Action Sheet 4a

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

Training, and Additional Modification of the "SYNTH" Gamma-ray Spectra Simulation System

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 in training, and additional modification of the "SYNTH" Gamma-ray Spectra Simulation Software.

2. Scope of Work

This Action Sheet provides for conducting additional training to EURATOM (Luxembourg) and/or Joint Nuclear Research Center (JNRC, Ispra, Italy) staff on the use of SYNTH gamma spectra simulation software, and to further modify the software to incorporate additional improvements identified in the previous phase of this work (Training, Evaluation, and Modification of the "SYNTH" Gamma-Ray Spectra Simulation System) completed in January of this year.

The work under this Action Sheet shall be performed at the EURATOM Safeguards Directorate, JNRC, and Pacific Northwest National Laboratory (PNNL) in accordance with the terms and conditions of the agreement.

3. Program Management

PNNL is responsible for provision and support of the SYNTH gamma spectra simulation software, for providing an expert to conduct training in the use of the software, and for making additional modifications to the software. EURATOM is responsible for field testing the modified software, and for providing feedback to the developers with respect to suitability, and technical content. EURATOM will also provide PNNL with written specifications for any additional requirements and, or suggestions that may be identified for inclusion in future versions of the software. Work to be done jointly is identified in Appendix I and is limited to that statement of work for the time being. Appendix II identifies coordinator and key personnel working on this project

DOE and EURATOM shall carry out this work interactively, exchanging information on the training, and software modifications as the project progresses. At the conclusion of this work, EURATOM will provide a final report on the activities, and any recommendations for use of the SYNTH gamma spectra simulation software.

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 Commission of European Communities	
Signature:		Signature :	
Printed Name:	Kenneth E. SANDERS	Printed Name:	Winfried KLOECKNER
Title:	Director International Safeguards Division	Title:	Head of Division Commission of the European Communities EURATOM Safeguards
Date:	April 16, 1998	Date:	

Appendix I

Statement of Work
for
Training, and Additional Modification of the "SYNTH" Gamma-ray Spectra Simulation System

1. Bac kground

Many of the safeguards activities performed by EURATOM staff utilize gamma-ray spectroscopy as an analytical tool both in the laboratory, and in the field. Analysis of the large number of gamma-ray spectra that are acquired in the process of a facility inspection generally requires a great deal of time and effort by a highly trained gamma-ray spectroscopist. Numerous software tools (analysis packages, data libraries, diagnostics, etc.) have been developed over the years in order to try and make the data analysis task more manageable.

SYNTH is an interactive Windows™ based program designed to synthesize the results of typical gamma-ray spectroscopy experiments /measurements. A customized version of SYNTH was developed for use by EURATOM in the previous phase of this work (Training, Evaluation, and Modification of the "SYNTH" Gamma-Ray Spectra Simulation System) completed in January of this year. One of the tasks specified in the previous work was to "Determine a list of additional desirable features and capabilities to be added to the SYNTH code to make it an even more powerful tool." This Action sheet is a direct result of that task.

2. Objective and Scope

The overall objectives of this work are:

- Continue to develop a version of SYNTH customized, and optimized for use by EURATOM, by implementing as many of the improvements identified in the previous work as is practical, and feasible. These include, but are not limited to:
  - Implementation of an automated "Black Box" [rather than interactive] mode of operation.
  - Refine, and extend the planar germanium detector model.
  - Determine the feasibility of developing a general NaI(CdT1) detector model.
  - Develop routines for printing the graphics presented in the "Pan/Zoom" form.
  - Generate a 32-Bit complied executable which will provide long file name support, and faster spectrum generation.
- Determine any additional features and capabilities that could reasonably be added to SYNTH to make it an even more powerful analysis/modeling tool.
- Train EURATOM staff on the many uses of SYNTH, with specific emphasis on its applicability to safeguards activities.

3. Schedule and Milestones

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Task Id.	Description	Starting Date	Ending Date	Duration (Weeks)
1	PNNL evaluates the requirements for software modifications, and requests any additional clarification, and / or required technical specifications	98.06.02	98.06.06	1
2	EURATOM supplies any additional clarification, and / or required technical specifications to PNNL	98.06.09	98.06.27	3
3	PNNL modifies the SYNTH software to correct existing deficiencies, and implement basic improvements to the code	98.06.30	98.08.08	6
4	PNNL provides EURATOM with the updated SYNTH software, and on-line Users Guide	98.08.11	98.08.11	-
5	EURATOM field tests and evaluates SYNTH and its applicability to EURATOM safeguards activities	98.08.11	98.09.05	4
6	PNNL develops training materials based on the capabilities of the updated SYNTH software	98.09.01	98.09.05	1
7	PNNL provides training to EURATOM staff on the use of SYNTH and its applicability to EURATOM safeguards activities	98.09.08	98.09.12	1
8	EURATOM prepares a summary report of the test and evaluation results, which includes a list of additional desirable features and capabilities to be added to the code	'98.09.15	98.09.19	1
9	EURATOM supplies a summary report of the test and evaluation results, which includes a list of additional desirable features and capabilities to be added to the code to PNNL	98.09.19	98.09.19	-
10	PNNL and EURATOM jointly write final report	98.09.22	98.09.26	1
11	Final report issued	98.09.30	98.09.30	-

Key Personnel
for
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