IAEA TECDOC SERIES

IAEA-TECDOC-1392/Rev. 1

Development of Instructors for Nuclear Power Plant Personnel Training



DEVELOPMENT OF INSTRUCTORS FOR NUCLEAR POWER PLANT PERSONNEL TRAINING

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DEVELOPMENT OF INSTRUCTORS FOR NUCLEAR POWER PLANT PERSONNEL TRAINING

INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA, 2018

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© IAEA, 2018 Printed by the IAEA in Austria October 2018

IAEA Library Cataloguing in Publication Data

Names: International Atomic Energy Agency.

- Title: Development of instructors for nuclear power plant personnel training / International Atomic Energy Agency.
- Description: Vienna : International Atomic Energy Agency, 2018. | Series: IAEA TECDOC series, ISSN 1011–4289 ; no. 1392, Rev. 1 | Includes bibliographical references.

Identifiers: IAEAL 18-01197 | ISBN 978-92-0-108018-9 (paperback : alk. paper)

Subjects: LCSH: Nuclear industry — Employees. | Nuclear power plants — Employees. | Employees — Training of.

FOREWORD

In 1996, the IAEA published Technical Reports Series No. 380, Nuclear Power Plant Personnel Training and Its Evaluation: A Guidebook, providing guidance on development, implementation and evaluation of training programmes. The IAEA's Technical Working Group on Nuclear Power Plant Personnel Training and Qualification subsequently recommended that an additional publication be prepared to provide further details concerning the development of instructors for nuclear power plant personnel training. In response, in 2004 the IAEA published Development of Instructors for Nuclear Power Plant Personnel Training (IAEA-TECDOC-1392). The present publication is an update of IAEA-TECDOC-1392 that reflects new training experiences, technological developments, current practices and techniques. It includes a summary of current practices in Member States on the development of instructors for nuclear power plant personnel training.

The quality of nuclear power plant personnel training is strongly dependent on the availability of competent instructors. Instructors need to have a comprehensive practical and theoretical understanding of all aspects of the subjects being taught and their relationship to nuclear power plant operation; the appropriate knowledge, skills and attitudes in their assigned areas of responsibility; and a thorough understanding of all aspects of the contents of the training programmes and their relationship to overall plant operation. To be effective, instructors need to take a systematic approach to training and have technical competence and credibility with the trainees and other plant personnel, adequate instructional and assessment skills and knowledge of the basics of adult learning.

This publication provides practical guidance on various aspects of instructor selection, development and deployment based on examples from different countries. It highlights the importance of an appropriate training policy as a means to improve plant and human performance; meet the organization's goals and the objectives of quality, safety, productivity; and improve training programmes.

The IAEA wishes to thank all the participants for their contributions to this publication. The IAEA officer responsible for this publication was L. Halt of the Division of Nuclear Power.

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1. INTRODUCTION

1.1. BACKGROUND

The safe and efficient operation of a nuclear power plant relies on quality personnel being recruited, qualified and trained on a timely basis. The IAEA Safety Guide: Recruitment, Qualification and Training of Personnel for Nuclear Power Plants, No. NS-G-2.8 [1], clearly states that only qualified persons shall be entrusted with functions important to safety. This concept depends very much on the availability of competent instructors. All instructors have to have a comprehensive practical as well as theoretical understanding of all aspects of the subjects being taught and the relationship of the subjects to nuclear plant operation. Hence, it is preferable for an instructor to have held a post at NPP relevant to the field of training responsibility. For example, it is recommended that control room simulator instructors have held a shift operation post at an appropriate level of seniority in a plant of the same design as that for which they are providing instruction.

All instructors have to have, or acquire through training, appropriate instructional knowledge, skills and attitudes (KSA) sometimes referred to as 'abilities' – specifically those KSA that are needed to impart and enhance training and learning. In addition, instructors will be trained in the application of all phases of the systematic approach to training (SAT), particularly the phases to which they contribute, although it has been found beneficial for instructors to participate in all phases of SAT.

Instructional KSA are also needed for occasional (part-time) instructors, including those who are involved in on the job-training (OJT) in the plant. Training provided for these KSA will be customized to the particular training setting or settings in which an occasional instructor will participate.

During a Technical Meeting on The Development of Training Personnel and Supporting Tools and Techniques (United Kingdom, July 2015), a recommendation from the participants was to update IAEA TECDOC-1392 on Development of Instructors for Nuclear Power Plant Personnel.

This report is a result of the contributions received from the Member States of the IAEA who were participating in gathering data in order to compile this report. Member States were invited to submit examples of documentation regarding the selection, recruitment, training, roles, development and deployment of instructors in their countries, whether by utilities, operating organizations, NPPs or by training organizations, relevant departments and centres. Selected examples are included in the appendices to this publication.

To ascertain more detailed information on current practices regarding instructor training and development in the Member States, a questionnaire was prepared and sent out to complete and return to the IAEA. The responses were analysed (see Section 2) by a team of consultants whose names and affiliations are given at the end of this publication. It is recognized that the training arrangements of operating organizations vary greatly according to organizational history and structure, national culture, industrial and professional staff demography, etc. However, despite these variations, there are common practices which are worthy of consideration for application in most situations.

This report focuses on the role of managers and leaders and how to manage the training function, monitoring, evaluation and support of training. The revised version also has more

focus on instructor career development and championing instructor excellence. New is the support for leading edge methods and technologies and how to use operational experience feedback. The role of instructors in preservation of knowledge and the specialization of instructors. Instructors' role in the integration of new training methods and techniques and coaching, mentoring and shadowing.

