



IAEA

الوكالة الدولية للطاقة الذرية

国际原子能机构

International Atomic Energy Agency

Agence internationale de l'énergie atomique

Международное агентство по атомной энергии

Organismo Internacional de Energía Atómica

Atoms For Peace

Wagramer Strasse 5, P.O. Box 100, A-1400 Vienna, Austria

Phone: (+43 1) 2600 • Fax: (+43 1) 26007

E-mail: Official.Mail@iaea.org • Internet: <http://www.iaea.org>

In reply please refer to: M2.05-USA

Dial directly to extension: (+431) 2600-22203

Mr. M. Farnitano

ISPO Liaison Officer

U.S. Mission to the International Organizations
in Vienna (UNVIE)

Wagramer Strasse 17 - 19

A-1220 Vienna

2004-08-18

Dear Mr. Farnitano,

With reference to the U.S. Support Programme, I am pleased to provide the following new Task Proposal.

04/TNS-010 Development of ISOCS Self Modeling Capabilities

This task is part of the Improved Techniques and Instruments for Verification of Nuclear Materials in Waste and In-plant Processes. The project manager is Mr. Lebrun.

Please inform me at your earliest convenience whether the content of the proposal is acceptable to the U.S. Support Programme or if you would like to introduce any amendments. In your reply, please also provide the name(s) of the U.S. contact person(s) responsible for the task.

Upon acceptance of the proposal, the IAEA will transmit the Task Outline to you indicating the name of the Agency task officer. Our understanding is that the U.S. Support Programme and the Agency task officer will then establish a detailed task workplan.

I would also like to express the appreciation of the Agency for the valuable contribution provided by the U.S. Support Programme to the Agency's safeguards efforts.

Yours sincerely,

N. Khlebnikov

Director

Division of Technical Support

Enclosure

cc: Ms. S. Pepper, USSP Coordinator

by ISOCS is consistent with FRAM results. When not consistent, the modeling is therefore manually tuned up in order to meet agreement. Whatever useful, this procedure is tedious and requires a high expertise level, which is not consistent with routine deployment of ISOCS.

The Agency needs to have FRAM and ISOCS coupled to automate the above-described approach. In addition to the coupling of codes, methods could be developed to assist self-modeling in the case of uranium and plutonium assay. For instance, specific behavior of the gamma rays in the energy range around the absorption discontinuity (k-edge) should be automatically interpreted in order to decide which parameter to refine in the model (matrix density, nuclear material mass fraction, wall thickness). ISOCS should implement these methods to automatically change the specified parameter in order to reach convergence on enrichment or total activity figure returned by analysis of each gamma line.

The task should therefore have two axes:

- n Define the methods for automatic improvement of the modeling,
- Implementation of the methods in ISOCS (e. g. coupling of FRAM and ISOCS).

The second step might include improvement of the man-machine interface. In particular the template based interface does not feed back any graphical interpretation of the data entered by the user which makes difficult the data input checking.

3.2 How will the task results be used and by whom:

Effectiveness of the IAEA safeguards verifications will be improved as the SG department will have an improved general purpose tool able to quantify nuclear material in waste or retained as hold up or more generally in any form where experimental calibration is not practical.

ISOCS safeguards application range will be enlarged and the requested expertise level for its use will reduce thus facilitating ISOCS deployment for routine applications. Quality control of the interpretation will be enhanced.

As ISOCS is based on IMCA, further development of ISOCS complies with the standardization and sustainability policy of the department.

3.3 Consequences if task is not performed:

The Agency will not take full advantage of the potential of numerically calibrated gamma spectrometry. Expertise level for the interpretation of ISOCS measurements will remain high and would limit ISOCS deployment for routine applications.

The quantitative verification of NM retained in waste or as hold up in plant process lines will still be contingent on the availability of experts to systematically assist SGO.

4. IAEA Proposed Work Outline

4.1 Major task stages with timing:

The Agency foresees the involvement of a R&D laboratory to develop and specify the concepts together with ISOCS supplier for the software implementation. Timeframe is indicated relatively to the Task Acceptance date (TA).

Major steps of the task are as follows:

- IAEA to develop user requirements:
Duration: 3 months, Delivery time: TA+3 months
Deliveries: user requirement document
- MSSP R&D lab to study the methods applicable to self-optimization of the modeling:
Duration: 12 months, Delivery time: TA+15 months
Deliveries: Principles and algorithms specifications
- MSSP contractor to modify ISOCS in order to implement FRAM coupling and develop the ISOCS capability for integration of automated self-optimization of the modeling:
Duration: 12 months, Delivery time: TA+15 months
Delivery: Modified version 1 of ISOCS software and related documentation
- MSSP contractor to implement the automated self-optimization methods developed by the R&D laboratory:
Duration: 6 months, Delivery time: TA+21 months
Delivery: Modified version 2 of ISOCS software and related documentation

Timing will be update upon acceptance of the task.

4.2 Support Division(s) / Section(s): SGTS / TNS
4.3 End User Division(s) / Section(s): SGOA / OA1, OA2
SGOB / OB1, OB2
SGOC / OC1, OC2, OC3
4.4 Estimated duration in months: 21

5. Safeguards Approval Process - not displayed

6. Acceptance by MSSP(s)

6.1 MSSP(s) to which the task is proposed: USA
Date accepted:
Agency Task ID: