.966	0.808	0.862	0.867
25	0.973	1.076	1.091	0.872	0.929	0.936
50	1.108	1.278	1.655	0.988	1.000	1.006
75	1.725	1.820	1.799	1.077	1.073	1.065
90	1.898	1.824	1.847	1.208	1.139	1.135
95	1.898	1.824	1.854	1.285	1.188	1.159
Number of LC10(1) Estimates Obtained	85	122	114	138	230	251
Number of Lower Bounds Obtained	81	122	109	136	230	251
Coverage of Lower Bounds	0.358	0.607	0.578	0.794	1.000	1.000

Estimates Related to LC01(4); True LC01(4) = 24708 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.494	0.572	0.676	0.573	0.633	0.688
10	0.580	0.651	0.838	0.629	0.729	0.737
25	0.651	0.915	1.035	0.774	0.873	0.854
50	0.904	1.422	3.884	1.011	1.024	1.019
75	4.225	4.084	4.132	1.216	1.188	1.189
90	4.743	4.379	4.450	1.363	1.331	1.334
95	4.938	4.670	4.488	1.657	1.423	1.401
Number of LC01(4)	85	122	114	138	230	251

Estimates Obtained						
Number of Lower Bounds Obtained	83	122	109	138	230	251
Coverage of Lower Bounds	0.349	0.607	0.431	0.783	1.000	1.000

Estimates Related to LC01(1); True LC01(1) = 55847mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.717	0.793	0.882	0.654	0.746	0.764
10	0.788	0.887	0.945	0.713	0.791	0.810
25	0.924	1.076	1.113	0.834	0.883	0.905
50	1.124	1.406	2.009	0.984	1.024	1.015
75	2.093	2.202	2.202	1.131	1.113	1.118
90	2.322	2.210	2.272	1.320	1.209	1.211
95	2.322	2.231	2.274	1.395	1.281	1.251
Number of LC01(1) Estimates Obtained	85	122	114	138	230	251
Number of Lower Bounds Obtained	83	122	109	138	230	251
Coverage of Lower Bounds	0.349	0.607	0.578	0.783	1.000	1.000

P2: Probit Relationship 2; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 49240 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.577	0.524	0.429	0.599	0.700	0.686
10	0.619	0.623	0.739	0.674	0.762	0.792
25	0.861	0.877	0.902	0.859	0.896	0.912
50	1.045	1.052	1.098	1.043	1.022	1.010
75	1.268	1.355	1.395	1.211	1.139	1.114
90	1.513	1.518	1.524	1.396	1.323	1.337
95	2.555	1.791	1.679	1.534	1.449	1.446
Number of LC50(4) Estimates Obtained	238	304	349	354	405	417
Number of Lower Bounds Obtained	223	300	344	329	404	416
Coverage of Lower Bounds	0.735	0.700	0.762	0.830	0.923	0.947

Estimates Related to LC50(1); True LC50(1) = 85732 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.821	0.795	0.741	0.769	0.801	0.813
10	0.858	0.828	0.874	0.844	0.869	0.859
25	0.922	0.925	0.926	0.910	0.927	0.936
50	1.013	0.984	0.985	1.010	0.997	0.999
75	1.147	1.087	1.086	1.115	1.078	1.065
90	1.332	1.193	1.200	1.201	1.153	1.141
95	1.592	1.501	1.323	1.272	1.211	1.176

Number of LC50(1) Estimates Obtained	238	304	349	354	405	417
Number of Lower Bounds Obtained	217	296	344	318	404	416
Coverage of Lower Bounds	0.908	0.834	0.919	0.937	0.958	0.969

Estimates Related to LC10(4); True LC10(4) = 31154 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.470	0.434	0.361	0.520	0.598	0.604
10	0.652	0.593	0.657	0.660	0.751	0.755
25	0.820	0.844	0.882	0.875	0.888	0.912
50	1.103	1.105	1.181	1.108	1.042	1.051
75	1.432	1.662	1.852	1.383	1.258	1.206
90	2.144	2.130	2.148	1.723	1.528	1.518
95	3.643	2.284	2.321	2.177	1.815	1.728
Number of LC10(4) Estimates Obtained	238	304	349	354	405	417
Number of Lower Bounds Obtained	238	301	345	350	405	416
Coverage of Lower Bounds	0.676	0.688	0.754	0.774	0.933	0.952

Estimates Related to LC10(1); True LC10(1) = 54242 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.736	0.650	0.622	0.701	0.765	0.785
10	0.843	0.778	0.817	0.793	0.849	0.864
25	0.950	0.972	0.984	0.936	0.950	0.946
50	1.106	1.065	1.134	1.109	1.052	1.027
75	1.291	1.303	1.301	1.281	1.178	1.145
90	1.449	1.365	1.350	1.392	1.291	1.250
95	2.288	1.529	1.420	1.486	1.341	1.325
Number of LC10(1) Estimates Obtained	238	304	349	354	405	417
Number of Lower Bounds Obtained	236	299	343	350	405	416
Coverage of Lower Bounds	0.682	0.699	0.776	0.774	0.936	0.954

Estimates Related to LC01(4); True LC01(4) = 21450 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.385	0.368	0.298	0.445	0.531	0.577
10	0.570	0.498	0.568	0.614	0.670	0.713
25	0.782	0.806	0.863	0.892	0.875	0.885
50	1.152	1.197	1.273	1.187	1.084	1.086
75	1.592	2.100	2.337	1.556	1.388	1.332
90	2.850	2.810	2.840	2.058	1.708	1.686
95	4.867	3.057	3.226	2.694	2.227	2.042
Number of LC01(4)	238	304	349	354	405	417

Estimates Obtained						
Number of Lower Bounds Obtained	237	301	345	354	405	416
Coverage of Lower Bounds	0.679	0.688	0.754	0.751	0.933	0.954

Estimates Related to LC01(1); True LC01(1) = 37347 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.603	0.529	0.539	0.585	0.679	0.695
10	0.741	0.656	0.745	0.695	0.774	0.801
25	0.913	0.911	0.960	0.944	0.929	0.938
50	1.186	1.151	1.205	1.187	1.103	1.080
75	1.512	1.630	1.671	1.473	1.303	1.258
90	1.751	1.771	1.806	1.742	1.487	1.405
95	3.077	1.914	1.915	1.830	1.661	1.563
Number of LC01(1) Estimates Obtained	238	304	349	354	405	417
Number of Lower Bounds Obtained	238	301	345	351	405	416
Coverage of Lower Bounds	0.676	0.691	0.765	0.772	0.933	0.957

P3: Probit Relationship 3; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7452 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.519	0.672	0.632	0.690	0.744	0.755
10	0.727	0.772	0.762	0.739	0.807	0.821
25	0.897	0.891	0.882	0.900	0.920	0.915
50	1.081	1.051	1.028	1.031	1.036	1.014
75	1.315	1.270	1.265	1.206	1.190	1.144
90	1.563	2.920	3.225	1.395	1.317	1.266
95	2.465	4.250	3.808	1.524	1.437	1.362
Number of LC50(4) Estimates Obtained	209	328	395	306	419	453
Number of Lower Bounds Obtained	149	301	395	270	419	453
Coverage of Lower Bounds	0.698	0.897	0.904	0.930	0.988	0.982

Estimates Related to LC50(1); True LC50(1) = 26278 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.755	0.838	0.820	0.820	0.850	0.867
10	0.817	0.875	0.881	0.872	0.884	0.894
25	0.922	0.952	0.964	0.934	0.944	0.943
50	1.000	1.043	1.054	1.011	1.019	1.000
75	1.133	1.146	1.172	1.110	1.081	1.074
90	1.254	1.320	1.387	1.185	1.157	1.143
95	1.368	1.437	1.402	1.239	1.199	1.192

Number of LC50(1) Estimates Obtained	209	328	395	306	419	453
Number of Lower Bounds Obtained	172	313	393	273	418	453
Coverage of Lower Bounds	0.942	0.907	0.906	1.000	0.993	0.974

Estimates Related to LC10(4); True LC10(4) = 4723 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.394	0.544	0.563	0.571	0.658	0.678
10	0.564	0.681	0.711	0.664	0.755	0.772
25	0.905	0.902	0.885	0.878	0.921	0.927
50	1.123	1.123	1.082	1.081	1.088	1.045
75	1.400	1.392	1.353	1.251	1.276	1.215
90	1.675	4.146	4.578	1.492	1.473	1.407
95	3.347	6.104	5.399	1.686	1.646	1.531
Number of LC10(4) Estimates Obtained	209	328	395	306	419	453
Number of Lower Bounds Obtained	209	323	395	291	419	453
Coverage of Lower Bounds	0.421	0.836	0.901	0.863	0.995	0.989

Estimates Related to LC10(1); True LC10(1) = 16656 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.721	0.830	0.850	0.720	0.803	0.852
10	0.782	0.890	0.897	0.790	0.858	0.874
25	0.875	0.968	0.992	0.913	0.945	0.947
50	1.018	1.088	1.093	1.052	1.051	1.031
75	1.121	1.228	1.240	1.173	1.155	1.122
90	1.283	1.433	1.520	1.292	1.254	1.213
95	1.458	2.064	1.987	1.380	1.306	1.267
Number of LC10(1) Estimates Obtained	209	328	395	306	419	453
Number of Lower Bounds Obtained	178	315	395	291	419	453
Coverage of Lower Bounds	0.500	0.857	0.909	0.863	0.998	0.993

Estimates Related to LC01(4); True LC01(4) = 3257 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.309	0.430	0.475	0.472	0.579	0.602
10	0.447	0.638	0.648	0.622	0.704	0.736
25	0.772	0.890	0.870	0.834	0.897	0.882
50	1.164	1.197	1.146	1.111	1.127	1.095
75	1.457	1.544	1.519	1.373	1.399	1.295
90	1.802	5.518	6.090	1.625	1.675	1.565
95	4.437	8.198	7.176	1.838	1.839	1.704
Number of LC01(4)	209	328	395	306	419	453