1.2. OBJECTIVE

The objective of this report is to provide practical guidance on various aspects of instructor selection, development and deployment, by quoting actual examples from different countries. It highlights the importance of having an appropriate training policy, especially considering the various organizational arrangements that exist in different utilities and countries.

1.3. SCOPE

This publication is primarily intended for users from the following organizations:

- Nuclear facility operating organizations in all phases of the lifecycle wishing to establish reliable, quality training programmes or improve their training systems;
- Regulatory personnel responsible for setting requirements and/or performing independent regulatory reviews of nuclear facility personnel training;
- Other entities involved in the nuclear industry sector (suppliers or contractors to nuclear facilities, e.g. NPP vendors, training organizations, technical support organizations, developers and suppliers of training materials and tools, e.g. for simulator training, and educational institutions such technical schools and universities);
- Members of international organizations who provide assistance to countries and nuclear facilities in enhancing safety, increasing efficiency and improving performance.

The main personnel from these organizations that would benefit from the use of this publication are:

- Management and supervisors responsible for the competence and qualification of their facility personnel;
- Training and human resource managers and leaders and specialists;
- Regulatory personnel.

This publication considers instructors who have a range of roles and responsibilities according to the operating organization's training arrangements. It is, therefore, applicable to operating organizations, NPPs and internal and external organizations having responsibilities for the training of NPP personnel.

1.4. STRUCTURE

The main text of this publication is contained within eight formal sections, including this introduction. Section 2 provides a summary in narrative form of the analysis of four important aspects of current practices regarding instructors. Section 3 examines the role of management in training. Section 4 discusses the roles of instructors. Section 5 describes some categories of instructors. Section 6 looks at aspects of developing the competence of instructors. Section 7 discusses instructor career development. Section 8 draws some conclusions and offers some recommendations on this topic.

Appendix I consists of the questionnaire sent to the IAEA Member States. Appendix II contains the codes of contributing country names supporting the main body of this publication. Annexes from I to XVI give a variety of examples of instructor's training documentation. Finally, there is a list of the experts who have contributed to the preparation of this publication. Some of the experts have contributed to the preparation of the publication during Technical Meeting on the Development of Training Personnel and Supporting Tools and Techniques (Cannington, Bridgwater, United Kingdom, 30 June–3 July 2015) and Consultancy Meeting on Development of Instructors for Nuclear Power Plant Personnel Training (Vienna, Austria, 8-11 February 2016).

2. SUMMARY OF PRACTICES FROM MEMBER STATES

This section outlines the responses to a survey designed to obtain information from Member States on the Development of Instructors for NPP personnel training; the survey was developed by the IAEA with the assistance from a team of international experts. The survey in the form of a questionnaire (Appendix I) was sent to potential respondents representing the Member States' operating organizations, NPPs, utilities, nuclear facilities, training centres and organizations involved in rendering training services for NPPs and nuclear facilities. Twenty completed or partly completed responses representing 18 countries were received and analysed by the international experts. A summary of these responses is presented in this section.

It can be noted that in this summary of the completed questionnaires certain countries are identified as following particular practices. To keep this section within a reasonable size only examples of countries are quoted; in many cases other countries also follow similar practices. However, the identification of a specific country enables a reader to refer to the relevant sections of the detailed report for further details on instructor training in that country. This summary only includes practices in countries who responded to the survey.

In quoting Member States of the IAEA, abbreviations or code elements taken from the International Standard Codes for the Representation of Names of Countries (ISO-3166 Part 1: 1997) [2] have been used in preference to state a full country name. The relevant code elements are identified in the Abbreviations and Code Elements (APPENDIX II).

2.1. POLICY ISSUES REGARDING INSTRUCTORS

The survey indicated that the responsibility for training activities varies within the utilities of IAEA Member States, lying either with the NPP top manager, termed variously a station manager or plant manager (MX/BG/PK), with the operational organization (GB /AM/TR/SK/RU/UA) or with the training/HR organization (MY/GB/DE/SE/HU/RO/SK /ZA/FI/EG/MX). In some Member States (SK for example) soft skills training is organized via human resources and technical skills via the NPP. In SE training is conducted by an external company.

In almost all Member States the training is organized by the NPP in partnership with a training organization, department or external centre (GB/CH/SE/SK/RU/US). In some Member States training is organized by the NPPs alone (AM/DE/FI/RO/BG) or by local/central training centres (TR/HU/MX/PK/EG). RU for example has a centralized training system combining all contributors.

With the exception of two Member States (AM/PK) the role of the instructor is included in the utilities' suite of training policy documentation but at different hierarchical levels; furthermore, this policy documentation contains different amounts of detail for different Member States. In some cases, instructors' roles are defined by an external training policy (SE) or arising from regulations or directives (CH).

There are no Standards or Norms for the identification, selection and training of instructors in some Member States (GB/DE/TR/HU/RO) whereas in others they are imposed by statutory (legal) authority guidelines or by consensus with national standards (SE/SK/FI/BG/ZA/UA). In US it differs between utilities where some have Standards or Norms and others have procedures that describe this job. In other Member States (AM/RU/MX/EG) the utilities set and monitor adherence to similar standards. In addition, two Member States have policies which are not defined (CH/PK).

In most Member States the responsibility and coordination of instructor training lies with the NPP manager or HR director. In three cases the chief engineer (AM/UA) or deputy chief engineer (RU) are responsible, in others the training department/division (GB/EG/PK/ZA/SK/HU) are responsible. In one case an external organization is responsible (SE).

