

# INTEGRATION OF VERSION CONTROL SYSTEMS IN CRO REPORTING PROCESS: COMPLIANCE OR AUTOMATION DRIVEN?

John W. Cornacchia, Robert Bethem, Robert Mitzel, Anthony Wong and Tamanna Husain *Alta Analytical Laboratory, El Dorado Hills, CA 95762*

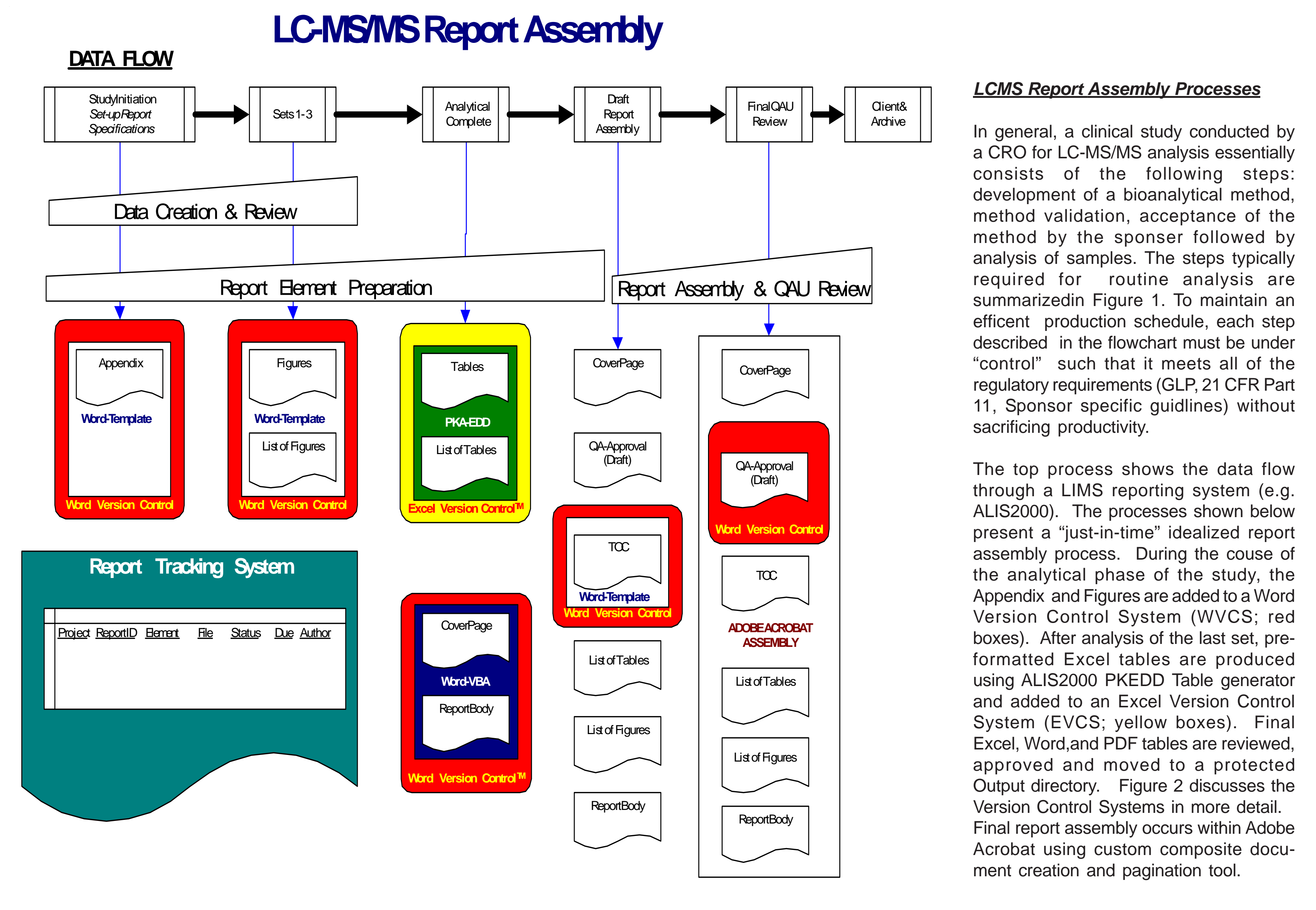
Ike D. Tabani, Isaac Pavalovsky and Mikhail Amchislavsky *Innovative Automation, Sacramento, CA 95823*