Estimates Obtained						
Number of Lower Bounds Obtained	209	323	395	296	419	453
Coverage of Lower Bounds	0.421	0.836	0.901	0.848	0.998	0.991

Estimates Related to LC01(1); True LC01(1) = 11484 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.539	0.715	0.764	0.584	0.714	0.765
10	0.664	0.796	0.837	0.713	0.771	0.823
25	0.837	0.979	0.983	0.865	0.913	0.918
50	1.033	1.163	1.135	1.067	1.092	1.068
75	1.192	1.357	1.348	1.271	1.267	1.211
90	1.408	1.856	2.003	1.451	1.417	1.348
95	1.764	2.772	2.640	1.592	1.491	1.412
Number of LC01(1) Estimates Obtained	209	328	395	306	419	453
Number of Lower Bounds Obtained	209	323	395	306	419	453
Coverage of Lower Bounds	0.426	0.836	0.909	0.820	0.998	0.998

P4: Probit Relationship 4; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 371 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.693	0.697	0.761	0.713	0.806	0.804
10	0.769	0.748	0.810	0.794	0.838	0.865
25	0.829	0.874	0.890	0.858	0.911	0.927
50	0.979	0.978	0.978	0.965	0.999	0.997
75	1.128	1.080	1.059	1.082	1.086	1.070
90	1.196	1.161	1.153	1.172	1.162	1.145
95	1.332	1.237	1.202	1.283	1.212	1.204
Number of LC50(4) Estimates Obtained	200	372	440	347	461	480
Number of Lower Bounds Obtained	193	370	435	329	459	480
Coverage of Lower Bounds	0.927	0.989	0.986	1.000	0.993	0.981

Estimates Related to LC50(1); True LC50(1) = 770 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.830	0.863	0.887	0.832	0.883	0.880
10	0.874	0.898	0.910	0.870	0.912	0.917
25	0.916	0.941	0.954	0.906	0.954	0.952
50	0.998	0.998	1.010	0.992	0.999	0.996
75	1.091	1.051	1.047	1.061	1.053	1.040
90	1.158	1.097	1.091	1.124	1.104	1.081
95	1.208	1.135	1.117	1.177	1.134	1.104

Number of LC50(1) Estimates Obtained	200	372	440	347	461	480
Number of Lower Bounds Obtained	194	370	435	329	459	480
Coverage of Lower Bounds	0.959	0.997	0.982	1.000	0.989	0.988

Estimates Related to LC10(4); True LC10(4) = 273 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.652	0.675	0.739	0.683	0.784	0.780
10	0.705	0.753	0.796	0.763	0.850	0.832
25	0.861	0.848	0.892	0.872	0.928	0.935
50	0.983	0.979	0.998	0.989	1.025	1.015
75	1.107	1.110	1.105	1.125	1.129	1.104
90	1.272	1.182	1.225	1.240	1.223	1.195
95	1.318	1.251	1.275	1.387	1.281	1.240
Number of LC10(4) Estimates Obtained	200	372	440	347	461	480
Number of Lower Bounds Obtained	196	369	434	344	460	479
Coverage of Lower Bounds	0.913	0.978	0.984	0.956	0.991	0.971

Estimates Related to LC10(1); True LC10(1) = 567 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.829	0.837	0.877	0.801	0.875	0.855
10	0.849	0.872	0.904	0.843	0.907	0.887
25	0.914	0.922	0.944	0.917	0.960	0.952
50	0.968	1.006	1.021	1.008	1.034	1.019
75	1.072	1.078	1.104	1.103	1.097	1.080
90	1.192	1.124	1.150	1.215	1.158	1.134
95	1.236	1.159	1.186	1.251	1.217	1.173
Number of LC10(1) Estimates Obtained	200	372	440	347	461	480
Number of Lower Bounds Obtained	193	366	433	341	458	478
Coverage of Lower Bounds	0.927	0.989	0.984	0.965	0.996	0.977

Estimates Related to LC01(4); True LC01(4) = 213 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.620	0.643	0.683	0.627	0.756	0.741
10	0.621	0.705	0.770	0.711	0.829	0.791
25	0.825	0.823	0.873	0.860	0.923	0.914
50	0.973	0.985	1.010	0.990	1.045	1.038
75	1.124	1.157	1.156	1.179	1.190	1.141
90	1.273	1.235	1.276	1.347	1.325	1.256
95	1.370	1.327	1.389	1.479	1.384	1.315
Number of LC01(4)	200	372	440	347	461	480

Estimates Obtained						
Number of Lower Bounds Obtained	196	370	435	345	460	480
Coverage of Lower Bounds	0.913	0.973	0.982	0.954	0.991	0.969

Estimates Related to LC01(1); True LC01(1) = 442 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.793	0.802	0.808	0.747	0.823	0.802
10	0.805	0.831	0.857	0.796	0.871	0.846
25	0.845	0.901	0.932	0.904	0.956	0.937
50	0.977	1.011	1.047	1.016	1.064	1.039
75	1.118	1.121	1.146	1.178	1.159	1.135
90	1.253	1.185	1.240	1.313	1.256	1.207
95	1.281	1.262	1.279	1.349	1.330	1.250
Number of LC01(1) Estimates Obtained	200	372	440	347	461	480
Number of Lower Bounds Obtained	194	369	434	341	460	478
Coverage of Lower Bounds	0.923	0.981	0.982	0.965	0.991	0.975

P5: Probit Relationship 5; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 126 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.409	0.564	0.540	0.575	0.671	0.710
10	0.590	0.698	0.655	0.713	0.770	0.779
25	0.879	0.864	0.849	0.859	0.893	0.903
50	1.126	1.060	1.053	1.070	1.025	1.022
75	1.486	1.658	2.781	1.267	1.185	1.144
90	2.927	3.552	3.628	1.458	1.328	1.277
95	3.713	3.731	3.719	1.645	1.471	1.382
Number of LC50(4) Estimates Obtained	261	388	433	365	458	489
Number of Lower Bounds Obtained	198	379	429	344	456	488
Coverage of Lower Bounds	0.662	0.813	0.632	0.826	0.967	0.975

Estimates Related to LC50(1); True LC50(1) = 400 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.787	0.823	0.795	0.781	0.816	0.824
10	0.869	0.881	0.880	0.831	0.864	0.873
25	0.919	0.979	0.968	0.902	0.914	0.931
50	1.032	1.075	1.072	1.004	0.996	0.998
75	1.194	1.281	1.266	1.106	1.075	1.071
90	1.407	1.352	1.347	1.205	1.171	1.143
95	1.513	1.465	1.455	1.305	1.244	1.180

Number of LC50(1) Estimates Obtained	261	388	433	365	458	489
Number of Lower Bounds Obtained	225	378	418	314	455	489
Coverage of Lower Bounds	0.853	0.844	0.639	0.997	0.982	0.990

Estimates Related to LC10(4); True LC10(4) = 74.5 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.337	0.464	0.471	0.522	0.547	0.642
10	0.493	0.635	0.568	0.690	0.741	0.755
25	0.903	0.854	0.904	0.881	0.913	0.895
50	1.196	1.191	1.173	1.116	1.082	1.073
75	1.622	2.111	4.184	1.436	1.307	1.238
90	4.468	5.382	5.584	1.720	1.541	1.423
95	5.660	5.706	5.805	1.853	1.703	1.541
Number of LC10(4) Estimates Obtained	261	388	433	365	458	489
Number of Lower Bounds Obtained	256	386	431	357	458	489
Coverage of Lower Bounds	0.477	0.762	0.619	0.787	0.967	0.986

Estimates Related to LC10(1); True LC10(1) = 236 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	1	2	3	1	2	3
5	0.736	0.817	0.785	0.699	0.772	0.804
10	0.793	0.890	0.934	0.795	0.850	0.860
25	0.913	1.009	1.031	0.935	0.947	0.947
50	1.142	1.155	1.189	1.059	1.045	1.041
75	1.336	1.576	1.618	1.209	1.161	1.140
90	1.765	1.977	2.065	1.361	1.271	1.231
95	2.080	2.034	2.203	1.442	1.349	1.271
Number of LC10(1) Estimates Obtained	261	388	433	365	458	489
Number of Lower Bounds Obtained	237	381	429	357	458	488
Coverage of Lower Bounds	0.519	0.814	0.629	0.787	0.967	0.988

Estimates Related to LC01(4); True LC01(4) = 48.5 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	1	2	3	1	2	3
5	0.255	0.412	0.376	0.425	0.477	0.541
10	0.396	0.559	0.496	0.632	0.686	0.716
25	0.845	0.854	0.891	0.886	0.905	0.873
50	1.349	1.316	1.303	1.163	1.124	1.114
75	1.905	2.495	5.860	1.580	1.446	1.354
90	6.309	7.552	7.954	1.932	1.779	1.597
95	7.981	8.068	8.354	2.165	2.011	1.743
Number of LC01(4)	261	388	433	365	458	489

Estimates Obtained						
Number of Lower Bounds Obtained	256	387	431	362	458	489
Coverage of Lower Bounds	0.477	0.700	0.619	0.776	0.967	0.988

Estimates Related to LC01(1); True LC01(1) = 154 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.468	0.680	0.677	0.545	0.682	0.701
10	0.672	0.774	0.852	0.707	0.761	0.799
25	0.872	1.004	1.054	0.909	0.938	0.933
50	1.206	1.248	1.301	1.144	1.093	1.075
75	1.563	1.957	2.255	1.386	1.293	1.224
90	2.242	2.794	2.952	1.554	1.471	1.372
95	2.819	2.918	3.116	1.661	1.579	1.462
Number of LC01(1) Estimates Obtained	261	388	433	365	458	489
Number of Lower Bounds Obtained	256	386	431	364	458	489
Coverage of Lower Bounds	0.477	0.795	0.626	0.772	0.967	0.988