All Member States use occasional (part-time) training instructors which include NPP specialists and subject matter experts (SME), contractors and equipment suppliers. In at least two cases external training organizations are also used (BG/DE).

Most Member States use a combination of full-time, part-time and on-the-job training (OJT). Some utilities use OJT instructors from the utilities other, often after undergoing a special training qualification (AM/GB). In the case of GB external contract trainers and mentors are also used.

The training organizations of the utilities in some Member States do not have a direct relationship with a country's nuclear regulatory body (GB/AM/SE/RU/BG/ZA/PK). However, in some countries (HU/SK/FI/MX/UA/RO) the training department or organization is licenced and inspected directly by the regulatory body. For example, in CH the regulatory body oversees the training, examination and content. In some Member States, for example GB, the normal interface with the regulator is at utility head office level. In US, simulator instructors are required to hold operator licences, and in CH the regulator attends licencing examinations for selected roles.

As above not all Member States' training organizations have a direct relationship with the regulator, of those that do some (SK/RO/MX) have some level of audit or authorization of specific training programmes whereas some (SK/FI/BG) have regulatory involvement in the licencing of some instructor roles, particularly of those involved in control room training programmes. In US, for example, it varies and in some organizations Licenced Operator requalification programs are evaluated directly by the regulator. Initial licence class exams are usually written by the NPP but approved by the regulator; other programs are approved by the NPP. The Regulator audits the Licenced Operator Requalification Training Programme and approved exams for new licenced operators (US).

In some cases, regulator interacts with the utility directly on operator exams. Otherwise, the regulator works with Institute of Nuclear Power Operators (INPO) to ensure their accreditation of training programs is above and beyond the regulatory requirements (US).

2.2. PREREQUISITES AND INSTRUCTOR SELECTION

Due to the required combination of theoretical knowledge, and utility current experience all Member States recruit some of their training instructors from NPPs, some also recruit from a combination of corporate, external and university sources. Additional recruitment is from Research Institutes. Table 1 shows the approximate percentage recruitment sources for the Member States who responded to the survey.

Source	>25 %	25-50 %	50-75 %	75-100 %
NPP	MX	RO/PK	DE/CH/SK/FI/US	AM/GB/SE/HU/SK/RU/BG/ZA/UA
Corporate	СН	FI/PK	0	0
External	GB/DE/CH/FI/ZA	SK/RO	0	0
University	AM/DE/CH/HU/SK/US	MX	0	0
Other	CH/SK/US	0	MX	0

TABLE 1. INSTRUCTORS RECRUITMENT SOURCES

The selection and recruitment processes for instructors are similar in a number of Member States and are typically in line with normal recruitment policy for utility posts. A selection panel or interview board of two or three persons from the relevant training department or centre, one often being the training manager, asks oral questions (GB/SK/RO/UA). In some cases, candidates take a written examination as well (MX/RO). Recruitment processes in some Member States follow the country's government procedures while in others the methods of selection and recruitment follow precisely the same pattern as for NPP personnel. In MX, for example, psychological testing is carried out. Some Member States require candidates to present a training session (UA). In US there are interviews by department managers and demonstration of teaching skills. No specific procedure. Also, instructors are chosen from existing employees, who are qualified in that job field and have the communication skills to be an instructor, and then they are taught how to be an instructor.

Most Member States do not have a policy of rotating/seconding instructors from NPP's. In some cases, permanent staff is supported by seconded staff typically for 2 years (GB/UA), 1 year (FI), 2-4 years (ZA). In the case of SE, where an external organization conducts the training if the requirement arises, a term of 1 year is preferred; these secondments are typically applied to simulator instructors. In some Member States, instructors are on long term contracts (MX/UA). In US, NPP workers usually rotate to a training position for 1 or 2 years and then go back to work in the NPP. Also, NPP staff is often rotated from the line to office jobs like training, quality assurance (QA), and emergency preparedness. The employees aren't seconded to another organization, just rotated to another department within their own organization.

The entry level requirements for instructors in most Member States are a university degree/or equivalent education in a relevant subject and experience of working at an NPP, the exact requirement varies with the instructor duties to be undertaken. Most utilities require the individuals at the time of recruitment to have training or teaching backgrounds/ adult learning certificates (AM/CH/RO/BG/ZA/PK) or to obtain them before starting the job (SK). Some Member States recruit on the potential for instructional skills, and the training for this is provided as required (GB/RU).

In US the entry level requirement varies, and education and experience in job positions are included. There are no regulations or any standards that state requirements for recruiting training personnel, technical and communication competencies are necessary.

The numbers of instructors recruited per year varies considerably between the Member States. The numbers depend on a variety of factors including: whether a country's nuclear generating industry is expanding or declining; the numbers of NPPs it has under construction, being commissioned, in operation and being decommissioned. Most Member States recruit more than ten instructors per year (AM/GB/DE/SE/HU/SK/MX/US). Note that where large number of part-time instructors and on-the-job trainers are used, if these individuals are included in the recruitment figures, the number of recruits can be much larger. For example, in BG 200 part-time instructors were employed in 2015. In US, the industry will recruit over 25 new instructors every year in the construction and operation fields. They probably hired a dozen new commissioning and decommissioning instructors during the past few years, and the number is expected to grow according to the industry development.

Most Member States seem to experience some difficulties in recruiting instructors of the right calibre. Some issues include: salary levels; the need to relocate; limited pool to recruit from; variance in competency, teaching skills and education; and a lack of motivation to become an instructor. Some utilities also experience problems related to the actual, or perceived, status level of instructor's role. Some utilities overcome this problem by rotation (RO), recruiting part-time instructors (RU/HU) or recruiting from local industry (ZA). In the case of BG, motivation comes from involving instructors in training needs analysis (TNA) and development of all stages of course requirements, including evaluation.

