

Thank you for purchasing CETIS v1.9.7.xx We hope the product greatly improves your lab's productivity and eases some of the pain and drudgery associated with statistical calculations of your data. We are

always interested in hearing from the end user, so if you have suggestions, want to place an order, or simply have a question regarding the use of CETIS, please call or write to:

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McKinleyville, CA 95519
Main Phone: (707) 839-5174 (Voice/Fax)
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***ATTN ACCESS 2000 USERS**

Due to complication of getting an Access 2000 compiled MDE to function under Access 2010, the Access 2000 version of CETIS is being deprecated. If you have a need to run CETIS under Access 2000, please contact Tidepool for a special copy of the MDE file.

***ATTN ACCESS 2007 AND 2010 USERS**

You should go to Tools>Options>Advanced>Default Record Locking and change to "Edited Record" to insure that any records being written to are locked.

Also you can go to the Options>Trust Center>Trusted Locations and add the folder containing the CETIS.mde. That will eliminate the annoying error message when you start it up. You can also use the Database>Security>Add to Trusted Locations command.

The Output To Rich Text Format does not work properly in Access 2007 and 2010 due to a known bug in the rtf generator.

ATTN ZSCALER USERS

If you are using Zscaler for monitoring and blocking network traffic, you may need to turn it off prior to activating your CETIS license or you won't be able to communicate with the tidepool license server.

***ATTN ALL ACCESS USERS**

Access apparently does not like the backend and frontend databases having the same name if in the same folder. If you have both installed locally, you should nest the CETIS.mdb file in a folder inside the folder containing the cetis.mde. CETIS will suggest when you relink the backend to place it in a folder named 'Backend.'

If you fail to see records in the Test Reports form or you cannot add samples to test batches on the Samples tab, you most likely have a corrupted Access installation and you should attempt to re-install Access/Office.

***ATTN VISTA, WIN7, WIN8, WIN8.1 and WIN10 USERS**

If you continually get a "Permission Denied" message upon startup and cannot eliminate it through permission and ownership changes, you will need to set the 'Always Run as Administrator' checkbox that can be accessed by right-clicking the CETIS short-cut and choosing Properties then Advanced. Now when the short-cut is clicked CETIS will be opened as if you used the Run as Administrator option.

If CETIS opens as a Read-Only file or it cannot update the backend, you will need to assign full permissions to the CETIS folder for all users that will be using CETIS.

A common problem people are reporting is that CETIS opens and then tells you that "CETIS was not properly linked to a valid back-end database, therefore the application is quitting now." This occurs because you have not been granted read/write permissions on the CETIS folder and all the files contained within it and the Windows folder. If you are not granted permissions, it does not matter what software you are using, it will report that it is read only. This problem is generally solved by closely following installation instructions and opening the installcetis.exe with the 'Run as Administrator' option.

***INSTALLING NOTE!!!**

If you are using products such as Symantec Endpoint Protection, you may need to disable it during installation of CETIS. There have been reports of products like SEP interfering or preventing the registration of files or read/write operations to the registry. Please consult the operation manual for the product on how to temporarily disable the software during installation.

***UPDATING NOTE!!!**

If your CETIS.mdb is on a server, it is highly recommended that you move it local when installing a new version (either from a CD or just overwriting an older version of the CETIS.mde with a new CETIS.mde version). It appears Access is not consistently copying tables to a server installed database. When the updating is done, you can move the CETIS.mdb back to it's original location and relink the database.

***VERY IMPORTANT!!!**

Do not under any circumstances use CETIS in a multi-user environment when either using a wireless network or a wired network with a history of hardware problems and drop-outs. Wireless networking systems are notorious for corrupting Access databases. A corrupted Access database will start behaving very strangely and becomes obvious. You should immediately take the file out of production and replace it with the latest backup. Many times the corrupted file can be repaired, but it is very important that any corrupted indexes get repaired as well. DO NOT use CETIS in a shared environment when using a wireless network. Access databases are notorious for data corruption when the wireless connection suffers dropouts.

***Tidepool Scientific Website**

A new website has been designed with enhanced support and ordering pages. Please start at the home page located at <http://www.tidepool-scientific.com>. The CETIS FAQ page can be found at <http://www.tidepool-scientific.com/Support/CetisTechFAQ.html>.

***Errata**

If you are strictly following the USEPA ICPIN method (i.e., Linear Interpolation) for USEPA protocols, make sure the X and Y variable transforms are set to "Linear." Other jurisdictions such as Environment

Canada require the X variable transform set to "Log(X)." The default template can be changed by making a change and then over-writing the current settings.

The formula for the "Combined Proportion Normal" endpoint used for bivalve and echinoderm larval development tests was wrong prior to v1.8.7.14. The formula read: 'IIF([#Normal]>[Initial],[#Counted],[Initial])' and should read 'IIF([#Counted]>[Initial],[#Counted],[Initial])' or 'IIF([Final]>[Initial],[#Counted],[Initial]).' Please make this correction in your database under the 'Development-Survival' test type.

Your manual may not have provided the 7d Survived data in Table D-1. Use the "Pan Count" data in lieu of the

"7d Survived" data. Remember, you can use the "Replicate Field" (right click) to quickly copy the data from the "Pan Count" field to the "7d Survived" field.

The "Chronic Mysid Survival, Growth, and Fecundity Test" has been changed to the "Mysid 7d Survival, Growth, and Fecundity Test." For the Tutorial (Appendix D), select "Mysid 7d Survival, Growth, and Fecundity Test" for the test title found in step 3 of "Enter Test Detail Data" section.

Version changes

*Version 1.9.7.10

When an older version of a shared non-local backend is updated, the user will no longer need to move it from the local drive to the shared drive since this task will be done automatically.

Fixed a bug that prevented analysis comments from being printed when printing multiple analyses and one of the analyses had no comments.

Made a change to how multiple controls are ordered on analytical comparison reports. The actual primary control will now appear at the top regardless of the ordering specified in the Control Types list and secondary controls will be ordered based upon the ordering specified in the Control Types list.

Fixed a bug that changed the nonlinear regression graph of the active form when the Preliminary NLR Graph is opened or updated.

*Version 1.9.7.9

Fixed a bug introduced into v1.9.7.7 that prevented nonlinear regression graphs from being printed when there were two or more nonlinear regression analyses associated with a test.

*Version 1.9.7.8

Added a new feature in the Test Design form that allows you to specify a time zero ("T0") measurement. By selecting this option the numbering sequence will start at zero and end at the number of readings specified minus one. For example if you wanted seven days of measurements plus a time zero measurement, you would check the T0 checkbox and specify eight "Reads." By selecting the Default Time Zero (T0) checkbox all parameters will start their numbering at zero, conversely de-selecting the option will start all parameters at one.

Changed the Parameter control type from text to a combobox control to support the adding of new records directly from the Test Data form. This change also eliminated a bug that indicated the cboParameter control could not be found.

Fixed a bug that was possibly displaying the wrong Sample Code on analytical reports for multiple sample designs.

*Version 1.9.7.7

Fixed a bug that prevented the TAC results from being displayed on the Summary report.

Fixed an issue of slow print times that started with v1.9.7.0. The replicate serialization feature introduced with v1.9.7.0 had to be removed.

Fixed a bug that closed all analysis forms when the Test Reports form is left open and the user saves one of the

analyses.

***Version 1.9.7.6**

Modified certain queries by replacing the NZ function with the Is Null criteria. This may speed up some queries for large databases.

***Version 1.9.7.5**

Made a slight change to a query which was required to address the case where a user did not designate the order of a control, such as 1 for primary, 2 for secondary, etc.

***Version 1.9.7.4**

Fixed a bug introduced in v1.9.7.0 that calculated the wrong standard error on the reports. Instead of the $SE=SD/\sqrt{N}$ it was calculating the $SE=SD/N$.

Some users of Access 2016 have reported that forms from multi-endpoint analyses automatically close before being saved. Changes were made to prohibit that.

***Version 1.9.7.3**

Made some programmatic formatting adjustments to analytical result forms to eliminate list boxes from showing scroll bars in Access 2013, even though there should be sufficient height.

Changed the formatting of quantal data to "0.00000" on the analytical result forms to make visual interpretation easier.

Changed the behavior of the Control down-down list on the QC Plot utility. It will now fire an event as if you selected a new parameter. When more than one control is selected, CETIS will combine the control codes and insert them into the Y axis label. For instance it might read "Acute Toxicity Control (DW, LW) Mean." This allows the specification of more than one control type when the same type of control has different names.

If an incorrect license is detected, CETIS will take you back to the opening screen where you can re-activate the license if you still have licenses available to activate.

***Version 1.9.7.2**

Access 2013 did not like a new ribbon bar command that was added, so it was removed for compatibility purposes.

***Version 1.9.7.1**

Added "Model" information to the top of the Linear Interpolation result form.

***Version 1.9.7.0**

Updated user manual. Replaced all screen shots of forms and dialogboxes and updated text to support ribbon toolbar UI. Added a "Glossary of Report Terms" for abbreviations used on the analytical reports.

Broke up the Test Batch, Sample, Test and Analysis comments. Now the Test Batch and Sample comments are grouped together as they always have, but the Test and Analysis comments will be printed at the end of the report. The rationale for this change was that some users use the "Test Comment" field for extensive comments about a test, sometimes multiple paragraphs. There is too much text appearing at the top of the report so it was moved to the end where there is unlimited space.

Added a new "Datasheet" tab on the ribbon bar with a group named "Format". Three new controls can be found there, "Background Color"; "Alt Row Color"; and "Save Color." This will allow you to adjust and save the color scheme of datasheets. Any change to row color will be applied to all datasheets and subforms. The Datasheet tab is only visible when the "Test List" is open.

Optimized the queries for the Test Design form making them faster and more reliable for updating designs of existing datasets. The order of samples in a multiple sample design can now be changed by changing the sequential Test Group number. This should only be done before data is entered and calculations are saved, however. Also added a "Reset Container Positions" command button on the Randomization tab for re-randomizing test container positions without altering anything else.

Separated the Test Organism field on the Global List form into species name and common name to aid in filtering.

Two new fields, "EditDate" and "EditOwner" were added to the tblTestDetail table to store the last date/time any user modified the test data and the OwnerID that did the editing. The computer and user name can then be found in the User Log. The EditDate ("Last Edited"), EditOwner ("Last Editor ID") and MD5 ("MD5 Hash") will now be printed in the analysis subreport near the top of each analytical report.

A new field named "MD5" was added to the tblAnalysisDetail table to store the MD5 digest of the data set associated with an analysis. The MD5 digest will appear near the end of each analytical report. A change in the MD5 digest indicates that the data has been altered and serves as a security check. The MD5 is a 128 bit hash snapshot of the groups, controls, position, replicate and calculated variate.

Added a 128 bit MD5 hash function that will create a digest of each endpoint on the Summary Data Detail page. This MD5 hash may or may not be equivalent to the hash calculated for each analysis, as the analysis may have only included one control but the overall dataset has multiple controls. However, different MD5 hashes calculated on the Summary report and printed at different times indicates the raw data had been altered between the two printings. This serves as a security check since the MD5 hash can act as a data fingerprint. The MD5 hash will also be outputted by the Ad Hoc Query utility.

A new field named "Total" was added to the tblCmpData table to store the total number of organisms per replicate for quantal data. CETIS will no longer create the binomials table real time but will use the data.

A new field named "Cov" was added to the tblRegLRSummary table for storing the covariance for the GLM linear regression module. The cov field will be used for the new LCx/ECx/ICx endpoint comparison utility.

Added a new LCx/ECx/ICx endpoint comparison utility for comparing two LCx/ECx/ICx endpoints to each other using either the Zajdlic (2019) Z test or the Robertson and Preisler (1992) LCx ratio test.

Added the Median to the summary data subreports on all point estimate analytical reports.

Reorganized the Measurement subform on the Test Data form. Optimized column widths on both subforms. Moved columns to more logical locations.

Resigned some queries to reduce the occurrence of too many database connections when printing reports and having too many other forms open.

Replaced all "n/a" with "---" on most sub-reports when data was either not entered, excluded, or could not be

calculated. The "---" also indicates missing test data.

Using the built-in Access "Best Fit" column width feature for adjusting the Test Data and Measurement Data subforms. Double-clicking in the record selector will re-apply the best fit setting.

Changed the behavior of double-clicking on the Global List form. It now will perform a "Best Fit" to the columns if a text column is not fully displayed.

Changed how the data detail and binomials are queried for analytical reports. It will now use the data that is stored at the time of saving an analysis instead of generating them realtime at the time of printing.

The reported endpoint data on the Summary reports for multiple sample designs will now be limited to the data associated with the selected analyses. That same holds true for the water quality data.

This change will also allow the replicates to align with their original position and missing data will be shown with a "---" character string. CETIS also saves the original replicate position when saving data instead of re-serializing the replicates as was done with previous versions.

The record locking on the main CETIS form is now dynamic and the setting is saved upon closing the form.

The height of the CETIS Main form, Test Reports form and Test Design form can now be resized when there are large numbers of records to display. The height setting for the CETIS Main form and the Test Reports form will be saved upon closing the form. The analysis result forms have been redesigned to display all the results without the need for scrolling, however the vertical height of the forms may be larger now depending on how many rows of results need to be simultaneously displayed.

The Batched Samples and Batched Tests subforms on the main CETIS form will adjust their column widths to "Best Fit" as records are changed.

Fixed a bug on the analytical report for the Fisher Exact or Cochran-Armitage family of statistical tests that calculated the wrong %Effect when the endpoint was ascending (i.e., mortality).

The analytical reports of the Fisher Exact and Cochran-Armitage family of statistical tests will now print with both frequencies and proportions.

Fixed a bug that caused the Rao-Scott corrected Cochran-Armitage test to not print on the same report as the other Cochran-Armitage and Fisher Exact tests.

Removed some frames on the main CETIS form to reduce clutter. Expanded the "Test Comment" field to encourage users to put lengthy comments there.

Added the design effect coefficient for Rao-Scott corrected Cochran-Armitage tests to the analytical reports. It is labelled as "D Effect" on the Cochran-Armitage reports, and "Design Effect" on the analysis result form.

Changed how the Rao-Scott design effect is applied. Previous versions converted the adjusted binomials to integers and they are now being stored as decimals since the quotient of an integer and the design effect coefficient can result in a decimal fraction. This change may result in a very slight change to the Z statistic and p-value. The Monte Carlo option for deriving the p-value is no longer possible with these changes.

Added the MSDu field to multiple comparison analytical reports and will print it if it is available.

Added TU and associated 95% CI to the Spearman-Kärber LC50/EC50 estimate subreport.

All P-values are now listed as <1.0E-05 (i.e., <0.00001) instead of <1.0E-37. Revised additional formatting to maximize consistency and report readability.

Fixed a bug that caused the Group label to be listed as Control II instead of the concentration units if the lowest concentration was significant. Now if it is a Control to Control comparison, the group labels will be listed as Control 1 vs Control 2 and if it is a Control vs Treatment comparison, the group labels will be listed as Control vs Conc-[units].

Removed the "Copy Controls" shortcut from the "Primary Controls" listbox on the "Analysis Options" form. Controls can only be copied from the Test Data form now.

Fixed a bug with the Ad Hoc Query tool that asked for the "Q1.Endpoint" parameter. This was due to a missing field in an underlying query.

Added a new combo box on the QC Plot form for choosing the control. If left blank and the plotting needs the control, a popup will allow multiple controls to be chosen like earlier versions. The Y-Axis edit box was enlarged to support editing.

Changed the TestCode field in the tblTestDetail table to required and the TestCode index to DisallowNulls. Any null entries will be automatically updated to the hexadecimal representation of the unique TestID number. The TestCode field can no longer be left blank. Duplicates will be permitted in the interest of importing data from another source, but should be corrected ASAP by the user. This also applies to the SampleCode field in the tblSampleDetail table.

*Version 1.9.6.14

When relinking to a backend on a network drive, CETIS will now convert a mapped drive pointer to a UNC pointer. Recent Windows updates has made mapped drives unreliable. It is recommended that the /wrkgrp switch in the shortcut target be edited to use a UNC address to the cetis.mdw file.

*Version 1.9.6.13

Skipped this version number.

*Version 1.9.6.12

Fixed a bug affecting the changing of a Test Type name requiring a restart of CETIS.

Changed the behavior of the alternate hypothesis option box for comparison testing. If an ascending endpoint is selected, CETIS will automatically change the Alt Hypo to $C < T$. If a non-ascending endpoint is selected, it will change it back to $C > T$. If the Alt Hypo is set to $C <> T$ (two tailed), no action is taken.

*Version 1.9.6.11

Changed the location of the license keys from the registry to a file based system due to the possible effect of Windows updates on the registry hives.

Fixed a bug that would import all test batch records even if they were deselected in the Test Import form.

***Version 1.9.6.10**

Fixed a bug introduced in v1.9.6.9 that caused an indeterminate Bartlett's test result to be scored as a passed test resulting in the possible selection of a parametric method when it should have been a non-parametric because the homogeneity of variance could not be ascertained.

***Version 1.9.6.9**

Changed how CETIS deals with all or none data where assumptions tests cannot be completed due to zero range or zero variance. CETIS will now record the attempted calculation and list the results as "Indeterminate."

Fixed a bug that reported Bartlett's test results when it should not have due to floating point decimal errors.

Eliminated ANOVA F test results when the MSE is zero resulting in a divide by zero error. Results of the F test will be listed as "Indeterminate." The F stat will be stored as "65556" indicating a divide by zero error.

***Version 1.9.6.8**

Fixed a bug that under some circumstances could have switch the mean and median graphing data shown on the Excel spreadsheet when exporting graph data.

Fixed a bug that prevented the Text Filter on the Global List form from being accessed.

***Version 1.9.6.7**

Fix a bug with the Wilcoxon Rank Sum test when there were large numbers of replicates that caused an overflow error.

***Version 1.9.6.6**

Added a control standard deviation plot to the QC Plotting utility.

***Version 1.9.6.5**

Fixed a bug that prevented the 'Exclude Groups Above Maximum NOEL' option from working properly.

***Version 1.9.6.4**

Added detailed explanation when there is a save fail following data analysis.

***Version 1.9.6.3**

Changed how the p-value is calculated for the Linear Regression parameters. Previous versions routinely used the t distribution. Now the Student t distribution is only applied when the dispersion factor is significantly greater than one (i.e., significant heterogeneity). Otherwise the standard normal z distribution is used to calculate the p-value. The field title is now just Test Stat since it could be either the t or Z statistic.

***Version 1.9.6.2**

Fixed a bug introduced in 1.9.5.7 then caused an error with the custom significant figure rounding algorithm. The bug caused parameters from not being displayed on the Linear Regression and Nonlinear Regression result forms. The bug had no effect on stored parameters or parameters displayed on reports.

Eliminated the choice of the older Access menu system when the Access version is 2010 or later.

Addressed an issue where selecting a new record on the Global Test List did not fire an OnCurrent event due to an Access bug requiring you to select the record somewhere other than the record selector.

*Version 1.9.6.1

Fixed a bug that specified the wrong query on the Summary Report for multiple sample designs.

*Version 1.9.6.0

Fixed a bug that resulted in the Cochran-Armitage and Rao-Scott adjusted Cochran-Armitage Omnibus Trend tests from appearing on the the analytical reports within the Auxiliary Tests subreport.

*Version 1.9.5.7

Fixed a bug that exported the Cochran-Armitage plot data slightly different than true mean and median due to floating point errors

Fixed the Verified Conc utility due to a permission issue.

Fixed a floating point error when formatting report data using a custom significant figure rounding algorithm. For example, the value 0.1675 would have been reported as 0.167 instead of 0.168 when the precision is set to three.

*Version 1.9.5.6

Fixed a bug that in some circumstances prevented graphics from being exported to a server drive.

*Version 1.9.5.5

Fixed a bug that exported the wrong plot when exporting plots from the Comparisons, Linear Regression or Nonlinear Regression result form.

*Version 1.9.5.4

Fixed a bug that prevented some of the TAC parameters from being printed on analytical reports when the NOEL/NOEC or LOEL/LOEC was not definitive (i.e., qualifer was "<" or ">").

*Version 1.9.5.3

Fixed a bug that cause a missing parameter error when printing TSK or Linear Interpolation analyse reports.

*Version 1.9.5.2

Fixed a bug that could cause the program to hang when linking to a different backend database.

*Version 1.9.5.1

Fixed an issue with the Residual Analysis subreport running across multiple pages.

Fixed an issue with Tarone Test when all replicate proportions are zero or one, resulting in a divide by zero error.