P6: Probit Relationship 6; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7.41 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.801	0.761	0.795	0.687	0.751	0.791
10	0.869	0.823	0.867	0.836	0.840	0.859
25	0.966	0.957	0.981	1.017	0.957	0.964
50	1.183	1.086	1.093	1.292	1.086	1.053
75	1.436	1.239	1.204	1.521	1.227	1.115
90	1.483	1.433	1.305	1.660	1.435	1.204
95	1.623	1.592	1.418	1.833	1.600	1.369
Number of LC50(4) Estimates Obtained	61	111	166	119	168	219
Number of Lower Bounds Obtained	18	94	160	83	162	218
Coverage of Lower Bounds	0.667	0.979	0.969	0.928	0.988	0.977

Estimates Related to LC50(1); True LC50(1) = 41.9 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.758	0.755	0.782	0.827	0.813	0.855
10	0.781	0.790	0.828	0.879	0.856	0.888
25	0.866	0.859	0.919	0.949	0.947	0.955
50	1.036	0.996	1.018	1.084	1.049	1.012
75	1.372	1.183	1.189	1.206	1.134	1.108
90	2.400	1.354	1.368	1.334	1.236	1.206
95	2.603	1.447	1.561	1.382	1.318	1.264

Number of LC50(1) Estimates Obtained	61	111	166	119	168	219
Number of Lower Bounds Obtained	27	103	162	89	164	218
Coverage of Lower Bounds	1.000	0.981	1.000	1.000	0.994	0.968

Estimates Related to LC10(4); True LC10(4) = 5.07 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.533	0.566	0.609	0.521	0.660	0.701
10	0.645	0.621	0.687	0.789	0.723	0.768
25	0.963	0.873	0.904	0.998	0.887	0.907
50	1.160	1.074	1.054	1.282	1.031	1.025
75	1.344	1.240	1.186	1.718	1.261	1.122
90	1.541	1.521	1.305	1.752	1.519	1.269
95	1.903	1.577	1.385	2.057	1.733	1.424
Number of LC10(4) Estimates Obtained	61	111	166	119	168	219
Number of Lower Bounds Obtained	44	104	162	91	164	218
Coverage of Lower Bounds	0.273	0.885	0.951	0.824	0.982	1.000

Estimates Related to LC10(1); True LC10(1) = 28.7 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.533	0.566	0.609	0.521	0.660	0.701
10	0.645	0.621	0.687	0.789	0.723	0.768
25	0.963	0.873	0.904	0.998	0.887	0.907
50	1.160	1.074	1.054	1.282	1.031	1.025
75	1.344	1.240	1.186	1.718	1.261	1.122
90	1.541	1.521	1.305	1.752	1.519	1.269
95	1.903	1.577	1.385	2.057	1.733	1.424
Number of LC10(1) Estimates Obtained	61	111	166	119	168	219
Number of Lower Bounds Obtained	44	104	162	91	164	218
Coverage of Lower Bounds	0.273	0.885	0.951	0.824	0.982	1.000

Estimates Related to LC01(4); True LC01(4) = 3.72 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.375	0.442	0.450	0.420	0.564	0.637
10	0.509	0.501	0.557	0.702	0.636	0.690
25	0.878	0.803	0.817	0.887	0.819	0.847
50	1.122	1.033	1.014	1.319	0.998	1.010
75	1.589	1.253	1.237	1.857	1.293	1.169
90	1.691	1.543	1.363	1.929	1.682	1.365
95	2.394	1.650	1.604	2.148	1.919	1.491
Number of LC01(4)	61	111	166	119	168	219

Estimates Obtained						
Number of Lower Bounds Obtained	47	105	161	97	165	218
Coverage of Lower Bounds	0.255	0.876	0.957	0.773	0.976	1.000

Estimates Related to LC01(1); True LC01(1) = 21.0 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.502	0.588	0.675	0.604	0.658	0.688
10	0.611	0.617	0.714	0.712	0.725	0.742
25	0.723	0.724	0.804	0.858	0.825	0.853
50	0.928	0.847	0.910	1.086	0.979	0.957
75	1.476	1.043	1.056	1.303	1.132	1.102
90	2.632	1.352	1.241	1.483	1.395	1.235
95	3.933	2.045	1.593	1.912	1.473	1.352
Number of LC01(1) Estimates Obtained	61	111	166	119	168	219
Number of Lower Bounds Obtained	37	98	155	112	164	218
Coverage of Lower Bounds	0.324	0.939	0.994	0.670	0.982	1.000

P7: Probit Relationship 7; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2067 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.048	0.173	0.167	0.193	0.324	0.329
10	0.227	0.295	0.379	0.344	0.430	0.478
25	0.659	0.618	0.694	0.617	0.658	0.675
50	1.465	1.136	1.220	1.086	1.016	0.951
75	2.845	2.074	1.901	1.823	1.444	1.345
90	4.584	2.924	2.572	2.751	2.150	1.901
95	6.155	3.492	2.989	3.471	2.651	2.270
Number of LC50(4) Estimates Obtained	437	495	499	483	499	499
Number of Lower Bounds Obtained	267	442	466	343	463	482
Coverage of Lower Bounds	0.285	0.516	0.642	0.717	0.892	0.938

Estimates Related to LC50(1); True LC50(1) = 7289 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.277	0.412	0.470	0.474	0.535	0.560
10	0.462	0.488	0.585	0.556	0.610	0.639
25	0.690	0.693	0.729	0.703	0.754	0.759
50	0.970	0.896	0.935	0.963	0.960	0.931
75	1.425	1.207	1.170	1.324	1.232	1.193
90	1.915	1.574	1.563	1.825	1.599	1.487
95	2.666	1.815	1.870	2.713	2.238	1.769

Number of LC50(1) Estimates Obtained	437	495	499	483	499	499
Number of Lower Bounds Obtained	216	353	450	370	481	494
Coverage of Lower Bounds	0.764	0.867	0.927	0.938	0.983	0.978

Estimates Related to LC10(4); True LC10(4) = 396 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.005	0.074	0.104	0.065	0.165	0.191
10	0.099	0.174	0.189	0.179	0.282	0.317
25	0.771	0.590	0.584	0.689	0.674	0.642
50	2.620	1.694	1.452	1.583	1.194	1.073
75	7.196	4.399	3.285	3.074	2.196	1.698
90	15.883	10.330	6.208	5.321	3.746	2.815
95	28.839	12.964	10.607	7.680	4.833	3.840
Number of LC10(4) Estimates Obtained	437	495	499	483	499	499
Number of Lower Bounds Obtained	420	492	497	476	496	497
Coverage of Lower Bounds	0.162	0.449	0.602	0.498	0.821	0.905

Estimates Related to LC10(1); True LC10(1) = 1397 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.087	0.318	0.319	0.200	0.440	0.478
10	0.373	0.476	0.474	0.497	0.607	0.588
25	0.966	0.815	0.797	0.816	0.828	0.789
50	1.771	1.303	1.178	1.275	1.139	1.061
75	3.254	2.077	1.803	1.936	1.502	1.374
90	4.929	3.307	2.506	2.850	2.092	1.738
95	6.715	4.199	3.339	3.476	2.460	1.993
Number of LC10(1) Estimates Obtained	437	495	499	483	499	499
Number of Lower Bounds Obtained	391	481	489	449	486	491
Coverage of Lower Bounds	0.189	0.470	0.609	0.537	0.829	0.906

Estimates Related to LC01(4); True LC01(4) = 103 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.001	0.028	0.042	0.016	0.067	0.096
10	0.044	0.094	0.118	0.116	0.205	0.218
25	0.821	0.608	0.517	0.637	0.604	0.590
50	4.623	2.133	1.781	2.034	1.380	1.198
75	16.129	7.619	5.456	5.938	3.074	2.262
90	52.908	26.182	14.258	11.434	6.902	4.768
95	103.021	43.206	35.033	17.031	9.012	6.394
Number of LC01(4)	437	495	499	483	499	499

Estimates Obtained						
Number of Lower Bounds Obtained	428	492	493	482	497	499
Coverage of Lower Bounds	0.159	0.443	0.596	0.492	0.817	0.896

Estimates Related to LC01(1); True LC01(1) = 363 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.019	0.125	0.129	0.069	0.207	0.221
10	0.135	0.278	0.294	0.265	0.381	0.369
25	0.981	0.785	0.704	0.689	0.742	0.703
50	3.140	1.732	1.433	1.698	1.286	1.156
75	7.136	3.642	2.957	3.510	2.208	1.848
90	15.755	10.004	6.140	6.121	3.704	2.814
95	24.658	13.008	11.178	7.928	4.834	3.445
Number of LC01(1) Estimates Obtained	437	495	499	483	499	499
Number of Lower Bounds Obtained	428	493	496	483	498	499
Coverage of Lower Bounds	0.159	0.450	0.599	0.497	0.813	0.892

P8: Probit Relationship 8; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 1437 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.012	0.056	0.168	0.132	0.239	0.397
10	0.117	0.178	0.287	0.331	0.433	0.506
25	0.561	0.544	0.621	0.582	0.655	0.719
50	1.458	1.183	1.231	1.015	0.992	1.010
75	3.244	2.200	1.976	1.673	1.495	1.343
90	5.171	3.558	2.952	2.507	2.319	1.934
95	9.029	4.310	3.503	3.208	2.950	2.475
Number of LC50(4) Estimates Obtained	433	480	486	483	495	499
Number of Lower Bounds Obtained	273	431	452	364	466	492
Coverage of Lower Bounds	0.264	0.497	0.659	0.714	0.886	0.959

