APPENDIX A –QUALITY ASSURANCE LEVELS

Quality Assurance Level	Potential Consequences if an Application Does Not Perform as Intended
High (If one or more apply)	Causes injury
	Causes an evacuation
	Causes environmental hazard including medium/high potential for reportable radiological release, groundwater contamination, or regulatory violation
	Causes a significant disruption in laboratory operations or business operations
	Causes significant disruption of an experiment or program, or has significant impact on a contractor or Department of Energy (DOE) mission or program
	Compromises data integrity: total loss of or severe reduction in data quality, experimental data or equipment output
	Causes a release of DOE sensitive information
Moderate (If one or more apply)	Causes environmental hazard including low/small potential for reportable radiological release, groundwater contamination, or regulatory violation
	Causes minor program downtime
	Causes a minor disruption in laboratory operations or business operations
	Incurs a minor loss of experimental data or equipment output
	Causes minor disruption to an experiment or program, or has minor impact on a contractor or DOE mission or program
	Causes public release of information not authorized by DOE for public release
	Causes minor reduction in data quality or equipment output
	Can lead to compromises in systems or can cause the release of passwords or credentials that can lead to compromise of such systems
	Can lead to compromises in systems with personal identifiable information (PII).
Low (All should apply)	Does not cause a worker safety-hazard
	Does not result in any evacuation
	Does not cause environmental hazards, causes no environmental impact
	No program downtime
	No/Negligible disruption in laboratory operations or business operations
	No/Negligible loss of experimental data or equipment output
	No adverse public impact
	Causes loss of information that is authorized by DOE for public release. No unplanned release of information to the public.
	Negligible reduction in data quality or equipment output

APPENDIX B –QUALITY CONTROL MEASURES

M = Mandatory
R = Recommended
O= Optional

Control Measure	High	Moderate	Low
Documentation created to design, develop, and maintain the application.	M	M	R
All external interfaces identified, documented and analyzed including user inputs and outputs.	M	R	R
High-level descriptions of major logic structure.	M	R	R
Results of code reviews must be reviewed and approved prior to production release.	M	R	O
Appropriate Test Plan, Test cases and Test Results documents created.	M	M	M
Test evidence is recorded for all test cases.	M	O	O
Each issue identified during inspection and acceptance testing, and its disposition, shall be documented.	M	O	O
Inspections and review documentation created and controlled during each of the lifecycle phases and at the end of the development cycle.	M	R	R
User acceptance test results must be reviewed and approved prior to production release.	M	R	O
Acquisition documents created for procurement of application or software services.	M	M	M
Change Management practices in place to ensure that changes are recorded, evaluated, prioritized, authorized, planned, tested, and implemented per the process.	M	M	R
Application source under version control prior to being placed into production use.	M	M	M
A Traceability matrix must be updated during each phase of the project to ensure all requirements are accounted for.	M	M	R
Collect and record problems, and ensure corrective actions are tracked through to completion.	M	R	O
User documentation under version control.	M	R	R
Documentation of basic operations and explanations of common errors.	M	M	R

APPENDIX C – GLOSSARY

Application – A form of software developed or configured to perform a specific task or range of tasks. An application can be a complex system with many components/programs, each of which may have a different QA level. In this case, the application should be classified as the highest QA level of its components, recognizing that each component may have different controls based on its individual QA level. In the context of this document, software such as firmware is considered an application.

Application Owner - The individual or group with the responsibility to ensure that the program or programs that make up the application, accomplish the specified objective or set of user requirements established for that application, including appropriate security safeguards.

Artifact – Any element created from the software development lifecycle, including but not limited to documentation, test plans, workflow diagrams, data files, and scripts.

Collaboration Applications - Any application that has been developed by an institution in collaboration with Fermilab and utilized on-site. This type of application is split into two classifications: data collection applications and data analysis applications.

DOE Sensitive Information - Sensitive unclassified data, such as personally identifiable information (PII), official use only, and unclassified controlled nuclear information require special handling and protection to prevent misuse of the information for inappropriate purposes. (from http://energy.gov/ig/downloads/audit-report-ig-0818)

Loss of Availability - disruption of access to or use of information or an information system.

Loss of Confidentiality - unauthorized disclosure of information.

Loss of Integrity - unauthorized modification or destruction of information.

Software – All of the non-hardware items associated with the operation and use of a computing system.

Software Quality Assurance – Processes and procedures that ensure that an application meets or exceeds established requirements.

APPENDIX D – ACRONYMS

Acronym	Description
ANSI	American National Standards Institute
ASQ	American Society for Quality
FIPS	Federal Information Processing Standards
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IQA	Integrated Quality Assurance
ISO	International Organization for Standardization
ITIL	Information Technology Infrastructure Library
ITNA	Individual Training Needs Assessment
SQA	Software Quality Assurance

APPENDIX E - REFERENCES

- Integrated Quality Assurance Program (location: https://esh-docdb.fnal.gov:440/cgi-bin/RetrieveFile?docid=2469)
- Document Management & Control Policy (location: http://www.fnal.gov/directorate/Directors_Policy/)
- Fermilab Environment, Safety & Health Manual (FESHM) (location: http://esh.fnal.gov/xms/ESHQ-Manuals/FESHM)
- Quality Assurance Manual (QAM) (location: http://esh.fnal.gov/xms/ESHQ-Manuals/QAM)
- Fermilab Engineering Manual (location: http://www.fnal.gov/directorate/documents/FNAL_Engineering_Manual.pdf)
- FEDERAL INFORMATION PROCESSING STANDARDS - Standards for Security Categorization of Federal Information and Information Systems (location: http://csrc.nist.gov/publications/fips/fips199/FIPS-PUB-199-final.pdf)
- CHANGE MANAGEMENT ITIL PROCESS – ITIL documentation can be found in DocDB (location: https://cd-docdb.fnal.gov:440/cgi-bin/ListBy?topicid=187)