



Energy Facility Contractors Group (EFCOG)
Software Quality Assurance Task Group

White Paper

Proposed Definition of Software

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SUMMARY

The EFCOG Software Sub-Group was assigned the task of refining the definition of software for the proposed revision of DOE O 414.1D. The purpose was to define software as it applies to all work and programs and not only as it applies to safety or risk significant software developed or used for DOE sites and sub-contractors.

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PURPOSE

The purpose for this white paper is to standardize and clarify the definition of software used at DOE Sites. The clarification will help ensure that all software is addressed and not just safety or risk significant applications and codes.

SCOPE

The scope was to develop a standard definition of “software” to be used in the proposed revision of DOE O 414.1D.

DEFINITIONS

None

NARRATIVE

In general, DOE O 414.1D Attachment 4 provides an obscure definition of what software is. The current definition is:

Computer programs and associated documentation and data pertaining to the operation of a computer system. (ASME NQA-1-2008 with the NQA-1a-2009 addenda)

The EFCOG Sub-group Task Team propose the following definition with examples:

Software is a set of instructions, data and/or programs used to operate computers and/or hardware.

Examples that fall under the *new definition* but would be excluded in the current version include non-safety software that:

- ▶ Controls production processes or equipment

- ▶ Is embedded and configurable (firmware)
- ▶ Is a data suite and programming code that are used to develop software programs and applications and is designed to assist the programmer and the programming language compiler in building and executing software (software libraries)
- ▶ Controls testing or inspection process or equipment
- ▶ Controls the calibration of standards and measurement devices
- ▶ Provides data files to support manufacturing, inspection, test, and/or acceptance parameters/records
- ▶ Supports the analysis of materials
- ▶ Supports embedded applications including vendor-supplied firmware and/or firmware developed at DOE sites which can be changed or programmed and that could potentially affect processes
- ▶ Provides analysis capability to determine acceptability of products or parts
- ▶ Supports programmatic analysis or design
- ▶ Are simple and easily understood applications such as utility calculations that do not fall directly under the Commercial-off-the-Shelf (COTS), Government-off-the-Shelf (GOTS), or developed software for which, if the software is a calculation, results can be verified by hand calculation
- ▶ Could produce incorrect results that impact the physical, functional, or operational requirements of configuration
- ▶ Is used to meet a regulatory requirement

CONCLUSION

The new definition is clearer, concise and with the examples, easily understood.

Software is a set of instructions, data and/or programs used to operate computers and/or hardware.

REFERENCES

- [DOE O 414.1D Admin Chg 1](#), Quality Assurance