2nd Draft Project Concept Template

Project Proposals for the RCA Programme 2022/2023
2ndRound Project Concept Template

Part 1: Information Sheet

2nd Round Concept Project proposals for the RCA Programme 2022/2023 are to be prepared USING THE 1ST ROUND CONCEPT PROJECT PROPOSAL.

The 2nd Round Concept should show the text changes that have occurred through the updating of the 1st Round Concept thorough THE USE OF TRACK CHANGE MODE.

The 2nd Round Concept Proposals will be evaluated against the response to the feedback you have received from RCA PAC on your 1st Round Concept Proposals as well as the criteria listed below:

- **Is its aims and objectives in line with priorities set out the RCA Medium Term Strategy for 2018/2023?**
- **Identify which elements of the MTS are being complied with.**
- **Why it should be a regional project.**
- **The essential role of the nuclear technology in the project.**
- **Does the proposal identify links to previous projects in this area of technology?**
- **Does the proposal overlap or duplicate current or previous RCA projects?**
- **Is a convincing case made to justify further projects in this area?**
- **Is there a strong TCDC component to exploit the benefits from the earlier projects?**
- **Is there a readily available baseline against which to measure the effectiveness of the project?**
- **If the proposal is essentially an extension of previous projects in this area that have been implemented for more than 2 TC Cycles, does the proposal include arrangements for the transfer of project leadership to others?**

Completed templates will be reviewed by the RCA PAC at the Meeting in Vienna planned to be held January / February 2020.

In addition to the above, please address the following specific questions:

Was this concept identified at the 48th RCA GCM as requiring merger with other similar concepts?	**NO.**
If "YES" – was this concept prepared as a result of consultation with the other proposers?	
If "NO" - why was this not undertaken?	

Your National Representative will be reviewing this2nd Draft Concept document to ensure that it has been prepared in compliance with the RCA special requirements.

(Please be aware that, if your concept design does not take account of the special requirements for the RCA programme, it will be rejected.)

Part 2: Concept Template[1]

Title:
The title should be as concise as possible and should summarize the objective of the project.

Strengthening Regional Cooperation on Treatment Method and Radiation Protection of Tritiated Waste from Nuclear Facilities in Asia Pacific Region

Compliance with the RCA Medium Term Strategy for 2018/2023:
All RCA projects have to comply with the RCA MTS for 2018/2023 - please refer to the MTS document. Briefly indicate to which specific MTS priorities this project proposal contributes and how will these be achieved?

The management of tritiated waste in Asia Pacific Region is a common challenge for RCA Member States which have nuclear facilities or intend to develop nuclear energy.~~Since tritium plays an important role in nuclear waste, the IAEA published a technical report "Management of Waste Containing Tritium and Carbon-14" in 2004. Tritium science and technology, including tritium separation, storage and transport, measurement, radiological effect, etc, have been well developed during last decade, especially after the Fukushima accident in 2011.~~This project aims at organizing regional technical training and communication in treatment method and radiation protection of tritiated waste for working personnel in nuclear facility, representatives of Nuclear Regulatory Authorities (NRAs), researchers in scientific establishments and universities from the region, etc.~~, sharing experiences and achievements of tritiated waste management, and promoting RCA Member States to improvetheirradiation protectionlevelson tritium and realize their SDGs.~~

This project will meet the priorities of radiation safety (C.2.5.) of RCA MTS for 2018-2023:

i) Encourage self-assessment and peer review of regulatory infrastructure by the NRAs in RCA GPs, and harmonize related methodologies and approaches at the regional level;

ii) Mentor new RCA GPs as well as those GPs without adequate radiation safety infrastructure to achieve the safety levels required by IAEA Thematic Safety Areas (TSA) 1, 2&3 (TSA1-Regulatory Infrastructure; TSA2-Radiological Protection in Occupational Exposure; TSA3-Radiological Protection in Medical Exposure), and to plan for the next TSAs (TSA4-Public and Environmental Radiological Protection; TSA5-Emergency Preparedness and Response; TSA6-Education and Training in Radiation, Transport & Waste Safety; TSA7-Transport Safety) in accordance with their specific requirements and resources.

