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To Our Valued Customers:

At Minitab, we recognize that the software products that we create must meet the needs and expectations of our customers within the constraints of feasibility, integrity of the product, and viability of the company. They must be the right products and they must operate in the right way.

We also recognize that the quality of software is multidimensional. Quality is not limited by one definition. In creating software, we will seek to balance all aspects of high quality. We will create software products that:

- Are available to customers in a timely fashion
- Are reliable and accurate in their operation
- Present an intuitive interface for both input and output
- Contain features that help customers do their work better

Finally, we recognize that the pursuit for quality is a journey with no end. We will continuously improve both the processes used to create our software products, and the software products created for our customers.

The information contained in this packet was compiled to help you understand Minitab's software validation process and continued commitment to quality. If you have any additional questions regarding our policies and processes regarding validation, please contact [techsupport@minitab.com](mailto:techsupport@minitab.com) or call +1-814-231-2682.

## ***A VISION STATEMENT FOR MINITAB INC.***

**Our Mission** is to create, market, and support statistical software and related products. We enable those involved in the teaching or practice of data analysis to do their jobs better by providing excellent products that are accurate, reliable, and easy to use. We are, and will always be, a quality and market leader in each of our chosen fields.

**Our Fundamental Objective** is to develop lasting relationships with customers, based on mutual satisfaction and trust. Loyal customers are the source of our profitability and growth, and facilitating their good work is our contribution to society.

### **Our Guiding Principles:**

- Quality
- Customer-Focus
- Continuous Improvement
- Informed Decision-Making
- Teamwork
- Empowerment
- Open Communication
- Integrity

Quality products and service are fundamental to customer satisfaction. We will distinguish our products, service, and policies as exceptional in ways that the customer values.

Quality is defined by the customer. We will actively solicit customer input to better understand their needs and expectations. The external customer is our primary focus; we serve internal customers so we may effectively meet the needs of our external customers.

To remain leaders in our industry, we must continually improve our products, service, and processes at a rate exceeding that of our competitors. We will pursue both incremental and breakthrough improvements, prioritizing our efforts according to their importance in serving external customers.

We will use the best data and other information obtainable within time and resource constraints and as warranted by the importance of the decision. We will seek out and listen to those having valuable input.

We will work together - with each other and our customers, suppliers, and distributors. We will align our individual and group efforts to improve the efficiency and effectiveness of our organization as a whole.

We will each be empowered with the authority, responsibility, and resources to best meet the needs of customers and help our company grow.

We will communicate openly, so each of us has the information and perspective necessary to contribute effectively to achieving company goals. We will communicate in a manner that helps us understand and support one another.

We will promote trust by assuring that honesty, integrity, and respect for others underlie all that we do.

## **Software Validation Process for MINITAB Statistical Software**

**Minitab Inc.**

All statistical and graphical output is validated using one or more of the following methods:

1. Validated by hand calculation. This may involve working through a mathematical or statistical calculation by hand, or it may be a visual verification of a graph.
2. Validated by comparison to other software. One or more existing statistical software products may be used for comparison. Occasionally, specialized software products are used, such as software for analyzing time series data. This form of validation is performed when the answers cannot be reasonably calculated by hand.
3. Validated by comparison to textbook examples. Data and output from respected textbooks are used for comparison. This form of validation is usually performed in combination with one of the two previous methods.

There are also a number of controls built into the software development process that contribute to ongoing validation. These are:

- 1) Technical support is provided for all of our software products. When customers report problems, our technical staff verifies the nature of the problem, records the details, and determines an appropriate method for addressing the problem.
- 2) Minitab has developed extensive automated test suites to validate product functionality. These suites are systematically run to regression test all new versions and conversions of the software. They are also run to validate correct behavior of the MINITAB software in new operating systems as they become available.
- 3) The software is submitted to a beta test period prior to release. This test helps to assure consistent results across a variety of hardware and software configurations.