Estimates Related to LC50(1); True LC50(1) = 5748 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.251	0.386	0.480	0.415	0.479	0.578
10	0.448	0.500	0.571	0.493	0.573	0.631
25	0.696	0.697	0.757	0.643	0.717	0.767
50	0.957	0.946	0.958	0.877	0.924	0.947
75	1.349	1.275	1.233	1.228	1.213	1.218
90	2.113	1.806	1.725	1.644	1.622	1.653
95	3.573	3.062	2.275	2.155	2.055	2.080

Number of LC50(1) Estimates Obtained	434	480	486	483	495	499
Number of Lower Bounds Obtained	209	332	413	378	482	497
Coverage of Lower Bounds	0.737	0.873	0.942	0.931	0.973	0.988

Estimates Related to LC10(4); True LC10(4) = 268 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.001	0.015	0.059	0.041	0.114	0.249
10	0.033	0.106	0.174	0.161	0.276	0.421
25	0.599	0.553	0.598	0.646	0.680	0.681
50	2.287	1.534	1.436	1.648	1.188	1.159
75	7.975	4.574	3.607	3.082	2.112	1.761
90	18.723	11.854	7.231	5.507	3.367	2.870
95	34.482	18.128	9.242	7.525	4.382	3.770
Number of LC10(4) Estimates Obtained	433	479	486	483	495	499
Number of Lower Bounds Obtained	426	469	480	470	487	495
Coverage of Lower Bounds	0.146	0.416	0.604	0.547	0.828	0.933

Estimates Related to LC10(1); True LC10(1) = 1070 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.035	0.211	0.334	0.223	0.412	0.561
10	0.216	0.446	0.490	0.421	0.559	0.668
25	0.839	0.755	0.828	0.798	0.804	0.846
50	1.671	1.288	1.266	1.328	1.081	1.074
75	3.285	2.207	1.909	1.961	1.538	1.376
90	5.097	4.022	2.596	2.831	1.988	1.753
95	8.228	4.877	3.211	3.480	2.334	2.128
Number of LC10(1) Estimates Obtained	433	480	486	483	495	499
Number of Lower Bounds Obtained	390	449	466	457	476	489
Coverage of Lower Bounds	0.182	0.452	0.629	0.562	0.838	0.947

Estimates Related to LC01(4); True LC01(4) = 68.0 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.000	0.003	0.027	0.011	0.033	0.131
10	0.010	0.041	0.103	0.097	0.188	0.265
25	0.579	0.506	0.569	0.703	0.608	0.627
50	3.537	2.088	1.641	2.353	1.378	1.296
75	18.582	7.625	5.927	5.742	3.175	2.419
90	66.521	34.286	15.161	12.602	5.913	4.372
95	123.211	65.012	30.775	16.735	8.873	6.369
Number of LC01(4)	433	479	486	483	495	499

Estimates Obtained						
Number of Lower Bounds Obtained	429	475	482	481	492	499
Coverage of Lower Bounds	0.145	0.402	0.600	0.534	0.807	0.926

Estimates Related to LC01(1); True LC01(1) = 272 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.002	0.052	0.127	0.058	0.172	0.298
10	0.057	0.229	0.329	0.190	0.352	0.452
25	0.922	0.677	0.773	0.810	0.737	0.731
50	2.602	1.785	1.490	1.954	1.270	1.231
75	7.853	4.042	3.048	3.871	2.275	1.817
90	17.512	9.957	5.376	6.061	3.284	2.810
95	31.911	17.295	8.356	8.423	4.621	3.523
Number of LC01(1) Estimates Obtained	433	479	486	483	495	499
Number of Lower Bounds Obtained	425	469	480	478	488	498
Coverage of Lower Bounds	0.148	0.418	0.604	0.540	0.814	0.924

P9: Probit Relationship 9; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2.94 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.286	0.270	0.386	0.518	0.591	0.679
10	0.494	0.509	0.562	0.615	0.682	0.735
25	0.774	0.784	0.766	0.826	0.852	0.860
50	1.162	1.082	1.026	1.041	1.037	1.019
75	1.568	1.535	1.522	1.303	1.268	1.192
90	2.187	2.133	2.070	1.644	1.542	1.408
95	2.611	2.480	2.400	2.009	1.806	1.629
Number of LC50(4) Estimates Obtained	450	486	495	484	499	500
Number of Lower Bounds Obtained	273	437	473	396	483	497
Coverage of Lower Bounds	0.498	0.519	0.624	0.874	0.944	0.974

Estimates Related to LC50(1); True LC50(1) = 6.65 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.540	0.578	0.602	0.641	0.679	0.677
10	0.580	0.639	0.685	0.705	0.745	0.737
25	0.810	0.804	0.784	0.834	0.845	0.844
50	0.997	0.989	0.968	0.981	0.961	0.954
75	1.231	1.186	1.135	1.163	1.138	1.089
90	1.593	1.457	1.440	1.359	1.333	1.279
95	2.031	1.964	2.148	1.598	1.701	1.420

Number of LC50(1) Estimates Obtained	450	486	495	484	499	500
Number of Lower Bounds Obtained	323	375	413	449	488	498
Coverage of Lower Bounds	0.864	0.843	0.872	0.964	0.977	0.990

Estimates Related to LC10(4); True LC10(4) = .874 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.259	0.260	0.343	0.596	0.665	0.832
10	0.490	0.503	0.530	0.785	0.905	0.985
25	1.062	0.947	0.962	1.209	1.154	1.233
50	1.837	1.596	1.518	1.708	1.548	1.508
75	3.574	2.928	2.441	2.243	1.977	1.842
90	6.455	6.273	4.991	2.911	2.571	2.199
95	6.811	6.848	6.432	3.447	2.903	2.530
Number of LC10(4) Estimates Obtained	450	486	495	484	499	500
Number of Lower Bounds Obtained	405	449	450	465	482	488
Coverage of Lower Bounds	0.301	0.401	0.502	0.658	0.838	0.918

Estimates Related to LC10(1); True LC10(1) = 1.97 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.620	0.682	0.761	0.788	0.942	0.979
10	0.847	0.848	0.867	1.007	1.050	1.076
25	1.218	1.148	1.153	1.235	1.227	1.249
50	1.717	1.527	1.425	1.526	1.466	1.428
75	2.428	2.072	1.980	1.910	1.718	1.614
90	3.153	3.065	3.021	2.316	2.038	1.790
95	3.667	3.680	3.137	2.650	2.243	1.990
Number of LC10(1) Estimates Obtained	450	486	495	484	499	500
Number of Lower Bounds Obtained	362	419	424	454	469	489
Coverage of Lower Bounds	0.337	0.422	0.509	0.674	0.834	0.869

Estimates Related to LC01(4); True LC01(4) = .325 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.122	0.198	0.256	0.550	0.543	0.865
10	0.347	0.426	0.454	0.853	0.901	1.033
25	1.311	1.100	1.014	1.507	1.393	1.530
50	2.912	2.310	2.133	2.567	2.138	2.071
75	7.044	5.064	3.744	3.688	3.202	2.793
90	16.095	15.544	12.185	5.628	4.486	3.523
95	17.558	16.920	15.947	6.540	5.399	4.322
Number of LC01(4)	450	486	495	484	499	500

Estimates Obtained						
Number of Lower Bounds Obtained	427	472	480	479	495	496
Coverage of Lower Bounds	0.286	0.377	0.465	0.639	0.800	0.877

Estimates Related to LC01(1); True LC01(1) = .734 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.367	0.538	0.565	0.650	0.883	1.000
10	0.707	0.741	0.809	1.075	1.070	1.239
25	1.512	1.332	1.312	1.559	1.477	1.573
50	2.811	2.095	1.963	2.290	1.997	1.951
75	4.774	3.737	3.023	3.242	2.753	2.395
90	7.534	7.573	5.817	4.264	3.465	2.833
95	8.211	8.970	7.669	5.394	4.192	3.374
Number of LC01(1) Estimates Obtained	450	486	495	484	499	500
Number of Lower Bounds Obtained	413	457	461	482	496	497
Coverage of Lower Bounds	0.295	0.385	0.462	0.635	0.784	0.839

W1: Weibull Relationship 1; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 45820 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.578	0.434	0.492	0.675	0.698	0.669
10	0.623	0.599	0.576	0.758	0.788	0.781
25	0.675	0.720	0.789	0.834	0.879	0.869
50	0.811	0.833	0.916	0.944	0.956	0.956
75	0.996	0.962	1.125	1.066	1.057	1.043
90	1.112	1.100	2.263	1.208	1.168	1.137
95	1.520	1.317	2.515	1.293	1.203	1.199
Number of LC50(4) Estimates Obtained	66	65	93	139	205	225
Number of Lower Bounds Obtained	60	61	93	134	203	224
Coverage of Lower Bounds	0.650	0.951	0.806	0.761	0.995	0.996

Estimates Related to LC50(1); True LC50(1) = 102388 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.750	0.753	0.757	0.743	0.815	0.828
10	0.796	0.833	0.808	0.801	0.860	0.873
25	0.883	0.906	0.903	0.871	0.904	0.911
50	0.948	0.997	0.963	0.935	0.959	0.962
75	1.077	1.063	1.061	1.008	1.015	1.001
90	1.170	1.109	1.318	1.080	1.045	1.037
95	1.204	1.141	1.324	1.120	1.091	1.059

Number of LC50(1) Estimates Obtained	66	65	93	139	205	225
Number of Lower Bounds Obtained	59	62	93	119	203	223
Coverage of Lower Bounds	0.949	0.952	0.828	0.975	0.990	1.000