In US, many workers are retiring and finding experienced NPP workers for instructors is difficult. Often former US Navy personnel with nuclear power background are hired and trained on systems to be instructors. Sometimes it is hard to identify operations instructors due to the lack of licenced operational personnel to fill secondary jobs in training, emergency preparedness and QA along with operating the power plant.

While many Member States do not offer special incentives (RO/ZA/FI/AM) to help recruit and retain instructors, others are able to provide salary incentives via retention of previous NPP salary levels, upgrades and retention of shift pay (SE/GB/HU/BG). Where retention of shift pay isn't possible, a percentage increase in base salary is incorporated or other special allowances/bespoke contractual agreements (ZA), performance based incentives are also used (HU).

In US, instructors are often salaried workers rather than hourly workers and are not authorized for overtime pay. Instructors' salary is higher than NPP workers' one at the same level, but often overtime pay for NPP workers gives them an overall higher pay rate. Also, salary is maintained when instructors are transferred between positions. Therefore, absence of overtime pay is not a disadvantage for those who no longer want to be on a shift rotation at the plant.

2.3. INSTRUCTOR COMPETENCE DEVELOPMENT

Almost every Member States has instructor's task lists in a variety of formats, almost all use a job description (GB/SK/RU/RO/ZA/US), often supported by competence and task lists for instructors with the exception of FI. In one case unit standards are also used (ZA).

Instructors in Member States perform a variety of roles and duties. The significant roles include but are not limited to the following categories listed in order of the highest to lowest ranking:

- Tutoring, mentoring and coaching;
- Delivering initial and continuing training;
- Feedback technical information to NPPs;
- Involved in knowledge management;
- Assist in incident investigations;
- Involved in the preservation of knowledge (as a result of retirement of very experienced and competent personnel);
- Assist with plant operation.

The specific 'Key Roles' for instructors vary according to the specific arrangements in that Member State, for example tutoring, mentoring and coaching is a key role for instructors (SK, FI, MX and US), whereas delivering initial and continuous training may be the main role (AM/GB/SE/HU/RU/BG/ZA/UA/US). Other key roles with less emphasis are assisting with plant operations (RU/MX/ZA/UA) or involvement in the preservation of knowledge (AM/GB/BG).

Most Member States have formal, initial and continuing instructors' training programmes. These generally follow internal process and procedures (RU/SK), some have requirements for training placed on them by regulatory procedure (MX). Typically, instructors' training programmes have formal training methodology modules supported by specific instructor training for the roles to be covered (UK/UA). This is typically supported by guided OJT with experienced instructors acting as mentors (UK/PPK/UA). Some also use web-based training (US). The duration of initial training depends on the instructor's role to be undertaken and the experience of the instructor when recruited; therefore, it varies from several weeks to many months. Continuing training requirements vary in frequency and duration across Member States. Typically, continuing training is provided at least annually (HU/SK/RU/UA/US) and varies according to the specific needs from 40 hours (RO/RU) to 20 days (BG), as well as formal evaluation of performance in each training setting the instructor teaches (in classroom, lab, simulator, OJT) (US). Once the training is completed, an instructor is qualified for the job and do not need to repeat the training again (US).

The process of integrating new instructors into the training organization in most Member States involves the new instructor working with a mentor or OJT experienced in the role. These arrangements may follow formal procedures, but often do not follow any written process (GB/SE/MX). Many Member States adopt the same process of integration of instructors into their role as all other new NPP personnel (FI/UA). Some Member States will then develop bespoke/specific training programmes, for example in RO/GB/UA. It is also common that instructors are integrated into the role using a progressive structured programme (RU/PK/GB), which allows individuals to take up specific duties, often supervised, as they complete sections of their training. In US, instructors are trained on-site following specific training procedures and then are evaluated before qualification.

Some Member States require those who provide instructors' training, whether as an individual or as an organization, to be licenced or accredited (SK/MX/ZA/RO/GB). Others require a university background, degree and/or extensive NPP experience (HU/RO). In most no formal qualifications are required except the relevant knowledge, experience and training skills. Some Member States have requirements specified by external bodies/ regulators (MX/ZA).

The arrangements for initial authorization (acknowledgement of competence) of instructors vary between Member States. Most Member States have certification/licencing in one form or another dependent on the instructor's role. This licencing can be organized by the NPP or by

the regulatory body. Where authorization is carried out by the NPP, for example, by the training or delegated to a line manager, it may be supported by a formal examination upon completion of formal training programmes (GB/SE/RO/BG). Simulator instructors are often required to be licenced for the roles that they train in line with their national policy. Often instructors are added to a formal instructors' register. All Member States except DE evaluate the performance of their instructors on a regular basis; the format of this evaluation varies. Most scrutinize formal reports are completed by trainees at the conclusion of a training session or course; these reports, by definition, include the trainees' perspective of instructor's performance. Some countries (RO/BG/UA) scrutinize trainees' examination results; many countries have regular formal observations of instructors by their supervisors or managers and leaders, and the interval of this varies from four times a year (UA/BG) to once a year (RO/GB). In most cases instructors are observed in every training and NPP managers, but are only required to be formally evaluated once a year in each setting in which they teach (classroom, lab, simulator, and in-plant).

