The United States Department of Energy (DOE)
and
The European Atomic Energy Community
represented by
The Commission of European Communities (EURATOM)
for

Computer Code Development for Automated Acquisition and Real-Time Analysis of Volume Measurement Data

1. Introduction

Pursuant to Article 3.1 of the Agreement between EURATOM and DOE for Cooperation in Nuclear Material Safeguards Research and Development (hereafter called the Agreement) signed on January 6, 1996, DOE and EURATOM undertake to carry out a cooperative effort to combine codes developed at JRC for the automated acquisition of volume measurement and monitoring data with a code developed at PNNL for the standardization and analysis of tank calibration data.

2. Scope of Work

This Action Sheet provides for the merging of a code developed at PNNL for the standardization and analysis of tank calibration data (called TANCS) with the codes developed at the JRC for the automated acquisition and real-time analysis of volume measurement and monitoring data into a single new code that encompasses the capabilities of both contributing codes.

The work under this Action Sheet shall be performed at the EURATOM Joint Research Center (JRC, Ispra, Italy), and Pacific Northwest National Laboratory (PNNL) in accordance with the terms and conditions of the agreement.

3. Program Management

PNNL is responsible for providing the TANCS software for the standardization and analysis of tank calibration data. JRC is responsible for providing its suite of codes for the automated acquisition of volume measurement and monitoring data. The detailed design of the combined code(s), together with related coding, testing and document production will be done jointly.

Work to be done jointly is identified in Appendix I and is limited to that statement of work for the present time. Appendix II identifies coordinator and key personnel working on this project.

DOE and EURATOM shall carry out this work interactively, exchanging necessary design and coding information as the project progresses. At the conclusion of this work, PNNL and JRC will provide a final report on the activities, and any recommendations for use of the combined code for volume measurement and monitoring, tank calibration and training activities.

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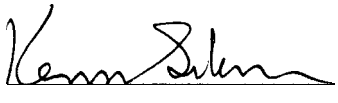
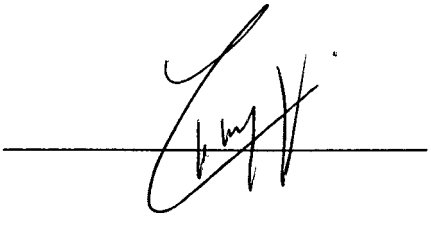
4. Fiscal Management

DOE and EURATOM shall bear their own expenses for this work.

5. Duration and Termination

This Action Sheet shall enter into force upon the latter date of signature, and shall continue in force for a two year period, or until mutually agreed by the parties that all activities under this Action Sheet are judged to be completed.

For the United States Department of Energy	For the European Atomic Energy Community Represented by the Communities
Signature: 	Signature: 
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Date: 1-11-99	Date: 2-18-99

Statement of Work
for
Computer Code Development for the Automated Acquisition and Real-Time Analysis of Volume Measurement Data

6. Background

A code for the acquisition, verification, standardization and analysis of tank calibration data, called TANCS, has been developed by PNNL. The TANCS code is used by IAEA inspectors and statisticians to verify calibration data and tank calibrations reported by plant operators. There are plans to incorporate the use of the TANCS code into the volume measurement training course conducted at the JRC for IAEA personnel. Simultaneously, a suite of codes has been developed at JRC for the automated acquisition of volume measurement data.

These codes are used by the IAEA and other JRC clients for the acquisition of tank calibration data and the verification of volume measurement systems. A single code that combined both sets of capabilities would represent a powerful new state-of-the-art tool for tank calibration, for the verification of volume measurements, and for training. Such a capability would find application at the IAEA, in the European Community, in Russia and other states of the former Soviet Union, and in other countries throughout the world.

7. Objective and Scope

The objective of this project is to merge the PNNL TANCS code and the automated data acquisition codes of JRC into a single code that combines the capabilities of both. The merged code will provide a comprehensive capability for the automated acquisition and real-time analysis of volume measurement data. The new code will provide a state-of-the-art tool for tank calibration, for verification of volume measurements, and for training. The success of this project will provide a volume measurement and verification capability that is not available anywhere else.

Major tasks required for this project include:

- an assessment of the capability of the present codes

  Results of this assessment will, in large part, determine the amount of effort required to merge the codes. A kickoff meeting will be held at PNNL for this purpose. Both codes are PC-based, so incompatibilities are not expected to provide a major obstacle.

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- development of standard protocols/procedures for the acquisition, processing and storage of data

  The code must be flexible enough to handle a variety of volume measurement configurations and it must be able to accommodate a variety of sampling schemes (e.g., number of variables, number of measurements, number of observations per measurement, time between measurements) for each measurement.

- incorporation of automated consistency checks to ensure data integrity

  With automated data acquisition systems, it is possible to develop a system of checks to ensure the internal consistency of the data being collected. Agreement must be reached on how extensive this system of checks should be. Given agreement, it will next be necessary to define and implement the specific checks required by the system. A working meeting may be required to work out this aspect of the code merger.

- development of a user-friendly interface

- preparation of adequate documentation

  The algorithm implemented in the code must be documented and a user's guide, preferably on-line, must be written. These documents will borrow heavily from documentation for the existing codes.

- performance and acceptance testing

  The new code must be tested against performance criteria as set for in a test plan.

  The final code must be tested for acceptability. All testing will be done at the JRC in Ispra, Italy.

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- Schedule and Milestones

Task Id.	Description	Starting Date	Ending Date	Duration (Weeks)
1	Kickoff meeting at PNNL to determine scope	98.12.01	98.12.15	2
2	Develop data acquisition protocols	99.12.07	99.01.15	6
3	Define data consistency checks	99.01.04	99.02.12	6
4	Develop User Interface	99.02.15	99.04.09	8
5	Prepare requirements document for new code that incorporates results of 1-4	99.02.22	99.04.16	8
6	Joint status review meeting (at a venue TBD)	99.04.19	99.04.30	2
7	Carry out necessary programming	99.05.03	99.06.28	8
8	Develop code test plan	99.06.11	99.07.09	4
9	Test code. Joint meeting at JRC for final code testing	99.07.09	99.08.20	6
10	Make final revisions based on test results	99.08.20	99.09.17	4
11	PNNL and EURATOM jointly prepare code documentation and Users Manual	99.07.01	99.09.30	12
12	PNNL and JRC issue final report and release code	99.09.30	99.09.30	-

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