Estimates Related to LC10(4); True LC10(4) = 31346 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.441	0.323	0.396	0.583	0.663	0.657
10	0.529	0.557	0.534	0.687	0.741	0.724
25	0.645	0.764	0.799	0.812	0.867	0.869
50	0.740	0.837	0.927	0.990	1.041	1.002
75	0.964	1.032	1.268	1.155	1.132	1.124
90	1.139	1.179	2.953	1.288	1.247	1.231
95	1.417	1.325	3.321	1.366	1.292	1.280
Number of LC10(4) Estimates Obtained	66	65	93	139	205	225
Number of Lower Bounds Obtained	66	64	93	139	204	223
Coverage of Lower Bounds	0.576	0.906	0.785	0.734	0.990	0.991

Estimates Related to LC10(1); True LC10(1) = 70246 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.540	0.604	0.609	0.699	0.736	0.773
10	0.699	0.809	0.776	0.779	0.811	0.831
25	0.861	0.919	0.908	0.836	0.930	0.925
50	0.944	1.012	1.020	0.961	0.997	0.999
75	1.034	1.115	1.131	1.089	1.090	1.079
90	1.171	1.179	1.728	1.196	1.163	1.156
95	1.196	1.206	1.734	1.257	1.185	1.169
Number of LC10(1) Estimates Obtained	66	65	93	139	205	225
Number of Lower Bounds Obtained	66	64	93	138	205	224
Coverage of Lower Bounds	0.591	0.906	0.806	0.739	0.985	0.991

Estimates Related to LC01(4); True LC01(4) = 19648 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.330	0.293	0.375	0.595	0.680	0.704
10	0.538	0.586	0.559	0.710	0.838	0.853
25	0.756	0.918	0.862	0.928	1.028	1.030
50	0.861	1.023	1.142	1.224	1.288	1.225
75	1.098	1.322	1.697	1.449	1.433	1.400
90	1.370	1.503	4.318	1.684	1.634	1.560
95	1.802	1.654	4.902	1.800	1.688	1.691
Number of LC01(4)	66	65	93	139	205	225

Estimates Obtained						
Number of Lower Bounds Obtained	66	65	93	139	205	224
Coverage of Lower Bounds	0.576	0.892	0.763	0.734	0.971	0.973

Estimates Related to LC01(1); True LC01(1) = 43906 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.486	0.550	0.574	0.736	0.771	0.786
10	0.659	0.820	0.783	0.816	0.896	0.907
25	0.955	1.072	1.025	0.952	1.095	1.076
50	1.103	1.303	1.249	1.209	1.233	1.219
75	1.241	1.419	1.525	1.347	1.390	1.346
90	1.427	1.489	2.528	1.555	1.517	1.498
95	1.470	1.503	2.557	1.740	1.546	1.564
Number of LC01(1) Estimates Obtained	66	65	93	139	205	225
Number of Lower Bounds Obtained	66	65	93	139	205	225
Coverage of Lower Bounds	0.576	0.892	0.774	0.734	0.980	0.964

W2: Weibull Relationship 2; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 49240 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.498	0.515	0.407	0.621	0.599	0.588
10	0.566	0.645	0.603	0.689	0.698	0.663
25	0.731	0.821	0.778	0.819	0.812	0.817
50	0.905	0.969	0.978	0.970	0.955	0.933
75	1.091	1.201	1.337	1.123	1.080	1.062
90	1.380	1.441	1.450	1.277	1.242	1.262
95	1.438	1.501	1.527	1.492	1.461	1.415
Number of LC50(4) Estimates Obtained	160	259	288	291	381	390
Number of Lower Bounds Obtained	146	251	277	262	378	389
Coverage of Lower Bounds	0.747	0.789	0.765	0.809	0.939	0.964

Estimates Related to LC50(1); True LC50(1) = 86960 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.679	0.729	0.689	0.726	0.746	0.740
10	0.754	0.815	0.727	0.774	0.806	0.793
25	0.840	0.909	0.878	0.876	0.873	0.867
50	0.934	0.959	0.932	0.944	0.938	0.947
75	1.042	1.046	1.028	1.021	1.014	1.011
90	1.150	1.118	1.105	1.098	1.099	1.062
95	1.253	1.151	1.156	1.145	1.160	1.124

Number of LC50(1) Estimates Obtained	160	259	288	291	381	390
Number of Lower Bounds Obtained	140	249	271	256	378	388
Coverage of Lower Bounds	0.950	0.912	0.959	0.926	0.984	0.990

Estimates Related to LC10(4); True LC10(4) = 30376 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.346	0.395	0.294	0.577	0.504	0.462
10	0.482	0.534	0.495	0.659	0.632	0.614
25	0.712	0.816	0.785	0.884	0.835	0.810
50	1.011	1.131	1.135	1.110	1.028	0.996
75	1.266	1.643	1.671	1.321	1.245	1.211
90	1.874	2.075	2.042	1.609	1.577	1.520
95	2.013	2.155	2.178	2.233	1.832	1.770
Number of LC10(4) Estimates Obtained	160	259	288	291	381	390
Number of Lower Bounds Obtained	159	256	281	282	378	389
Coverage of Lower Bounds	0.654	0.773	0.754	0.734	0.939	0.951

Estimates Related to LC10(1); True LC10(1) = 53646 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.643	0.687	0.552	0.667	0.669	0.661
10	0.654	0.773	0.731	0.746	0.734	0.736
25	0.881	0.965	0.914	0.883	0.886	0.890
50	1.037	1.139	1.094	1.107	1.042	1.011
75	1.249	1.297	1.280	1.275	1.183	1.154
90	1.329	1.357	1.344	1.381	1.304	1.250
95	1.395	1.380	1.367	1.498	1.357	1.320
Number of LC10(1) Estimates Obtained	160	259	288	291	381	390
Number of Lower Bounds Obtained	159	254	279	275	378	389
Coverage of Lower Bounds	0.654	0.780	0.760	0.760	0.939	0.951

Estimates Related to LC01(4); True LC01(4) = 16629 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.317	0.374	0.307	0.594	0.494	0.484
10	0.494	0.636	0.511	0.716	0.680	0.665
25	0.891	1.022	0.930	1.133	1.030	0.996
50	1.343	1.598	1.578	1.506	1.387	1.327
75	1.864	2.461	2.620	1.991	1.746	1.697
90	3.093	3.384	3.400	2.578	2.291	2.138
95	3.374	3.481	3.606	3.725	2.782	2.575
Number of LC01(4)	160	259	288	291	381	390

Estimates Obtained						
Number of Lower Bounds Obtained	160	256	282	284	379	390
Coverage of Lower Bounds	0.650	0.758	0.716	0.718	0.916	0.903

Estimates Related to LC01(1); True LC01(1) = 29368 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.593	0.673	0.618	0.656	0.685	0.674
10	0.670	0.834	0.753	0.819	0.799	0.823
25	1.002	1.151	1.108	1.135	1.079	1.076
50	1.496	1.623	1.566	1.547	1.407	1.353
75	1.768	2.023	1.908	1.876	1.682	1.604
90	2.145	2.214	2.235	2.275	1.983	1.805
95	2.219	2.243	2.330	2.347	2.261	1.934
Number of LC01(1) Estimates Obtained	160	259	288	291	381	390
Number of Lower Bounds Obtained	160	256	282	280	379	390
Coverage of Lower Bounds	0.650	0.766	0.730	0.739	0.908	0.869

W3: Weibull Relationship 3; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7452 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.456	0.555	0.522	0.693	0.669	0.747
10	0.612	0.677	0.710	0.769	0.753	0.809
25	0.766	0.856	0.878	0.879	0.871	0.899
50	1.002	1.038	1.008	1.005	0.974	0.986
75	1.190	1.291	1.244	1.182	1.117	1.101
90	1.695	2.568	2.754	1.336	1.248	1.210
95	3.030	2.776	3.027	1.495	1.340	1.360
Number of LC50(4) Estimates Obtained	188	298	370	264	369	426
Number of Lower Bounds Obtained	135	282	357	233	361	421
Coverage of Lower Bounds	0.652	0.855	0.824	0.914	0.989	0.990

Estimates Related to LC50(1); True LC50(1) = 25949 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.704	0.779	0.791	0.738	0.772	0.815
10	0.764	0.835	0.834	0.797	0.818	0.861
25	0.844	0.892	0.922	0.866	0.889	0.900
50	0.950	0.978	0.998	0.966	0.971	0.958
75	1.007	1.064	1.066	1.050	1.034	1.016
90	1.098	1.157	1.196	1.121	1.103	1.081
95	1.138	1.222	1.376	1.145	1.162	1.123

Number of LC50(1) Estimates Obtained	188	298	370	264	369	426
Number of Lower Bounds Obtained	148	291	351	241	361	424
Coverage of Lower Bounds	0.919	0.931	0.886	1.000	1.000	0.998

Estimates Related to LC10(4); True LC10(4) = 4653 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.350	0.447	0.412	0.604	0.572	0.682
10	0.454	0.595	0.628	0.741	0.699	0.762
25	0.745	0.864	0.883	0.890	0.853	0.897
50	1.064	1.116	1.066	1.074	1.039	1.049
75	1.292	1.416	1.370	1.285	1.207	1.202
90	1.811	3.681	3.882	1.515	1.430	1.352
95	4.373	4.007	4.429	1.698	1.576	1.490
Number of LC10(4) Estimates Obtained	188	298	370	264	369	426
Number of Lower Bounds Obtained	187	298	362	257	367	424
Coverage of Lower Bounds	0.358	0.809	0.815	0.809	0.973	0.983