Changed the formatting of exported plots to match the format displayed on reports. This change was made to make the printouts look better on monochrome printers. Exported plots and associated data are now saved to the Backend folder.

*Version 1.9.5.0

The QImLicenseLib.dll (.Net Framework 2.0 version) was changed to QImLicenseLib.Net4.dll (.Net Framework 4.0 version) for simpler compatibility with newer versions of Windows.

Added the Tarone C(alpha) test for overdispersion applied to binomial data when calculating the

Cochran-Armitage Trend test, Linear Regression or Nonlinear Regression modules. Tarone, R.E. (1979).

Testing the goodness of fit of the binomial distribution. *Biometrika*, 66 (3), 585–590.

Added the Rao-Scott adjusted Cochran-Armitage Trend test. The Rao-Scott adjustment compensates for design effects (significant differences between the observed and predicted variance with groups) indicating overdispersion or beta-binomial distributions. Rao, J., & Scott, A. (1992). A simple method for the analysis of clustered binary data. *Biometrics*, 48(2), 577-585.

Added a PMSD calculation for both linear and non-linear regression. The PMSD is the 95th percentile delta value for the threshold parameter divided by the response range. Any chosen effect level below the PMSD is suspect and OECD recommends scrutiny of the results. The PMSD is displayed on the Result forms and the Analytical reports. The PMSD is only calculated when the threshold parameter is modeled and has 95% confidence limits.

Added the 'Threshold' response (abbreviated as 'Thresh') to the Nonlinear Regression Summary subform. The 'Threshold' field represents either the modeled threshold response if optimized or the control response if not optimized. The 'Threshold' parameter on the Linear Regression report has been changed to either the estimated threshold if the 'Optimize Threshold Response' option is selected, or the fixed threshold based on the inputted value or the control if the 'Optimize Threshold Response' option is de-selected. Generally the threshold response should always be optimized or modeled unless there are compelling reasons not to.

Removed the Critical F stat from the Linear Regression and Nonlinear Regression subforms to make room for new fields. Since the F-Test p-value is provided, there is diminished reason for printing the critical value.

Added the ability to save the concentration-response plot and/or the underlying data automatically when saving a result set. CETIS will create a folder using the name of the Test Code and assign the

Analysis ID as the file name. The plot file will have the wmf extension and the underlying data will have the csv extension added to the file name. Both the 'Save Plot' setting and the default 'Status Level' setting are now non-volatile and will be saved from one analysis to another unless changed.

Changed the command 'Create Reports' to 'Test Reports' in the shortcut menu associated with the Global Test List form.

*Version 1.9.4.12

In an effort to expand the use of nonlinear regression models that can be applied to the Gamma endpoint (ratio of light loss to light remaining), CETIS will now check if the term "Gamma" is found in the endpoint name, and if found, does a special calculation for the IC_x or EC_x estimates as it does for the Microtox Gamma model. Although CETIS has historically provided the "Microtox Gamma" model, it may be found that other CETIS models such as the 3P Log-Logistic or 3P Log-Gompertz provide a better fit. Only use the term "Gamma" in an endpoint name where the endpoint is a ratio similar to the above.

Failure to take heed will result in error.

*Version 1.9.4.11

Fixed a bug that prevented the "Save and Print Report" feature from working properly.

*Version 1.9.4.10

Fixed a bug that started with the addition of Analysis Comments (v1.9.4.0) that caused non-target graphs on open forms from being changed inadvertently. Changing the page order of the tab control addressed the problem.

***Version 1.9.4.9**

Fixed a bug that prevented Analysis Comments from appearing on reports when either Test Batch Comments, Sample Comments or Test Comments are lacking.

Removed the "Comments:" label from the comments subreport as it unnecessarily adds an extra line to the report which could cause other subreports to spill onto another page.

***Version 1.9.4.7**

The QImLicenseLib.dll (.Net Framework 2.0 version) was changed to QImLicenseLib.Net4.dll (.Net Framework 4.0 version) for simpler compatibility with newer versions of Windows.

***Version 1.9.4.6**

Fixed a glitch that prevented certain nonlinear regression models from running when analyzing ascending quantal data.

Fixed a glitch that prevented the use of response variable transforms when analyzing ascending quantal data.

Changed to Inno Setup installer to mark the short-cuts with the Run as Administrator flags. This will avoid problems trying to activate the license.

***Version 1.9.4.5**

Changed how the Effect Levels listbox is updated after changes are made.

Fixed a glitch that could possibly return the wrong p-value, and therefore result, when conducting the Mann-Whitney/Wilcoxon tests and there are excess ties with unbalanced design.

Any test that can be calculated by Monte-Carlo will now uniformly use the Monte-Carlo method even when there are no ties. This was done to apply Monte-Carlo methods to all group comparisons.

There are four possible codes used the p-value "type" such as "E" (exact permutation method if ties or Harding algorithm if no ties), "C" (cumulative density function), "A" (large sample approximation) and "M" (Monte-Carlo method).

***Version 1.9.4.4**

Made a change to keep the Distributional Tests subreport from splitting onto two pages when printing a Comparisons report.

***Version 1.9.4.3**

Fixed an unknown Access bug that was causing a popup message to appear when the Global list was sorted or filtered.

***Version 1.9.4.2**

Fixed a bug that prevented LR and NRL Lack of Fit calculations where there was not at least 2 replicates per group.

*Version 1.9.4.1

Fixed a bug introduced into v1.9.4.0 that prevented QC Plots from being generated.

Fixed a bug that Win10 Creator introduced that changed the behavior of variant data type. This Win10 bug affected QC Plots at a minimum.

Increased font size on QC Plot report.

Set auto-compact criteria of front-end database to 15 mb.

Changed how methods are listed on the Test Reports form to make it easier to determine what should be printed.

Fixed a bug on the Point Estimates tab of the External Data Entry form.

*Version 1.9.4.0

Redesigned the Test Type form where you enter new or edit existing fields in a Test Type Table. The field ordering can now be changed from within this form. Click the record selector of a field you want to move while holding the Alt key down, release the Alt key and click at the insertion point. The field ordinal position will then be changed. Alternatively you can change the ordinal position number for a field by changing the entry in the Order column and then clicking the edit box or anywhere in the form. You will see the field ordering change based on your entries. Once the order is satisfactory, you save the new ordering by clicking the Update button.

Eliminated the boolean "OfficialRecords" field in favor of a new integer based Status field. You can now assign different status levels to saved result records. For instance a 0 could be assigned to all unofficial data analyses, a 1 could be assigned to all official data sets, a 2 could be assigned to all result sets that represent the most sensitive endpoint, and a 3 could be assigned to the final reportable results. You are free to use whatever status assignment system makes sense to your situation.

The status level can be changed for any result records at any time in the Create Reports form. You can now select records based on the status level in the Create Reports form. Data can be exported and imported based on the status levels assigned. Queries can be based on assigned status levels. For instance you can specify a "2,3" text string to extract only records that were assigned either a 2 or 3 status, i.e., either the final results or most sensitive results. The status level can be set at the time data is after an analysis has been done or from the Create Reports form. The status levels can represent what ever you want but if working with a group of CETIS users, you should agree to some system of uniformity. This new system provides much more flexibility in managing the data.

Status Level and Sorting selection are now saved and applied when the Create Reports form is first opened.

Added new flexible sorting capability to the Create Reports and Ad Hoc Query forms.

Added a new Endpoint cloning feature in the Test Types form. This is helpful when you have a multi-day Test Type with multiple Endpoints and only the endpoint name and field references change, you can copy an existing endpoint and then modify the few fields including the Endpoint Name that needs to be changed.

Changed how Test Type properties are returned. CETIS now references the tables in the back-end database instead of the table links in the front-end database. The Date Created and Last Modified information returned will be more meaningful.

Moved the checkmark indicating the most sensitive endpoint to the left and added a new column labeled "S" indicating the user assigned status level.

Added 30 more fields to the Test Data form, providing for a total of 80 test data fields.

Added the PC Code (U.S. EPA Pesticide Chemical Code) field in the tblMaterialCodes table. The CAS# and PC Code are now displayed in the Samples subreport.

Added the CAS#, PC Code, Taxon, Software Version, Status and Verified fields as extractable field options for all appropriate ad hoc queries.

Changed the sort order for the point estimate results and comparison result queries.

Increased the font size of the graph labels appearing on reports.

Added a checkbox on the Randomization tab of the Test Design form for auto-filling the seed number.

Fixed a bug that caused an error when the same control is compared to itself and the Primary Control/Secondary Controls option is selected.

Fixed a bug that prevented multiple linear regression models from running when the "Calculate All" feature was used, even though multiple models are specified by the chosen Decision Tree.

You can now save comments associated with an analysis. The comments are extractable with ad hoc queries and will also appear on all Analysis reports. The comments are limited to 255 characters.

Created a new form for entering legacy endpoint data derived from software other than CETIS. This allows both CETIS and external data to be included in a query. The form can be accessed by clicking the "Enter External Data" button on the Analysis Options form. This external data cannot be used to generate CETIS reports but will appear in queries built by the Ad Hoc Query tool. In the Create Reports form, any entered external data will be marked with an "X" to distinguish the external data from CETIS data.

Fixed a bug that possibly listed the wrong binomial on the point estimate analytical report when more than one endpoint was printed at the same time. This did not affect the results in anyway, only the binomial at the bottom of the report.

Increased the MaterialCode field in the tblMaterialCodes and tblSampleDetail tables to 10 characters.

Updated the tblMethods and tblNRModels tables in the back-end database.

Fixed an Access screen updating issue when creating complex multipage reports.

***Version 1.9.3.0**

A new version of QLMLicenseLib (v7.2.15123.1) is being used.

Only local admins can now activate or deactivate (release) a license.

Added error handling when default printer device cannot be found.

Added an auto-compact feature upon closing when the cetis.mde (front-end database) file bloats beyond 12.5 mb. The cetis.mdb (back-end database) will still need to be compacted regularly by the database administrator.

Added a monotonic Mean and %-Effect columns on the Linear Interpolation and Trimmed Spearman-Kärber analytical reports.

CETIS now deletes any changes to the default system printer when CETIS is shutdown. Additional modification done to the Printer Setup form.

CETIS now tests for and deletes any linked tables not found in the linked back-end database when a different back-end database is selected or the links are refreshed.

*Version 1.9.2.8

Changed the formula for log transformed CV-% displayed on the QC Plot. The previous formula was described by Kirkwood, TBL (1979, Geometric means and measures of dispersion. Biometrics, 35, 908–909). The revised formula is described by Koopmans, L. H.; Owen, D. B.; Rosenblatt, J. I. (1964, Confidence intervals for the coefficient of variation for the normal and log normal distributions. Biometrika, 51, 25–32). The revised Koopmans formula is now $(\exp(\text{SDln}^2)-1))^{0.5}$ while the previous Kirkwood formula was $\exp(\text{SDln})-1$.

Changed the threshold for scientific notation on CETIS reports from $\geq 10,000$ to $\geq 100,000$.

When conducting the either the Williams' or Shirley Multiple Comparison Test, CETIS previously used the dose-response direction assigned to the endpoint when determining the appropriate direction of smoothing (i.e., increasing or decreasing). The new reversion will alert the user and give them a choice when the alternative hypothesis conflicts with the direction assigned to the endpoint.

*Version 1.9.2.7

Added the 3P Indeterminate Order (IORE) model to the Nonlinear Regression module. This model is the same as the 3P Gustafson-Holden (FOMC) model but with a different parameterization.

Changed the recordset type of certain forms to Dynaset (Inconsistent Updates) to address an Access 2010 bug that prevented the checking of records to be deleted, exported or imported.

Re-instated ability of either a CETIS Admin or CETIS User to activate or deactivate a license.

Added a Send Reg Keys button to the Manual Activation tab on the startup screen for sending the required keys to activate a license when the license is in demo mode.

Fixed a bug that prevented the Calculate All feature from working correctly with the Linear Regression module.

*Version 1.9.2.6

Fixed a bug that was introduced starting in v1.9.0.0 that calculated incorrect confidence limits when the Power Transform Both Sides (PTBS) method was used with the Nonlinear Regression module.

*Version 1.9.2.5

For security reasons, only members of the CETIS Admins group can now change the backend database.

The User Name stored in the tblUserLog table now includes the security level the user logged in with, e.g.,

-1="CETIS Admin", -2="CETIS User" and -3="CETIS Viewer".

Added the endpoint name to the "Method Summary" ad hoc query.

Changed the "WET Evaluation" button in the Test Reports form to read "Test Evaluation" since it can be used for more than just Whole Effluent Tests. You can use this feature to mark a data set as reviewed.

*Version 1.9.2.4

Changed the behavior of the WET Evaluation report. It now inherits the options from the summary report including whether you want specific comments, TAC evaluation, summary data, detail data or binomial data pairs to be displayed on the report. It also uses the summary data, detail data and/or binomial data subreports that is also found on the summary report. This will display then entire data set for the endpoint instead of a subset of data that could result if a user deselected certain test groups during analysis. It should also be acknowledged that the summary data, detail data and/or binomial data subreports from the summary report represent the current dataset. If a user edits the raw data and does not replace the old analyses with a new one that reflects the changed data, the reported results may be inconsistent with the raw data you are reporting.

Changed the appearance of the WET Evaluation form, moving the Test Review Comments to its own tab.

*Version 1.9.2.3

Fixed a bug that prevented the summary data for a point estimate analysis from appearing on the WET Evaluation report.

*Version 1.9.2.2

CETIS Users and Viewers are now warned against joining a network database unless they have authorization.

CETIS Viewer can no longer see where the database is stored on the startup screen.

Fixed a bug affecting CETIS Users and Viewers not being able to update the list of extracted fields on the Ad Hoc Query form.

*Version 1.9.2.1

Fixed a bug on the regression analytical reports that may have displayed the number responding or not responding in error (off by one). This was due to a propagated Access floating point error when the proportion responding was multiplied by the total number to arrive at a number responding or not responding. For instance if the product was 62.9999999999, the integer would be 62 when it should have been 63. In no way did this affect your results, the error only affected the "A" field on the report.

*Version 1.9.2.0

CETIS now allows you to choose which type of comment you want displayed on the various reports. As an example you might want Test Batch Comments, Test Comments and Sample Comments displayed on the summary report, but only want the Test Comments on the analytical reports.

When the CalculateAll method is used and the lack of fit test cannot be completed due to insufficient number of replicates, previous versions would assume there was no lack of fit and would not calculate the remaining models or methods in the queue. Now when the lack of fit test cannot be completed, CETIS will continue to calculate all models and methods in the queue.

Changed the behavior of the Test List form when data records are unlocked on the main CETIS form. Prior versions experienced a loss of the current record cursor. Now CETIS will refind the record that was selected prior to unlocking the records.

Fixed a bug that prevented the printing of Summary reports when there are no analyses performed.

A new CETIS LE (limited edition) version has been created specifically for POTWs that only need to analyze point estimates for reference toxicants.

***Version 1.9.1.8**

Changed the formatting of the %Effect field on the Test Evaluation report to match the other reports. The field now uses the built-in "Percent" format.

***Version 1.9.1.7**

Fixed a bug that prevented "non-official" analyses from being exported.

Re-instated permissions of a Level 2 user (member of CETIS Users Group) to delete tests. The original change only existed since v1.9.1.1.

***Version 1.9.1.6**

Added security commands back to the Security ribbon group that were inadvertently removed.

Added the Database Dictionary utility for CETIS Admins and CETIS Users.

***Version 1.9.1.5**

Granted modify permissions to CETIS Viewers for certain queries such as Ad Hoc Query that require modifications in order to be viewed.

Created new code to remove spaces and carriage returns from pasted activation keys due to the user making an error and copying more than just the provided key or pressing the {Enter} key on their keyboard after pasting the activation key.

***Version 1.9.1.4**

A rootfinder is needed for solving for X when X appears twice in a nonlinear regression model. As of v1.8.8.5 the original bisection algorithm was replaced with a more efficient golden section algorithm. It has been found that on occasion the root could not be found because the maximum number of iterations, set at 50, was insufficient. The maximum number of iterations has been increased to 200 which appears to greatly diminish the possibility that a root cannot be found.

Made a tweak to the nonlinear regression graph to show some limited extrapolation to the right of the highest concentration.

This version of the MDE is code signed.

***Version 1.9.1.3**

Extended the usefulness of the 3-P Logistic, 4-P Logistic, 3-P Gompertz, 4-P Gompertz, 3-P Cumulative Normal, 4-P Cumulative Normal, 3-P Logistic+Hormesis, and 4-P Logistic+Hormesis models by allowing the upper asymptote to extend beyond unity when analyzing binomial data with a linear covariate scale.

For the models listed above, the "optimized threshold" is now calculated based on the predicted response at zero, instead of using the upper asymptote as the threshold. Earlier versions used the upper asymptote as the threshold response. Although the fitted upper asymptote can now be greater than one, the optimized upper threshold limit is still set to unity in the case of binomial data since the domain of proportions do not fall outside zero and unity.

Disabled the Edit Trees button on the Analyze Options form for all non-admin users. This was done to remain consistent with the permissions set for various ribbon button commands.

*Version 1.9.1.2

User is provided a second chance to relink to the backend database at startup.

Some re-arrangement and re-naming of existing controls and addition of new controls to the new ribbon.

Added a new command button to the ribbon named "New Tests" that will open the main CETIS form in a special mode that only allows the addition of new records and does not show or allow the editing of existing records. To edit the records just open the "Edit Tests" form.

The main CETIS form now opens in locked mode regardless of the lock state upon closing the form. This change was made to minimize inadvertent changes to existing records.

*Version 1.9.1.1

CETIS will now ask the user if they want to adopt the newer ribbon user interface or stay with the older commandbar user interface. This will be asked the first time you start up a new mde.

Added the option of deleting the 'dddd hh:nn' format from date fields which caused some issues with exporting some ad hoc queries to Excel. This option is available when conducting an intensive repair of a database.

Removed the custom function CSngl from queries that uses Access aggregate functions such as Avg, Min, Max, etc. Because the built-in Access aggregate functions store and calculate the data as a single precision floating point, when Access subsequently displays the results, it converts the results to a double precision floating point. Consequently you may see numbers such as 2.20000004768372 when it should read 2.2. If this is corrected for by re-converting the number to single precision (which the CSngl function did), the built-in Excel exporting utility will convert the data to text. Therefore we will have to live with the bug, the lessor of two evils.

Removed the ability of a Level 2 user (member of CETIS Users Group) to delete tests. Only a Level 1 user (member of CETIS Admins Group) can delete test records.

*Version 1.9.1.0

CETIS running on Access 2010 and later is now utilizing the Microsoft Office Fluent UI. Instead of CommandBar menus, the CETIS user interface will display a custom ribbon with custom tabs, groups, and controls. Most controls have the same or similar name as the predecessor. There are some new features like exporting to Excel or PDF are available on the Output tab. It is expected that in the future, more and more features will be programmed into the custom CETIS ribbon.

A new way of making reports modal until they are either closed or printed will eliminate the hogging of CPU resources during the period a report is kept open.

***Version 1.9.0.19**

Fixed a bug that resulted in a messaged error when more than one linear regression reports are printed.

Modified change made in v1.9.0.18 to avoid '#Error' being displayed when a date is left blank. The #Error caused and error message with sorting and filters.

Reduced the numbers of combo list boxes used on the linear and nonlinear regression reports.

***Version 1.9.0.18**

Changed how ad hoc queries are constructed to avoid a Microsoft Office bug that prevents dates from properly being exported from an Access query to an Excel spreadsheet without error messages.

***Version 1.9.0.17**

As of v1.9.0.17, all cetisinstall.exe files will be code signed and the publisher will be listed as "Tidepool Scientific, LLC". Any other publisher is suspect and should not be installed.

Changed the code behind the Global List form to allow record filtering from the column title for those versions of Access that support it.

Changed the "Zeta" label on the Nonlinear Regression Options subform to toggle between Phi and Lambda depending on whether a regression is weighted or PTBS is used.

***Version 1.9.0.15 and 1.9.0.16**

Changed some internal license activation and startup code.

***Version 1.9.0.14**

Fixed a bug affecting nonlinear regression graphs for some models that resulting in extraneous data being plotted.

Removed "DF", "Trials", "Seed", "TST_b" and PMSD labels from the comparison analytical reports when those data are not applicable to the analysis.

Fixed a bug that printed "MSD" instead of "Ties" when ties were recorded for a non-parametric test were recorded but there were no ties in the first comparison.

Fixed a bug that mis-sorted the labels for linear and nonlinear regression ANOVA tables.