# Minitab Inc. Software Development Life Cycle Release 13

April, 2000

## 1. Overview

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- 2.0 Inputs and Outputs
- 3.0 Requirements Phase
- 4.0 Project Phase
- 5.0 Alpha Phase
- 6.0 Beta Phase
- 7.0 Final Cleanup Phase
- 8.0 Production Phase
- 9.0 Maintenance Phase

## 2. Inputs and Outputs

Customer Feedback (Feedback database, Trip Reports, and customer visits)  
Employee Feedback  
Master Feature List



### Requirements Phase

Feature List  
Initial Project Management Database  
Initial Release Software Development Database (SDD)



### Project Phase

Beta-ready release of MINITAB software  
Beta-ready print documentation  
Beta-ready Help text  
Updated Project Management Database – including changes due to Alpha Phase  
Updated Release Software Development Database (SDD) – including changes due to Alpha Phase  
Updated Test Log Database



### Beta Phase

Updated Project Management Database  
Updated Release Software Development Database (SDD)  
Updated Feedback database  
Updated Test Log Database  
Updated release of MINITAB software  
Final print documentation



### **Final Cleanup Phase**

Final Release Software Development Database (SDD)  
Gold master release of MINITAB software  
Final Test Log Database  
Final Help Text



### **Production Phase**

Production release of MINITAB software



### **Maintenance Phase**

Point releases of existing product  
Upgraded software development tools  
Customer feedback (Feedback database, customer visits, trip reports)  
Logged problems  
New and modified QA testing materials  
Reprints of paper documentation  
Upgraded Help documentation (as part of point releases)

## **3. Requirements Phase – Detail**

3.1 The Director of Product Development selects a Lead Designer for the product. The product, as used in the remainder of this document, refers to a major new release of the MINITAB software.

3.2 The following individuals meet to develop the objectives for the product:

Lead Designer  
Product Manager  
Research and Design Department  
Director of Product Development and Marketing  
Manager of Customer Services  
Sales Leader  
International Coordinator  
Manager of International Operations  
Customer Services Manager – Minitab Ltd.

3.3 The Lead Designer reviews customer and employee feedback from all documented sources. These include:

Feedback database  
Trip reports  
Exhaustive requested feature list

3.4 The Lead Designer meets with the following individuals to solicit suggestions and opinions on priorities of new functionality:

Product Manager

Sales Leader  
Manager of Customer Services  
Training Specialist  
International Coordinator  
Manager of International Operations  
Customer Services Manager – Minitab LTD

- 3.5 The Lead Designer meets with the following groups to solicit suggestions and opinions on priorities of new functionality:

Customer Support  
Sales  
Training  
Marketing

- 3.6 The Lead Designer obtains feedback relative to competition software from members of the Research & Design department.
- 3.7 All individuals from the step 3.2 are invited to meet with the Research & Design department to develop the first draft of the product feature list. The Exhaustive list, along with all documented feedback obtained from steps 3.3 through 3.6, is reviewed to select the features that will define the product. Each of these features then becomes a project for the product.
- 3.8 Internal coding projects are added to the first draft feature list by the Program Development Manager and the Chief Internal Architect.
- 3.9 The Bug Review Team reviews bugs from the Post Release Bugs database. Selected problems that would require significant time and effort are added to the first draft feature list.

Members of Research & Design review design issues from the Post Release Bugs database. Each designer should recommend for inclusion in the first draft feature list important design issues from his/her area of expertise. He/she should also look for clusters of bugs from specific content areas that when combined constitute an important area for fixing. The design issues would only be included in the first draft feature list if they were large enough to be considered a project. Note that members of Research & Design will recommend that some bugs and/or design issues be fixed whether they are projects or not.

- 3.10 The Director of Product Development appoints a Project Manager. The Project Manager obtains assignments for projects from the managers of each of the development departments:

Research & Design  
Program Development  
Quality Assurance  
Documentation

- 3.11 The Project Manager solicits initial estimates from each of the project team members, and each of the projects (features) is then evaluated for feasibility.
- 3.12 A second draft of the feature list for the product is then written based on the feasibility evaluations.

3.13 All additions to the product feature list must be processed through the Lead Designer. These additions will be discussed and reviewed for their feasibility, comparisons to other features, and their relevance to the product objectives.

3.14 All deletions to the product feature list must be processed through the Lead Designer. These deletions usually occur because some other feature takes a higher priority, or because the feature requires more time and/or staff resource than is available.

#### **4 Project Phase – Detail**

4.1 The individual development departments select project team members. Each department decides how to optimally assign staff to the various projects for a new product. Most project teams are comprised of one member from each of Research & Design, Program Development, Quality Assurance, and Documentation. Hereafter, in this document, these roles will be referred to Designer, Software Engineer, Tester, and Technical Writer, respectively. The Project Manager and Lead Designer will appoint project leaders to each project team. Department managers will also have input to these appointments.