The process of defining any new instructor competences in Member States varies but in general the approach is to use the SAT process (GB/RU/US) including TNA, change management, changes in systems, equipment, procedural requirements and regulations, feedback or observation (SE/HU/SK/BG/US) enabling the modification of training programmes and material. Where appropriate training methods are also changed. Often formal review processes are applied, in the case of GB this is under the direction of a Curriculum Review Committee; this committee is responsible for instructor training programmes. In the case of DE and CH there is no specified process.

Targets for instructor performance indicators, such as the amount of time that instructors spend on each phase of SAT, are set and monitored in some Member States. Where no targets are measured (GB/HU/SK/MX), typically instructors are held accountable for the performance indicators for their programme and performance is reviewed by ongoing performance observation rather than specific targets. Where formal targets are set, these typically measure time spent delivering training, developing training and reviewing material (RU/RO/ZA). In SE, for example, time spent undertaking NPP activities is also measured as a target. Some utilities regard it is important for instructors to spend at least 35% of their time on the implementation phase; others believe the instructors resource usage depends on the training needs of the NPP personnel at that time, so targets are of no practical use. In US, for example, it differs at each utility and if not the most important is to ensure instructors competence, quality of training, etc. through observations of instructors and evaluation of training effectiveness back in the NPP.

Instructors in all Member States contribute to various aspects of training: analysing of training needs; designing and developing training sessions; delivering technical and soft skills; training in a variety of settings by various methods, including simulations and OJT; assessing trainees. Instructors are also often involved in the evaluation of training effectiveness and efficiency and, if necessary, as a result this evaluation modifying the training materials, methods, settings or assessment techniques. Instructors in most countries perform a variety of roles from tutoring, mentoring and coaching, to delivering initial and continuing training and providing remedial training when necessary. In many cases instructor's feedback technical information to NPPs to some degree may be considered for modifying plant operating procedures; and many instructors are able to assist with plant operation when needed. Instructors may also assist in incident investigations and knowledge management, or the preservation of knowledge that might be lost as a result of the retirement of very experienced and competent personnel.

2.4. INSTRUCTOR CAREER DEVELOPMENT

In the majority of the Member States, instructors keep their job positions on a full-time basis and rarely return or transfer to a NPP after working in training in a structured way; although it is not unusual in some countries that instructors are able to return to NPP on an individual basis. Simulator instructors are treated differently in some Member States and are rotated between NPP and instructor positions (UA/RO/FI/GB). This allows plant knowledge to be kept up to date and assists in the recruitment of instructors. When instructors are rotated between the NPP and the training function, the period of rotation depends on the country and on the individual NPP. It can vary between six months to two years (GB/FI/US), and to several years (ZA/UA).

During temporary assignment, individuals, who are recruited as instructors, are provided with training sessions in technical subjects or human factors topics, either to obtain or to retain their qualifications (RO/GB/KR/UA). Training is also provided to upgrade their knowledge (GB/UA). Prior to resuming NPP duties, training programmes including OJT, are directly linked with the new job position (KR/ZA/ GB/UA). In some cases, an examination or an observation/refresher training period is required before returning to NPP work, for example, as shift supervisor or as an operator, especially if the qualification or certification period has expired (ZA/UA/US).

In most cases, the job position considered for an instructor returning to an NPP depends on the individual's experience and area of competence (operation, maintenance, etc.). In some Member States (GB/FI/KR/RO), individuals return to their original or equivalent job positions, such as licenced or senior operators, senior shift supervisors or safety engineers. In some countries, individuals may return to the NPP at a higher grade than they were when seconded or return to supervisory/management positions (PK/US). It is possible in some Member States for instructors to return to any available job position at the NPP, when that individual secures the position throughout competitive interview (GB/SK).

Experience as an instructor in some Member States is not essential in securing a job position in the organization (HU/RO/AM); however, it is generally desirable and recognized as value added, because of the skills and competences acquired. A former instructor finds it easier to be promoted in the original workplace (GB/SK/UA). At least in one country (GB), NPP personnel, who have been temporarily assigned to the training department, have progressed more in their operating careers on returning to the NPP, than staff who have not undertaken instructor's role. In some cases, experience as an instructor is a pre-requisite for certain job positions and for senior management positions.

Where training strategy is required to be a part of a project regarding an existing or new design of the NPP for a Member State, it is mainly based on job and task analysis (JTA)/job competency analysis (JCA) and on training process such as SAT. The provision of simulator training in advance of fuel loading into a new NPP is sometimes a requirement of the regulator (GB). Where modifications to existing plant are implemented, a SAT based review of training is generally carried out; this may be part of a formal modification process (GB/SK). Some specific training programmes are also delivered by equipment suppliers for new plant and for major modifications (RO/UA). Where appropriate, some Member States would consider using overseas training provision when the first type of NPP was being constructed in that state (GB/ZA).

In addition to the traditional training techniques and media used widely across Member States; a wide range of new technology is becoming increasingly available and costs effective to the industry. Traditional full-scope simulators (FSSs) are being enhanced and increasing use is being made of basic principles and compact simulators, both for operator training and for wider discipline areas and contractor staff. Basic principles and compact simulators are used in many Member States (KR/BG/ZA/GB/CH/SK/US). The use of computer based training (CBT), sometimes as part of a blended learning solution, is increasing (CH/SK/FI/RU/RO/KR/BG/PA); the extent of the use of learning technology will have a significant impact on both learners and the competence requirements of instructors in the future. The ability to review and assess learning media and to incorporate the technology where selected will require specialized skills and knowledge. Some Member States are starting to use virtual reality (VR) (GB/CH/US); this may have significant impact on the future generation of instructors. It is recognized that young employees have different needs to those of the existing workforce. Another area, where technology is becoming increasingly common place, is in the use of learning management systems (LMS); most utilities are using some form of computerized training record and LMS.

