

Summary Report

ANSN STG

Regional Workshop on Radiological Environmental Impact Assessment for Nuclear Installations

Manila, Philippine, 24-28 October 2022

Background

IAEA Safety Standards No. SSR-1, Site Evaluation for Nuclear Installations states that “The site and the region shall be investigated with regard to the characteristics that could affect the safety of the nuclear installation and the potential radiological impact of the nuclear installation on people and the environment.” SSR-1 also states that “The potential effects of the nuclear installation on people and the environment shall be estimated by considering the postulated accident scenarios (including the resulting source terms) and taking into account the feasibility of planning effective emergency response actions at the site and in the external zone.”

To fulfil these requirements, IAEA Safety Standard No. NS-G-3.2 Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants, provides recommendations and guidance on studies and investigations necessary for assessing the impact of a nuclear power plant on people and the environment - for example, environmental background including population distribution, analysis of transport of radionuclides in atmosphere, analysis of transport of radionuclides in surface water, analysis of transport of radionuclides in groundwater, monitoring of radioactivity in the environment, consideration of the feasibility of effective emergency response actions, application of management system for all above activities.

During the ANSN STG regional workshop held in October 2021, most of the participants requested organization of a workshop on radiological environmental impact assessment for nuclear installations to enhance the understanding and competence of regulatory bodies and future operators regarding investigation of site characteristics and assessment of radiological environmental impact for nuclear installations.

Objectives

The objectives of the meeting are to enhance the understanding and competence of regulatory bodies, future operators, and research organizations regarding investigation of site characteristics and assessment of radiological environmental impact for nuclear installations.

The following activities were included in workshop to achieve the objective:

- Presentation of IAEA safety requirements and guides related to assessment of radiological environmental impact for nuclear installations,
- Presentation of good practices in assessment of radiological environmental impact for nuclear installations,
- Share participants’ experiences on the subject.

Work Done

Mr Altinyollar (Technical Officer, EESS-IAEA) chaired the workshop.

On Monday, workshop started with opening session and adoption of agenda. Mr Altinyollar provided a presentation on IAEA Guidance for environmental impact assessment for Nuclear Installations summarizing siting process for nuclear installations, role & responsibility during site licensing, IAEA safety standards related to site evaluation, site evaluation requirements, typical table of contents safety analysis report, IAEA Safety Standards related to EIA (Environmental Impact Assessment), typical content of the environmental scoping report, typical content of the environmental impact assessment report and overlaps between EIA and site licensing. Mr Altinyollar also delivered another presentation on IAEA Safety Standard No. NS-G-3.2, Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants (NPPs) including gap analysis and changes in new revision (DS529). Then Mr Harman delivered a presentation on general approach and consideration for environmental background including population distribution. He elaborated relevant requirements in IAEA Safety Standard No. SSR-1, Site Evaluation for Nuclear Installations. He presented the considerations in determining what could be significant for a particular site/installation combination, population distribution and public exposure and uses of land and water in the region and habit data for the local population. Mr Harman delivered another presentation on analysis of transport of radionuclides in atmosphere including collection of data and why is dispersion modelling needed, types of models and case study: the Trawsfynydd site in the UK.

On Tuesday, Mr Ekmekci delivered a presentation on the need for modeling of dispersion of radionuclides in the hydrosphere including problem definition, collection/production of new data, analysis and evaluation of data, development of conceptual model, mathematical model, model calibration, sensitivity analysis and simulation for prediction-interpretation. He also made a presentation on analysis of transport of radionuclides in surface waters including selection of source parameters, type of models for laboratory or field, identification of exposure pathways, definition and collection of data necessary for modelling, calibration of model and sensitivity analysis and scenario-based simulation. Mr Harman delivered a presentation on assessment of overall radiological impact including determining source terms, modelling dispersion in the environment, example of food chain modelling, risk/dose models – early effects and late effects and comparison of dose/risk with criteria. Mr Harman also presented examples on assessment of overall radiological impact.