4.2 Most projects will proceed with an iterative process begun by the Designer drafting an initial external design document. This external design describes and illustrates the functionality from a user's perspective. In contrast, if a written internal design is needed, this will include the software engineer's description of the organization of the source code. A typical path of development is for the Designer to deliver to the Software Engineer a completed external design. The source code is then written by the Software Engineer and peer reviewed. The code is integrated into a daily version of the development product, and the Tester begins the project testing of the new project. The Technical Writer will be writing both paper and on-line documentation for the new project throughout the life of the project. The writing can begin anytime after the external design is complete, and will sometimes continue through the final cleanup phase. The whole process iterates because there are generally changes made to the design(s) and to the working functionality because of feedback from any of the coding, testing, or writing phases of project work. The primary activities for each project during the project phase include:

- 4.2.1 Designer writes external design
- 4.2.2 Software Engineer, Tester and Technical Writer review external design
- 4.2.3 Software Engineer writes internal design, if applicable
- 4.2.4 Software Engineer implements (codes) external design
- 4.2.5 Software Engineer submits code for a peer review
- 4.2.6 Software Engineer fixes problems found in peer review
- 4.2.7 Tester writes test plan
- 4.2.8 Designer and Software Engineer review test plan
- 4.2.9 Tester implements test plan
- 4.2.10 Software Engineer fixes bugs/Designer resolves design issues
- 4.2.11 Tester verifies fixes
- 4.2.12 Technical Writer writes documentation for manual(s) and on-line Help
- 4.2.13 Designer reviews documentation

4.3 Major milestone dates occurring (in order) during the Project phase are:

- 4.3.1 Alpha Start – select projects are reviewed by customers
- 4.3.2 QA Handoff – project code is complete and ready for testing
- 4.3.3 Priority 1 Testing Complete – all important functionality is tested
- 4.3.4 Priority 2 Testing Complete – all but cosmetic testing is completed
- 4.3.5 Code Cut Off – all project cleanup is complete and known bugs are fixed
- 4.3.6 Beta Start – official end of Project Phase

- 4.4 Communication between and within project teams is carried out throughout the project phase in two primary ways. First, project teams meet together for a kickoff meeting to make sure everyone clearly understands the design of the new functionality. Additional meetings are held at the request of any team member. Second, a Microsoft Access database is used to track bugs and design issues throughout the development life of the product. All bugs, design issues, and incomplete functionality are logged as records in this database, and project members communicate on these specific tasks through the Discussion field.
- 4.5 The Project Manager oversees bi-weekly meetings during the length of the project phase. These meetings are attended by all project leaders, department managers, the Lead Designer, and the Director of Product Development.
- 4.6 The Project Manager maintains two Microsoft Access databases called the Project Management Database and the Time Log Database. Each project is maintained as a record, with estimates and actual workdays tracked by each of the project team members. These databases also track detailed estimates by work task, and show historical information on changes to estimates. Both the Project Manager and the Lead Designer use various reports generated by these databases for tracking status and risk.

## **5 Alpha Phase – Detail**

- 5.1 The Alpha Phase is a period of approximately 3-4 weeks and is primarily an early test and feedback phase for key customers. New functionality in the product, critical to the objectives for the release, is given to key customers interested in reviewing and giving feedback on the functionality. These projects are typically large and complex.
- 5.2 The Alpha Phase is actually a “subset” of the Project Phase since it occurs within the boundary dates of the Project Phase.
- 5.3 The most current daily version of the development product is packaged on a CD and sent with minimal documentation to the key customers.
- 5.4 There will likely be known bugs and some incomplete functionality in the product during the Alpha Phase, but the functionality under review should be complete enough to allow the customers to work with it, and to allow them to comment on the nearly finished look and feel.
- 5.5 The Designer for each of the features being reviewed is responsible for customer contact and for documenting the feedback.

## **6 Beta Phase – Detail**

- 6.1 The Beta Phase is a 6 to 8-week period where customers are given an opportunity to use the software prior to production. Except for continued work on unfixed bugs, the development version sent to beta test is fully implemented with the intended look and feel of the final product.
- 6.2 Technical writers complete the printed documentation during this phase.
- 6.3 Critical and important bugs and design issues reported by beta testers are addressed by the development group during the Beta Phase. A balance of time-to-market, feature completeness and quality, and resource availability is maintained in deciding what changes to make to the product during the Beta Phase.