This project will (1) introduce the experience of self-assessment and peer review of typical nuclear facilities by the Nuclear Regulatory Authorities in RCA Member States (including Japan, Korea, China, etc.) with focusing on the tritiated waste management and radiation protection, (2) present the development of tritium monitoring and tritiated waste management strategy in typical nuclear facilities for emergency preparedness and transport, (3) illustrate the tritium measurement method and radiation protection principle

[1] If you have not been involved in drafting a concept before and if you are not fully acquainted with the RCA and its Programme you are encouraged to support advice and assistance from your RCA National Representative.

including tritium radiological protection for occupation, public and environment, (4) encourage other NRAs in RCA GPs to do self-assessment and peer review of regulatory infrastructure and share their experience and achievement of tritiated waste management, (5) promote RCA Member States to improve their radiation protection levels on tritium, and (6) mentor new and less advance member states to achieve the safety levels required by IAEA Thematic Safety Areas (TSA) 1, 2&3 and to plan for theirrespective next TSAs.

By organizing technical training sessions and nuclear facility visits, ~~We~~ we will present regional partners about principles of tritiated waste management, supply technical trainings on tritiated waste treatment and radiation protection of workers, encourage regional NRAs to perform self-assessment and peer review for improvement, and guide new and developing RCA GPs to meet and upgrade the safety levels required by IAEA. By establishing a workgroup andproviding on-site expert guidance to enhance the communication, t~~T~~his project will strengthen regional exchanges and cooperation on tritium science and technology for RCA Member States and promote the radiation safety level in Asia Pacific Region.

Overall Objective:

State the objective to which the project will contribute. Note this has to be in line with the RCA MTS for 2018/2023. It should be a short description expressed as: To do ………

To improve the tritium radiation protection and tritiated waste management level in RCA Member States.~~and promote the radiation safety level of nuclear facilitiesin RCA countries in Asia Pacific Region.~~

RCA Projects are to be designed to have a Socioeconomic Benefit:

What is the potential socioeconomic benefit that might be realised from the project concept over a 5 to 7-year horizon?

The potential socioeconomic benefitthat might be realised from the project concept over a 5 to 7-year horizon include: (1) Improving the level and capacity of tritiated waste treatment and disposal in nuclear facilities in the region; (2) Increasing the knowledge of tritium science and radiation protection ofrepresentatives of NRAs which can provide a basis for more effective nuclear facility supervision; (3) Providing engineering guidance for the treatment of tritiated waste water in Fukushima and the control, measurement, and discharge of tritium in future fusion reactors in Asia Pacific Region; (4) Promoting radiation safety levels of nuclear facilities in RCA Asia Pacific Member States and safe and secure working environments of all workers.~~.~~

Proposed Participating Government Parties:

List the Government Parties expected to participate in the project:

The expected participates of nuclear regulatory agency, nuclear facility management corporation and related research institutions in RCA Asia Pacific Member Countries include but not limited to:

Japan (Nuclear and Industrial Safety Agency (NISA), Japan Atomic Energy Agency (JAEA), Toyama University, Nagoya University, etc.), Korea (Korea Institute of Nuclear Safety (KINS), Korea Hydro & Nuclear Power Co. Ltd, Hanyang University, etc.), China (China Atomic Energy Authority (CAEA), China Academy Of Engineering Physics, Tsinghua University, etc.), India (Atomic Energy Regulatory Board (AERB), Nuclear Power Corporation of India Limited (NPCIL),etc.), Pakistan (Pakistan Nuclear Regulatory

Authority (PNRA), Quaid-i-Azam University Islamabad, etc.),Indonesia (NationalAtomic Energy Agency (BATAN), National Nuclear Energy Agency (BATAN), Universitas Gadjah Mada, etc.), Malaysia (Department of the Atomic Energy Licensing Board (AELB), The National University of Malaysia, etc.), Thailand (Thai Institute of Nuclear Technology (TINT), Chulalongkorn University, etc.), Vietnam (Vietnam Agency for Radiation and Nuclear Safety (VARANS), Vietnam Atomic Energy Institute (VINATOM), Nuclear Research Institute (NRI), etc.), Bangladesh (Bangladesh Atomic Energy Commission, etc.), Myanmar (Division of Atomic Energy, Yangon Technological University, etc.), Cambodia (Royal University of Phnom Penh (RUPP), etc.), Singapore (Nanyang Technological University, NationalUniversityofSingapore, etc.), Philippines (Philippines Department of Energy, etc.), Nepal, Lao People's Democratic Republic, Mongolia, Sri Lanka, Australia, New Zealand, etc.

However, the participating institutes must be approved by the NRs before attending this project.