Changed X-scale range of linear and nonlinear regression Plot#3 to overlap minimum and maximum response. Previous versions set the minimum of scale to zero.

***Version 1.9.0.13**

Fixed a bug that failed to establish a new relationship between the tblSampleSources and tblSampleDetail tables when a user inadvertently broke the existing relationship by deleting SampleSourceCode used within the tblSampleDetail table and then attempted to repair the corrupted database. The fix also adds a new entry in the tblSampleSources with the code "UNK" and the description "Unknown Source".

***Version 1.9.0.12**

Fixed a bug that incorrectly presented %Effect data in the WET Evaluation report when multiple endpoints were selected.

***Version 1.9.0.11**

Fixed a bug that incorrectly presented summary data in the WET Evaluation report when more than one hypothesis test or point estimate data set was presented for each endpoint. This normally would not be done so the bug was inconsequential because only a single analysis per endpoint should be flagged as "Official."

***Version 1.9.0.10**

Fixed a bug that prevented the % Effect from appearing on the reports when an endpoint was ascending and quantal.

Added the P Level (i.e., probability) on the Test Result forms for each parameter estimated when conducting linear or nonlinear regression. This can be helpful for determining if a non-zero natural threshold response should be included in the model.

Within the linear and nonlinear regression modules, changed the limits of proportions from 0.0000001-0.9999999 to 0.000001-0.999999 to match the limits set for the EPA Probit v1.4 algorithm. This will have very minimal effect on results, probably at the 6th or 7th decimal place.

***Version 1.9.0.9**

CETIS has now implemented the Cochran-Armitage Step Down test procedure as described in OECD Series on Testing and Assessment, Report No. 54. ENV/JM/MONO(2006)18/ANN. The testing includes a preliminary Cochran-Armitage Omnibus Trend test, a Chi-Square Lack of Fit test for assessing departures from linearity and an overall Pearson Chi-Square test for assessing overall independence. The Cochran-Armitage Step Down test is now available with an ordinal scoring (0, 1, 2,..., k-1) or a numerical scoring with the entered groups or doses serving as the scores. All previous calculations of the Cochran-Armitage Step Down test used the former method.

The test start and end dates as well as the sample and receive dates will now be pre-filled when the "Clone Test" form is opened.

***Version 1.9.0.8**

The linear regression "Model" degrees of freedom is now based on the number of parameters minus one taking into account the intercept. However the "Model Mean Square" is still based on the corrected

Total Sum of Squares. This change will have no effect on the reportable results only affects the F-Test of the model, although rarely. This change maintains consistency with SAS GLM.

The nonlinear regression "Model Sum of Squares" and "Model Mean Square" are now based on the uncorrected "Total Sum of Squares." This change will have no effect on the reportable results and only affects the F-Test of the model, although rarely. This change maintains consistency with SAS NLIN.

Fixed a bug that prevented the regression ANOVA data from being exported along with the other regression data.

Version 1.9.0.7

Changed how licenses are deleted and released from individual computers. A license will now be released and can be installed on a different computer/hard-drive up to five times. After a license has been released five times or more, it becomes invalid.

Fixed a bug that failed to refresh the tabledef link to a cloned test type table created from within the Test Types form. When the test type was opened, the fields were not visible because the tabledef was not updated.

Version 1.9.0.6

Fixed a bug that prevented the saving of queries within the Ad Hoc Query form under some circumstances.

Version 1.9.0.5

Fixed a bug that introduced a very small error to the null variance of the large-sample approximated Jonckheere-Terpstra in the case of ties.

Version 1.9.0.4

Changed the display of the p-value on reports. All values less than 0.001 are displayed in scientific notation. Previous versions displayed values less than 0.0001 as "<0.0001". P values less than the smallest representable single precision value will be displayed as <1.0E-37.

Changed the limits of the DFOP nonlinear model rate constants to be positive for descending curves and negative for ascending curves.

Version 1.9.0.3

Fixed a bug that prevented the dose-response curve from showing when the curve is asymptotic well above the origin.

Disambiguated all VBA string functions with the VBA.String prefix to deal with the failure of Access updates to properly execute the string functions on Access 2010.

Fixed a bug that resulted in #Type? being displayed on the multiple comparison subreport when the group was flagged with an asterisk.

Fixed a bug that set the Fisher Exact p-value to unity in certain cases when the reverse tail is tested such as is done for mortality and the treatments outperform the control. Generally this would have no effect on decision-making or NOEL/LOEL assignments.

Version 1.9.0.2

Fixed a bug that left off the endpoint name from certain ad hoc queries.

Fixed a bug that resulted in the failure to apply the Material Type to certain ad hoc queries.

Version 1.9.0.1

Fixed a bug that incorrectly set the number of significant figures when selecting the Save and Print option for any analysis result form. It is now set to the current setting on the Test Reports form.

Version 1.9.0.0

Significant changes were made to the licensing and installation systems. The changes are beyond the scope of this readme, however. License activation will either be through internet activation or manually once supplied with an activation key and computer key. The new licensing is managed through the Quick License Manager (QLM) System. Do not delete the QLM directory or any files within it or you will not be able to log into CETIS and you will need to reinstall the software.

Installation is now performed with the cetisinstall.exe program. The installation is now uninstalleable. Nearly all

traces other than the backend database will be removed from the computer when uninstalling.

The new installation program should have eliminated issues with the GRAPHS32.ocx not registering on Windows Enterprise version.

The installation no longer modifies your default system.mdw and instead ships with a CETIS specific WIF named CETIS.mdw. It will be stored with the backend database and is referenced through the CETIS shortcut. At your option you can make a copy of the cetis.mdw and rename it to system.mdw, move it to a shared location and then join it. That will make the attachment to the workgroup semi-permanent and the /wrkgrp switch in the shortcut will no longer be needed. Otherwise you will need the shortcut with the /wrkgrp switch intact.

CETIS will no longer ship on CD but will only be downloadable in the future. This will facilitate quick turn-arounds on updating.

The Test Cloning feature has been revised to allow you to modify just about any parameter including Test Type, Test Title, Protocol and Organism. If you know of a test in your system that has at least some of the design you want in the new test, this new cloning feature may be the fastest way to get a new fully designed test into your database. The "Clone Test..." command has been moved into the "Open..." menu of the Global List shortcut since it opens a dialog form.

Reworked and revised the queries behind reports with the goal of reducing the number of open database connections made when creating reports.

Reworked and revised most reports and subreports.

Redesigned the Summary report for multiple sample designs to limit the displayed data to the selected analyses.

Redesigned the Test Evaluation report to limit the Data Summary and TAC subreports to the selected analyses.

Added checkmarks to the most sensitive endpoints on the Summary report.

Redesigned and improved how data worksheets are created. There are a few new options including printing field names vertically and also breaking lengthy names to avoid wide columns.

Reworked the Ad Hoc Query utility for better performance and function. The field selection listbox has been reduced to a single listbox and you can no longer change the sort order. The new ordering groups similar data, for instance TestBatchID, SampleID, TestID and AnalysisID are now grouped together.

Double-clicking a cell on the Test Data or Measurement sub-forms will no longer fill down. The short-cut command "Fill Down" can be used instead. Double-clicking was occurring inadvertently and overwriting data by mistake.

Improved predictor scale collapsing on all point estimate conc response graphs.

Expanded the size of the main CETIS form to facilitate measurement entry. Also added a command button for test cloning.

Redesigned the Test Acceptability Criteria editing form. It now opens and behaves like the Export and Import

forms and you can use filtering and sorting strategies like other CETIS forms. The form will initially be opened locked and will need to be unlocked before records can be edited, added or deleted.

Added a new command to the Format menu named "Alternate Row Color." A true setting will display alternating datasheet row colors if using Access 2007 or higher.

[Edited Oct. 17, 2015]

Nonlinear regression confidence limits are now based strictly on $F(\alpha, 1, df)$ quantiles and the changes listed below for v1.8.8.5 have been deprecated. In other words the heterogeneity factor is no longer used to inflate the confidence limits as is done for linear regression when significant heterogeneity is detected.

Version 1.8.8.5

Binomial nonlinear regression confidence limits are calculated as they are for the linear regression module. CETIS calculates a heterogeneity factor (hf) when significant heterogeneity is detected (significant chi-square test). The hf is used to inflate the diagonals of the covariance matrix to take into account the over-dispersion and will subsequently base the confidence limits on $t(\alpha/2, df)$ or $F(\alpha, 1, df)$ quantiles. All other distributions disregard the heterogeneity factor regardless of the outcome of the heterogeneity test. The heterogeneity factor is calculated as the Pearson chi-square divided by the df. In cases where the heterogeneity factor is not applied, CETIS bases the 95% CL on the $Z(\alpha/2)$ or the Chi-square ($\alpha, 1$) quantile as appropriate.

Changed the confidence limits on the linear and non-linear regression dose response graphs to be based on $F(\alpha, 1, df)$ instead of $F(\alpha, n \text{ params}, df)$. This will display slightly narrower limits.

Changed the log likelihood equations to full log likelihoods by adding the likelihood constants. This has no effect on determining convergence.

[Edited Oct. 28, 2015]

Due to the change in the log likelihood equations, Poisson and Negative Binomial weighting is only applicable to discrete integer data such as counts. To mimic the Poisson weighting, the Box-Cox with phi set to 0.5 will set the weighting to the inverse of the response.

Changed the labeling of parameters to lower case and changed some alphabetic letters to lowercase greek letters.

Nonlinear regression model names and functions are displayed after being selected.

CETIS estimates the MLE phi parameter (with confidence limits) used for the gamma, inverse Gaussian, negative binomial and beta binomial distributions. The limits are estimated using the "golden section" numerical optimization method. If a reasonable phi parameter has been estimated, the calculated deviance (likelihood ratio) and Pearson chi-square should approximate the degrees of freedom and phi should be significantly greater than zero but less than one. In fact, beta binomial weighting with a phi of zero is equivalent to binomial weighting and negative binomial weighting with a phi of zero is equivalent to Poisson weighting.

Double-clicking on the "Comparisons" dropdown listbox will allow you to edit the hide attribute of the comparison methods available. This is useful to reduce the number of methods shown in the listbox. If a template is chosen that requires a hidden method, CETIS will unhide it automatically. Be forewarned that this list is maintained in the front-end, so you may need to re-edit the list if you receive a new version.

Changed the labeling of certain functions on both the Analysis Options form and various analytical reports.

Eliminated the PMSD calculation for the Welch TST method per EPA request.

Changed how two sample comparison tests are reported and will no longer give the results in the NOEL/LOEL form. Summary report now has a Multiple Comparison and Single Comparison subreport, in addition to the normal Point Estimate subreport. Point estimate and comparison results have been shifted to the right side of the Summary report to be consistent with the Analytical reports.

The "Test Reports" form now sorts analysis records with the analysis dates in descending order.

Added a new command to the Database menu named "Change..." that will allow you to relink to a different backend database. The previous command was named "Refresh Table Links..." and was nested in the Database>Utilities>Back-End Database> submenu. The Refresh Table Links..." command has been retained but will only refresh the links to the current backend database, while the new "Change..." command allows you to select a different backend database.

Version 1.8.8.4

Changed how the data is organized for the Fisher Exact test and Cochran-Armitage test. CETIS reverses the NR (not responding) and R (responding) columns when an ascending response is detected. The results remain the same.

Changed the beta binomial weighting to the special case of the Dirichlet-Multinomial distribution to match that of SAS FMM procedure.

Version 1.8.8.3

Added the beta binomial weighting in the nonlinear regression module to address over-dispersion when analyzing binomial data (see Brooks, R. J. 1984. Approximate likelihood ratio test in analysis of beta-binomial data. Appl. Statist. 33(3) 285-289). Likewise the negative binomial distribution can be used for Poisson data when over-dispersion is apparent. The phi parameter is estimated using the concentrated likelihood method (See Seber and Wild, 1989).

Fixed a bug that resulted in the nonlinear regression result form from not appearing on the screen when the total number of iterations exceeded the maximum set.

Version 1.8.8.2

Fixed a bug that was introduced in v1.8.8.1 where the nonlinear regression results are incorrect if a Y transform was chosen.

Version 1.8.8.1

A grouping code can now be used to group together nonlinear models that can be run simultaneously. For instance the grouping code "A3P" will run all common log-based 3 parameter models. You can then sort through and choose the model run with the lowest AIC or BIC. Adding a letter prefix allows the list to be sorted into an order most often used, but any coding system can be used. The group or groups of models can be selected from the "Model Group" listbox. If a new model is selected from the "Function Parameters" drop-down list, any selections in the Model Group listbox will be deselected. Double-click either the "Function Parameters" drop-down list or the "Model Group" list to edit the groupings.

You now have the ability to reduce the number of models in the nonlinear regression model list by changing a

"Hide" attribute for those models not being used. If you select a template for a model that is hidden, it will be unhidden. Double-click either the "Function Parameters" drop-down list or the "Model Group" list to edit the "Hide" attribute. Be forewarned that this list is maintained in the front-end, so you may need to re-edit the list if you receive a new version.

Added more digits to the parameters and parameter SE on the Linear Regression and Nonlinear Regression result forms. This was done so you can compare results to certified results to ten or eleven digits.

The matrix condition number for the pseudo-Hessian is provided at the end of the nonlinear regression iterations table when the algorithm fails to converge. The matrix condition number is defined as the ratio of the largest eigenvalue to the lowest eigenvalue. Large ratios indicate an ill-conditioned matrix and the likely reason why convergence failed.

***Version 1.8.8.0**

Changed GUI to make the screens easier on the eyes and more pleasing to view.

CETIS now forces the binomial weighting in the nonlinear regression module when a data type is quantal and prevents binomial weighting when the data type is not quantal. This will prevent inadvertent mistakes in selecting the data compatible weighting schemes. The rule applied when multiple endpoints are analyzed simultaneously is all quantal data sets automatically switch to binomial and all non-quantal data sets will switch either to the normal weighting or any other non-binomial weighting that currently is selected.

Changed the "NP ANOVA" label to "Omnibus" and the "Auxiliary tests" label to "Control Trend and Outlier Tests" on the Comparisons tab.

Changed displayed confidence limits on graph to Wald type limits for both the linear and nonlinear regression modules.

For each nonlinear regression model, added the y domain on the dropdown list and if the model is a preferred model marked with an asterisk ("*").

Changed Analysis tabs to read "Group Comparisons", "Linear Regression (GLM)", "Nonlinear Regression (NLR)", "Linear Interpolation (ICP)", and "Trimmed Spearman Kärber." Previous tabs were marked "Comparisons", "Linear Regression (MLE)", "Nonlinear Regression", "Linear Interpolation", and "Spearman Kärber".

Added the Canonical Link description to the Linear Regression (GLM) tab.

***Version 1.8.7.21**

Removed the continuity correction for the Cochran-Armitage Step-Down test. Although some authors suggest that a continuity correction should be applied, it has been decided that the correction would not be applied so it is consistent with the SAS implementation.

Fixed a bug that prevented the last group from being displayed on the Fisher Exact graph report.

***Version 1.8.7.20**

Fixed a bug that prevented a new test type table created in the back-end database from being linked to the front-end database.

***Version 1.8.7.19**

Tweaked algorithm used to adjust reported single precision value to chosen significant figures.

***Version 1.8.7.18**

Corrected a bug with Shirley's test when there are ties.

***Version 1.8.7.17**

Added 4 new nonlinear regression models based on OECD exponential family #2, #3, #4 and #5 algorithms (Report No. 54. ENV/JM/MONO(2006)18/ANN).

***Version 1.8.7.16**

CETIS will no longer allow a linear interpolation calculation with only two groups.

***Version 1.8.7.15**

Selecting the all-pair-wise comparisons option with a Fisher Exact test in previous versions was invalid. The code has been changed to allow this although it is not recommended due to the very conservative results you will obtain.

***Version 1.8.7.14**

Changed how '95% confidence limits' are calculated for the LC50 binomial method. As long as the number of test subjects in the bracketing concentrations are greater than 5, the 95% CL are simply the untransformed bracketing concentrations. This change is consistent with Stephan (1977).

The formula for the "Combined Proportion Normal" endpoint used for bivalve and echinoderm larval development tests was wrong prior to v1.8.7.14. The formula read: 'IIF([#Normal]>[Initial],[#Counted],[Initial])' and should read 'IIF([#Counted]>[Initial],[#Counted],[Initial])' or 'IIF([Final]>[Initial],[Final],[Initial]).' Please make this correction in your database under the 'Development-Survival' test type.

***Version 1.8.7.13**

Version number skipped...

***Version 1.8.7.12**

Fixed a glitch that prevented data set with a divide by zero error from appearing on the Summary or Test Evaluation report.

***Version 1.8.7.11**

Fixed a glitch on the Summary TAC subreport where not all TAC criteria were printed.

Fixed a glitch that could result in the wrong number of total pages on a report, whereby a particular page could exceed the total number of pages.

***Version 1.8.7.10**

Changed the Summary Report to reflect cases where a divisor cell is null or missing, for example the number of exposed individuals.

Added an "Include Raw Data" option for the Measurements Report. Setting this option to false will prevent the raw data for the replicate measurements from being displayed.

***Version 1.8.7.9**

Corrected a bug that prevented the test and sample measurement subreports from appearing on the

Measurements report.

Changed the behavior of the 2P Exponential nonlinear model when a data set is quantal.

Changed how control data appears in the report tables based upon the assigned sort order set within the Control Types list (i.e., tblControlCodes table). Primary controls will appear first then secondary then tertiary controls.

The PMSD is now calculated for the Welch TST test.

***Version 1.8.7.8**

Addressed a bug that potentially would yield a wrong median displayed on the reports when comparing multiple controls. The bug had no affect on results.

Fixed a bug related to the Save and Print feature.

***Version 1.8.7.7**

Addressed a bug that could potentially cause Access to freeze when a test design is changed following a fill down operation on the Test Data form.

Changed behavior of expandable text boxes on the Test Types form.

Internal variable name changes.

***Version 1.8.7.6**

Added an error message if a calculated proportion is greater than one or less than zero, indicating a data entry error.

***Version 1.8.7.5**

Fixed an Access bug that affected French language users when trying to open the Test Data form.

***Version 1.8.7.4**

Revised how graphs are created for Fisher Exact and Cochran-Armitage analyses on binary data. If the test groups were replicated, CETIS will create a modified box plot (i.e., no whiskers) similar to the box plot created for continuous data.

Graphs on the comparison analytical reports now show the control code on the abscissa scale (e.g., "0 D").

A test type can now have multiple default endpoints. Previous versions allowed only a single default endpoint. If more than one endpoint is designated as a default endpoint, they will all be initially selected in the Available Endpoints listbox. This new feature can be used effectively with the Calculate All button.

***Version 1.8.7.3**

The Analyst drop-down combo-boxes are now sorted by Analyst Name instead of Analyst Code. You can enter the Analyst Name with the last name first in the tblAnalystCodes table to aid in selecting the correct analyst.

***Version 1.8.7.2**

Fixed a bug that failed to sort the controls on the Test Evaluation report, resulting in the %Effect to be based on the first alphabetically sorted control.

Changed how users are logged in to database. Previous versions showed user name as a combination of a code and the Access user name. The current version will show the code and the Windows account name.

***Version 1.8.7.1**

Unlocked the Database>Import submenu for members of the CETIS Users group.

***Version 1.8.7.0**

Fix a bug that affected the 'Calculate All' feature when both quantal and non-quantal endpoints are selected.

Changed the labeling of the Graphical/Binomial method to strictly apply to all or none effect data sets.

Revised how the linear and nonlinear concentration-response plots are generated.

***Version 1.8.6.9**

Revised report queries to increase report generation speed for large datasets.

***Version 1.8.6.8**

Changed Data Dictionary report so the Field Name and Field Caption can text wrap.

***Version 1.8.6.7**

Reorganized/consolidated Test Data and Measurement Data shortcuts in an effort to avoid an idiosyncratic Access bug.

***Version 1.8.6.6**

Changed the listbox in the Test Reports form from a simple multi-select listbox to an extended-select listbox. Use the control key to simulate the old system and the shift key to select a block of records.

Consult the Access help files if you are unsure how to use an extended select listbox.

Revised and streamlined some queries used to generate analytical comparison reports. These changes were made to speed up report generation when there are large numbers of comparisons to be printed all at once.

***Version 1.8.6.5**

Changed the behavior of the default data transforms that can optionally be specified for each endpoint. If a default transform for an endpoint is specified on the Test Types form, during calculation CETIS will check if the Transform combo-box on the Analysis Options form is set to "Automated Decision Tree." If it is, then it uses the default transform. However, if you manually select a different transform, such as "Untransformed," on the Analysis Options form, then that is what is applied to all calculations.