## Introduction

Version control and management systems range from simple version tracking to full document control and team management solutions. In the past, CRO's have been preoccupied with implementing systems delivering error free custom designed laboratory reports with minimal delay. Resources have been primarily focused on designing reporting systems with these production goals in mind. FDA has recently published guidance that address issues pertaining to computerized systems used to create, modify, maintain, archive, retrieve, or transmit clinical data intended for submission to FDA. Criteria are provided under which FDA will consider electronic records and signatures equivalent to paper records and traditional handwritten signatures. With the adoption of 21 CFR Part 11 regulations the need for electronic record keeping procedures during report preparation became a regulatory requirement.

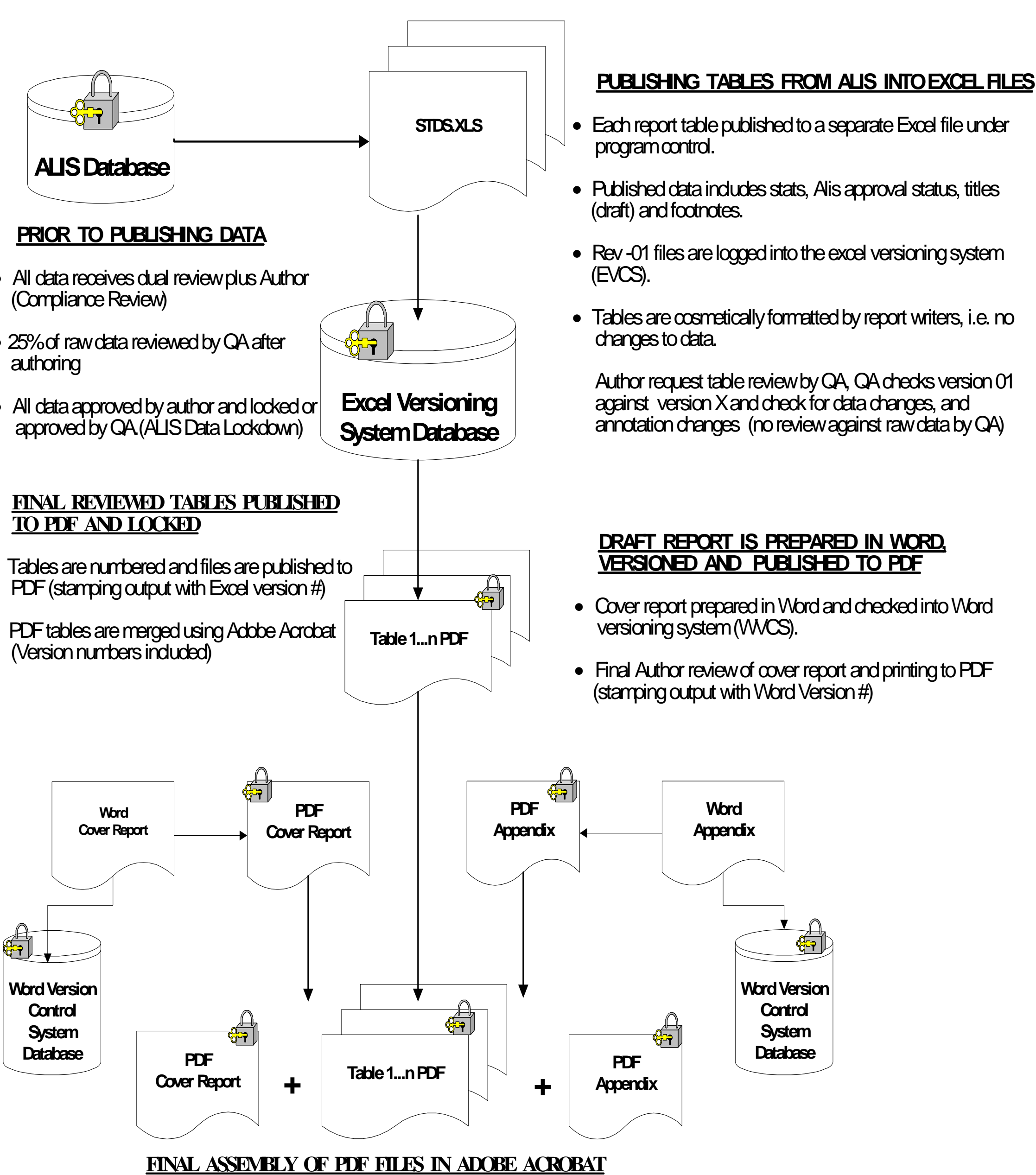
The potential impact on CRO report production efficiency is a primary concern when considering how to incorporate electronic signatures, audit trails and change control procedures in data reporting groups using MS Office applications, such as Excel and Word. We propose one solution that appears to not only achieve better regulatory compliance but also actually speeds the rate of report generation in a routine production environment. This system approach includes the use of ALIS-MS (LIMS) approval roles; file locking and a novel MS Excel and Word Versioning System that ensures that file changes are tracked and auditable. This approach coupled with electronic file review tools can actually improve the accuracy and rate of data review resulting in greater report throughput.