Technical Cooperation among Developing Countries (TCDC) Project Component:
Review the resource documentation provided on-line – www.rcaro.org/ ???. Outline the TCDC strategies to be used in the project to enhance regional cooperation:

~~In current project, we will adopt the following TCDC strategies to enhance regional cooperation:~~

~~a) Emphasize the implementation of TCDC modalities, including the use of regional expertise and facilities in project design, implementation, monitoring and evaluation;~~

~~b) Potential to incorporate, encourage and stimulate activities through TCDC;~~

~~c) Providing some cost-free experts for the RCA Programme;~~

~~d) Strengthen relations between the DCs, or forge new ones;~~

~~e) Increase the exchange, generation, dissemination, and use of scientific and technicalknowledge.~~

Considering the RCA TCDC Strategy, in current project, we will use the following strategies to enhance regional cooperation:

a) Organize those advanced member countries (Japan, Korea, China, etc.) to presentthe experience of self-assessment and peer review of nuclear facilities with focusing on the tritium radiation protection and tritiated waste management, encourage those less advanced member countries (Bangladesh, Viet Nam, Cambodia, Indonesia, Malaysia, Thailand, Myanmar, etc.) to introduce their nuclear facilities or nuclear energy development plan, and guide those less advanced member countries to do self-assessment and peer review of nuclear facilities or improve nuclear energy developing plan;

b) Mentor new RCA GPs as well as those GPs without adequate radiation safety infrastructure to achieve the higher safety levels especially for the tritium radiation protection;

c) Provide the technical training with the knowledge of tritium measurement and tritium radiation protection of workers and supervisor, and supply some cost-free experts from those advanced member countries for the RCA program;

d) Strengthen relations between the DCs by organizing technical training sessions and visits;

e) Increase the exchange, generation, dissemination, and use of tritium scientific and technical knowledge by establishing a workgroup to enhance the regional cooperation among RCA GPs.

Will the project design feature partnering arrangements between those advanced and those less advanced in the technology?

Yes. We will arrange the participants from those advanced member countries, such as Japan, Korea, and China to share their research experience in tritiated waste treatment and radiation protection, in order to help those less advanced member countries to develop the tritium measurement technology, tritium waste management strategy, tritium radiation protection regulations, etc.

We will introduce the experience of self-assessment and peer review of typical nuclear facilities by the Nuclear Regulatory Authorities in those advanced member countrieswith focusing on the tritiated waste management and radiation protection, encourage those less advanced member countries to perform self-assessment and peer review of regulatory infrastructure to harmonize related methodologies and approaches at the regional level, and guide new and developing RCA GPs to meet and upgrade the safety levels required by IAEA.

We will organize the China Tritium Science and Technology Conference in Zhuhai City, Guangdong Province, China around August, 2021. The technical training on tritium radiation protection and tritium waste management for this project will be embeddedin this conference.In this way, the participants can obtain a wide and comprehensiveunderstanding of scientific and technological development of tritium.

Besides, we will establish a workgroup on tritium radiation protection and tritium waste management among participants. The scientific and engineering materials about developmentand achievement of tritium science and technology can be shared in the workgroup. If some participants wish to have experts on site for guidance, we can help to contact the experts. This workgroup will communicate closely and frequently to promote the regional cooperation on treatment method and radiation protection of tritiated waste from nuclear facilities in Asia Pacific Region.

If so, list those expected partnerships.

The expected partnerships include the Japan Atomic Energy Agency (JAEA), Toyama University, etc. in Japan, the Korea Institute of Nuclear Safety (KINS), etc. in Korea, the China Academy Of Engineering Physics, Tsinghua University, etc. in China, the Atomic Energy Regulatory Board (AERB), etc. in India, the Pakistan Nuclear Regulatory Authority (PNRA), etc. in Pakistan, the National Atomic Energy Agency (BATAN), Universitas Gadjah Mada, etc. in Indonesia, the Department of the Atomic Energy Licensing Board (AELB), National University of Malaysia, etc. in Malaysia, the Thai Institute of Nuclear Technology (TINT), Chulalongkorn University, etc. in Thai, the Vietnam Agency for Radiation and Nuclear Safety (VARANS), etc. in Vietnam, the Bangladesh Atomic Energy Commission, etc. in Bangladesh, the Division of Atomic Energy, etc. in Myanmar, the Royal University of Phnom Penh (RUPP), etc. in Cambodia, the Nanyang Technological University, etc. in Singapore, the Philippines Department of Energy, etc. in Philippines, Nepal, etc.