***Version 1.8.6.4**

The mean (red dot marker) on the comparison stacked bar plot now represents the back transformed mean if a data transformation has been chosen. All other features of the stacked bar graph are based on the untransformed statistics. Previous versions showed the red marker as the ordinary group mean of the untransformed variates.

Fixed a bug that prevented the display of the plot median on the comparison analytical reports when the median was less than the mean.

Fixed a bug that was inadvertently displaying a plot reject line on the comparison analytical reports for certain non-parametric methods.

***Version 1.8.6.3**

Fixed a bug that prevented the Repair Corrupt Database command from appearing after the database has been diagnosed.

Added the operating system information to the diagnosis printout.

***Version 1.8.6.2**

Fixed a bug that prevented the use of a cetis.mdb file to serve as the donor database when importing data.

***Version 1.8.6.1**

Fixed a bug that prevented the linear regression graph from being printed when the threshold response was zero.

***Version 1.8.6.0**

The 'Batch Endpoints' form has been deprecated in favor of a multi-select listbox on the Analysis Options form that will perform like the older Batch Endpoints form. Also a new command button named 'Clear all' will automatically close all pending results that have not been saved.

Due to issues with Windows 7 read/write permissions, changes in v1.8.5.5 were short-lived. The CETIS license files will now be maintained in the %allusersprofile%\application data\tidepool scientific\cetis folder (i.e., c:\programdata\application data\tidepool scientific\cetis folder in Windows 7) as a public or backup license and the %appdata%\tidepool scientific\cetis folder as a private or working license. If a new user is granted permission to use CETIS, then they will get a working copy of the public license within their profile. Users will still need to have read/write permissions in both folders referenced above in order to use CETIS.

Since Vista/Windows 7 will not allow read/write permissions for the Program Files folder, the revised setup.mde will suggest the %allusersprofile%\application data\tidepool scientific\cetis location to install the software. It can also be installed in the root directory or anywhere that read/write permissions can be granted to non-admins.

***Version 1.8.5.5**

The backup cetis.lic file is now kept in either the System32 or SysWOW64 folder depending on the bitness of your operating system. You must be granted permissions to read/write to these folders in order to use this file.

The cetis.lic file is now maintained with the cetis.mde file. The cetis.lic file is still required to use CETIS so do not delete it.

Added a new messaging system when analyzing data. Previous versions could potentially truncate the message if too long.

Fixed a glitch that prevented the Grubbs test from running on some quantal data sets using the linear interpolation or trimmed Spearman-Kärber methods.

***Version 1.8.5.4**

Added sorting ability in the Create Reports form.

Added warning message when changing test types.

***Version 1.8.5.3**

Fixed a bug that gave incorrect 95%CL on the Summary reports. The 95%CL on Analytical reports were always correct.

Fixed a bug that inappropriately messaged ties were found and that a Monte Carlo calculation should be done, even though $N \leq 25$ and CETIS calculated an exact permutation result. This messaging error would only occur if multiple test groups were selected for the Mann-Whitney test.

***Version 1.8.5.2**

Removed a restriction allowing only a single control data point per day. Now if you have multiple test batches on a given day, CETIS will plot the control data for each test batch.

***Version 1.8.5.1**

Fixed a bug that prevented some of the nonlinear regression X and Y transforms from being used.

***Version 1.8.5.0**

Added a new feature that allows you to clone any test type with all associated endpoints. Both fields and/or endpoints can be limited as needed and all fields and endpoints can be later edited. This feature is helpful when you need to create a similar but slightly different test type that already exists in your database. Right-click on a test type in the Test Types list to access the 'Clone Test Type' command.

Test type names can now be easily renamed. Right-click on a test type in the Test Types list to access the 'Rename Test Type' command. You will be prompted for a new name limited to 30 characters in length. Use caution when using this feature if you share data with others since changing the test type name may have significant impacts on sharing data. The renaming should be limited to test types that you have created not those originally shipped with the software.

If a test type table has not been populated and you attempt to delete an endpoint associated with the test type, CETIS will ask if you want to permanently delete all endpoints and the test type table in one operation. Only use this feature when you are certain there is no chance you will be using the test type at a later time.

Reorganized/consolidated shortcut and main menus. Made use of submenus to better organize tasks.

No updates to the backend with this version.

***Version 1.8.4.32**

Fixed bug that prevented the nonlinear regression AutoFind feature from working properly when the endpoint is ascending and quantal.

Fixed a bug that in some cases did not show the upper reject line on the comparison plot when a two-tailed test is selected.

***Version 1.8.4.31**

Fixed a bug that repeated the data for the first control when printing an analytical report for the comparison of two controls.

***Version 1.8.4.30**

CETIS will now allow a field data type change from the Test Type form.

Modified the QC plotting to allow a control code(s) to be selected for both single and multiple sample designs simultaneously.

***Version 1.8.4.29**

Fixed a bug that may have caused the Fill Selection and the Clear Selection short-cut command to only act on a single column when multiple columns are selected.

Controls in a multiple sample design can now be given a control code to make analysis and control selection easier. Multiple sample designs can now be analyzed much like a single sample design with separate control and treatment lists.

CETIS now limits the samples printed on the analysis report to the groups selected for the comparisons in a multiple sample design. Previous versions printed all samples that are batched into the multiple sample design.

CETIS can now print measurement and summary reports even if no analyses are selected. This may be of use if you have not calculated any statistics but want to print out the raw and summarized data.

CETIS will print all endpoints for which there is valid data in at least one replicate.

Modified how CETIS behaves when reports are printed.

Added a command button on the QC Plot page that will set the minimum y-axis scale to zero.

Control data from both a multiple sample and single sample designs can now be combined when creating a QC plot. CETIS will either use the relative position or group number, or will use the selected control code. If the "*" item is selected, CETIS will return the control data from the first group in a multiple sample design. If the "***" item is selected, CETIS will return the control data from the second group, and so on. This strategy will only work when you are consistent where the control samples are placed in the design. With the new capability of adding control codes to samples in the multiple sample design mode, this will be the preferred way of plotting control data from multiple sample designs.

Both multiple sample and single sample controls can now be plotted simultaneously.

Control codes can now be updated from the Test Design form.

The sequential group number for multiple sample designs will be displayed in the control and treatment lists on the Analysis Options form.

Fixed a bug that printed a passed test when the TST method was used on multiple sample designs when it should have printed a failed test.

***Version 1.8.4.28**

Eliminated the drop-down field heading on some subform datasheets that show on Access 2007 and 2010 versions. The behavior of the short-cut menus changed by necessity.

Added the "User and Group Permissions" command and "Workgroup Administrator" command to the

Database>Security submenu. The "User and Group Permissions" command can be used by a designated admin to lock down certain objects that can only be accessed by the user that is left with permissions. Only the CETIS Admin user will have these special admin rights, so CETIS Admin should be given a password.

Reworked the Test Type edit form. Fields can be renamed or deleted from this form now. If Fields are renamed, then you will need to adjust the endpoint expressions accordingly. Field renaming should be done sparingly and not be done where different database users are attempting to share data.

***Version 1.8.4.27**

Added a Output To...Rich Test Format command on the reports shortcut menu. Unfortunately the MS Access RTF converter is not well designed and is known to have various bugs. If you need to convert the reports into Word documents, it may be far better to output as a pdf file and then convert the pdf to a Word doc or docx file.

Fixed a bug that prevented the binomial data for the controls from being printed on the Analysis reports when the control data was pooled. If the control data is pooled, CETIS will print all the control data, including controls possibly not pooled, on the binomial data subreport. Due to a limitation of the data that CETIS stores, the binomial data subreport will not be limited to just the pooled controls if there are more than two types of controls.

***Version 1.8.4.26**

Added the Analyst code to the test batching subform. You can now specify the analyst for a test without going to the "Individual Test" tab.

***Version 1.8.4.25**

Changed how columns are sized on the Measurements tab of the Test Data form.

***Version 1.8.4.24**

Changed the Data Dictionary utility so you can now select which tables to use for the dictionary if the entire collection of linked tables is not desired.

***Version 1.8.4.23**

Changed how columns are sized on the Test Data tab of the Test Data form. The user can adjust the column width and save the sizes, however, it will also set the minimum width based on the character length of the caption.

Removed the field caption dropdown shortcuts from the Testbatch, Sample and Test Measurement subform.

***Version 1.8.4.22**

Added Analyst field to the Global List.

CETIS Users, in addition to CETIS Admins, can now export data.

Modified the TSK algorithm so that if no control is selected, CETIS automatically sets the lower threshold option to "Assume Zero Response."

Changed the TSK algorithm to address a specific and unusual case where 50% trim is required. CETIS will calculate the midpoint of all concentrations (log transformed) yielding 50% effect.

***Version 1.8.4.21**

Addressed a minor bug that affected the updating of the short-cut menu used for all reports.

***Version 1.8.4.20**

Changed how reports are printed and how printers can be set. CETIS now closes a previewed report before printing it. This should eliminate cases where part of the reports are missing.

***Version 1.8.4.19**

Fixed a bug that incorrectly labeled the alternative hypothesis of the TST hypothesis test as $C^*b>T$ instead of $C^*b<T$.

***Version 1.8.4.18**

Fixed a bug that resulted in the wrong Binomial Data subreport showing in the Analysis Reports when more than one analysis is printed simultaneously. The Analysis Reports are now sorted first by Endpoint Names, then Analysis Date.

***Version 1.8.4.17**

Modified the algorithm used to calculate the Studentized Maximum Modulus distribution where the Satterthwaite-Welch df is a non-integer. The SW df is still converted to an integer when stored in the database.

***Version 1.8.4.16**

Fixed a bug with the "Add Trusted Location" command.

Fixed a bug with the "PDF Format" and "XPS Format" as output options and created a new submenu named "Output To..." where the new commands can be found.

***Version 1.8.4.15**

Added "PDF Format" and "XPS Format" as output options on the report short-cut menu.

***Version 1.8.4.14**

Added a new menu item named "Add Trusted Location" that will allow Access 2007 and 2010 users to include CETIS in the list of Trusted Locations. This requires a change to the registry.

Modified the Export... command for reports so that Access 2010 can now output the report to alternative formats.

***Version 1.8.4.12**

CETIS checks to see if the tblComport table is present in the backend database and creates one if it is missing.

***Version 1.8.4.11**

Changed how the initial parameters are calculated for the nonlinear regression module.

***Version 1.8.4.10**

Added the type of p-value calculated on the Comparison result form. The key is "A" = Large Sample Asymptotic, "C" = Cumulative Density Function, "E" = Exact, and "M" = Monte Carlo.

Replaced a missing "Data Entry Shortcut" popup menu.

Programmed CETIS to run an exact permutation calculation for the Mann-Whitney and Wilcoxon Rank Sum

tests if there are ties within a group but not necessarily amongst groups.

***Version 1.8.4.9**

Added additional X and Y transforms to the nonlinear regression module.

Made a change in how CETIS calculates the exact permutation p-value for the Mann-Whitney and Wilcoxon Rank Sum test when the C<T alternative hypothesis is chosen.

***Version 1.8.4.7**

Changed the method of calculating the ANOVA table for both the linear and nonlinear regression modules.

Added negative binomial weighting scheme to the nonlinear regression module for addressing over-dispersed Poisson data. If Zeta is left on 'Auto,' CETIS will calculate the best fit zeta parameter resulting in the chi-square equaling its expectation. The user also has the ability to set the zeta parameter to any number greater than zero. Also added a new log-likelihood equation, Pearson chi-square and deviance test for the Gamma and Inverse Gaussian weighting schemes.

Made some further modifications to the nonlinear regression module resulting in the exact ECx results as the linear regression module when comparable models are chosen.

CETIS will now present the standard normal deviate value for the Jonckherre-Terpstra, Mann-Whitney and Wilcoxon Rank Sum test when the asymptotic method is required.

Changed how the intercept, mu and sigma values are calculated for the Log-Normal (Probit) model. The constant 5+ is no longer added to the intercept to convert to probit units and instead is left in NED units. This has no effect on the ECp/LCp values.

Removed the restriction of the Poisson weighting to count data only. Using the Poisson weighting for non-discrete data should only be done sparingly as an ad hoc approach.

***Version 1.8.4.6**

CETIS now includes the control data for residual analysis when calculating point estimates using the linear regression module. Residual analysis will now match the residual analysis for the nonlinear regression module when the comparable model is chosen (i.e., the Log-Normal/Probit linear model vs the 3P Cumulative Log-Normal EV nonlinear model). The log likelihoods will also be identical because

CETIS now uses the control data to calculate the log-likelihoods in the linear regression module. The calculated ECx values will be identical to previous versions of CETIS.

Added a convergence criteria to the linear regression module and changed the method of determining the linear regression convergence to include all estimated parameters including the log likelihood.

Although this change will require more iterations, it will better insure an endpoint to the parameter estimation. It is unlikely to affect the estimated ECx values however.

Added the median to the Data Summary page of the Comparison Result form.

***Version 1.8.4.5**

Included more specific versioning on the diagnostic printout.

*Version 1.8.4.4

Addressed an Access 2010 peculiarity that interfered with setting the correct parameter limits in the nonlinear regression module when an endpoint is quantal. Only Access 2010 appears affected.

*Version 1.8.4.3

Added a new archiving utility. The Database>Utilities>Archive Data... command will archive your CETIS database by splitting the database and creating two new databases. The archive database will contain test data from before the date specified and the other will contain test data after the date specified. If you choose not to delete the archived data from the current database, it will be unaltered. A copy of the original database will also be created and will be named CETIS_BAK_XXXXXX.mdb using a sequential numbering system. This copy should be stored securely as it represents the original database prior to archiving. If you decide not to archive after starting the process, you can rename this file as CETIS.mdb and it will again become the current unaltered database.

You can use this utility to reduce the size of the working CETIS database by eliminating old test records that are no longer used and only need to be stored in an archive data-base. If need be, you can later link your CETIS front-end to the archived database for viewing, analyzing or creating reports. You can also make a copy of the CETIS.mde file, place it in the 'Archive' folder and link it to the archive database after renaming the archive as CETIS.mdb.

Changed the binomial subreports on the Analysis Reports to reflect only the test groups chosen in the analysis.

Fixed a bug that prevented a test from being cloned.

Changed how backup files are named and where they are stored. They are now named with a sequential number such as CETIS_BAK_XXXXXX.mdb (although the user can also rename the file with a date) and are stored in a folder named 'Backups' now. Also, when compacting the backend database, CETIS will automatically create a backup file of the newly compacted database and name it CETIS_BAK_XXXXXX.mdb.

Eliminated the calculation of the Quasi-AICc. Now all linear regressions are calculated with the AICc so models can be directly compared.

Changed the appearance and behavior of the CETIS calendar. Replace the two pairs of arrows with a single pair. A left click will increment/decrement by month and a right-click will increment/decrement by year.

*Version 1.8.4.2

CETIS now has a repair utility for repairing corrupted databases. You should always run the diagnostics before and after the repair operation. The menu item only becomes visible after the diagnostics are run and only for users with admin qualifications. Such repairs should be done in consultation with Tidepool. The repair utility will repair corrupted relationships between primary tables/fields and foreign tables/fields as needed, will delete any unrelated records, and will repair any primary keys that have become corrupted. The diagnostic utility should be run with a comparison to the refschema.csv file provided, which is a scan of a healthy CETIS database.

During relinking, CETIS will suggest nesting the cetis.mdb if it is co-located on the same machine as the cetis.mde. This only applies to Access 2010 installations.

*Version 1.8.4.1

Improved Access 2010 compatibility

*Version 1.8.4.0

Added a new feature that saves table index and relationship information to a csv file for diagnostic purposes. The utility can be used to compare to a reference schema. You can access this new feature by choosing the Database>Utilities>Run Diagnostics... command. You should use this feature on a schedule to document how the database structure might be changing over time.

Also, if you encounter a corrupted database, please read the following Microsoft article:

<http://support.microsoft.com/kb/283849>. Contact Tidepool about suggestions on how to fix a corrupted database.

*Version 1.8.3.3

Various internal fixes. CETIS is now compiled under Access 2002 and is no longer compatible with Access 2000. See note above.

Added the Linked Table Manager to the Database>Utilities menu.

Fixed a bug affecting the Pearson goodness of fit under conditions of extreme values.

Fixed a bug with setting the default and CETIS printers.

*Version 1.8.3.1

Removed an alert that repeatedly appeared when the control was a non-zero number.

If a concentration is detected, CETIS displays it as "C-gm/L", for example. If the second character is a hyphen ("-"), then CETIS will display as is. For instance the "T-Hrs" entry is displayed as "T-Hrs."

*Version 1.8.3.0

The login procedure has been revised and the Startup form will not automatically close. You will need to click the OK button or press <return> on the keyboard.

Added a calculated median field to the Comparison Analytical reports and eliminated the standard deviation field. The standard deviation field remains on the Summary report. Also added a new subreport that shows the replicate transformed data in addition to the untransformed replicate data.

Added new calculated fields to the data summary report used for Fisher's Exact and Cochran-Armitage tests.

Changed the "Assume Zero Response" lower threshold option on the Linear Regression module to not optimize the lower threshold even if selected.

Added an incrementing and decrementing feature to the nonlinear regression model for starting parameters. Using the shift + arrow keys, you can tune the parameters to manually optimize the starting parameters and help with convergence. The Up and Down arrow keys (coarse adjustment) add or subtract 50% of the current value, while the Right and Left arrow keys (fine adjustment) add or subtract 10% of the value. If just the Shift key is pressed and the Auto Find checkbox is selected, CETIS will open the Test Fit graph and place it in manual mode. The Preliminary NLR Graph must be open to see how the parameter change affects the initial fit. Generally the Auto Fit feature will suffice unless the data is sparse, there is little dose-response noted, or the data is noisy.

Added a Monte Carlo version of the Cochran-Armitage linear trend test. This can be useful when the data set is small and sparse.

The improved four cycle Wichmann-Hill 32 bit pseudo-random number generator (PRNG) is used for Monte Carlo, bootstrapping procedures and primary keys (Wichmann and Hill, 2006). Previous versions of

CETIS used the highly rated Mersenne Twister algorithm, but has been replaced by the Wichmann-Hill PRNG due to its improved speed, up to 32% faster.

CETIS now applies the continuity correction to the Mann-Whitney and the Wilcoxon Rank Sum tests to be consistent with SAS and S-Plus. This only applies when the large-sample approximation is applied.

Corrected a bug in the Jonckheere-Terpstra test where large numbers of ties could cause an overflow error and subsequent inability to analyze the data.

CETIS now calculates the probabilities for the Wilcoxon Rank Sum, Mann-Whitney U and the Fligner-Wolfe test using exact permutations when the total number is 25 and there is at least one tie across groups. If there are no ties, then CETIS uses the Harding approach when the total number of combinations is less than 1E12. The exact permutations method will support a sample of 12 in each group or 15 in one group and 10 in the other.

Added an optional seed number for the Monte Carlo based calculations. Using the same seed number will generate identical estimates. The seed edit box can be double-clicked to retrieve a new seed number.

Changed the behavior of the Ad Hoc datasheet or reports when opened to behave more like other CETIS reports.

Added a Database>Logoff command to allow you to close all forms and reports, log off the back end database and log out of the user log. This new feature should be used if you keep the CETIS application open but are inactive.

Fix a bug that prevented the assignment of the field size for a text type field when creating or editing a test type table.

Fixed a bug that calculated the 95% confidence limits too narrowly on the data summary subreport found on analytical reports.

Added a pop-up menu for certain listboxes that allow you to select all, deselect all or toggle the selections. The popup menu is accessed by right-clicking in the listbox.

Added a new Pages drop-down listbox on the Reports form that allows you to control the maximum number of pages initially shown in print preview.

*Version 1.8.2.1

Fixed the Dunn test when the variance is zero.

*Version 1.8.2.0

Added a two-way replicated and unreplicated ANOVA and a two-level nested ANOVA (Sokal & Rohlf, 1981). Alternative ANOVAs are now selectable from a drop-down list box. Grouping and nesting factors are specified in

the Test Types form. Labels can be provided for the factors. The two-way ANOVA can deal with proportional or mostly proportional designs using the "20.5 Analysis by proportional numbers" method described by Snedecor and Cochran (1980). It cannot have missing cells however. You are directed toward SAS GLM Type IV analysis in the case of missing cells.