Estimates Related to LC10(1); True LC10(1) = 16203 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.657	0.745	0.704	0.724	0.735	0.782
10	0.704	0.806	0.811	0.765	0.806	0.840
25	0.807	0.917	0.940	0.893	0.897	0.913
50	0.967	1.039	1.080	1.016	1.005	1.004
75	1.081	1.197	1.218	1.138	1.124	1.109
90	1.262	1.315	1.437	1.257	1.217	1.206
95	1.408	1.429	1.518	1.336	1.262	1.255
Number of LC10(1) Estimates Obtained	188	298	370	264	369	426
Number of Lower Bounds Obtained	163	292	360	257	365	423
Coverage of Lower Bounds	0.417	0.825	0.825	0.809	0.978	0.983

Estimates Related to LC01(4); True LC01(4) = 2586 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.351	0.480	0.395	0.649	0.579	0.727
10	0.449	0.637	0.653	0.817	0.759	0.859
25	0.896	1.003	1.056	1.133	1.027	1.088
50	1.413	1.496	1.406	1.408	1.336	1.365
75	1.647	1.944	1.876	1.765	1.633	1.617
90	2.498	6.052	6.389	2.094	1.988	1.874
95	7.232	6.624	7.402	2.294	2.227	2.100
Number of LC01(4)	188	298	370	264	369	426

Estimates Obtained						
Number of Lower Bounds Obtained	188	298	365	261	369	426
Coverage of Lower Bounds	0.356	0.809	0.803	0.797	0.959	0.937

Estimates Related to LC01(1); True LC01(1) = 9005 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.662	0.780	0.757	0.796	0.785	0.850
10	0.730	0.885	0.862	0.881	0.900	0.938
25	0.966	1.072	1.128	1.060	1.071	1.091
50	1.274	1.355	1.411	1.333	1.284	1.288
75	1.457	1.685	1.700	1.548	1.528	1.503
90	1.715	2.070	2.289	1.793	1.697	1.690
95	2.328	2.300	2.490	1.942	1.810	1.783
Number of LC01(1) Estimates Obtained	188	298	370	264	369	426
Number of Lower Bounds Obtained	188	298	366	264	369	426
Coverage of Lower Bounds	0.362	0.809	0.806	0.788	0.957	0.951

W4: Weibull Relationship 4; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 371 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.689	0.697	0.687	0.730	0.735	0.720
10	0.769	0.748	0.712	0.796	0.792	0.774
25	0.829	0.849	0.840	0.849	0.881	0.882
50	0.925	0.928	0.937	0.965	0.955	0.948
75	1.000	1.034	1.009	1.045	1.029	1.011
90	1.167	1.365	1.117	1.150	1.119	1.076
95	1.230	1.455	1.433	1.226	1.169	1.120
Number of LC50(4) Estimates Obtained	152	312	388	290	431	471
Number of Lower Bounds Obtained	146	310	374	276	425	468
Coverage of Lower Bounds	0.952	0.910	0.944	0.989	0.984	0.979

Estimates Related to LC50(1); True LC50(1) = 769 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.806	0.808	0.824	0.798	0.811	0.836
10	0.832	0.826	0.840	0.833	0.843	0.852
25	0.905	0.899	0.901	0.896	0.902	0.909
50	0.917	0.942	0.943	0.939	0.948	0.945
75	1.025	0.989	0.988	1.011	0.993	0.982
90	1.082	1.053	1.028	1.047	1.043	1.017
95	1.092	1.080	1.061	1.079	1.064	1.036

Number of LC50(1) Estimates Obtained	152	312	388	290	431	471
Number of Lower Bounds Obtained	147	310	374	277	425	468
Coverage of Lower Bounds	0.993	0.961	0.968	0.996	0.991	0.996

Estimates Related to LC10(4); True LC10(4) = 270 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.635	0.670	0.697	0.730	0.684	0.721
10	0.675	0.736	0.720	0.797	0.775	0.782
25	0.796	0.860	0.856	0.891	0.901	0.905
50	0.895	0.975	0.997	1.003	1.024	1.031
75	1.026	1.117	1.102	1.150	1.135	1.116
90	1.293	1.672	1.252	1.261	1.238	1.187
95	1.316	1.794	1.753	1.358	1.330	1.250
Number of LC10(4) Estimates Obtained	152	312	388	290	431	471
Number of Lower Bounds Obtained	152	310	376	289	425	469
Coverage of Lower Bounds	0.895	0.906	0.934	0.941	0.979	0.951

Estimates Related to LC10(1); True LC10(1) = 559 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.747	0.822	0.834	0.813	0.800	0.823
10	0.798	0.859	0.861	0.856	0.833	0.854
25	0.871	0.930	0.945	0.925	0.926	0.927
50	0.966	0.994	1.016	0.992	1.026	1.029
75	1.021	1.049	1.064	1.109	1.091	1.084
90	1.100	1.108	1.122	1.216	1.163	1.128
95	1.152	1.189	1.153	1.233	1.215	1.166
Number of LC10(1) Estimates Obtained	152	312	388	290	431	471
Number of Lower Bounds Obtained	151	312	378	289	425	470
Coverage of Lower Bounds	0.901	0.904	0.929	0.948	0.976	0.949

Estimates Related to LC01(4); True LC01(4) = 181 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.684	0.745	0.787	0.785	0.755	0.815
10	0.730	0.808	0.810	0.904	0.882	0.878
25	0.904	0.985	0.996	1.031	1.046	1.053
50	1.046	1.187	1.197	1.192	1.245	1.257
75	1.197	1.364	1.374	1.447	1.433	1.396
90	1.595	2.268	1.589	1.630	1.589	1.521
95	1.614	2.444	2.363	1.746	1.720	1.611
Number of LC01(4)	152	312	388	290	431	471

Estimates Obtained						
Number of Lower Bounds Obtained	152	312	378	290	425	470
Coverage of Lower Bounds	0.895	0.891	0.907	0.938	0.925	0.855

Estimates Related to LC01(1); True LC01(1) = 375 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.812	0.898	0.869	0.862	0.858	0.898
10	0.854	0.938	0.976	0.945	0.937	0.956
25	0.970	1.068	1.098	1.072	1.082	1.081
50	1.148	1.209	1.234	1.183	1.269	1.256
75	1.233	1.338	1.341	1.405	1.384	1.366
90	1.328	1.391	1.431	1.559	1.498	1.432
95	1.385	1.505	1.497	1.625	1.548	1.492
Number of LC01(1) Estimates Obtained	152	312	388	290	431	471
Number of Lower Bounds Obtained	152	312	378	290	425	471
Coverage of Lower Bounds	0.895	0.904	0.902	0.938	0.929	0.834

W5: Weibull Relationship 5; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 126 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.390	0.517	0.347	0.620	0.708	0.720
10	0.590	0.625	0.612	0.721	0.766	0.788
25	0.826	0.827	0.802	0.854	0.853	0.867
50	0.992	0.988	0.994	0.993	1.000	0.965
75	1.293	1.260	2.032	1.239	1.120	1.085
90	1.678	2.798	3.104	1.434	1.256	1.175
95	2.927	3.396	3.388	1.654	1.468	1.262
Number of LC50(4) Estimates Obtained	191	290	329	257	372	427
Number of Lower Bounds Obtained	151	274	324	231	370	416
Coverage of Lower Bounds	0.629	0.825	0.642	0.835	0.978	0.995

Estimates Related to LC50(1); True LC50(1) = 393 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.726	0.805	0.696	0.780	0.789	0.800
10	0.790	0.859	0.791	0.796	0.826	0.834
25	0.880	0.940	0.915	0.879	0.878	0.888
50	0.976	1.016	1.007	0.973	0.940	0.950
75	1.046	1.097	1.090	1.048	1.027	1.003
90	1.182	1.286	1.289	1.163	1.101	1.063
95	1.238	1.316	1.314	1.232	1.148	1.123

Number of LC50(1) Estimates Obtained	191	290	329	257	372	427
Number of Lower Bounds Obtained	165	270	315	220	368	419
Coverage of Lower Bounds	0.927	0.856	0.702	0.995	0.992	0.998

Estimates Related to LC10(4); True LC10(4) = 77.7 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.321	0.415	0.252	0.571	0.615	0.675
10	0.497	0.564	0.530	0.698	0.684	0.738
25	0.820	0.802	0.798	0.867	0.868	0.881
50	1.063	1.099	1.052	1.075	1.092	1.022
75	1.436	1.425	2.947	1.409	1.270	1.191
90	2.096	4.063	4.523	1.649	1.459	1.317
95	4.280	4.976	4.994	1.913	1.625	1.438
Number of LC10(4) Estimates Obtained	191	290	329	257	372	427
Number of Lower Bounds Obtained	189	289	327	252	372	420
Coverage of Lower Bounds	0.471	0.768	0.615	0.762	0.973	0.971

Estimates Related to LC10(1); True LC10(1) = 242 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.646	0.728	0.464	0.672	0.751	0.767
10	0.744	0.824	0.715	0.725	0.795	0.816
25	0.883	0.936	0.952	0.856	0.899	0.903
50	1.017	1.095	1.083	1.037	1.002	1.005
75	1.146	1.305	1.368	1.203	1.123	1.088
90	1.348	1.558	1.878	1.326	1.239	1.172
95	1.545	1.923	1.909	1.411	1.321	1.225
Number of LC10(1) Estimates Obtained	191	290	329	257	372	427
Number of Lower Bounds Obtained	186	284	323	251	371	422
Coverage of Lower Bounds	0.478	0.792	0.653	0.765	0.976	0.974

Estimates Related to LC01(4); True LC01(4) = 42.6 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.355	0.407	0.229	0.615	0.654	0.742
10	0.506	0.676	0.521	0.756	0.752	0.843
25	0.988	0.921	0.933	1.023	1.079	1.069
50	1.451	1.463	1.388	1.397	1.426	1.355
75	1.877	2.028	4.919	1.961	1.738	1.600
90	3.107	6.834	7.577	2.347	2.044	1.829
95	7.191	8.371	8.441	2.729	2.389	2.080
Number of LC01(4)	191	290	329	257	372	427