Analysis of gaps / problems / needs as applied to the RCA region:
Outline the major gaps / problems/specific needs to be addressed by the project (~ 300 words):

Tritium is a typical nuclide widely existing in various nuclear energy systems. It can easily enter water cycle and biosphere, causing radiation hazards to the environment and public. Tritiated waste can be generated in various nuclear facilities. Self-assessment and peer review of typical nuclear facilities by the Nuclear Regulatory Authorities related to the tritiated waste management are very essential for the safe and sustainable operation of the nuclear facilities.However, the self-assessment and peer review on tritiated waste management have not been performed or considered in all the nuclear facilitiesin RCA countries.~~Like in CANDU and High Temperature Gas-cooled Reactors, a certain amount of tritiated water was produced.~~

Nevertheless, if nuclear accident happened, a large amount of tritium may release. Like in Fukushima accident, tritiated water with a total volume and activity of approximately 1.13×10^6 m^3 and ~10^{15} Bq, was generated by March, 2019. ~~Numerous storage tanks were built for temporary storage, but the evaporation and leakage of tritiated water into the environment remains a problem. The worse situation is that tritiated waste water is still increasing, however, the storage tanks are limited.~~ The effective treatment and disposal of tritiated waste water from Fukushima nuclear power plant will be an urgent challenge~~. If improperly handled, it is likely to hinder the safe and sustainable development of nuclear energy and cause negative social impact~~for not only ~~in~~ Japan but also RCA countries in the Asia Pacific Region.

In addition, t~~T~~ritium is served as the fuel in ITER project, which will be consumed in large quantities annually (~kg). Meanwhile a certain amount of tritium may discharge into the environment. Tritium measurement, control, storage, and disposal will be the essential technology in future fusion reactors.

In a word, the measurement, treatment and radiation protection of tritiated waste in nuclear facilities are urgent issues for RCA members in Asia Pacific Region with nuclear facilities (such as Japan, Korea, China, India, Pakistan, etc.). For RCA Asia Pacific member countries that intend to develop nuclear energy (such as Indonesia, Malaysia, Philippines, Thailand, Vietnam, etc.), technical reserve and planning should be carried out in advance. Knowledge and experience of tritium science and radiation protection are also needed for nuclear regulators, working personnel in nuclear facilities, researchers, as well as public in the RCA Asia Pacific Member Countries.

This project will focus on technical training of the treatment method and radiation protection of tritiated waste from nuclear facilitiesin Asia Pacific Region, share the experience of self-assessment and peer review of typical nuclear facilities by the Nuclear Regulatory Authorities in RCA GPsrelated to the tritiated waste management and radiation protection, illustrate the tritium measurement method and radiation protection principle, guide RCA Member States to improve their radiation protection levels especially for tritium, and promote safe and secure working environments of workers.

Review the resource documentation and list any past RCA projects that have addressed similar problems/needs in this area of technology.

Some RCA projects that have addressed similar problems/needs in this area of technology are listed:

(a) Enhancing Regional Capabilities for Marine Radioactivity Monitoring and Assessment of the Potential Impact of Radioactive Releases from Nuclear Facilities in Asia-Pacific Marine Ecosystems ~~(RCA)~~, Project Code: RAS7028, Objectives: To improve the integrated regional quality-assured capabilities for marine radioactivity monitoring and for impact assessment of routine and accidental releases of radioactivity into the marine environment.

(b) Assessing Deep Groundwater Resources for Sustainable Management Through the Utilization of Isotopic Techniques ~~(RCA)~~, Project Code: RAS7030, Objectives: To improve the capability for efficient and effective planning for sustainable management of deeper groundwater resources.

(c) Assessing and Improving Soil and Water Quality to Minimize Land Degradation and Enhance Crop Productivity Using Nuclear Techniques ~~(RCA)~~, Project Code: RAS5084, Objectives: To enhance the capacity of countries in the Asia-Pacific region to use nuclear techniques to assess and improve soil and water quality, and to implement best agricultural practices to minimize land degradation and enhance crop productivity.

(d) Radiation Processing Application for Agrowaste, Project Code: RAS8087, Objectives: to introduce the technology of electron beamprocessing to the local rayon industry in the region, develop the necessary technology to meettheir specific needs and finally demonstrate the technical, economical and environmentalbenefits to the industry.