There are barriers that prevent Member States from fully engaging in new learning technology or using it at all. These barriers range from practical issues such as information security restriction (GB/HU) and time to implement to financial constraints (AM/ZR/ KR/UA/US). There are, however, also human resource issues that influence the adoption of new technologies. The competence of current instructors and managers and leaders to understand and utilize the range of media in a learning environment is a significant barrier (GB/SE/HU/SK/FI/BG/UA). The availability and usage of the technology itself is also an issue in some Member States (BG/UA/FI/SK). Adapting to the future technology based world in training may be one of the most significant challenges that training functions will face in the future. Conversion of traditional training materials to new technology training and training the instructors and student to use the new technology is another challenge.

3. THE ROLE OF MANAGERS AND LEADERS

This section describes the roles and responsibilities of managers and leaders within the organization relative to recruiting, training, qualifying, developing and supporting facility instructors.

In most facilities, there are three levels of management:

- *Corporate / Executive Managers and Leaders* These managers and leaders have policy making functions, resource provision and overall responsibility for the success of training programs, including instructor development, vision and senior leadership of expectations at their facilities which links with Learning Organization and Learning Culture;
- Senior Managers and Leaders Senior managers and leaders have execution and control functions within the facility. These positions include the facility manager, training manager, and the site department (or functional area managers and leaders) leading those who have direct influence on operation and support of training activities and instructors' quality of delivery;
- *First Level Managers and Leaders / Supervisors* These individuals have responsibility for the safety, quality, performance and training of all personnel under their control. The term 'line manager' is used in this publication to mean the manager directly responsible for an employee's performance in a specific area. Supervisors, where this role is separate from that of Line manager, may be called upon to identify potential instructor candidates, contribute to the assessment of instructor performance, or called upon themselves to serve as instructors.

3.1. ESTABLISHING TRAINING POLICY

The corporate managers and leaders of the operating organization are responsible for establishing and promulgating an overall training policy regarding the training, qualifications and performance of their own personnel.

It is necessary that the operating organization formulate and promulgate an overall training policy dealing with the training, qualification and performance of facility personnel. This policy is the commitment by the operating organization and the facility to personnel training, the provision of competent staff, and an acknowledgement of the critical role of training for the safe, reliable operation and maintenance of the facility.

The operating organization need clearly define the responsibilities for all aspects of training process. Such information on responsibilities is recommended to be included in the training policy. Because the IAEA endorses SAT, organizations need to have written policies that follow that process. This concept is endorsed by the IAEA in its Guidebook on Nuclear Power Plant Personnel Training and its Evaluation; Technical Reports Series No. 380 [3]. For organizations that operate several facilities, the overall training policy is formulated at the operating organization level, with individual facility policies created from the overall policy to ensure it is implemented.

It is necessary to clearly understand that the nature of this policy, and the level of commitment to it by the operating organization, the facilities and training functions, will have a significant impact on the roles and responsibilities of instructors, and their ability to fulfil these roles and responsibilities. It is recognized that different facilities will have differing requirements for their instructor cadre which will need to be reflected in the training policy. For example, there are different approaches to the use of contracted instructors and this need to be specifically addressed in the training policy as it applies to the facility.

Within the policy, the operating organization has to clearly define the roles and responsibilities for instructors in all aspects of the training process. This information has to be included in the written procedures that support the policy. In this context it is also helpful to indicate the instructors' roles in the implementation of SAT.

ANNEX I contains an example of factors that might be considered when formulating a training policy, including the need to support instructor development.

3.1.1. Components of a training policy

A training policy has to include the operating organization's vision of training and its role in supporting safe and reliable facility operation via the continuous development of the KSA of its employees. It provides the training mission, philosophy and strategy of the organization to achieve the expected outcomes. It is recommended that the overall training policy and other high-level documents of the operating organization require the use of SAT for training personnel whose jobs impact safe and reliable facility operation.

ANNEX II provides an example of a training policy.

3.1.2. Goals and scope of the training policy

Several considerations have to be taken into account when a training policy is formulated. The internationally recognized requirement for all personnel whose work may have an impact on

safe and reliable facility operation is that they are qualified for and competent to perform their jobs. SAT is recognized worldwide as best practice in ensuring that personnel are appropriately qualified, because it:

- Identifies all tasks that will be covered by training for achieving competence;
- Provides QA of design, development and implementation of the training process and thus builds quality into training and qualification programmes;
- Provides tools for management to monitor, evaluate and to regulate the effectiveness of the training provided and its impact on the competence of facility personnel.

It is recommended that the application of SAT methodology also be required for training instructor development training where those instructors have a potential impact upon safe and reliable facility operation.

To be most effective, the training policy has to be consistent with the human resource policy and may even exist as part of that policy.

3.2. MANAGING THE TRAINING FUNCTION

For the purpose of this publication, and considering the roles of instructors, the following responsibilities are usually assigned to a Facility training manager even though some or all the tasks may be undertaken on the manager's behalf by a central function or an external training organization:

- Coordinate all training for facility personnel, including that provided by external sources;
- Oversee each phase of the SAT process of all training for facility personnel including OJT;
- Procure and maintain all training tools, equipment and materials, including simulators and mock-ups;
- Provide a programme for training and qualification of all instructors in technical and instructional abilities;
- Maintaining an Instructor Register of approved instructors qualified to deliver training to facility staff;
- Ensure the effectiveness of implemented training solutions;
- Provide QA of training from internal and external sources;
- Support the overall training evaluation and feedback processes, with continual support from and interaction with plant departments for which training is provided;
- Provide periodic reports to the facility and department managers and leaders on the evaluation of training effectiveness;
- Maintain records on the training and qualification of all facility personnel;
- Oversee contract trainers, and non-plant instructors who have functions to perform at the plant.