- 6.4 Someone from the Quality Assurance department serves as Beta Administrator. This person manages all processes – from the initial mailing to solicit test sites, to the final mailing of complimentary copies of the MINITAB software.
- 6.5 The Beta Administrator collects and distributes all feedback from the beta test sites. Bug reports are forwarded to the appropriate Tester for confirmation. Feedback is forwarded to the appropriate Designer for review.
- 6.6 Although the primary objective of the Beta Phase is to receive feedback and problem reports from the beta testers, and then improve the product because of that feedback, there may be marketing activities occurring concurrently with the beta test. That activity is managed by the Marketing department.

## **7 Final Cleanup Phase – Detail**

- 7.1 All remaining issues from the Beta Phase are addressed during this Final Cleanup Phase. The most serious remaining bugs and design issues are corrected and the final online Help text is completed.
- 7.2 Most of the activity during this phase involves testing and writing. Testers complete project tests, run the final suite of regression tests, and continue to write automated tests. Technical Writers continue to write text for online Help and StatGuide. There is also some final bug fixing and verifying by Software Engineers and Testers.
- 7.3 Final edits to the About Box are completed.
- 7.4 Regular bug review meetings are held by the Bug Review Team to make quick decisions on resolving all remaining and newly logged problems. A procedure has been documented for resolving bugs found in the final days of testing.
- 7.5 The QA department conducts a final phase of testing. All high-priority tests are regression tested to assure that the gold master version functions correctly and to assure that late code breakage did not occur.

## **8 Production Phase – Detail**

- 8.1 The Physical Product Leader oversees all aspects of the Production Phase.
- 8.2 The Build Engineer creates the gold master CD and diskette versions of all products, including annual license and copy-protected versions. These gold master copies are delivered to the media vendor for an initial verification run. Multiple copies are produced and delivered back to Minitab for a quality check.
- 8.3 The Software Development Project Leader oversees the final testing and verification of all production gold masters. Testing is performed to assure the correctness of files, file dates, and number of diskettes. In addition, checks are made for virus-free media and that the final versions of MINITAB install and run correctly on all required operating systems.
- 8.4 The gold master delivery/verification process follows this approximate schedule:
  - 8.4.1 Gold master diskettes and CDs are shipped to production vendor using overnight delivery
  - 8.4.2 Production vendor returns evaluation diskettes and CDs and assembly samples to Minitab using overnight delivery
  - 8.4.3 Software Development Project Leader verifies diskettes and CDs

8.4.4 Production vendor proceeds with duplication and assembly of Minitab product

8.5 Other processes within the Production Phase, not pertaining to the actual Life Cycle development of the MINITAB software product, are documented in separate procedures.

## **9 Maintenance Phase – Detail**

9.1 The Maintenance Phase includes all maintenance activities that take place between major releases of a product. Maintenance activities are defined as work projects that affect either the current product release in the field, or work projects done in preparation for the next scheduled release of that same product.

- 9.1.1 All customer-reported problems are logged and monitored during the lifetime of a product in the field. Problems found internally by Minitab employees are also logged.
- 9.1.2 Customer feedback is logged. This feedback includes requests and suggestions sent to Customer Support, where it is then logged in the Feedback database. Customer feedback also includes suggestions received on customer visits and on training trip reports.
- 9.1.3 Program Development may make improvements to source code.
- 9.1.4 Program Development may work on software tool improvement.
- 9.1.5 Print documentation may be reprinted with improvements and/or errors corrected.
- 9.1.6 QA may create new or modify existing test materials.

9.2 The Maintenance Phase also includes the production of all point releases of the current product release in the field. Each point release includes either problem fixes or new functionality or both. Each development cycle of a point release is very similar to the larger product life cycle process. The specific details of a point release development cycle can be found in a separate document.

## Partial list of Minitab customers:

3M  
Alcoa  
American Express  
Arkansas State University  
Armstrong World Industries  
AT&T  
Avery Dennison  
Bell Atlantic  
Blue Cross/Blue Shield  
Bombardier  
British Telecom  
Chase Manhattan  
Compaq  
Crane  
DaimlerChrysler  
DuPont  
Eastman Kodak  
Ford Motor Company  
GenCorp  
General Electric  
General Motors  
Hewlett-Packard  
Honeywell International  
International Paper  
ITT Automotive  
Leading Six Sigma Consultants  
Lucent Technologies  
Maytag  
Motorola  
Nokia  
Pilkington Libbey Owens Ford  
Polaroid  
Reckitt and Colman  
Seagate Technology  
Solo Cup  
Standard Products  
Toshiba Display Devices  
Warner Lambert