(e)Sustainability of Regional Radiation Protection Infrastructure, Project Code: RAS9042, Objectives: to assist the Member States to sustain the developed infrastructure mainly through development of networks to ensure continuation of regional cooperation.

(f)Radiation Technology for Development of Advanced Materials and for Protection of Health and the Environment, Project Code: RAS8098, Objectives: to enhance RCA Member States' capabilities in applying radiation technology for advanced materials development, natural polymer processing, and assurance of health safety and protection of environment.

(g)Radiation Processing Applications for Health and the Environment, Project Code: RAS8106, Objectives: to apply radiation processing to natural polymers for use in the health and environment sectors, to establish radiation processing technology for environmental purposes, and to transfer radiation processing technology to end users and promote its use in the health and environment sectors.

Compared to our project, the differences lie in:

The Project (a) (Project Code: RAS7028) was focused on the marine radioactivity monitoring and for impact assessment of routine and accidental releases of radioactivity into the marine environment. The Project (b) (Project Code: RAS7030) used isotope techniques to improve the capability for sustainable management of deeper groundwater resources. The Project (c) (Project Code: RAS5084) adoptednuclear techniques to improve soil and water quality for best agricultural practices. The Project (d) (Project Code: RAS8087) developed the technology of electron beam processing meet the needs of local rayon industry. The Project (e) (Project Code: RAS9042) was focused on the networks developmentof the developed infrastructure to ensure regional cooperation. The Project (f) (Project Code: RAS8098) applied radiation technology for advanced materials development, natural polymer processing, and assurance of health safety and protection of environment. The Project (g) (Project Code: RAS8106) was devoted to application and promotion of radiation processing technology for health and environmental purposes.

However, our project is concentrated on strengthening the regional cooperation onthe treatment method and radiation protection of tritiated waste from nuclear facilities in RCA memberstates, sharing and encouraging self-assessment and peer review of regulatory infrastructure by the NRAs in RCA GPs related to tritium waste management in order to harmonize related methodologies and approaches at the regional level, and guiding new RCA GPs as well as those GPs without adequate radiation safety infrastructure to improve their radiation protection levels on tritium and realize their SDGs.

The technical training and communication on tritium science and technology, including the tritium precise measurement in liquid, gaseous and solid waste, tritium radiation protection, etc. will be the important content. Meanwhile, the experience in tritiated waste management in the nuclear facilities will be presented~~shared~~ and exchanged, and self-assessment and peer review for improvement from regional NRAs will be shared and encouraged, which can promote the radiation safety level in Asia Pacific Region.

What are the major additional capabilities/skills in this area of technology that will be provided through this project (~ 200 words).

The tritium measurement is the key technology in this project, since the treatment and radiation protection of tritiated waste largely depends on precise tritium activity values.Tritium can exist in solid, liquid, and gaseous waste. The liquid scintillation technique will be chosen as the dominate method to measure tritium in liquid sample. Compared to other techniques, such as Raman spectroscopy, mass spectrometry, etc.,the liquid scintillation technique has lower cost, simple experimental system, easier sample preparation, and more convenient measurement.For tritium in the solid and gaseous waste, it will be converted into liquid sample for measurement. For tritium in gaseous waste, a tritium sampler will be adopted to capture the tritium into water, and then the liquid scintillation counter can be used for further measurement. For tritium in solid waste, such as in irradiated graphite, a combustion device will be adopted to convert the tritium into gas and then absorb by the liquid for further liquid scintillation detecting.

The experience of self-assessment and peer review of typical nuclear facilities by the Nuclear Regulatory Authorities in China with focusing on the tritiated waste management and radiation protection will be shared, and the design of tritium monitoring in typical nuclear facilities will also be presented, which can encourage self-assessment and peer review of nuclear facilities by other NRAs in RCA GPsand promote RCA Member States to improve their radiation protection levels on tritium.

Through this project, besides the tritium measurement method, the tritium sampling technology, tritium storage method, tritium treatment and disposal technical route, and tritium radiation protection specification will be provided at the same time.

Requirements for participation:

Indicate the minimum requirements that the counterpart institutions in Government Parties would need to meet in order to participate in this project.

~~In principle, there are no special requirements for participants since the tritiated waste management and radiation protection are regional issues. However, if the counterpart institutions in Government Partieshave nuclear facilities, or are interested/prepared to develop nuclear energy, or have some understandings of tritium or radiation protection, they will gain more knowledge and experience from this project.~~

The counterpart institutions in Government Parties should have nuclear facilities, or make the preliminary nuclear energy development plans, or carry out tritium waste related research. Knowledge of radiation protection, radioactive waste management, etc.,and experience of radiation monitoring design, radiation safety supervision, etc., are preferred.