Estimates Obtained						
Number of Lower Bounds Obtained	189	290	328	252	372	425
Coverage of Lower Bounds	0.471	0.724	0.607	0.762	0.968	0.925

Estimates Related to LC01(1); True LC01(1) = 133 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.691	0.699	0.443	0.661	0.779	0.835
10	0.805	0.895	0.716	0.801	0.882	0.926
25	1.085	1.111	1.159	1.018	1.095	1.112
50	1.359	1.426	1.474	1.378	1.324	1.309
75	1.577	1.882	1.974	1.693	1.525	1.467
90	2.001	2.605	3.147	1.899	1.758	1.646
95	2.581	3.239	3.228	2.125	1.953	1.742
Number of LC01(1) Estimates Obtained	191	290	329	257	372	427
Number of Lower Bounds Obtained	189	289	328	257	372	427
Coverage of Lower Bounds	0.471	0.779	0.619	0.747	0.965	0.918

W6: Weibull Relationship 6; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 7.41 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.397	0.711	0.654	0.616	0.617	0.761
10	0.397	0.732	0.675	0.731	0.760	0.843
25	0.568	0.828	0.836	1.148	0.987	0.905
50	1.007	1.132	0.964	1.433	1.144	1.042
75	1.614	1.696	1.557	1.525	1.389	1.158
90	1.628	2.340	1.995	1.613	1.648	1.361
95	1.843	4.413	2.467	1.652	1.708	1.599
Number of LC50(4) Estimates Obtained	11	41	55	65	69	109
Number of Lower Bounds Obtained	9	41	55	41	69	106
Coverage of Lower Bounds	0.444	0.902	0.909	0.951	0.986	0.972

Estimates Related to LC50(1); True LC50(1) = 41.4 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.855	0.784	0.844	0.822	0.850	0.862
10	0.902	0.827	0.886	0.864	0.864	0.878
25	0.911	0.908	0.925	0.932	0.922	0.924
50	1.013	1.038	1.025	1.047	1.035	0.998
75	1.035	1.125	1.150	1.108	1.115	1.125
90	1.142	1.370	1.282	1.137	1.186	1.200
95	1.232	1.496	1.635	1.153	1.302	1.364

Number of LC50(1) Estimates Obtained	11	41	55	65	69	109
Number of Lower Bounds Obtained	6	41	55	47	69	108
Coverage of Lower Bounds	1.000	0.951	0.982	1.000	1.000	1.000

Estimates Related to LC10(4); True LC10(4) = 5.35 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.225	0.445	0.432	0.397	0.439	0.509
10	0.225	0.499	0.480	0.608	0.550	0.623
25	0.365	0.593	0.633	0.826	0.837	0.761
50	0.724	0.886	0.801	1.345	0.998	0.897
75	1.175	1.320	1.485	1.626	1.434	1.088
90	1.318	2.482	1.828	1.649	1.631	1.348
95	1.543	5.458	2.605	1.649	1.727	1.623
Number of LC10(4) Estimates Obtained	11	41	55	65	69	109
Number of Lower Bounds Obtained	11	41	55	51	69	108
Coverage of Lower Bounds	0.364	0.902	0.945	0.765	0.986	0.972

Estimates Related to LC10(1); True LC10(1) = 29.9 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.521	0.629	0.710	0.592	0.692	0.711
10	0.521	0.665	0.718	0.644	0.724	0.747
25	0.608	0.716	0.755	0.721	0.792	0.797
50	0.692	0.838	0.826	1.011	0.872	0.862
75	0.743	0.948	0.974	1.131	1.007	0.934
90	0.834	1.147	1.154	1.163	1.147	1.103
95	0.908	1.158	1.183	1.163	1.227	1.156
Number of LC10(1) Estimates Obtained	11	41	55	65	69	109
Number of Lower Bounds Obtained	11	41	55	51	69	106
Coverage of Lower Bounds	0.364	0.902	0.964	0.765	0.986	0.991

Estimates Related to LC01(4); True LC01(4) = 3.57 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.163	0.350	0.354	0.319	0.417	0.451
10	0.163	0.391	0.400	0.486	0.544	0.548
25	0.295	0.528	0.598	0.833	0.753	0.686
50	0.636	0.873	0.728	1.435	1.064	0.885
75	1.037	1.339	1.574	1.933	1.527	1.176
90	1.294	2.996	2.103	1.988	1.920	1.587
95	1.545	7.463	3.136	1.988	2.079	1.777
Number of LC01(4)	11	41	55	65	69	109

Estimates Obtained						
Number of Lower Bounds Obtained	11	41	55	51	69	109
Coverage of Lower Bounds	0.364	0.902	0.964	0.765	0.986	0.963

Estimates Related to LC01(1); True LC01(1) = 20.0 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.377	0.584	0.678	0.476	0.641	0.619
10	0.377	0.633	0.682	0.527	0.679	0.701
25	0.511	0.657	0.707	0.719	0.739	0.751
50	0.575	0.737	0.785	1.125	0.895	0.862
75	0.650	1.024	0.889	1.363	1.103	1.018
90	0.819	1.400	1.229	1.382	1.367	1.216
95	0.908	1.583	1.420	1.382	1.503	1.333
Number of LC01(1) Estimates Obtained	11	41	55	65	69	109
Number of Lower Bounds Obtained	11	41	55	65	69	109
Coverage of Lower Bounds	0.364	0.902	0.964	0.600	0.986	0.963

W7: Weibull Relationship 7; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2067 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.147	0.171	0.159	0.374	0.476	0.429
10	0.269	0.273	0.214	0.494	0.587	0.522
25	0.524	0.540	0.417	0.716	0.731	0.682
50	0.940	0.889	0.786	0.974	0.952	0.889
75	1.557	1.552	1.215	1.272	1.212	1.083
90	3.047	2.942	2.619	1.684	1.418	1.310
95	3.716	3.580	3.497	1.910	1.621	1.443
Number of LC50(4) Estimates Obtained	410	484	492	468	497	499
Number of Lower Bounds Obtained	286	439	465	394	481	492
Coverage of Lower Bounds	0.378	0.424	0.467	0.817	0.925	0.974

Estimates Related to LC50(1); True LC50(1) = 7582 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.474	0.535	0.503	0.558	0.588	0.564
10	0.602	0.604	0.580	0.619	0.643	0.625
25	0.720	0.747	0.701	0.742	0.749	0.747
50	0.896	0.893	0.868	0.914	0.856	0.861
75	1.111	1.089	1.042	1.098	1.013	1.015
90	1.330	1.309	1.244	1.267	1.163	1.170
95	1.671	1.614	1.464	1.365	1.299	1.312

Number of LC50(1) Estimates Obtained	410	484	491	468	497	499
Number of Lower Bounds Obtained	272	352	347	398	490	494
Coverage of Lower Bounds	0.901	0.798	0.839	0.990	0.984	1.000

Estimates Related to LC10(4); True LC10(4) = 637 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.064	0.090	0.066	0.281	0.377	0.308
10	0.179	0.176	0.132	0.436	0.473	0.463
25	0.474	0.421	0.333	0.816	0.770	0.698
50	1.487	0.991	0.843	1.458	1.214	1.049
75	2.709	2.414	1.667	2.178	1.757	1.468
90	9.099	8.593	7.218	3.098	2.411	1.908
95	10.906	10.411	10.037	3.599	2.871	2.216
Number of LC10(4) Estimates Obtained	410	484	492	468	497	499
Number of Lower Bounds Obtained	404	481	490	464	496	497
Coverage of Lower Bounds	0.262	0.370	0.433	0.692	0.873	0.946

Estimates Related to LC10(1); True LC10(1) = 2336 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.295	0.336	0.310	0.486	0.557	0.499
10	0.426	0.493	0.410	0.651	0.645	0.607
25	0.797	0.723	0.629	0.905	0.874	0.807
50	1.352	1.106	0.937	1.274	1.106	1.030
75	1.977	1.691	1.377	1.681	1.371	1.253
90	2.710	2.694	2.306	2.158	1.626	1.478
95	3.325	3.265	3.240	2.413	1.786	1.608
Number of LC10(1) Estimates Obtained	410	484	492	468	497	499
Number of Lower Bounds Obtained	366	446	472	449	487	491
Coverage of Lower Bounds	0.295	0.399	0.445	0.719	0.893	0.949

Estimates Related to LC01(4); True LC01(4) = 147 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.028	0.076	0.055	0.289	0.457	0.353
10	0.199	0.190	0.151	0.598	0.650	0.596
25	0.795	0.609	0.423	1.474	1.333	1.097
50	3.475	1.933	1.488	3.310	2.543	1.931
75	7.852	6.201	3.737	5.909	4.287	3.148
90	36.598	34.245	28.710	9.401	6.352	4.618
95	43.453	41.374	39.842	10.679	7.846	5.953
Number of LC01(4)	410	484	492	468	497	499

Estimates Obtained						
Number of Lower Bounds Obtained	406	482	490	464	496	497
Coverage of Lower Bounds	0.251	0.349	0.406	0.672	0.825	0.901

Estimates Related to LC01(1); True LC01(1) = 538 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.197	0.319	0.245	0.496	0.670	0.555
10	0.464	0.529	0.449	0.866	0.888	0.829
25	1.289	1.036	0.828	1.703	1.476	1.284
50	3.176	2.071	1.620	2.883	2.365	1.925
75	6.301	4.319	3.129	4.542	3.269	2.730
90	10.777	10.631	8.971	6.433	4.375	3.578
95	13.256	13.003	12.950	7.272	5.046	4.026
Number of LC01(1) Estimates Obtained	410	484	492	468	497	499
Number of Lower Bounds Obtained	406	481	491	467	496	498
Coverage of Lower Bounds	0.259	0.347	0.399	0.670	0.813	0.845

