P2

Task Proposal (SP-1)

1. **Task Proposal**

1.1. Task Proposal ID:	15/TND-003
1.2. Task Title:	Junior Professional Officer - NDA Simulation Engineer
1.3. Requestor / Division / Section:	Lebrun Alain_Robert / SGTS / TND
1.4. Task Proposal Type:	JPO Task
1.5. Task Category:	A (Measurement Methods and Techniques)

1.6. Reason (if task is either a joint task or desires multiple acceptance)

2. **Project**

2.1. Project ID and Title:	SGTS-001 - NDA Techniques
2.2. Project Manager / Division / Section:	Mayorov Mikhail / SGTS / TND

3. **Safeguards Requirement Identification**

3.1. Background

Within the Division of Technical and Scientific Services (SGTS), the section for Non Destructive Assay (TND) is responsible for the development, design, testing, installation, maintenance, troubleshooting, and upgrading of all the Non-Destructive Assay (NDA) systems used by the Inspectorate to meet the IAEA's safeguards mission. The NDA services team (NDAS) is responsible for providing field support by experts participation in the implementation of challenging or unusual NDA applications for inspection, design information verification, complementary access and other safeguards activities in the field; managing the NDA related development and implementation projects and selected tasks; providing guidance to Division of Operations (SGOs) and other SGTS teams on safeguards implementation of advanced NDA techniques; maintain and further develop the computerized modelling and simulations capability to address implementation and development of NDA techniques; providing expertise in the area of nuclear fuel cycle including depletion and reactor simulations capabilities; providing training related to the implementation of NDA systems for safeguards applications; and providing expert support for other United Nation organization in the field of radiation detection, identification and assessment.

3.2. What is Needed and When

Under the above described scope of TND there is a rapidly extending usage of Monte Carlo simulation code and other simulation tools such as fuel depletion codes. Such simulation tools are no longer used only for designing NDA instrument but have become operational tools used to calibrate instruments and to simulate expected NDA signatures subsequently compared to signatures observed during actual verification.

The TND section has established significant capabilities in support of the simulation work both from the tools perspective (i. e. a parallel computing system, state of the art simulation codes) and the expertise point of view. However, the workload in the area of the simulation of NDA systems resulting from implementation support tasks persistently exceeds current availability of staff within the Division.

There is a need for assistance in the area of computerized simulation of NDA system, it is therefore proposed that a Junior Professional Officer (JPO) is recruited to support the NDA section in timely delivering simulation results of unchallengeable quality as required to support implementation of IAEA safeguards by SGOs.

3.3. Why is the task needed and consequences if task is not performed

Demand in computerized simulation of NDA systems arising from implementation task in support of SGOs exceeds current capabilities and potentially negatively impact the quality of the simulation work. Would the JPO not be recruited, SGTS may not be able to satisfy all requests formulated by SGOs or, even worse, NDA experts, under stress may not have the time to devote sufficient effort to ensure quality of their simulation results.

3.4. How will the task results be used and by whom

The JPO will work in support of inspections by executing simulation work as requested by Task Officers responsible for safeguards implementation tasks.

The JPO will also contributing conducting peer reviews of simulation work executed by other experts in support of unchallengeable quality of simulation results.

The JPO will update procedures applicable to the execution and reporting of computerized simulations in support of NDA system for safeguards applications

4. Proposed Sub Tasks

5. Proposed Work Outline

5.1. Estimated Duration (months):	24		
5.2. Status Report Frequency:	**Once every**	4	Month

5.3. Supporting Divisions(s) / Section(s): SGTS / TND

5.4. End User Divisions(s) / Section(s): SG / All

5.5. Proposed Work Phases

Phase Number: 1

Phase Title: Produce Work Plan

Description

The work will consist in providing assistance, on an ongoing basis, in the area of Monte Carlo simulation in support to safeguards implementation tasks involving complex Non Destructive assay instruments and methods.

The total picture of work will be instructed as Work Plan after his/her arrival.

Start Month after acceptance: 1 **End Month:** 1

Carried out in sub tasks:

Phase Number: 2

Phase Title: Assistance for NDA Simulation

Description

The work will be implemented based on ongoing demand.

Start Month after acceptance: 1 **End Month:** 24

Carried out in sub tasks:

6. Safeguards Approval Process

6.1. Suggested to MSSPs: USA

6.2. Reason for suggestion of MSSPs

The US SP is interested in this activity and has resources to support safeguards implementation by provision of JPO qualified in the specialization of Monte Carlo simulations.

