CyFlex® Knowledge Article

Version Release Process

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Release Sequence

- A newly captured version of CyFlex will be considered a <u>Pre-Alpha</u> release until it has undergone benchtop and regression testing at TRP Laboratories. The initial version will be designated as Major.Minor.0 as described in *[Definition of a CyFlex Version Number](#)*, e.g. 6.1.0. Bug fixes performed as a result of this testing will be captured but no Major, Minor, or. Patch level changes will be made since this version is for internal use only and there should be no misunderstanding about exactly which version is being used.

- Once the benchtop testing is complete, the most recent version will be designated as an <u>Alpha</u> release. At this point, it will need to begin testing in an actual test cell. TRP Laboratories will always endeavor to keep its test cells running the latest version. But additional testing will be required at Cummins facilities.

  There are approximately a dozen unique combinations of test cell hardware at CTC alone. TRP Laboratories will work closely with the level fives at CTC to assist in the initial installation and testing of the newest version. Where possible, the benchtop tests performed at TRP Laboratories will be repeated at the test cell. Bug fixes will continue to be captured but will not be reflected in the Patch level number as long as distribution is limited and the process of updating all versions under test goes smoothly.

- Once a new version has been working successfully at one or more test cells for a long enough period of time for the level fives to develop confidence, it will be designated as a <u>Beta</u> release and will be propagated to additional cells that are representative of a significant portion of the unique hardware features of existing test cells. It may be necessary to increment the version Patch level number to avoid confusion as the number of installations increases.

- Changes at the Patch level should be tested as expeditiously as possible. At a minimum, the new version should be tested where the bug was found or where the incremental improvement was requested. Bench or other types of testing should be used as common sense would dictate. The goal is to avoid the situation we have had in the past where changes are made but never tested while everyone still remembers the details of the problem and the fix.

- Once at least six representative test cells have run successfully for 40 hours of actual engine operation with no bug fixes, the version will be designated as an <u>official release</u> which can be installed with reasonable confidence throughout Cummins. Bug fixes and isolated improvements will continue as required. Any change will require a new version number at the Patch level. We will no longer apply patches to older versions. The customer will know just by the version number that the version is unique.

- Significant changes made at the Major or Minor revision level will require this entire process to be repeated from the beginning.

Test Cell Testing Options

- TRP Laboratories has a number of test cells that we will always keep on the latest version of CyFlex. The amount of testing is necessarily limited to ongoing funded projects and it is not financially viable to burn fuel just to test software. The amount of software testing could be significantly increased if Cummins could find meaningful work to keep these cells busy.

- At one time, CTC had a cell designated as a test site for the latest software and test hardware. The cell was also being used to do meaningful work for an understanding customer and was manned by a level five dedicated to finding problems. Designating one or more cells to perform this function could be a viable and valuable means for testing new releases.

- If the previous two options are not tenable, the level fives will have to work with customers and test cell management to identify cells where new versions can be tested. Syncing a new version is not a lengthy process and reverting to an older version is not difficult if significant problems are encountered. It should be possible to identify a certain number of problems just by running a 'go' and checking for new errors. The real exposure begins when the test cell is run for the first time.