Stakeholder analysis and partnerships:

Briefly describe who are expected to be the principal beneficiaries of this project and any role that will be defined for them in the project.

The principal beneficiaries of this project arerepresentatives of Nuclear Regulatory Authorities, working personnel in nuclear facility. Other beneficiariesinclude environmental protection agency personnel, researchers in the nuclear field in scientific institutions and universities, graduate students who are interested in tritium science and technology in universities, and radiation monitoring equipment company.

For the representatives of Nuclear Regulatory Authorities and working personnel in nuclear facility, they are target audience and also important training participants at the same time. They will obtain the tritium science knowledge, share tritium related issues in the practical work, regulation, and radiation protection, and are encouragedto conduct self-evaluation and peer review on their regulatory infrastructure, which can guide new RCA GPs and the GPs with insufficient radiation safety infrastructure to raise the level of nuclear radiation safety.

Have any extrabudgetary funding possibilities, sponsors and partners been identified?

We have talked about the ideas of organizing technical training session or seminar related to tritiated waste management and radiation protection with some nuclear facilities organizations, nuclear facilities regulatory agencies, scientific research institutions, universities, etc. in China and neighbouring countriesin Asia Pacific Region (Bangladesh, Myanmar, Singapore, Viet Nam, Cambodia, Indonesia, Malaysia, Thailand, etc). They are interested in participating this kind of program and sharing the research experience. ~~But we haven't discussed the details, including funding, sponsors since this project is still in the concept phase.~~

We have talked about the cooperation with Sun Yat-Sen University in China, who will be the host of the China Tritium Science and Technology Conference in 2021. The technical training on tritium radiation protection and tritium waste management in 2021 for this project can be embedded as a track in the conference. The registration fee can be waived, and accommodation can be provided at a very low price (even free) depend on the number of participants.

There will also be technical visits to some nuclear facilities in this project, like the 10MW high temperature gas-cooled reactor in China, etc. We will provide free local transportation to the facilities and meals with the supportof Institute of Nuclear and New Energy Technology, Tsinghua University, China.

Have they been involved at this concept stage?

We have talked about the general idea to organize this kind of technical training session or seminar related to tritium waste management and radiation protection with Sun Yat-Sen University in China, and Institute of Nuclear and New Energy Technology, Tsinghua University, China. The financialsupportfor the project can be implemented, and the details will be discussed after the acceptance of the application.

We have contacted the potential collaborators in Myanmar (Ministry of Education Division of Atomic Energy), Bangladesh (Military Institute of Science and Technology (MIST)), Viet Nam (Vietnam Agency for Radiation and Nuclear Safety VARANS), Cambodia (Graduate School of Science Royal University of Phnom Penh), Indonesia (Universitas Gadjah Mada), Malaysia (University Kebangsaan Malaysia), Thailand (Chulalongkorn University), etc. They are interested inthis project and willing to join the workgroup in future.~~But they haven't actually involved at this concept state yet. However, they are supposed to be interested in participating this project with the acceptance of the application.~~

Role of nuclear technology:
Indicate the essential nuclear technique that would be used and outline why it is suitable for addressing the problems/needs in question.

The tritium measurement will be the key technology in this project, since the treatment and radiation protection of tritiated waste largely depend on the precise tritium activity values from the measurement. The liquid scintillation technique will be adopted to measure the tritium in the liquid sample. For the tritium in the solid and gaseous waste, it will be sampled and converted into liquid sample for measurement. Meanwhile, the tritium sampling technology, tritium storage method, tritium source term analysis for typical nuclear systems, tritium treatment and disposal technical route, and tritium radiation protection specification will be provided at the same time.

Is this the only available technique?

No. But it is the most widely used, effective and proven method.

Does it have a comparative advantage over non-nuclear techniques?

Compared to non-nuclear techniques, such as Raman spectroscopy, mass spectrometry, etc., the liquid scintillation technique has lower cost, simple experimental system, easier sample preparation, and more convenient measurement.

Duration of the project:
Indicate the number of years required to complete the project.

4 years

Part 2: National Representative Endorsement for Project Concept

This 2nd Round Concept meets the RCA project requirements and I endorse it as a priority for the RCA Programme 2022/2023.

Signed: 

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Date: 24/01/2020