Added the Cochran-Armitage trend test as described in OECD Series on Testing and Assessment. Report No. 54. ENV/JM/MONO(2006)18/ANN.

Added the Dunn's mean rank test with and without the Holm-Bonferroni step down. The original Dunn test is described by Dunn(1964). Dunn, O.J. (1964). Multiple comparisons using rank sums. Technometrics, 6(3), 241-252. Step-down variation is mentioned in OECD Series on Testing and Assessment. Report No. 54. ENV/JM/MONO(2006)18/ANN.

***Version 1.8.1.3**

CETIS now closes the Main form when cloning new tests to make room on the screen, but will reopen it when the Clone Test form is closed.

Fixed a bug that prevented entered data from appearing on the data worksheets when the "Print Existing Data" option is checked.

Fixed a bug that prevented the correct test record from appearing on the Test Data form after cloning a new test.

Fixed a bug that did not correctly open or close the Test Data form depending on the state of the "Test Data" toggle button on the Test Design form.

***Version 1.8.1.2**

Revised the bench worksheet printout to address more columns. Also added a column width proportionality variable on the Worksheet form for adjusting the column widths on the printout.

***Version 1.8.1.1**

Increased the number of available fields for any test type to 50. The bench worksheets are not currently supported.

***Version 1.8.1.0**

Added the Hochberg-GT2, Dunnett T3, Gabriel, Tamhane-Dunnett Step Down and the Games & Howell multiple comparison methods to the list of comparison tests.

***Version 1.8.0.15**

Added a WHERE clause to the constructed QC Plot query and Ad Hoc query for endpoints that have an entry in the "Where Expression" field. This will eliminate problems where a user enters a zero in a field that results in a division by zero error and causes all data to be excluded from the query.

Fixed a problem where the Reports listbox does not populate when using Access 2010.

***Version 1.8.0.14**

Changed the TST algorithm to address the case where both control and treatment have zero variance, in which case the adjusted df is undefined. Significant toxicity is simply determined by the $T < b * C$, where T equals IWC

group, C equals the Control response and b represents the RMD threshold coefficient. This approach is consistent with the US EPA calculation. (pers. comm. Jerry Diamond, Tetra Tech, 2011)

Changed Shirley's test to the Williams modified Shirley test. This improves statistical power by re-ranking at each step level. Modifications can be found in Williams, D. A. (1986). A note on Shirley's nonparametric test for comparing several dose levels with a zero-dose control. *Biometrics*, 42, 183-186.

Fixed a bug that could allow an interrupted dose response message for the Williams, Shirley, or stepped Bonferroni multiple comparison tests.

Modified the Jonkeheere-Terpstra test in the case of ties. Now the probabilities of each group tested during the step-down are calculated using a tie corrected variance instead of using the exact probability that does not correct for ties. The user will retain the capability of running a monte-carlo simulation in the case of ties. In the case where no between group ties are detected, CETIS will calculate the exact probability as long as N is less than 40.

***Version 1.8.0.13**

Fixed a bug that threw a bad references error for the graphics server library.

***Version 1.8.0.12**

Fixed a bug that prevented the calculation of a Studentized Range probability when the statistic was zero.

***Version 1.8.0.11**

Fixed a bug, introduced into v1.8.0, that resulted in the confidence limits being too narrow for the results generated by the linear regression module.

Fixed a bug that prevented the use of the 2P Cumulative Lognormal nonlinear model when an endpoint has the Ascending Dose Response option set as true and the control data is used.

***Version 1.8.0.10**

Corrected a misspelling in the TAC subreport

Corrected a bug that prevented the saving of the Log Transform option in the QC Plot utility

Corrected a bug that prevented the changing of the randomization option in the Test Design form when updating a design.

Corrected a bug that indicated a failed WET test evaluation when a linear interpolation result was recorded as >100 and the IWC was set to 100.

***Version 1.8.0.9**

Corrected a bug that affected the TST Welches t-Test method when the user attempts to specify the TST alpha different than that specified in the Test Titles table.

***Version 1.8.0.8**

Fixed a bug that allowed the program to enter an infinite loop while graphing data.

***Version 1.8.0.7**

Changed the behavior of the Linear Interpolation randomization seed field. CETIS will now generate a new seed

number after each calculation instead of requiring the user to specify the seed number. If the identical calculation is required, you will need to insure that the seed number matches the previous calculation.

Multiple model selection in the Linear Regression module can be saved as a template now.

All alerts during the calculations are combined into a single message. This eliminated the multiple message pop-ups during calculations.

*Version 1.8.0.6

Change the type of calendar used by CETIS. The Microsoft Calendar ActiveX control that shipped with previous versions of Access has now been deprecated and is unavailable in Access 2010. The loss of this feature prevented the startup and functioning of CETIS on Access 2010.

*Version 1.8.0.5

Added batch processing (i.e., multiple endpoints) for calculating statistics. Depress the toggle button next to the endpoints dropdown list, select the desired endpoints in the Batched Calculations form and click either the 'Calculate' or 'Calculate All' command button. The 'Calculate' button will calculate all endpoints for the selected module, while the 'Calculate All' button will apply the active decision tree.

Added a toggle button on the Analysis Options form that allows the user to suppress alert messages during statistical calculations. If a yes/no decision is required, the user will still be messaged with the question. This feature should only be used when feedback from the software is not required.

Changed key combinations in forms and menus to make CETIS section 508 compliant (<http://www.section508.gov>). Shift-F10 will simulate a right click on the mouse/tracking device. ALT+"Underlined Letter" in a menu name will bring focus to the object in the form. Using the TAB key will move the focus forward to the next object. ALT-F6 will cycle through open forms. CTRL+W or ALT+F4 will close the form or report with the current focus. To restore a minimized form, make the form title bar active by pressing ALT-F6 then press ENTER. To activate a command button on a form, press ALT and the sequential button number, numbered from left to right.

*Version 1.8.0.4

Fixed a bug that truncated data displayed in the nonlinear regression plot when data was pooled. Also fine tuned the nonlinear regression plot and the display of the control on the log scale.

Changed some behavior of the Decision Tree form. Added a clearing button to clear all fields prior to the creation of a new decision tree record.

*Version 1.8.0.3

Since it has been determined that Access struggles to copy tables to a database on a non-local drive, the updating code gives the user the option of updating the file on the local drive.

*Version 1.8.0.2

Fixed a bug that was introduced into v1.8.0.0 that was related to significant figure formatting.

Added some code to deal with tables that don't get copied during the version updating. This appears to be an Access bug and only relates to a cetis.mdb that resides on a server.

*Version 1.8.0.0

Changed the dependent variable scale of the linear regression graph to the original scale instead of the Abbott corrected scale. This will eliminate the truncating of data above the natural threshold response.

Added a log scale option for the linear and nonlinear regression.

Changed the behavior of the scale adjusters at the bottom of the graphs. You can repeatedly truncate the scale to eliminate extraneous areas of the dose-response plot. Clicking on the center button will refresh the graph with the original axis parameters. CETIS will save the revised axis parameters to be used when printing reports.

Added the Bayesian Information Criteria (BIC) to those parameters calculated with the linear and nonlinear regression modules.

Added the Pearson Chi-square goodness of fit analysis for nonlinear regression when the binomial or Poisson weighting is chosen.

Added the log-likelihood ratio test, also known as a deviance test, for binomial or Poisson weighted regressions.

Changed how the residuals are calculated. The results will be the same but the scale will change and will match the nonlinear regression scale when the same weighting is used.

Fixed a bug that prevented the use of the nonlinear regression Gamma weighting.

Changed the nonlinear regression convergence criteria by adding a tolerance factor of $1E-6$ to the absolute value of the divisor. This helps eliminate non-convergence of very small parameters such as the hormesis parameter.

Fine-tuned the algorithm used to set the nonlinear regression starting parameters.

Changed the software code to accept zero values entered as test groups even if not designated as a control with a control code. This will aid the analysis of chemical degradation or depuration studies where there is generally a time zero group.

Added the non-linear Gustafson and Holden (1990) model, also known as the First Order Multi-Compartmental (FOMC), and the Simple First Order (SFO) model for chemical kinetics studies. Although the Gustafson and Holden model is widely cited and is discussed in the FOCUS (2006) document, the model can show high correlation between the parameters and results should be interpreted with caution when this is the case.

Added the non-linear Hockey Stick model as described in the FOCUS (2006) document.

Added the critical value for the Shapiro-Wilks W test. The critical values agree with those presented in: Royston, J. P. (1992). Approximating the Shapiro-Wilk W-test for non-normality. *Statistics and Computing*, 2,117-119.

A warning is now given when very excessive correlation (>0.99) between estimated parameters occurs using the nonlinear regression module.

Added "T-days", "T-hrs" and "T-min" units for conducting chemical kinetic studies. CETIS will recognize and unit with the prefix "T-" as being time related.

Modified the reports for multiple sample designs to present the data more effectively.

Removed some of the annoying beeps when analyzing data.

Reduced the occurrence of consecutive error messages.

***Version1.7.1.0**

Added the new USEPA Test for Significant Toxicity (TST) Welch's t Test described in document EPA 833-R-1-003. The TST method is a bioequivalence approach that controls the false negative rate.

Added the capability of saving QC plot templates.

Changed the labeling on the Comparisons report to reflect whether or not the test was a multiple comparison or a single comparison test. A single comparison test will now have a narrative instead of the NOEL, LOEL, TOEL and TU.

Changed the label "Diff%" to "%Effect" on the data summary subreports.

Added a new drop-down list for the alpha level assigned to auxiliary tests such as the Grubbs' and Mann-Kendall tests.

Added a descriptive message when there are no test batches appearing in the drop-down listbox of the Samples page of the main form.

Added a "Set Default Printer" command under the File menu that allows the user to change the default printer in Access dynamically.

Added a new special control code ("@") reserved for pooled controls.

Added Control Codes to the Code Replace utility.

Added a new subreport that summarized the comparison results for multiple sample designs.

***Version1.7.0.5**

Added some fail safes for importing template records and installing the analysis templates table in the backend database. On occasion, Access did not copy the templates table to the backend database when the file was on a server.

***Version1.7.0.4**

Added a new printing option for printing worksheets that will toggle the printing of any existing data or default values. This is helpful if a default value has been assigned to a field, such as zero for a tare weight, and you do not want that printed on the data worksheet.

***Version1.7.0.3**

An inherent Access bug has been identified that affects the calculation of the Standard Error (i.e., "StdErr" column on reports) displayed on all of CETIS reports requiring a data summary subreport. For reasons unknown, Access does not return the correct count of replicates, even though the "Count" column on the reports is correct. A work around has been found and implemented. This glitch in no way affects the toxicity test results, only the StdErr displayed on the data summary subreports. Future report generation, even for existing data sets, will display the correct Standard Error.

***Version 1.7.0.2**

Fixed a bug that inadvertently added a carriage return in the sample comments section of a multiple sample report.

Fixed a bug that prevented the pooling of replicates when using the nonlinear regression module.

Fixed formatting issues with the data worksheet reports.

***Version 1.7.0.1**

Added a new feature that will exclude concentrations (test groups) that exceed the maximum NOEL calculated for the same Test ID and endpoint. This is useful when a protocol specifies that the survival

NOEL (or NOEC) is calculated first and then all subsequent growth analyses only include the NOEL concentration and any lower concentrations.

***Version 1.7.0Z**

Added a new QC plot parameter labeled as PMSD MS [i.e., multiple sample]. This selection will plot all PMSD values in a test run, especially useful for multiple sample designs where you might want to plot all PMSDs from all analyses done on the group of samples within the test run. Because it does not restrict to a single value per test run, this option should not be used for reference toxicant plotting.

Fixed a bug that crashed Access when attempting to print Fisher's Exact reports for multiple sample designs.

***Version 1.7.0Y**

QC plots can now be created without any limits shown on the plot.

Fixed a bug that may have prevented the creation of the tblDecisionTree table when converting older versions.

Fixed a bug that prevented the creation of a new sample record when cloning similar tests from the same day and the user wants a new sample record even though a matching one exists in the database.

Fixed a bug that could prevent Fisher's Exact test reports from being created/printed when more than one analysis is chosen.

***Version 1.7.0X**

Enlarged the Station and Sample Code columns in the 'Batch Sample' and 'Setup Multiple Samples' forms. Also the user can now double-click on the record instead of clicking the appropriate button.

Added a '2mo' (i.e., two month) listbox item to the 'Batch Sample' and 'Setup Multiple Samples' forms. Also, after a sample is batched and the sample is removed from the list, CETIS now selects the next oldest sample instead of the topmost list item. This will make it easier when there is a very long list of samples in cases where the 'span' has been set to a month or more.

***Version 1.7.0W**

If a user double-clicks on an empty cell in the Measurements tab of the Test Data form, CETIS will now add the current date/time to that cell.

CETIS will now create QC plots for control data derived from multiple sample setups (i.e., sediment or ambient

water tests). This can be done by selecting the "Multiple Sample Control" from the "Select Control(s)" form.

A minor bug was fixed that affected the Cumulative Mean QC plot. Previous versions used all data points (N) to calculate the data labels shown on the right of the plot. It now calculates the mean based on the N-1 data points to reflect the exclusion of the most recent data point from the calculation of the mean and SD.

***Version 1.7.0V**

Corrected a problem that interfered with updating previous versions of the cetis.mde when downloaded from the website.

Added an abbreviated worksheet printout for test measurements when you do not need the additional fields and want to save on paper.

***Version 1.7.0U**

Previous versions required that the controls were not incorporated into the design of the test recordset you wanted to copy control data into. This is because CETIS issued an Append query, not an Update query, to copy control data from one test to another. This new version now allows the controls to be part of the test design of the test you are trying to copy control data into. CETIS now issues first an

Update query in cases where the controls are part of the design, followed by an Append query in cases where the controls have not been specified in the design. The control data can be copied from another test record set from either the Test Data form or the Analysis Options form. You can either right-click in the control listbox on the Analysis options form or right-click on a cell within the Test Data form to access the Copy Controls command.

***Version 1.7.0T**

Added back an abbreviated version of the "Measurement Worksheet" for those that do not require all of the available fields for recording. This will result in less paper usage due to the fewer number of pages

printed. To print the shortened version of the worksheet, check the "Print Short Measurement Worksheet" option in the "Print Worksheets" dialogbox. This form of the worksheet was available in earlier versions of CETIS.

Fixed a bug that identified the wrong concentration when Grubbs' test identified an outlier. This bug only affected versions 1.7.0 revO to 1.7.0 revS.

***Version 1.7.0S**

Fixed a bug that created a [Link] field instead of a [TestID] field on any new test type table created. For previous versions you can open the test type table in the CETIS.mdb file directly in Access and change the name of the Link field to TestID.

***Version 1.7.0R**

Fixed a SQL bug that prevented the updating of the measurement parameters for a "Multiple Sample" design.

***Version 1.7.0Q**

A potential flaw in the USEPA ICPIN calculation has been identified for quantal data when there are uneven numbers of the replicate total (i.e., total number of subjects within a replicate). For instance, it is common for a mysid fecundity test to typically have 0, 1, 2, 3, 4, or 5 total females. The ICPIN does not allow binomials to be entered, and instead the user enters a proportion for each replicate. The use of proportions is problematic

because they ignore the total count and assign equal weight to all replicates. In cases where the total count is unity such as a ceriodaphnia test, there are only two possible outcomes, 0% and 100%. Equal weighting should not be applied in this extreme example because it can severely skew the mean. Like ToxCalc 5.0, the ICPIN in CETIS has been altered to sum the binomials within a test concentration and then calculates the proportion from the summed values. Bootstrap iterations also calculate the proportions based on the bootstrapped binomials instead of the bootstrapped proportions.

***Version 1.7.0P**

Addressed the incorrect PMSD calculation when the Power(X^Z) transform is chosen with a zeta variable less than 0, resulting in the inversion of the concentration-response. This transform should be used very sparingly as there are generally better variance stabilizing transforms.

***Version 1.7.0O**

When an outlier is identified by Grubbs' test, CETIS will message the user if the data are not normally distributed as evidenced by the Shapiro-Wilks test outcome. Normally distributed data is generally considered a pre-requisite for a valid Grubbs' test.

***Version 1.7.0N**

Multiple controls can now be selected for QC plotting. This may be useful when different control names are used for different clients, but they represent the same control type.

The order of the controls on the Summary Report is now based on the order set in the Control Codes List, therefore the %-Diff calculated will be based on the control with the lowest non-null ListOrder number.

An error was found and corrected for Grubbs' test as calculated for the Comparisons module only. The error resulted in a type I error greater than alpha.

***Version 1.7.0M**

Added the capability of changing nominal concentrations to verified concentrations from the Test Data form. This feature is available by clicking on the third command button on the bottom left of the form.

CETIS now goes to the new cloned record instead of going to the first record in the recordset.

***Version 1.7.0L**

Fixed a bug that affected the Bonferroni adjustment of either the Wilcoxon Rank Sum test or Fisher's Exact test. Only the straight Bonferroni adjustment was affected. The Bonferroni-Holm, Bonferroni-

Hochberg or Bonferroni-Hommel adjustments were not affected. The glitch resulted in the number of contrasts to be reduced by one, therefore the familywise p value was less than it should have been.

You should recheck your results if you previously used the straight Bonferroni-adj Wilcoxon Rank Sum test or Bonferroni-adj Fisher's Exact test. Only significant treatments with a p-value close to, but less than, alpha would be affected.

Fixed a bug that prevented properties from being copied from a donor table to a recipient table when importing test data or test types.

If you have imported non-standard test type tables, you should check to make sure they have a primary key for the combined TestID, TestGroup, ControlCode and Rep fields. This will prevent duplicate records.

Fixed a bug that yielded a negative PMSD when a "Power(X^Z)" data transform specified a negative Zeta variable.

Changed the behavior of the nonlinear regression 'Test Fit' graphing form. Instead of being a modal dialogbox, it is now a popup so it will remain on the screen. The user can de-select the Autofit option after getting an initial fit and then adjust the parameters accordingly and refresh the graph by clicking on the 'Test Fit...' button again. This should make it easier to analyze problematic data sets where the initial parameters are not close enough to achieve convergence.

Removed the Log(X) option from the Morgan-Mercer-Flodin and Weibull models within the nonlinear regression module. The model already inherently log transforms the concentration. Secondly, it has been discovered that the MMF model is just a reparameterization of the Log-Logistic model, therefore they can be used interchangeably yielding the exact same ECp/ICp estimates.

When revising a multiple sample design such as a sediment test, you can reorder the current ordering of the samples. This may be useful if after you have set up a test and entered data you decide that the ordering was incorrect. You can open the "Test Design" form, change the order in the "Test Group" field and click on the "Update" button.

Revised the "Stored Comments" form accessible from each of the comment fields on the main CETIS form. The revised form allows the editing of long comment text and allows users to save long text for reuse as a template. To save text, enter a new "Code" up to 10 characters long and click on the "Save Template" button. The new entry will be seen in the drop-down list after saving the record.

*Version 1.7.0K

Fixed a very specific bug that crashed the program when attempting to print a graph from an analysis that used the Morgan-Mercer-Flodin model with Log(X).

*Version 1.7.0I

Fixed a minor bug that affected the Time field on the Calendar form.

*Version 1.7.0H

Fixed the numbering on the non-detailed Measurement report when there are more than 10 measurements for a given parameter.

*Version 1.7.0G

Added a new command, "Paste From Excel," accessible by right-clicking in a cell on the Test Data form. This new command will automatically determine the dimensions of the selected array and select the same sized array on the CETIS Test Data form. Due to an Access imposed limitation, previous versions required the user to manually select the correct block of cells, otherwise the paste command would fail.

*Version 1.7.0F

Fixed a bug that prevented the updating of the "Individual Tests" form after adding a sample to a test batch from the "Samples" page.

The query used to populate the Test Batches drop down list was modified to sort by the test start date.

***Version 1.7.0E**

Fixed a bug introduced into 1.7.0D that outlined the Residuals Distribution listbox in red when all tests but Bartlett's test could not be run due to at least one of the groups having zero variance.

Changed the sign of the Mann-Kendall statistic. This has no effect on the results, however it is reasoned that a positive statistic should indicate a trend of increasing values while a negative statistic should indicate a trend of decreasing values.

Fixed a bug that prevented the pooling of controls when the data was non-quantal.

***Version 1.7.0D**

The Residuals Distribution listbox on both the Linear Regression and Nonlinear Regression result forms will now be outlined in red whenever the residuals are found not to be normally distributed or are heteroscedastic.