ANNEX IV provides an example of manager and supervisor responsibilities.

3.2.1. Monitoring, evaluation and support of training

The manager and department managers and leaders have to demonstrate to personnel through their actions that the success of training programmes is fundamental to the success of the business. The success is their responsibility, even though much of the training is provided by the training organization. These actions can take a variety of forms. Good practices may include the following:

- Regular observation of the conduct of training e.g. operations department managers and leaders observing simulator training, participating in the assessment of shift supervisors, and supporting feedback provided by instructors;
- Providing visible support through opening and the closing of training programmes to set expectations and receive feedback;
- Routine reviewing of training evaluation outputs with subordinates during staff meetings;
- Establishing joint facility/training organization groups to review training needs;
- Supporting curriculum review groups to determine and maintain programme content;
- Regular rotation of personnel between plant departments and instructor positions;
- Support of the training function through the provision of appropriate resources;
- Adequate planning including release of personnel to attend training

ANNEX V provides an example of the terms of reference for a Training Programme Review Committee (TPRC).

3.2.2. Training policy and human resources policy

As previously stated, the IAEA recommends the training policy to be consistent with human resource policy (in some organizations, training is included as part of the human resources policy). The human resources policy addresses areas such as recruitment and selection, career planning and development and the retention of personnel. In this context it is important to highlight the benefits of undertaking instructor duties in individual employee development and career planning. Human Resources practices need to assist, rather than inhibit, the transfer of staff between training and facility roles.

3.2.3. Review of instructor training content

Constant striving to improve production efficiency, safety and reliability (and thus quality) has led to an increasing emphasis on training for human factors in areas such as communication, teamwork, reliability, man-machine interfaces, management and supervision and analytical methods. This emphasis on human factors has led to a need for greater integration of training and human resources management activities. Managers and leaders are recommended to ensure that instructor training reflects the non-technical as well as the technical skills and competencies required to ensure instructors are able to fully support evolving facility requirements.

Managers and leaders are also recommended to ensure that process is in place to continually review instructor training programmes in line with modern technology and techniques to ensure training programmes make the best use of this.

Section 6 details developing instructor competence and Section 7 covers instructor professional development.

3.2.4. Selection, recruitment and qualification of instructors

It is generally recognized that, wherever possible, staff with facility experience has to be selected as instructors as they have not only the required technical knowledge, but also operational experience. Where this is not possible, for reasons of distance or facility staff shortages, considerable technical training is required for instructors in the KSAs required for their roles, and to establish credibility with trainees.

Managers and leaders have to develop policies that ensure experienced staff can be released to undertake instructor roles and that those individuals are not adversely affected by doing so. Individuals also need to be supported in returning to facility roles if this is required.

Managers and leaders are recommended to ensure that where there are limitations in the number of experienced staff available, a mixture of external and facility experienced staff are provided, or the use of facility staff temporarily assigned to assist with the development of and support of externally recruited staff is provided.

Managers and leaders are recommended ensure that individuals appointed as instructors are formally appointed and that their competence is adequately assessed. Records have to be kept of formal appointments to training roles and ongoing formal reviews undertaken.

Many countries require instructors to be qualified/certified to the same level as are the trainees, who they will instruct (e.g. simulator instructors are required to obtain or maintain a reactor operator licence). Managers and leaders need to ensure that where this is not a requirement equivalent arrangement in place.

ANNEX VI contains an example of criteria that may be used when recruiting and selecting instructors.

3.2.5. Organization and management of instructor staff

The organization and management of instructor staff will vary greatly depending on the assignment of responsibilities (i.e., the balance of responsibilities between full-time, occasional and contracted instructors). However, there are some important common principles that managers and leaders are recommended to maintain:

- The organization of training functions have to be such that instructors can easily obtain the necessary support to deliver effective training;
- Advantage to be taken of the breadth of an instructor's expertise to utilize him/ her in other instructional roles whenever possible;
- Appropriate interfaces to be established across functional boundaries to enable instructors to work closely with facility staff to identify training needs and ensure that the training provided is appropriate;
- Maintenance and ongoing development of instructor competence to be systematically implemented and monitored.

ANNEX VII provides an example of a training organization structures used by Member States that may be considered when developing reporting responsibilities and relationships between staff positions.

3.2.6. Managing training interfaces

Management's interaction with organizations and individuals that impact training is highly important to the successful integration of training to support safe and reliable operation. Communication has to be effective in all interactions and the reasons for and goals of the interface need to be clear. Responsibilities are recommended to be defined in procedures. To create a learning organization, it is very important that managers value training high.

3.2.6.1. Interface between facility management and the training organization

For the relationship between the training organization and the facility to be successful, IAEA recommends the training organization to recognize its primary purpose: to provide a training service to the facility manager; to support that manager; to take full responsibility for ensuring that only competent personnel undertake activities on the plant which may affect safety.

Equally, the facility manager has to give the training organization the necessary authority and support, including financial and human, to enable the training organization to discharge this purpose effectively. Visible support for the training organization by facility management will encourage the right relationships between instructors and trainees, and will assist instructors to enforce management expectations of performance and behaviour. To support these formal interface arrangement details of: review meetings; reporting requirements; and information, sharing processes needs to be established.

When the operating organization utilizes a central training function to provide training for several sites, it has to be reflected in the goals, scope and responsibilities within the training policy and supporting procedures to avoid tension between the training organization and individual facilities.