1



2

### LC-MS/MS Report Production Under Version Control System Process



### Mass Spectrometry Data Production & Reporting Incorporating Excel & Word Version Control Systems

Figure 2 show the use of an Excel Version Control System (EVCS) software during report production. Prior to table generation, all data is reviewed, approved and "locked" in the ALIS2000 database. Draft Excel data tables are then automatically generated and checked into the EVCS. All table changes are auto-versioned, tracked and an audit trail associated with a valid electronic signature is maintained (see below). Similarly, a draft report narrative is prepared in Word and checked into a Word Version Control System (WVCS) which manages revisions, audit trails, and electronic signatures as described for the EVCS.

In the final step, individual PDF reports are merged and paginated utilizing a custom PDF composite document creation and pagination tool in conjunction with Adobe Acrobat. The PDF document is reviewed, converted to read-only format for review only, digitally signed and locked for non-editing, prior to distribution.

3

## Conclusion

In summary, we have described our proposed approach to automating LC-MS/MS based data production and report generation using version control systems for Microsoft Office application such as Excel and Word. The major advantage to this approach is threefold. First, change control procedures are incorporated that meet regulatory requirements based on 21 CFR Part 11. Second, file tracking and version control will greatly reduce QA review times by eliminating the need for 100% review of tables submitted for QA review after LIMS data approval. Last, this approach allows project managers and report production coordinators, to process large amount of data and assemble reports rapidly as the entire process of excel file generation, versioning of each revision and PDF file production is automated providing significant savings of time and resources.

**Table 1. Summary of Calibration Curve Parameters for the analysis of Analyte 123 in Human Whole Blood**

Extraction Prep Batch	Analysis Date	Slope	Intercept	r <sup>2</sup>	n
EPB_001	1/23/2004	0.00914583	0.000732239	0.9994	14
EPB_002	1/25/2004	0.00907012	-0.00130080	0.9996	14
EPB_003	1/26/2004	0.00911434	-0.000540373	0.9998	14
EPB_004	1/26/2004	0.00903973	-0.000973405	0.9991	14
EPB_005	1/27/2004	0.00925011	-0.00137217	0.9989	14
EPB_006	1/28/2004	0.00898999	-0.000789995	0.9993	14
EPB_007	1/30/2004	0.00903545	-0.000774969	0.9995	14
EPB_008	2/4/2004	0.00902953	-0.00157529	0.9987	14

**REASON FOR CHANGES**

Changed "n" number of points for Prep. Batch sets 5 and 6, as 2 standards were rejected in each case.

**File Version Number**  
**Date/Time Stamp**  
**Electronic Signature**