7. Attached Documents

N/A

IAEA
International Atomic Energy Agency

Job Description for Professional Posts

Position and Grade:	NDA Simulation Engineer (P-1 or P-2)
Organizational Unit:	NDA Services Team Section for Non Destructive Assay Division of Technical and Scientific Services Department of Safeguards
Duty Station:	Vienna
Type/Duration of Appointment:	Junior Professional Officer / 1 year

Organizational Setting

The Department of Safeguards is the organizational hub for the implementation of IAEA safeguards. The IAEA implements nuclear verification activities for some 180 States in accordance with their safeguards agreements. The safeguards activities are undertaken within a dynamic and technically challenging environment including advanced nuclear fuel cycle facilities and complemented by the political diversity of the countries.
The Department of Safeguards consists of six Divisions: three Operations Divisions: A, B and C, for the implementation of verification activities around the world; three Technical Divisions: Division of Concepts and Planning, Division of Information Management, and Division of Technical and Scientific Services; as well as two Offices: the Office of Safeguards Analytical Services and the Office of Information and Communication Services.
The Division of Technical and Scientific Services is responsible for nuclear and other measurement systems applied in verification activities, containment and surveillance techniques and all verification logistics.
The Section for Non-Destructive Assay (NDA) Section is responsible for the development, testing, commissioning and provision of equipment for non-destructive assay of nuclear materials; the development, implementation and maintenance of respective methodologies to be applied by SG inspectors; the provision of relevant training and/or expertize through direct participation in field measurements; and providing relative methodological support to the section of unattended systems and other users.

Main Purpose

As a team member reporting to his designated supervisor within the NDA Services Team (NDAS), the NDA Simulation Engineer contributes to the technical production of the team through activities focussing on numerical simulations of radiation measurement systems. These equipment/systems include radiation detection technology with emphasis on gamma spectrometry, neutron coincidence counting, spent fuel assay, and other measurement techniques that have been deemed necessary to support the department.

Role

The NDA Simulation Engineer is a substantive contributor to the team, implementing attended Non Destructive Assay system projects related to simulation of the application of radiation

instruments/techniques. The NDA Simulation Engineer also develops and applies procedures and best practices meant to ensure unchallengeable quality of the simulation results.

Partnerships

The NDA Simulation Engineer works closely with the staff of SG-TND Section providing support to other NDA experts on assigned tasks. Additionally, he/she acts as a technical point of contact for the Operation Divisions of the Safeguards Department, providing technical support to inspectors in the area of simulation of NDA systems as required.

Functions / Key Results Expected

The NDA Simulation Engineer will contribute to the programmatic goal to provide technical support to the Department of Safeguards Operations staff. To do so, the following functions will be performed by the incumbent:

- To maintain and improve the methodology, tools and associated documentation related to the quality management of numerical simulations of NDA instruments.
- To apply the methodology in developing, validating and running calculations supporting the development, testing and calibration of selected NDA systems.
- To provide occasional field support for the validation of simulation results and deployment of NDA systems.
- To facilitate the implementation of the Quality Management System of the Department, review the technical procedures currently in use in the NDA area for compliance with the QMS guidelines, and suggest and introduce improvements in the area of simulation of NDA systems.

Qualification, Experience and Skills

- University degree in Nuclear Engineering, Nuclear Physics, Physics.
- Demonstrated experience in simulation of complex NDA systems with computrized tools including Monte Carlo codes such as MCNP.
- Experience in detection and characterization of nuclear and radioactive material and/or operation of nuclear facilities is an asset.
- Experience in developing, evaluating, and implementing various types of radiation detection equipment is an asset.
- Experience in working with radioactive sources is an asset.
- Demonstrated knowledge of the physics underlying the detection of radiation in the context of Non Destructive Assay systems.
- Excellent computer skills and experience with MS Office applications .
- Demonstrated ability to write clear and concise technical reports and procedures.
- Demonstrated capability to work on complex engineering/scientific tasks.
- Fluency in spoken and written English. Knowledge of other official IAEA language (Arabic, Chinese, French, Russian or Spanish) an advantage.

NOTE: The incumbent of the post will be considered to be a radiation worker and be subject to an appropriate programme of physical and special medical surveillance arranged by the Agency.