***Version 1.7.0C**

Fixed a bug that was not updating the Sample Code list on the Test Design and Test Data forms when different records are selected on the Global List.

Fields in the Ad Hoc Query and the Test Data form are now adjusted to 'best fit' width upon opening. The best fit width is based on the larger of either the field caption or the largest entry in the field. You can enlarge the field width if necessary by click dragging the right margin of the field title.

***Version 1.7.0B**

Fixed a bug that required the user to respond to a question on whether to update the test start and end dates when a new test batch record was created.

Fixed a bug that prevented the use of the Add Now button on the Samples page of the CETIS form from adding a test batch to a sample when the sample record is first created but not saved.

***Version 1.7.0A**

Fixed a bug that resulted in the wrong variate being removed after Grubbs' test identifies an outlier. Problem was limited to cases where the position numbers are not serially numbered starting at one (i.e., 4,5,8,9,10...).

Fixed a bug that prevented multiple linear regression models from running simultaneously.

Fixed a bug that prevented Grubbs' test from running when conducting a linear regression.

Fixed a bug that scrolled the Global List form two columns to the left obscuring the Sample Date and Sample Source when the form is first opened.

Probabilities are now displayed on forms as "<0.0001" instead of "0.0000" when the calculated probability is less than 0.0001.

***Version 1.7.0**

Certain terms used in previous versions of CETIS have been substituted for more meaningful terms to help the new user grasp the basics of using CETIS. The "Test Run" is now referred to as the "Test Batch", the "Test Link" is

now referred to as a "Test." The "Test Number" is now the "Batch ID", the "Sample Number" is now the "Sample ID" and the "Link Number" is now the "Test ID." The term 'link' is no longer part of the CETIS lexicon except where it applies to linked tables. On the Measurements page of the Test Data form, the field previously labeled "Sample" is now labeled "Reading" to avoid confusion with the term Sample as it relates to the sample that is tested.

The task of linking sample with test run has been altered. Instead of linking, the term now is batching. A single sample can be added to multiple test batches from the Samples page of the main CETIS form.

Also multiple samples can be added to a single test batch from the Test Batch page of the main CETIS form. Either method accomplishes the same goal, that is adding a sample to a test batch. A "Span" field allows you to specify the maximum time period in days between the Sample event and the Testing event, thus keeping the number of records displayed in the form or listbox to a minimum.

Associated with the name changes, the "Test Link List" is now called the "Global Test List." As before, the Global List displays all test records in the database.

The "Test Title" and "Sample Code" are now displayed on the "Individual Tests" page of the main CETIS form. This will better help you decipher which test you are editing.

You can now change the Batch ID, Sample ID or Test ID to a number less than 1000 when setting up templates. This signals to CETIS that the records in question are used as templates and should not be deleted when performing database maintenance and cleanup.

When a Test Code or Sample Code field is left blank, CETIS will automatically enter a hexadecimal representation of the Test ID and the Sample ID, respectively.

The value in a date/time field can now be easily changed by using the arrow keys in combination with the shift key. The Shift-UP arrow and Shift-DOWN arrow will increment and decrement, respectively, one hour to the time. The Shift-RIGHT arrow and Shift-LEFT arrow will increment and decrement, respectively, one minute to the time.

The Mann-Kendall Trend Test and Grubbs' Outlier Test can now be run with any module. In the case of the Linear Regression and the Nonlinear Regression modules, the Mann-Kendall and Grubbs' tests are directed against the residuals. In the case of the Comparisons, Linear Interpolation and Spearman-Karber modules, the tests are directed against the empirical dataset. For the Linear Interpolation and Spearman-Karber modules, the Angular (Corrected) transformation is used to transform the proportions derived from quantal tests prior to running Grubbs' test. Non-quantal data is left untransformed.

The "Assess Outlier" checkbox has been removed from the Comparisons, Linear Regression and Nonlinear Regression pages since outliers can now be assessed by checking the "Grubbs' Outlier Test" checkbox on the bottom left-hand side of the Analysis Options form. The "Assess Trend" checkbox has been removed from the Comparisons module since a trend in the controls can now be assessed by checking the "Mann-Kendall Test" checkbox on the bottom left-hand side of the Analysis Options form.

The record locking status is now memorized when closing either the main CETIS form or the Test Data form.

Control data can now be copied from one test to another within the same test batch by clicking on the "Copy Controls" button next to the Primary Controls label of the Analysis Options form. The button will only be

displayed when CETIS finds no control data for the current test.

A "New" command button and "Clone" command button has been added to the Test Batches and Samples pages of the main CETIS form. These command buttons will create a new blank record or a copy of the current record, respectively. A new command button named Clone Test is located on the Individual Tests page of the main CETIS form. This button will clone the current test and create a new test batch record, sample record and test record, as well as provide instantaneous test design.

A default decision tree for dilution tests and a decision tree for multiple sample tests can now be specified from within the Test Titles table. If a default decision tree has been specified, CETIS will load the decision tree automatically when the Analysis Options form is opened or updated.

A point estimate label can now be assigned to any endpoint. Select "LC" for any survival test, "EC" for any non-lethal quantal test, or "IC" for any non lethal quantitative test. If the "PE Label" is left blank,

CETIS will automatically assign "EC" for any quantal test and "IC" for any quantitative test. You can also use labels such as "ET" for Effective Time or "LT" for Lethal Time when the test groups are represented by time instead of concentration.

A Log (X) transform, as opposed to a Log (X+1) transform, has been added to the Linear Interpolation module. The zero dose control is automatically set to 1E-8 prior to the log transformation. The results may be slightly different than the Log(X+1) transform.

Column widths are automatically adjusted to fit the longest text string or numerical entry when a datasheet type form or subform is opened.

The QC Plot form has been slightly modified. Instead of clicking the "Calculate Parameters" command button near the bottom of the form, you now click the "Display Plot" tab to both calculate the parameters and display the plot. Other minor bugs were fixed.

When the "Exclude Groups with Complete Response" is checked, CETIS will exclude the test groups having complete response (e.g., no survival in all replicates) from all comparison testing, but will include the groups in the concentration-response plot.

***Version 1.6.6E**

Added a message to warn the user when there are excessive ties between treatment groups that result in a divide-by-zero condition. The new message applies to the Dwass-Steele-Critchlow-Fligner and Hayter-Stone procedures.

***Version 1.6.6D**

Fixed a bug that prevented the saving of data if the controls were pooled.

Added the current backend database path to the startup screen.

***Version 1.6.6C**

Improved the way the software handles an invalid workgroup information file.

***Version 1.6.6A**

Added the Test Data and Measurement TAC tables to the list of templates and tables that can be exported and

imported from other databases.

Modified a query that was used for deleting duplicates in older versions of CETIS. When extremely large tables were encountered, the previous query appeared to freeze the application.

*Version 1.6.6

The decision trees have been expanded to include logic for point estimates as well as comparisons. Different analysis templates can be assigned to both quantal and quantitative data. You can select up to four different analyses to run in series. The primary method will run first, followed by the secondary, tertiary and finally quaternary method. You can specify to stop after the first acceptable fit or run and display all analyses. To take advantage of this new capability, you must begin on the Comparisons tab, in which case the "Calculate All" command button will be visible. By selecting different Decision trees, you can affect how the data will be calculated and which templates will be loaded prior to the calculation.

Decision tree templates and analysis option templates can now be imported from other files. This is helpful when you update a MDE and want to import the decision tree templates you created using an earlier version. The decision tree templates are stored in the CETIS.mde file and the analysis option templates are stored in the CETIS.mdb file. Tidepool Scientific may also provide you a file to load into your existing database.

Added the Mann-Kendall trend test for control data. When there are less than 10 replicates, CETIS performs an iterative permutation calculation to provide an exact probability, even when ties exist. When there are 10 or more replicates, the user can select either a Monte-Carlo based probability or a normal approximation using Z-scores. The normal approximation method has a correction for ties and Monte Carlo inherently addresses ties.

CETIS can now calculate Grubbs test for linear regression or nonlinear regression, based on the weighted residuals.

CETIS now calculates a data set with and without the outlying data point identified by 'Grubbs Extreme Value' test. The title bar will be marked with an asterisk (e.g., "...#1*") indicating the data set without the outlier. If no outlier is detected, then only the original analysis will be shown.

The nonlinear regression initial parameter estimation has been improved with proprietary methods.

Removed the Lambda Inc/Dec edit boxes, therefore the user does not need to set these parameters.

Added the selected weighting to the nonlinear regression results form to make it easier to distinguish between analyses.

Fixed a bug affecting the optimization of the Box-Cox zeta parameter. In cases where the log of the target variable could not be evaluated because the variable was zero, the optimization failed.

When assessing residuals for linear or nonlinear regression, CETIS now runs both Bartlett's test and the modified Levene test to determine normality. Bartlett's test is more powerful, but suffers false positives when the residuals are heteroscedastic (i.e., unequal group variances).

According to Bates and Watts (1988), after an ANOVA based lack of fit test, the residual mean square should be used instead of the pure error (replication) mean square. Previous versions used the pure error, however, based on the advice of Bates and Watts, all variance estimations, for both replicated and unreplicated designs, will

now be based on the residual mean square. This change will result in slightly different confidence limits.

Version 1.6.5C

Decision text changed for TAC assessments on the printed reports. Instead of "Failed Acceptability Criteria" or "Passed Acceptability Criteria," CETIS now states "Result Within Limits", "Result Above Limit" or "Result Below Limit." This was addressed due to some controversy on whether a PMSD constitutes an actual TAC or whether it should just provide guidance in qualifying results.

Version 1.6.5B

Fixed a bug that displayed an erroneous %-Diff on the data summary subreports when the expected response curve is ascending (e.g. mortality, Microtox Gamma).

Version 1.6.5A

Fixed a bug that sorted the response variates for all comparisons. The net effect is that the response variates displayed in the Data Detail subreport of the Analysis Report appear sorted.

Fixed a bug that resulted in the failure to select a non-parametric comparison test when the MSE is zero. Since most parametric methods divide by the MSE, if the MSE is zero (all replicates equal the mean of the replicates), the calculation cannot be completed.

Added the position number of the outlier when CETIS calculates Grubb's test and displays the results in a message box. This will allow the user to more easily exclude the variate from other analyses.

Version 1.6.5

Instead of just a numerical effect level being listed, CETIS now attaches a prefix "EC" for quantal data and "IC" for continuous data on all reports.

The Link Code field length has been increased to 15 characters. The Link Code is now labeled Test Code on all forms and reports.

Fixed a bug that affected Access 2002 users when changing the cell height of bench sheets.

Fixed a bug that prevent a report from opening from the Ad Hoc Query form.

Fixed a bug that prevented the table properties from being displayed from the Test Types form.

Fixed a bug that prevented the CETIS manual fro opening with Acrobat Reader 8.0 and later.

Fixed a bug that calculated the wrong Diff% field on the WET Test Evaluation report after the first endpoint is printed.

Fixed a bug that occurred when a WET test evaluation record was deleted and the WET Evaluation form became unresponsive.

Added a Workgroup command button in the Startup form that allows a user of Access 2002, 2003 or 2007 to join a different workgroup.

Version 1.6.4revJ

Fixed a bug in 1.6.4I that can select a parametric comparison test instead of a non-parametric test when the

Automated Decision Tree is selected.

The 'Exclude Groups with Complete Response' option in the Comparisons tab is now only applied to multiple comparison dilution tests.

Version 1.6.4revI

Revised additional queries associated with reports to speed up the printing of reports.

CETIS now distinguishes the trimmed Spearman-Kärber vs the untrimmed Spearman-Kärber or the binomial method.

When there are two replicates, the automated decision tree will automatically perform a parametric method, if possible, since there are no non-parametric methods that support two replicates.

Version 1.6.4revH

Revised query for non-detailed measurement report.

Version 1.6.4revG

Revised queries for QC plotting to eliminate extreme lag when queried against a large database

Version 1.6.4revF

CETIS now closes the main CETIS form, if open, when reports are created. When the Test Reports form is closed, CETIS will reopen the main CETIS form if it was open prior to opening the Test Reports form. This change addresses the failure to print the graphs in preview mode when the main CETIS form is open while reports are being created (error message reads "Cannot open anymore databases" when this occurs).

CETIS will now open reports in preview mode based on the total number of pages within the report. You can change the number of pages displayed by selecting the appropriate short-cut command (right-click on the report).

Version 1.6.4revE

Changed the nonlinear regression module to ignore the 'Regress Control' option when no control is detected.

Version 1.6.4revD

Corrected a bug that affected the two parameter nonlinear models when the expected curve is ascending (i.e., increased dose results in greater response magnitude).

Version 1.6.4revC

Removed a restriction that prevented running Dunnett's test or Williams' test when there are only two replicates. Although far from ideal, there are some that need this capability.

Version 1.6.4revB

Fixed a bug that was introduced in v1.6.4 that prevented the correct display of a Fisher Exact graph.

Previous versions recalculated the summary statistics based on ranks when auto transform was selected and CETIS determined that a rank test was appropriate. As of this version, the summary statistics are not recalculated and are maintained for the transform that CETIS originally selected.

Version 1.6.4revA

Added the capability to export "Comparisons" concentration-response plot data for creating graphs in other applications.

Version 1.6.4

Added the capability to export graph data for creating graphs in other applications. The data is saved in comma separated values format also known as "CSV", that can be opened directly from Excel. This feature does not apply to the "Comparisons" concentration-response plot.

Version 1.6.3revH

Fixed a bug that could erroneously indicate a passed WET evaluation when a single concentration was tested and the NOEL was less than the IWC.

Version 1.6.3revG

If the CETIS application is moved to a different computer or a different hard drive, CETIS will ask for the product ID to be re-entered.

Version 1.6.3revF

Fixed a bug that prevented the copying of control data from one test link to another.

Version 1.6.3revE

When exporting data, relations to the tblTestDetail and tblSampleDetail are excluded so codes in the donor database can be changed to codes in the recipient database.

Fixed a bug that prevented successful linking when the LinkCode field was left blank.

Version 1.6.3revD

The Test End date on the Test Link page is now updated to the Test End date on the Test Run Detail page when a new link is created.

Version 1.6.3revC

Change the startup code to allow the software to be installed on a drive other than the C: drive.

Version 1.6.3revB

Fixed a bug that affected the conversion of a 1.0.25 version (or earlier) of the CETIS backend database to the latest version.

Fixed a bug that prevented the clearing of field attributes when creating a new test type.

Version 1.6.3

Removed the "New Record" and "Delete Record" toolbar buttons since the buttons have no effect on the main CETIS form. CETIS provides these functions as short-cut commands instead.

Version 1.6.2

Fixed a bug that prevented the use of a comma decimal separator used by some localities.

Fixed a bug that prevented East Asian users from installing or logging on to CETIS.

Version 1.6.1revD

Fixed a bug that prevented the messaging of the Grubbs Test.

Version 1.6.1revC

When the Test Links form is opened, CETIS will now select the current or last Test Link selected.

Modified how the p value is calculated for Grubbs test. In some cases of small N with previous versions, the p value could not be calculated and the test would fail to indicate an outlier.

Modified the queries used in the WET Evaluation form and report. The LOEL and TOEL parameters were eliminated in favor of a single NOEL/LOEL parameter. CETIS now considers both the NOEL and LOEL for judging compliance with the stated IWC. If both $NOEL < IWC$ and $LOEL > IWC$ conditions are true, then it indicates that the IWC concentration was not included in the analysis. In this case, CETIS will report "Poss Fail", for possible failure to meet the IWC.

Version 1.6.1

The Clone Test Link form has been significantly enhanced and now supports modifying the Sample Source, Sample Station, Client, and Project fields. The Clone Test Link form will now update depending on the current record of the Test Links form. The behavior of the form is now consistent with the behavior of the QC Plot form.

The Ad Hoc Query form will now update depending on the current record of the Test Links form. The behavior of the form is now consistent with the behavior of the QC Plot form. The Ad Hoc Query form is now accessible from the short-cut menu (right-click) of the Test Link form.

Added a "Measurements" subform to the Test Run and Test Links pages. The new subforms will behave just like the Measurements subform on the Samples page. Uses include light level during test, photo period, Sperm:egg ratio, etc.

Added a 5 character "OrganismAge" text field to the tblTestDetail table to track the age of the test organism. Since it is a text field, the unit of time can be added such as "20m", "12h", "22d" or "1.5yr"

Removed dropdown lists for Test Run comments, Sample comments and Test Link comments due to potential effect on performance with large databases. The user can now double-click in these fields to open a second form with drop down listings of all past comments.

Version 1.6.0

Some major changes to the CETIS backend database were implemented. Changes include the dropping of the "UniqueKey" index and subsequent creation of a new "PrimaryKey" for each test type table, tblCmpData, tblRegData, tblFEData and tblMeasurements tables, and subsequent scanning for and elimination of duplicates.

Replaced all SQL Server reserved names used for CETIS field names with non-reserved names in preparation for an eventual upsizing to SQL Server.

The updating code is now incorporated into the CETIS front-end so the user will not need the Setup files to update their backend or export files.

CETIS now prevents the importing of duplicate records when importing data. Also, CETIS informs the user when incompatible test types are attempted to be imported.

Added a new option when printing reports to include or exclude boxes around the sub-reports. To draw boxes on reports, check the "Draw Boxes" checkbox where appropriate.

Added "AnalystCode" field to the tblTestLinks table.

You can now use the "+" and "-" keys to increment or decrement date fields.

Version 1.5.0E

Added a field level lock for the Group, Code, Rep and Pos fields on the Test Data form to prevent unintentional changes to these fields. The user must now unlock the fields before they can be edited. The

Group, Code, Parameter and Sample fields are also locked until unlocked by the user. CETIS Viewers cannot unlock these fields.

Tightened the user level security for CETIS Users and CETIS Viewers.

Fix a bug that affected the nonlinear regression module when analyzing binomial data. Bug introduced into v1.5.D.

Fixed bug that returned a LOEL of 0 in some cases. Bug introduced into v1.5.D.

Version 1.5.0D

Replaced the generalized concentrated log likelihood function in the nonlinear regression module with a binomial log likelihood function when analyzing quantal data. The new binomial log likelihood function is identical to the function used in the linear regression (MLE) module for binomial data.

Multiple linear regression analyses can be run simultaneously. Previous versions listed the models in a dropdown combo-box. Now the models are listed in a multi-select listbox. To run multiple models, just select the desired models and calculate.

Fixed a bug that prevented the saving of a WET evaluation.

Fixed a bug that printed "Name?" on the WET evaluation report.

Fixed a bug that interfered with the cloning of a sample when sample measurements are taken.

Version 1.5.0

The Test Acceptability dialog box has been enhanced and now includes a list box displaying all available TAC records in the database. By clicking on a record in the list box, CETIS will find the underlying record and display the associated upper and lower bounds.

You can now click on a Linear Regression or Nonlinear Regression data marker and CETIS will return the selected non-control concentration, with replicate and position number, in the status bar at the bottom of the screen. The information will display in the status bar for six seconds or until the data marker is clicked on again. Once a position of a data marker is known, the data point can be easily excluded from a subsequent analysis by de-selecting the position from the "Positions" listbox within the Analysis Options dialog box. The pointer is sensitive to where it is placed on the red data marker, so you may need to re-position the pointer before clicking again. An audible beep will indicate a successful click on the data marker. Note that if the data marker is near a displayed curve or superimposes another data marker, the Graphics Server "Hot Hit" event may fail to

fire.

A Mersenne Twister algorithm has been incorporated by CETIS for generating random numbers. Previous versions utilized the built-in VBA random number generator, however the Mersenne Twister algorithm is a much better random number generator. All Monte Carlo and bootstrapping procedures utilize the Mersenne Twister algorithm. The algorithm is based on the Makoto Matsumoto and Takuji Nishimura (2002-Jan-26) C program implementation as translated to VBA by Pablo Mariano Ronchi (2005-Sep-12).

Changed the name of the Test Detail tab on the main CETIS form to "Test Runs", indicating the record pertains to a test run with potentially multiple samples. The Sample Detail tab on the Main CETIS form has been changed to Samples and the Test Link Detail tab has been changed to Test Links.

Added a new "Positions" list box to the "Analysis Options" dialogbox allowing the exclusion of a group occupying a specific position(s). The "Positions" are assigned during test design and represent the randomized (or non-randomized) test container position.

Control data must now be incorporated into the data set for each link that will utilize controls. Previous versions allow you to identify another link containing the control data, however the approach was cumbersome and less than ideal. Now you can import control data from another link that is part of the same test through a simple command labeled "Copy Controls..." accessible from a short-cut menu on the Test Data form or the data can be imported at the time of data analysis by clicking on the "Copy Control Data From Other Link..." radio button. If control data already exists in the current link, the radio button will be disabled. Copying control data is useful when you want to enter data just once for a control set and then populate the records of all other associated links that rely on the same control data set.

CETIS now transfers table relationships from the back-end database to a newly created export file. This will allow a user to change codes in an export file after it has been created. This may be useful for changing the identity of labs, sample sources, clients, etc., when sharing data with external recipients.

All reports have undergone substantial revision, making the reports more readable. The queries generated for the reports have also been revised making the report creation generally faster. With Access 2002/2003, the reports are opened as larger pop-ups, making them fill the entire Access window. A new short-cut menu has been design for various reporting needs; as always, the short-cut is accessible by right-clicking on a report.

Calculated 95% LCL, 95% UCL and Diff% fields have been added to a number of data summary subreports. The confidence limits are calculated by the formula $CL = \text{MEAN} \pm t * SE$. The Diff% field represents the percent difference from the control and is calculated as $\text{Diff}\% = 100 * (\text{Control MEAN} - \text{Treatment MEAN}) / \text{Control MEAN}$. In the case of the Comparison reports, this field can be used in conjunction with the PMSD for determining significant groups.

The Test Comment, Sample Comment and Link Comment fields are now drop combo boxes, providing a listing of all previous comments stored in the database. This feature will allow you to quickly input a long text string that is used repeatedly such as TIE tests where the keys (0=Control, 1=pH 8, 2=C18, 3=EDTA, etc.) to the group numbers can be listed in the comment field.

Test Comments, Sample Comments and Link Comments are now combined into a single record when displayed on reports. Each comment is separated by a period and two spaces. This change may save a number of rows on a report and may result in less paper use.

CETIS now calculates the median instead of the midrange for the comparisons plot, therefore the light blue region of the floating bar chart represents the difference between the mean and median. The plot on both the form and report has been modified, drawn with wider column widths. The circular markers represent the mean and the second line not passing through the mean represents the median when different from the mean. Normal distributions are expected to show close agreement between the mean, median and mode. Although the plot appears similar to a box and whisker plot, the whiskers are omitted and the 25th and 75th percentiles are not displayed because toxicity data generally consists of eight or less replicates and is generally inappropriate for a box and whisker plot.

Eliminated the DF Corrected limits option. Instead a new feature was added allowing the display of a trendline. The choice of trendlines include none, linear, second order polynomial, third order polynomial and moving average (n=5).

Eliminated the right Y-axis option on the QC Plot in favor of printed labels of the mean/mode and limits.

Added increment and decrement buttons on the QC Plot, allowing the fine adjustment of the Y-axis. Changes on the form will be duplicated on the printed report.

A change in the way data is filtered in the QC Plot form has been made. To exclude data from a QC Plot, excluded records must be selected, not deselected as in previous versions. This change will maintain the number of data points selected (i.e.,20) if there are sufficient data.

Revised the query used to return records to the QC Plotting utility. The query now selects the most recent analysis where more than one exists for a particular endpoint with all having the Official Results attribute. Simply stated this change will eliminate duplicate results for any given day of testing.

User changes on those plots that support X axis scrolling will be saved and graphs on the reports will reflect any changes.

Added the Analyst and Instrument ID lists to support the new Serial Port Reader.

Added the option of printing a concise or detailed report of raw measurement data. The detailed report prints all of the QA measurements, measurement Date, Analyst and Instrument ID. Although the concise report does not print these extra fields, it may consume much less paper. To print the detailed report, select the "Detailed Raw Data" option on the Test Reports dialog box.

Added a serially numbered Renewal field to the Sample Measurements table and subform. Instead of having separate parameters for each renewal day (e.g., pH A, pH B, pH C), you can now specify zero for the original sample and 1,2,3... for the sample measurements of the renewal samples and use the same parameter (e.g., pH). CETIS will automatically increment the renewal field. The 'Sample Measurement' subreport has been revised to address multiple sample measurements in the case of renewals.

Added Date/Time, Analyst, and Instrument ID fields to the tblMeasurement table and Measurement data entry form.

Added a Trials field to track when Monte Carlo resampling is performed and how many trials were run.

CETIS now applies a "significant figures" formula to most numeric data fields on the reports. The user can specify 2, 3, 4 (default), 5 or 6 significant figures in the 'Test Reports' dialog box. Percent fields generally apply 3

significant figures. This change should make the reports more readable and interpretable.

All dates on reports and forms have been changed to consistently read in military time. All reports will display the date/time in the "dd mmm-yy hh:nn" format and all forms will display in the "ddddd hh:nn" format.

Changed the "Rebuild Table Links..." sub-menu to read "Relink Backend Database..." to be more descriptive.

When date fields are double-clicked, CETIS now truncates the current date to exclude seconds from the current time. Seconds are also trimmed from the time edit box obtained using the Calendar control.

The setup date field was eliminated in favor of two new fields, the 'Start Date' and the 'End Date' fields, found on the Test Links tab of the main CETIS form. When there are multiple samples linked to the same test, you can specify the actual starting date/time and ending date/time of each sample (i.e., test link). This will allow a more accurate determination of the test duration and sample holding time on the reports. When creating a new link, the fields will initially be populated with the 'Start Date' and the 'End Date' values associated with the Test Detail record.

The Endpoint Expression/Numerator Term, Denominator Term and Where Expression fields within the Test Types form can now be expanded or contracted by clicking on the corresponding expansion button. This is useful when the expression is too long to fit in the allocated space. Changing to a different field will automatically contract the field to its original height.

Added Test Link comments to the bench sheets.

CETIS now re-selects the current cell after clicking on the double-entry toggle button. CETIS also provides the field name when messaged about a discrepancy between the original and second entry.

You can now search by either test link code or test link number on the main CETIS form by selecting the appropriate search type from the drop-down list.

Concentration units can now be left blank, in which case the label will appear as "Group" instead of "Conc-mg/L" or other chosen concentration unit. This is useful when the groups are entered as a serial number and not a concentration. A key for the serial numbers can be entered into the Link Comments.

The "Repair Database" command was removed from the Database>Utilities sub-menu since the command is obsolete on post Access 97 versions. Instead the "Compact Database" command has been changed to "Compact and Repair Database," since the compacting method also repairs damaged databases.

Version 1.1.2revS

The format of the Measurement Worksheets were changed to reflect how data is entered into the system. The new format matches exactly how the data will be entered into the Test Data>Measurements tab.

The Monte-Carlo algorithm has been modified to address ties. All methods that utilize Monte-Carlo based probabilities will now permute all data including ties. When an exact test is available, such as the

Wilcoxon Rank Sum and Mann-Whitney type tests and no ties are detected, CETIS will calculate the exact probabilities even if the Monte Carlo option has been selected. If ties are detected and the exact test is selected, CETIS will message the user and suggest re-analyzing the data with the Monte Carlo option selected. This is because the exact test does not address ties, which can substantially change the outcome of a test (see

Bergmann, R., J. Ludbrook and P.J.M Spooren. (2000). Different outcomes of the Wilcoxon-Mann-Whitney test from different statistics packages. *The American Statistician*, 54,72-77)

Monte Carlo simulation was added to the Fligner-Wolfe test.

An extension to the Mann-Whitney U algorithm (Harding, E. F. (1984). An efficient, minimal storage procedure for calculating the Mann-Whitney U, generalized U and similar distributions. *Appl. Statist.*, 33,1-6) was added so that CETIS now calculates exact k-sample probabilities for the Jonckheere-Terpstra test, including the Jonckheere-Terpstra Step-Down test. When calculating with Monte Carlo simulation and no ties are detected, CETIS will always use the exact method when the sum of all replicates for a particular step is no greater than 40.

Multiple Decision Tree records can now be maintained in the database. This is helpful when tests are done for two or more jurisdictions (such as Canada and the US) that differ in the statistical test methodology. The default Decision Tree will always be used unless the user selects a different template.

Added a list of Test Titles in the Test Types dialogbox. Clicking on a title will automatically select the associated default test type. Clicking on a test type will select the first matching Test Title in the list.

Fixed a bug that resulted in the count not being N-1 within the group where an outlier was detected. This bug had no affect on the results.

Fixed a bug that prevented the previewing of a WET evaluation report.

Fixed a bug that prevented the saving of a Linear Regression template.

Fixed a bug that printed the significance lines when a non-parametric test was run and a parametric MSD was calculated for USEPA reporting purposes.

Fixed an inherent MS Access bug that converted a PMSD value formatted as % in the table to the PMSD *100, causing a failure based on the TAC value stored as a proportion.

Fixed a bug that affected the Mann-Whitney U test and Wilcoxon-Rank Sum test when the number of replicates in either group exceeded 20 and there were excessive ties.

Fixed a bug that may have prevented the Kruskal-Wallis test from running when there were ties.

Modified the linear regression weighting. If user chooses not to perform a weighted regression, the responses are still weighted by the probability densities, but not by the inverse variance. Under the usual circumstances, the "Weighted Regression" should always be run for quantal data. Previous versions simply applied a weight of unity when the "Weighted Regression" option was deselected, instead of the weight proportional to the probability density function.

CETIS calculates the linear regression QAICc (quasi-second order Akaike criteria) selection criteria when a variance inflation factor, also known as the heterogeneity factor, is applied to calculated variances.

Changed the label from ChV (Chronic Value) to TOEL (Threshold Observed Effect Level). The TOEL is the geometric mean between the NOEL and LOEL.

Version 1.1.2revR

Fixed a bug that uniformly printed "0.9999999999992" for the concentration on the Ad Hoc Query Test Data Summary report.

Version 1.1.2revQ

As it relates to TAC subreports, fixed an MS Access bug that infrequently occurs when it calculates an averages.

Version 1.1.2revO and 1.1.2revP

Versions not released.

Version 1.1.2revN

CETIS now compacts the data export file after creation.

Fixed a bug that prevented a user from selecting or de-selecting records in the Data Import form under some limited circumstances.

Only used codes are now imported unless the user chooses the "Import All Available Codes" option is selected.

Version 1.1.2revM

Added the capability to edit records and replace codes from import files prior to importing the records into the CETIS.mdb. The records can be edited one record at a time in a special version of the main

CETIS form or the Global Code Replacement form. Both of these special forms are available from the Data Import form.

Fixed a bug that resulted in the incorrect calculation of the mode parameter when plotting NOEL/LOEL values.

Version 1.1.2revL

The method and model used, probability of fit and model rejection fields have been added to the Point Estimate Results query.

The Control CV% has been added as a QC plot parameter.

The QC Plot control limits can now be specified as the mode +/- 1 concentration interval. The user must specify the dilution factor.

Version 1.1.2revK

Added additional fields to the Test Data form to support up to 30 total data fields (prior versions supported 20 data fields).

CETIS will now substitute Arial Narrow font when needed to get the data fields to fit on the Data Worksheets. The user can also change the column widths and then permanently save the widths from the Test Data form.

Version 1.1.2revJ

When CETIS detects a change in the test start date after a link is made, it will determine if the revised test start date is later than the stored test setup date. In this case, the user will be given a choice to update the test setup date to match the revised test start date.

Version 1.1.2revH

Added raw data sub-reports to the Linear Regression, Nonlinear Regression, Linear Interpolation and

Spearman-Karber modules.

Version 1.1.2revG

Fixed a bug that affected the graphical 95% confidence bands for the log-angle model in the linear regression module.

Version 1.1.2revF

The calculation of the second order Akaike Information Criteria (AICc) has been added to the linear and nonlinear regression modules. The formula for the AICc = $-2 * \log \text{Likelihood} + 2P + 2P(P+1)/(N-P-1)$ where P = number of estimated parameters and N = total sample size. Whereas the log likelihood is maximized, the AICc is minimized at convergence. Although the absolute value of the AICc has little meaning, the relative difference between different model runs can be used to judge the best fitting model (i.e., smallest AICc is best). Comparisons between the AICc derived from linear regression cannot be compared to the AICc derived from the nonlinear regression because different log-likelihood formulas are used. See Burnham and Anderson, "Model Selection and Multimodel Inference: A Practical

Information-Theoretic Approach" (2nd edition), Springer-Verlag 2002. Note that the F statistic is no longer displayed on the nonlinear regression result form due to space constraints. Since the P-level is still displayed for the lack-of-fit test, this change has little consequence.

CETIS now automatically pools replicates when conducting linear or nonlinear regression and individual replicates can only be one of two outcomes, such as a chronic ceriodaphnia test with a single individual per replicate.

The calculation of the confidence bands have been altered in the linear regression module. Previous 95% confidence bands were calculated as inverse prediction limits using Fieller's theorem, just as they are for all ECx limits. CETIS now more appropriately calculates the limits based on the variance of Y-hat and applies the Working-Hotelling method of calculating 95% confidence bands. Although Finney only applies the heterogeneity factor (which is in fact the residual mean square) to all variances when significant heterogeneity is detected, CETIS uses the residual mean square as one of the terms in the Y-hat variance formula in all cases regardless of the Chi-square heterogeneity test.

Version 1.1.2revE

Fixed a bug that required the closing and reopening of the Analysis Options form when a different set of ECx levels were chosen.

Changed the login procedure.

Fixed a bug introduced into v1.1.2revC that prohibited the choosing of Fisher's Exact test for ceriodaphnia type survival data when the Small Sample Size criteria was set to zero.

Improved the reporting of measurement data when more than 10 measurements are made per test group.

The default endpoint is now automatically chosen in the Ad Hoc Query form.

Version 1.1.2revC

Changed the Quantal Data Small Sample Size criteria to zero. Canadian users should change this to 100.

CETIS now assesses single replicate residual distribution with the Shapiro-Wilks test. Homogeneity of variance

cannot be checked for unreplicated data, however.

Version 1.1.2revB

The concentrated log-likelihood functions used in the nonlinear regression module to determine convergence has been revised. Although still based on the Seber and Wild (1989) general log-likelihood functions, the three different concentrated log-likelihood functions were altered (i.e., the unweighted, weighted and PTBS forms are now consistent with each other). This should have little or no affect on the results since the residual sum of squares is still used to guide the parameter estimation. However, inter-comparisons of the concentrated log likelihood values at convergence for different settings is now more appropriate.

Fixed a bug introduced into 1.1.2revA that prevented the printing of more than one analyses at a time.

Version 1.1.2revA

A small sample criteria can now be edited on the "Quantal Data" page of the "Decision Tree" dialog box. The number provided in the "Small Sample Size" edit box represents the criteria CETIS uses to determine if a quantal data set can be treated as continuous/quantitative data through an arcsin squareroot transformation (i.e., Angle transform). CETIS uses the total number of experimental units in the controls to make this determination. Where the total number of experimental units exceeds the small sample criteria, CETIS will choose a method other than Fisher's Exact Test and treat the data as pseudo-continuous. This can be done because as the number of experimental units (e.g., number of eggs, number of fish, etc.) tends toward infinity, the proportions derived from the quantal data behave more like continuous data. If you always want the data treated as continuous/quantitative data, unless there are no replicates or no partial responses possible, set this criteria to zero.

Nonlinear and linear regression parameters can now be extracted from the database using the ad hoc query tool.

Bartlett's test is now the primary method for testing homoscedasticity of the regression residuals. In the event that Bartlett's test cannot be completed due to ties or the residuals are found not to be normally distributed, the modified Levene Test (also known as the Brown-Forsythe test) is substituted. Although Bartlett's test is a powerful test for heteroscedasticity, it requires normally distributed data and cannot have ties across all replicates.

The Statistical No Effect Concentration (SNEC) described by Chevre et al. (2002, *Env. Tox. Chem.*, v21, pp.828-833), can now be calculated by CETIS. The SNEC is the concentration represented by the intersection of the control response and the upper 95th percentile confidence band. CETIS then calculates the 95% confidence limits on the SNEC using the large sample asymptotic method as used for all ECx estimates.

New models have been programmed into the nonlinear regression module including the cumulative normal, cumulative log-normal (Bruce and Versteeg, 1992, *Env. Tox. Chem.*, v11, pp.1485-1494), Holliday

(Ratkowsky, 1990) and the exponential models. Models with the suffix "EV" are expected value (EC50) parameterizations. Ratkowsky (1990) has found the EV models generally behave better and exhibit less parameter-effects (PE) nonlinearity. Close-to-linear models provide more appropriate asymptotic standard errors and faster convergence.

The nonlinear regression module now uses the preferred analytical derivative approach as opposed to the numerical derivative approach. Besides being exact, the analytical derivatives generally result in faster convergence.

The residual ANOVA table is now printed on the linear and nonlinear regression analysis reports.

Linear regression residuals are now based on original units (i.e. proportions) instead of NEDs.

The Up Arrow, Down Arrow, Home and End keys have been activated on the Test Links form to allow easy record navigation or for scrolling through records. The Insert and Delete keys have been activated on the Test Links form to clone a link and delete a link, respectively.

When clicking on a record in the Test Links form, CETIS will automatically select the entire row. Click a second time on a field value to de-select the row when you want to use the "Filter By Selection" feature.

Added a new column in the Test Links form labeled "Design Type." This can be used to separate records that are based on multiple sample designs (such as sediment or ambient water tests) from the standard single sample control-treatment designs.

CETIS now only applies the "Exclude Groups With Complete Response" option when the test design is a standard control-treatment design. Multiple sample designs and "All-Pair-wise " analyses ignore this option.

Moved the residual vs predictor plot under the concentration-response plot and matched the scale for easier interpretation.

Fixed a bug that included control data on the nonlinear regression report plots when the user choose not to regress the control data.

Fixed a bug that calculated incorrect Log-Logistic + Threshold model ECx values when the threshold parameter was significant.

Fixed a bug introduced into v1.1.1revH that prohibited the use of two parameter models in the nonlinear regression module.

Fixed a bug that caused the empirical data points on the linear regression graph to be displayed in original scale instead of the Abbott corrected scale. This bug had no effect on the results.

The linearization algorithm used for estimating starting parameters required for the nonlinear regression module now truncates the upper 90th percentile of data. This change will generally provide better starting parameters when there are substantial numbers of data points above the 90th percentile.

Version 1.1.1 revH Changes

Previous versions of the nonlinear regression module calculated the 95% prediction limits instead of the 95% confidence limits. To be consistent with the other modules, CETIS now calculates the 95% confidence limits. This change has no effect on the predicted ECx values, but the limits will be narrower.

Improved initial parameter estimation for the Bleasdale-Nelder and Farazdaghi-Harris models.

Widened the data field slightly on the data detail subreport to display negative values when they occur, such as Microtox gamma values.

Fixed a bug that prevented the Control Codes from being exported.

Fixed a bug that affected the Brown-Forsythe modified Levene test of residuals. Although the bug did not affect ECx results, it may have affected the outcome of Levene's test.

Fixed a bug that interfered with the MLE of the Box-Cox parameter.

Because the Bragg model can have two solutions (i.e., parabolic curve) under certain combinations of parameters, CETIS now precludes the calculation of ECx values when the "C" parameter is negative. The

Bragg model is most useful for hormetic dose-response curves. When the "C" parameter is negative this usefulness is lost and the predicted curve may be parabolic.

Version 1.1.1 revG Changes

Fixed the Database>Delete>Test Links command that failed to delete the selected records.

Changed the method of calculating numerical partial derivatives within the nonlinear regression module. CETIS now uses Ridder's method of polynomial extrapolation. This should address the occasional non-smoothed 95% confidence limits displayed on the graph.

Version 1.1.1 revF Changes

Added a "Global Code Replacement" dialog box. This can be opened by choosing the Edit>Code Replacement... command. First select the "Field to Search", then select the appropriate "Replace Code" and

"Replace With." To apply the code replacement to the database, click on the "Replace All" button. All matching codes in the database will be automatically replaced.

Version 1.1.1 revE Changes

Fixed a bug that could possibly result in an incorrect mean on the Test Summary report when an endpoint has an SQL WHERE statement.

Version 1.1.1 revC Changes

Fixed bug introduced in v1.1.1 revB that required the entry of a number in the "Receive Temp" field of the "Clone Link" form. The field can now be left blank.

Version 1.1.1 revB Changes

In the case where the MSE is zero, CETIS will apply the correct non-parametric test as if the data set was non-normal.

Added Test End Date and Sample Receipt Temp on the Clone Link Form.

Fix a bug that placed the Test Design form behind the main CETIS form when linking under certain circumstances.

Twenty records are now shown on the 'Link to Sample' or 'Link to Test' forms.