On Wednesday, Mr Ekmekci made a presentation on analysis of transport of radionuclides in groundwater including general approach, selection of source parameters, exposure pathways, selection of appropriate model, construction of representative conceptual model, simplifications and uncertainty, mathematical model construction, model calibration, sensitivity analysis and simulation for prediction based on scenarios. He also made brief presentations to elaborate, giving some examples, on;

- 1) the use of models in designing an effective monitoring program
- 2) the key and critical points that should be considered during review of the chapters of impact assessment reports relevant to groundwater systems, and
- 3) the preliminary illustration of graded approach in modeling practice.

Practice session was organized. During the practice session, the participants had the opportunity to

- 1) understand the fundamentals of modeling

- 2) be aware of the assumptions and simplifications of analytical models
- 3) flexibility and main steps of numerical modeling

They constructed a numerical model for a given conceptual hydrogeological model and simulated transport scenarios in both a homogenous and heterogeneous systems. The transport was simulated using particle tracking (advective) and advective and dispersive mechanisms. Thereby, they had the insight of the modeling different transport mechanisms that might be needed in applying a graded approach.

Mr Harman made a presentation on monitoring of radioactivity in the environment including purposes of monitoring, environmental baseline, and prospective and retrospective dose assessment. He also showed UK examples. Mr Harman also delivered a presentation on consideration of the feasibility of effective emergency response actions including population considerations and collection of information.

On Thursday, Mr Altinyollar delivered a presentation on application of management system for environmental impact assessment activities including relevant IAEA safety standards, development of project work plan, generic management system process for these activities, and documentations.

Then as part of ANSN Siting Topical Group (STG) meeting, country presentations were delivered by representatives of Republic of Korea, Bangladesh, Indonesia, Malaysia, Thailand, Philippines, and Viet Nam. Country representatives presented status of their nuclear projects, regulatory framework for environmental impact assessment, content of Environmental Impact Assessment Report (EIAR), regulations, decision making organizations.

The 12th annual meeting of the STG was held on Friday. Ms Seonjeong Park (the Coordinator of the STG, KINS, Republic of Korea) chaired the meeting. The objectives of the annual meeting are to provide a forum to discuss and review the status of the Topical Group activities with feedback from the participating Member States, and to discuss future activities plan. The topics for the STG regional activities in 2023 were confirmed by STG members as site evaluation for small modular reactors.

On Friday before closing of the workshop, presentation on summary of the workshop was given by Mr Altinyollar.

Closing speech was delivered by Mr Alan Borrás (Chief of Nuclear Regulatory Division, Philippine Nuclear Research Institute)

Workshop achievements / Recommendations

The IAEA team comprised of one IAEA staff member and two external experts from UK and Türkiye. 27 participants from Republic of Korea, Bangladesh, Indonesia, Malaysia, Thailand, Philippines and Viet Nam joined to the workshop. Questions and feedback from all participants were informative and contributed to fulfil the objective of the workshop. IAEA Team appreciated very much active contribution of all participants. In conclusion the objectives of the workshop have been achieved.

Participants recognized that technical aspects related radiological EIA for nuclear installations is a complexity and safety relevance. The technical expertise and experience are needed for development of EIAR for nuclear installations including data collection,

modelling, analysis, overall impact assessment of nuclear installations on people and environment and also reviewing of the EIAR. Use of well-established process based on IAEA safety standards is very important.

During STG annual meeting, the topic for the STG regional activity which will be held in 2023 were confirmed by STG members as “Site Evaluation for Small Modular Reactors (SMR)”. Host country for the 2023 will be investigated by Ms Park (the Coordinator of the STG, KINS, Republic of Korea). The topics for the future STG regional activities, 2024-2026 are discussed. Effect of climate change on site parameters, combination of hazards, volcanic and seismic hazards, identification of capable of faults, geotechnical aspects are possible topics for future activities.

Annexes:

- I. Final agenda
- II. Attendance Sheet
- III. Group photo
- IV. Presentations as listed in the agenda
- V. 1 page summary for GNSSN Newsletter
- VI. Participant evaluation



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