W8: Weibull Relationship 8; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 1437 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.148	0.175	0.191	0.442	0.427	0.515
10	0.323	0.290	0.274	0.558	0.525	0.589
25	0.697	0.536	0.507	0.774	0.732	0.732
50	1.013	0.884	0.868	1.061	0.929	0.923
75	1.487	1.534	1.380	1.335	1.182	1.141
90	3.095	3.123	2.884	1.598	1.446	1.360
95	4.095	4.022	3.569	1.811	1.641	1.541
Number of LC50(4) Estimates Obtained	408	469	482	461	494	499
Number of Lower Bounds Obtained	285	449	463	393	479	493
Coverage of Lower Bounds	0.442	0.503	0.529	0.799	0.927	0.976

Estimates Related to LC50(1); True LC50(1) = 5748 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.449	0.479	0.501	0.542	0.583	0.574
10	0.586	0.564	0.544	0.607	0.637	0.648
25	0.774	0.740	0.735	0.731	0.748	0.748
50	0.943	0.893	0.877	0.889	0.873	0.872
75	1.163	1.127	1.055	1.084	1.046	1.010
90	1.466	1.399	1.352	1.292	1.202	1.184
95	1.891	1.618	1.671	1.424	1.368	1.348

Number of LC50(1) Estimates Obtained	408	469	482	461	494	499
Number of Lower Bounds Obtained	274	366	369	396	478	496
Coverage of Lower Bounds	0.909	0.820	0.859	0.982	0.990	0.996

Estimates Related to LC10(4); True LC10(4) = 474 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.059	0.086	0.104	0.335	0.289	0.417
10	0.204	0.200	0.184	0.556	0.422	0.512
25	0.710	0.530	0.416	0.936	0.720	0.740
50	1.574	1.118	1.044	1.494	1.147	1.072
75	2.536	2.040	1.888	2.135	1.710	1.519
90	8.452	8.243	7.758	2.885	2.289	1.972
95	11.173	10.669	9.325	3.395	2.659	2.310
Number of LC10(4) Estimates Obtained	408	469	482	461	494	499
Number of Lower Bounds Obtained	394	460	465	452	483	489
Coverage of Lower Bounds	0.310	0.448	0.477	0.686	0.880	0.945

Estimates Related to LC10(1); True LC10(1) = 1898 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.240	0.339	0.377	0.503	0.505	0.559
10	0.525	0.481	0.494	0.648	0.596	0.644
25	0.988	0.726	0.745	0.947	0.818	0.814
50	1.419	1.144	1.044	1.258	1.109	1.022
75	2.018	1.565	1.361	1.638	1.362	1.263
90	2.822	2.401	2.314	2.025	1.581	1.510
95	3.333	3.168	3.185	2.313	1.747	1.641
Number of LC10(1) Estimates Obtained	408	469	482	461	494	499
Number of Lower Bounds Obtained	342	437	445	436	472	484
Coverage of Lower Bounds	0.368	0.492	0.515	0.711	0.898	0.963

Estimates Related to LC01(4); True LC01(4) = 119 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.035	0.062	0.101	0.374	0.314	0.532
10	0.269	0.217	0.196	0.724	0.544	0.677
25	1.265	0.739	0.593	1.814	1.172	1.226
50	3.750	2.032	1.865	3.311	2.160	1.963
75	6.825	5.110	4.392	5.461	3.894	3.269
90	30.933	30.296	28.263	8.131	5.923	4.687
95	40.874	38.884	34.979	9.983	7.361	5.992
Number of LC01(4)	408	469	482	461	494	499

Estimates Obtained						
Number of Lower Bounds Obtained	399	464	479	458	491	496
Coverage of Lower Bounds	0.281	0.422	0.441	0.668	0.827	0.887

Estimates Related to LC01(1); True LC01(1) = 476 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.156	0.324	0.386	0.556	0.533	0.699
10	0.579	0.525	0.560	0.889	0.759	0.905
25	1.641	1.043	1.063	1.807	1.327	1.286
50	3.178	2.150	1.969	2.792	2.053	1.906
75	5.480	4.011	3.242	4.089	2.945	2.600
90	8.652	8.629	8.365	5.561	4.086	3.503
95	12.400	11.547	10.103	6.870	4.667	4.091
Number of LC01(1) Estimates Obtained	408	469	482	461	494	499
Number of Lower Bounds Obtained	387	462	470	454	489	495
Coverage of Lower Bounds	0.315	0.429	0.455	0.676	0.814	0.844

W9: Weibull Relationship 9; 4 Durations per concentration

Estimates Related to LC50(4); True LC50(4) = 2.94 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(4) Estimates over True LC50(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.545	0.468	0.264	0.679	0.713	0.660
10	0.589	0.653	0.544	0.739	0.781	0.745
25	0.727	0.806	0.793	0.853	0.868	0.849
50	0.902	0.956	0.994	1.013	0.959	0.952
75	1.167	1.772	2.116	1.163	1.069	1.041
90	2.466	2.377	2.373	1.317	1.176	1.127
95	2.466	2.485	2.560	1.445	1.251	1.204
Number of LC50(4) Estimates Obtained	170	242	285	284	407	444
Number of Lower Bounds Obtained	132	236	274	256	404	438
Coverage of Lower Bounds	0.667	0.661	0.580	0.867	0.993	0.995

Estimates Related to LC50(1); True LC50(1) = 6.67 mg/m3

	Number of Concentrations					
	3			4		
	Number of Animals per sex per CxT			Number of Animals per sex per CxT		
Percentiles of LC50(1) Estimates over True LC50(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.774	0.764	0.668	0.776	0.793	0.808
10	0.846	0.836	0.760	0.810	0.838	0.845
25	0.911	0.942	0.923	0.881	0.894	0.892
50	0.991	1.004	1.001	0.963	0.948	0.943
75	1.102	1.125	1.191	1.038	1.003	0.997
90	1.226	1.209	1.229	1.118	1.063	1.059
95	1.226	1.249	1.355	1.168	1.106	1.091

Number of LC50(1) Estimates Obtained	170	242	285	284	407	444
Number of Lower Bounds Obtained	144	227	263	251	405	437
Coverage of Lower Bounds	0.875	0.736	0.684	0.996	0.998	1.000

Estimates Related to LC10(4); True LC10(4) = 1.92 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(4) Estimates over True LC10(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.435	0.429	0.176	0.613	0.663	0.569
10	0.568	0.630	0.451	0.740	0.754	0.707
25	0.700	0.819	0.780	0.904	0.910	0.866
50	0.922	1.049	1.054	1.096	1.045	1.031
75	1.329	2.449	2.935	1.336	1.194	1.162
90	3.392	3.276	3.289	1.543	1.352	1.291
95	3.392	3.466	3.608	1.654	1.442	1.392
Number of LC10(4) Estimates Obtained	170	242	285	284	407	444
Number of Lower Bounds Obtained	159	236	278	280	406	440
Coverage of Lower Bounds	0.478	0.661	0.565	0.789	0.988	0.986

Estimates Related to LC10(1); True LC10(1) = 4.35 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC10(1) Estimates over True LC10(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.616	0.553	0.437	0.752	0.766	0.691
10	0.746	0.743	0.627	0.801	0.836	0.821
25	0.865	0.962	0.916	0.900	0.936	0.921
50	1.018	1.109	1.128	1.027	1.017	1.013
75	1.260	1.333	1.649	1.170	1.134	1.102
90	1.666	1.672	1.692	1.315	1.218	1.188
95	1.686	1.721	1.867	1.430	1.278	1.237
Number of LC10(1) Estimates Obtained	170	242	285	284	407	444
Number of Lower Bounds Obtained	155	237	277	279	407	441
Coverage of Lower Bounds	0.490	0.658	0.599	0.792	0.985	0.991

Estimates Related to LC01(4); True LC01(4) = 1.12 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(4) Estimates over True LC01(4)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.428	0.410	0.153	0.705	0.753	0.585
10	0.559	0.686	0.453	0.856	0.856	0.751
25	0.829	0.988	0.920	1.080	1.114	1.056
50	1.117	1.355	1.412	1.385	1.369	1.312
75	1.784	3.835	4.611	1.779	1.587	1.534
90	5.293	5.138	5.164	2.165	1.851	1.771
95	5.293	5.471	5.700	2.282	2.031	1.910
Number of LC01(4)	170	242	285	284	407	444

Estimates Obtained						
Number of Lower Bounds Obtained	160	240	281	282	407	444
Coverage of Lower Bounds	0.475	0.650	0.552	0.784	0.961	0.950

Estimates Related to LC01(1); True LC01(1) = 2.55 mg/m3

	Number of Concentrations					
	3			**4**		
	Number of Animals per sex per CxT			**Number of Animals per sex per CxT**		
Percentiles of LC01(1) Estimates over True LC01(1)	**1**	**2**	**3**	**1**	**2**	**3**
5	0.587	0.527	0.361	0.834	0.833	0.722
10	0.730	0.790	0.648	0.906	0.948	0.877
25	1.003	1.133	1.067	1.084	1.135	1.128
50	1.257	1.479	1.509	1.345	1.307	1.280
75	1.652	2.057	2.598	1.538	1.560	1.487
90	2.629	2.620	2.657	1.876	1.718	1.630
95	2.631	2.688	2.937	2.077	1.810	1.726
Number of LC01(1) Estimates Obtained	170	242	285	284	407	444
Number of Lower Bounds Obtained	159	240	281	284	407	444
Coverage of Lower Bounds	0.478	0.650	0.555	0.778	0.951	0.939