When rebuilding links to the BE database, CETIS now verifies the Test Type tables are accessible from the FE database. Previous versions only verified this at start-up. The previous command 'Rebuild Links'

is now called 'Rebuild Table Links' since the term 'link' can have different connotations.

Version 1.1.1 revA Changes

In support of multi-user access to the BE database, all pessimistic locks on forms have been changed to optimistic locks. Consult your Access help file to understand the ramifications of this change.

CETIS now requeries the main CETIS form if it is open while you delete a link on the Test Links form. Prior versions left the deleted record on the main CETIS form.

When relinking to a different database, CETIS saves the path to the new database. When subsequently updating the front-end, the correct path will appear for the back-end database in the setup form.

Version 1.1.1 Changes

Added an optional default data transform that can be applied to each endpoint. This option is found in the Test Types form.

Added the Freeman-Tukey and Anscombe transforms for hypothesis testing.

Added the Bonferroni-Holm, Bonferroni-Hochberg and Bonferroni-Hommel procedures to the Fisher Exact and Wilcoxon Rank Sum tests.

Added the Jonckheere-Terpstra step down comparison method described in OECD (2003).

Added the Quantal Data page to the Decision Tree form.

Added the NOEL and LOEL to the list of Test Acceptability Criteria (TAC).

CETIS now saves the preferred number of Monte Carlo trials.

Fixed a bug that caused the program to crash when trying to create a new endpoint.

Fixed a bug that excluded the last data point on the QC Plot. The bug initially appeared in v1.1.0.

Fixed a bug affecting Dunnett's p-value that initially appeared in v1.1.0. The bug affected data sets where the DF was odd.

Version 1.1.0 Changes

The Access 97 version is no longer supported. Please disregard all references to Access 97 in the manual. The Access 2002(XP) and Access 2003 compatible version is now found in the Access 02-03 folder on the original CD.

A number of new non-parametric methods have been added to this version including Shirley's test, Nemenyi-Damico-Wolfe test, Dwass-Steel-Critchlow-Fligner test, Hayter-Stone test, and Wilcoxon Rank

Sum Two-Sample test. The Wilcoxon Rank Sum Two-Sample test is synonymous with the Mann-Whitney test and will always lead to the same conclusion, so they can be used interchangeably. Shirley's test is the non-parametric version of Williams' test requiring ordered treatments and a control. The Nemenyi-Damico-Wolfe test is also intended for control vs ordered treatment comparisons. The Hayter-

Stone test and Dwass-Steel-Critchlow-Fligner test is intended for all pair-wise comparisons. Monte Carlo

simulation can be used to calculate the probabilities of the Nemenyi-Damico-Wolfe test, Dwass-Steel-Critchlow-Fligner test, and Hayter-Stone test. Monte Carlo simulations (user specified number of trials) can be performed by selecting the "Calculate Monte Carlo Probabilities" checkbox. An initial 1000

Monte Carlo simulations is made on "Worst Case" data to determine if a rejection can be made under any data combination. All methods except Shirley's have been programmed based on the discussions in

"Non-Parametric Statistical Methods" 2nd Edition, by Hollander and Wolfe (1999). Shirley's test has been programmed based on Shirley's original publication "A non-parametric equivalent of Williams' test for contrasting increasing dose levels of a treatment" (Shirley, E., 1976; Biometrics 33:386-389).

Added Kruskal-Wallis Omnibus test, Jonckheere-Terpstra and Fligner-Wolfe tests as a non-parametric tests for overall treatment effects. The tests can be run by selecting the appropriate test from the

"Auxiliary" drop down list. Although a regular single classification ANOVA is always run regardless of this selection, these tests can be used to gauge overall treatment effects when data sets are found to violate the parametric assumptions. The Jonckheere-Terpstra test is intended for ordered control vs treatments and the Fligner-Wolfe test is for non-ordered control vs treatments. The Kruskal-Wallis and

Jonckheere-Terpstra tests use large sample approximation. The Jonckheere-Terpstra also can use Monte-Carlo simulation (user specified number of trials) for the calculations of probabilities. The Fligner-Wolfe

test calculates exact probabilities when the total number of data points does not exceed 40. All methods are based on the discussions in "Non-Parametric Statistical Methods" 2nd Edition, by Hollander and Wolfe (1999).

Grubbs' test for single outliers is now available in CETIS. Select the "Identify Single Outlier" option on the Comparison tab to initially screen your data for the most extreme data point. CETIS will provide you the option of excluding the data point from the analysis and provides you with a probability of type I error. The algorithm is based on the paper "Procedures for detecting outlying observations in samples"

(Grubbs, F.E., 1969; Technometrics 11:1-21). The test is applied to the transformed and centered data with the same alpha as specified for the general comparison test.

You can now open and edit the comparison "Decision Tree" that is used to decide which comparison test to run. Criteria include test design/balanced replications; whether the test is a single, multiple or all-pair-wise comparison; or if the ANOVA assumption tests passed or failed. Previous versions used a static tree that held consistent with current U.S. EPA guidelines. However, as the user base expands well beyond the US borders, it is desirable for other users to edit the decision tree for their specific requirements. For instance now that CETIS can accommodate unbalanced designs when running Dunnett's test, it may be desirable to always run Dunnett's even though the replicates are unbalanced.

When the comparison "Transform" is set to "Automated Decision Tree," CETIS will use the "Rank" transform after the data is first transformed to the appropriate transform (i.e. Arcsin Sqrt) for the ANOVA

Assumptions testing. After the ANOVA Assumptions testing and Outlier testing is complete, CETIS converts the data to ranks and then runs the non-parametric method. The ranks transformed data are stored and displayed on the reports where appropriate.

CETIS now uses Algorithm AS R94 Applied Statistics (1995) 44:4 for the Shapiro-Wilks test covering N=3 to 5000.

A SW critical value is no longer calculated and stored.

The chi-square percentage point is now calculated with Algorithm AS 91 Applied Statistics (1975) 24:35.

The "Test Data" and "Test Links" windows can now be horizontally or vertically arranged next to each other by clicking on one of the "Split Panes" toggle buttons on the "Test Data" form. The Test Data form will update based on which record is clicked on in the "Test Links" form. You must click on the left margin (row selector) to activate the update. All form titles will be labeled with the current Link Code number.

The "Test Data" form no longer opens in "Dialog" mode, but is now opened within the CETIS parent window.

CETIS toolbars can be moved to where ever you want them with the CETIS window.

Fisher's LSD, Tukey's HSD, and Student-Newman-Kuel's Tests now store either the calculated t or q statistic with the associated critical value. Previous versions converted these statistics into MSD's as described by Sokal and Rohlf (1981). The interpretation of significance is the same, however.

There are some minor terminology changes in CETIS. To avoid confusion in the "Test Design" form, the tab page labeled as "Test Groups" is now referred to as "Groups." What was referred to as "Links" are now called "Test Links." All underlying tables and field names remain the same. What was previously referred to as the "Graphical" method (U.S.EPA terminology) is now referred to as the "Binomial" method, a more correct reference. The Binomial method is used to estimate an EC50/LC50 when all or none responses occur.

Dunnett's Multiple Comparison test and the Studentized Range based tests use algorithms to calculate probabilities and critical values. Dunnett's test can now be used for unbalanced replicates or expanded control replication. Also, this improvement yields a calculated Type I error probability instead of a generic " ≤ 0.05 or > 0.05 " probability. You will notice a delay during Dunnett's test because of the very intensive calculations. Since Steel's Many-One Rank statistics are derived from Dunnett's tables, Steel's test also can take advantage of this expanded capability. Dunnett's multi-variate t distribution is based on algorithm AS 251 in Applied Statistics (1989), 38:564-579; also see correction note in Applied Statistics (1993), 42:709. The studentized range distribution is based on Algorithm AS 190 Applied Statistics (1983) 32; also see corrections from Applied Statistics (1985) 34.

Certain listboxes are now outlined in red during data analysis to highlight potential data problems or assumption failures. Some checkboxes now display their label in red if it normally should be left checked.

Both the Linear Regression and Nonlinear Regression results tables now include the name of the model used and the numerical function applied.

To clear up any confusion, the "Optimize Threshold" option in the Nonlinear Regression module will use the estimated zero dose response as the benchmark. De-selecting this option will use the empirical (measured) response as the benchmark.

You can now temporarily invert the expected dose-response in the Nonlinear Regression module. This may be of interest for some tests like a phytoplankton test where it is desired to estimate endpoints for stimulation when it occurs.

A new parameter "E" has been added to the Nonlinear Regression module specifically for the hormesis factor when it occurs in a model.

The Nonlinear Regression module will no longer calculate EC/IC estimates if either a null model is detected or convergence was not achieved. This should eliminate "improbable" estimates. CETIS will still display EC/IC estimates if convergence was reached and the null model hypothesis is rejected.

New models have been included in the Nonlinear Regression module. New models include the Log-Logistic, Log-Gompertz, Log-Logistic with Hormesis factor, and Log-Logistic with Threshold factor. Please note you do not select a log transform of the predictor variable (X) when running these models. These models are preferred when a log transformation of the predictor variable is appropriate because a zero dose control can be included in the regression. You cannot log transform a zero dose control when running the other models. Models marked as EV are expected value parameterizations based on the

EC50/IC50 expected value, generally the most robust area of the dose-response curve. The "D" parameter should match the EC50/IC50 displayed on the results page. However, the 95% confidence limits will deviate. This is because the 95% CL for the parameter is not a joint 95% CL. The 95% CL calculated and stored in CETIS are based on inverse prediction theory that factors in the uncertainty of all parameters in the model.

A bug was found in the original Levenberg-Marquardt algorithm that produced a numerically smaller variance-covariance matrix depending on the size of lambda at convergence. This bug produced smaller parameter confidence limits in some circumstances, especially with the binomial weighting function. This bug had no effect on the ECx estimates.

The automatic Box-Cox estimator has been improved in the Nonlinear Regression module. Prior versions may not have converged effectively due to how the concentrated log likelihood was calculated and updated.

The QC Plotting utility now calculates the mean and limits for all data except the latest data point. Previous versions calculated the mean and limits based on all data selected. Therefore if you want to base the mean and SD on 20 historical data points you should select 21 total data points (i.e., 20 historical + latest).

The QC Plotting utility now displays the graph in original units after log transforming. This will make it easier to interpret the data points.

Fixed the "Delta" value on the QC Plot report when data is log transformed to represent difference in original units.

CETIS now calculates the adjusted R2 for the nonlinear regression methods. Although the adjusted R2 value takes into consideration the number of estimated parameters, it should still not be relied on as a measure of fit. Use the Lack-of-Fit test instead.

Fixed a bug in the Linear Regression module that prevented the completion of the calculations if there was only one replicate per treatment and the "Pooled Replicates" was not selected.

Version 1.0.26D Changes

Added new popup forms for linking tests and samples. When linking a test or sample, a smaller popup form showing the last 10 tests or samples is displayed instead of the entire list. The entire list of tests or samples can still be accessed from this popup form.

Added new nonlinear models for hormesis including two parameterizations of the linear logistic model (Brain and Cousens, 1989, Weed Res. 29, 93-96; Ewijk and Hoekstra, 1993, Ecotoxicology and Environmental Safety 25,

25-32).

Revised subroutine for estimating starting parameters for Bragg models. Prior versions may not have reached convergence due to poor initial starting values.

Due to an unknown Microsoft Access bug, users with their regional settings set to a language using the comma (",") as the decimal separator resulted in software failure. CETIS now runs using any regional settings. Charts displayed with Graphics Server now formats the Y-axis based on regional settings.

When the "Test Links" and either the "Analysis Options," "Test Reports" or "Quality Control Plot" forms are open, clicking on a new record on the "Test Links" form will automatically update the other form.

Previous versions required you to click on either directional scroll button to update the form.

The Test Design form was reworked. The Default Reps, Default Measure and Default Samples behave differently. When a new group or parameter is entered, the Reps, Measure and Samples fields are immediately updated if a default value is specified.

The date a link was last analyzed is now displayed on the "Test Links" form. This can be used to sort the records based upon the last time an analysis was performed.

Most of the drop-down lists can be appended directly from the Test Runs or Samples pages. CETIS will make a determination whether the entry already exists in the underlying table or list. In cases where a new entry is determined, the user is prompted for an appropriate code to store in the database.

The "Global Links" form is now called the "Test Links" form.

Version 1.0.26C Changes

A bug was addressed that may have led to the order of the raw data on reports to not correspond to their actual replicate number. This had no effect on the calculations, but is now fixed.

Version 1.0.26 Changes

Added a new field named "Qual" to the tblMeasurements table for recording measurement qualifier codes, such as DL (below detection limit).

The Linked Samples subform on the Test Runs page now lists all samples that are part of a multiple sample link. The Linked Tests subform on the Sample Detail page now lists all tests that are linked to a sample including those in a multiple sample link.

A new feature has been added that allows you to enter measurement data specific to a sample. Sample specific measurements can be added on the Sample Detail page of the main CETIS form. The sample specific measurements will subsequently appear on the Measurement report. The Ad Hoc Query form also supports the new feature. This feature requires the addition of a new table called tblSampleMeasurements to the CETIS.mdb file, which the 1.0.26 SETUP.mde file will do automatically.

Sample renewals are now displayed and can be added directly on the "Link Detail" page. The Sample Renewals command button on the "Sample Detail" page has been eliminated due to redundancy.

"Test Detail" and "Sample Detail" subreports can now be included or excluded on the Summary, Measurement

and Analysis reports.

Reports are now opened sequentially. To open the next sequential report, close the visible report by clicking on the "Close" button on the toolbar or the close button on the top right corner of the report.

Cell heights on the data benchsheets can now be adjusted. If left blank, the cell height will be the default height. The height is measured in inches.

Added a space for Analyst and Instrument ID on the Measurement worksheets. This data is for archival purposes only and is not stored in the database.

After using the "Clone Link" utility, CETIS now selects the newly formed link on the "Global Links" datasheet form.

If only one group is detected on the measurement summary subreport, CETIS does not list a pooled value.

Added a "Restrict" option when setting up measurements. By checking "Restrict", only the control(s) and the highest concentration will be included for the measurement.

Improved the interaction and synchronization between the main CETIS form and the Global Links form.

Version 1.0.25B Changes

The "Link Code" field can now be edited directly from the "Linked Samples" or "Linked Tests" sub-forms.

The "Linked Samples" or "Linked Tests" sub-forms are now updated after creating a new link.

The "Fisher's Exact" analysis report now correctly lists all of the comparisons when the "Compare All Possible Pairs" option has been selected.

Version 1.0.25A Changes

A bug was detected that affected the t-Test results in rare cases. If the t-Stat is identical between two adjacent groups, the P-Level may be erroneously listed as "0" in the second consecutive group and indicate a significant test when in fact it may not be significant. Check your results if you have any question. The bug may have affected some versions of 1.0.24 and 1.0.25.

Version 1.0.25 Changes

A number of enhancements were implemented with CETIS 1.0.25 that may not be discussed in your manual. Please refer to the following discussion outlining these changes:

*A new WET (Whole Effluent Toxicity) Evaluation report has been designed allowing the user to complete a test evaluation; comparing acute and chronic results with stored IWC (instream waste concentration) values and determining compliance with Test Acceptability Criteria (TAC). CETIS considers the WET test regulatorily significant if the calculated index of toxicity (e.g., ChV, LOEL, ECx) is less than or equal to the supplied IWC. In the case of the NOEL, CETIS considers the WET test regulatorily significant if the NOEL is less than the supplied IWC.

A cover letter with company/agency logo can be printed and standard paragraphs can be stored and easily copied (double-click) to the cover letter and/or test evaluation report. The new Test Evaluation features can be found by clicking on the "WET Evaluation" button in the "Test Reports" form. A new table has been added

named "tblReviewerCodes" that can be edited with the names and contact information of the test reviewer(s). The table "tblLogo" is used to store the company logo, with position parameters, appearing on the cover letter. New fields have also been added to the "tblSampleSourceCodes", "tblClientCodes", and "tblLaboratories" tables to support the test evaluation features. These tables should be opened using the "Edit>Lists..." command and new supporting data added.

The WET Evaluation applies to all "Official" analyses in the database for a particular link. Selecting or de-selecting analyses in the "Test Report" form will have no effect on which analyses are evaluated.

*A new command labeled "Clone Link" provides for a rapid cloning of a link record (with corresponding sample and test records). All test design implications are also replicated automatically. This command can be accessed by right-clicking on a record in the "Global Links" form.

*Lists to edit can now be selected individually from the "Lists>" submenu.

*New test and sample records can be added by clicking on "Records>New>Tests..." or "Records>New>Samples..." commands. Links can also be created using the "Records>New>Links..." command.

*A new field labeled "# Analyses" and "Review Date" have been added to the "Global Links" form. The number appearing in the "# Analyses" field represents the total number of "Official" analyses calculated for the corresponding link. The "Review Date" represents the date a WET evaluation was performed for a particular link.

*The Database>Delete>Unlinked Samples and Database>Delete>Unlinked Tests commands now automatically delete all matching records without the user having to select the individual records.

*The "Test Data" form now opens in "popup" mode and fully expands to the size of the parent CETIS window.

*The "Global Links" form can now be accessed while the "Test Reports or "Analysis Options" form is open. This will allow you to click on different records without closing the form. To make the record clicked on the current record, click on either of the arrow buttons located near the bottom of the "Test Reports or "Analysis Options" form. The arrow buttons can also be used to scroll through the records.

*The more user meaningful "Link Code" is displayed in the status bar instead of the "Link" number.

*All graphs displayed within the user interface have been improved and are displayed with a black background and various vibrant colors.

*The box-whisker plot has been replaced with a simpler stacked bar plot. The circular symbol represents the mean, the top and bottom of the bars represent the maximum and minimum values and the interface between the light and dark blue portions of the bars represent the midpoint between the maximum and minimum values (mid-point of the range). The plot is also displayed in untransformed units, while previous versions displayed in transformed units. The simpler stacked bar plot is more applicable to the typical toxicity test design where there are few replicates. The older box-whisker plot was considered less meaningful when there are few replicates.

*The "Linear Regression" module has a new option allowing the user to automatically pool groups with small expectations when performing the Chi-square goodness of fit. Previous versions performed this calculation but required user intervention.

*The linear Regression plot now displays in original concentration units. Previous versions displayed in log units.

*The plots used for the Spearman-Karber and Linear Interpolation modules now displays both the smoothed adjusted line as well as the unsmoothed line.

*The Spearman-Karber plot now displays as the endpoint, therefore it is consistent with the other graphs. The graph also displays both the response data as well as the corrected and smoothed response line.

*A previous bug affecting the assignment of controls to an external link has been fixed.

*The "Effect Levels" in the Linear Regression, Nonlinear Regression and Linear Interpolation forms can now be toggled on and off.

*The Test and Sample fields in the Ad Hoc Query form can now be toggled on and off.

*A previous Graphic Server bug that prevented the proper functioning of simultaneously displayed analysis result forms has been addressed.

Version 1.0.24 Changes

A number of enhancements were implemented with CETIS 1.0.24 that may not be discussed in your manual. Please refer to the following discussion outlining these changes:

*New test types, protocols, species and test titles have been added to the CETIS database as defaults.

*A new field has been added to many of the lists, allowing you to hide the entry on the main CETIS form. Open the list and select the "Hide" field if you do not expect to use the entry and want to hide it from view. It is recommended that you not delete the default entries so that you can maintain compatibility with other users.

*The drop-down lists in the "Ad Hoc Query" and "QC Plot" forms are limited to the entries used in the database. This should simplify the selection of criteria because extraneous data is not shown in the lists.

*The default endpoints are now protected and cannot be deleted. Although a default endpoint can be edited by the user, it is recommended that you not do so unless contacted by the software vendor.

*The nonlinear regression module has been improved and provides better initial estimation of the parameters and allows you to log transform the independent variable for all models. A "Microtox Gamma" model has been added allowing the calculation of Microtox Acute and Chronic data.

*When having the "Global Links" form open, you can now scroll through the records while having the "Test Reports" or "Analysis Options" form open. This capability allows you to quickly print or analyze multiple links without having to close the forms.

*You can now print worksheets and analyze data directly from the Test Data Entry form.

*The Import Data form now allows you to exclude records you do not want to import. This may be helpful when another user sends you a file that includes records you do not want part of your database.

*A Bonferroni adjusted Fisher's Exact Test has been added to the "Comparisons" methods.

*A "Log Transform" option has been added to the "QC Plot" form. Select this option to log transform the data in cases where the random variable are assumed lognormal.

*Most of the edit boxes, lists, and graphs now have a white background. This should improve the readability of the data in the forms.

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