3.2.6.2. Interface between plant departments and the training organization

Training provided by organizations separated from the facility structure will be most effective when there are good working relationships between instructors and facility staff. Instructors need assistance from facility management and staff for a variety of activities:

- Input to the design of initial and continuing training programme content;
- Integration of classroom and OJT;
- SME input to the development and delivery of specific training modules;
- Participation in the assessment of trainees;
- Information on plant and procedure changes;
- Feedback on the effectiveness of the training given;
- Supporting the identification and review of programme content; and
- Capturing lessons learned from Operating Experience in training programmes.

It is recommended for training and facility management to establish formal interface arrangements to ensure effective cooperation between instructors and plant staff where necessary. Good cooperation will help to ensure effective training.

3.2.6.3. Interfaces with other training providers

When external training providers are engaged (especially by a separate internal training organization), it is important that the training they deliver meet same standards and quality standards as that from internal providers, unless there is agreed justification for specific differences. It is important, therefore, to establish and implement appropriate formal arrangements to ensure that contracting organizations understand what is expected of them.

It may also be appropriate for the facility or the internal training organization to consider 'certifying' contract instructors even if it is the contract organization's responsibility to ensure their competence.

3.2.6.4. Interfaces with regulatory body

Since the training organization's role is to assist the facility manager in ensuring the competence of the facility staff, regulatory bodies are most likely to want evidence that the training organization is itself a competent supplier.

In some cases, this relationship is managed through the facility or the operating organization. However, there may be advantages in having a direct relationship, thus giving the regulatory body confidence in the independence of the training organization for assessing the competence of trainees. The method to be applied will be influenced by the regulatory interfaces in that country.

3.3. MANAGING INSTRUCTOR CAREER DEVELOPMENT

Training and qualification of instructor personnel is a continuous process. Thus, managers and leaders have to establish processes for the selection, recruitment, qualification and retention of instructors with a view towards long-term return on investment and job stability within the operating organization. The use of appropriate assessment techniques within the selection process for instructors is highly recommended.

3.3.1. Building the instructor cadre

It is important to have mechanisms that encourage plant staff to apply for instructor roles as well as to facilitate their reintegration into facility operations after their assignment in training if it is not permanent. It is important that staff members are not disadvantaged personally by transferring from facility operations into training.

Facility staff, who have moved into training for the period of time, and then after returning to the facility, are promoted based on their broader experience, become positive role models for supporting training. Such individuals also often undertake an ongoing liaison role between the facility and the training function, formally or otherwise, to the benefit of both parts of the organization.

3.3.2. Integration and mentoring of new instructors

The integration of new instructors can be a particular challenge, especially if the core team of instructors is a stable one, or if a new instructor has come from outside the organization. Arrangements are recommended to be in place to support new instructors through job shadowing, mentoring and supervised integration into the role on a phased basis.

Employees perform better when they are motivated to do so through whatever means matters most to them. This may be different for each individual and managers and leaders have the responsibility to take the time to understand what the motivating factors are for each of their instructors.

3.4. CHAMPIONING INSTRUCTOR EXCELLENCE

Managers and leaders are responsible for supporting the success of all staff members including instructors. Support and recognition can come from all levels of management within the organization and used appropriately will increase motivation of instructors to become more effective.

Managers and leaders have to be champions of training and its delivery to drive organizational performance, increase safe facility operations and support employee growth and professional development. When instructors are directly supported and encouraged, they are more willing and able to learn new methods and expand their training and communications skills. Instructors are well placed to test new procedures or new requirements.

It is also recognized that it is necessary to have performance management processes in place to manage individuals who do not reach the high standards required.

3.4.1. Support for leading edge methods and technologies

It has been said that 'change is the only constant' and nothing is a truer statement where training is concerned. Especially in the realm of training delivery, electronic applications have changed significantly in a short period of time and continue to do so.

Seasoned instructors who have been delivering training for years with PowerPoint slides may be uncomfortable with the advent of new development and delivery technologies. It will be up to managers and leaders to not only facilitate the integration and implementation of new methods and technologies for training, but to support instructors to engage with these technologies.

Younger staff, entering the workforce, has grown up with computers, tablets, mobile phones and other devices and their styles of learning have been shaped by those tools. These are not a novelty to them; their learning has always included on-line or electronic delivery. They are used to learning through playing games, having immediate access to information, and receiving instant feedback to their inputs. For the organization and facility to be successful, instructors and students will need to be flexible and open to different ways of learning and managers and leaders will need to be champions of forward-thinking and innovation and embrace changing technologies in the development and delivery of training. Time, resource and encouragement are to be provided to ensure full advantage is taken from these opportunities.

3.4.2. Use of operational experience feedback

A significant factor in the future success of the nuclear industry is the ability to learn from operational experience, to be a learning organization. It is important to incorporate this learning into training programmes and to use it to support technical, theoretical and human factors training.

Managers and leaders must ensure that operational experience processes include consideration of training implications and that the training organization is involved in reviewing and assessing its significance for training programmes. Effective interfaces between instructors and facility departments are to be established to ensure 'lessons learned' from all relevant operational experience.

4. THE ROLE OF INSTRUCTORS

This section describes the role of instructors in the provision of an effective training service. It is recognized that instructors will perform a range of training roles and that they are unlikely to perform all the roles identified in this guidance. The roles of the instructor depend upon the training setting(s) in which they deliver and the jobs and subjects that they support during that training. It is also recognized that utilities may not, due to their unique organizational arrangements, require all instructor roles to be supported. However, instructors within the

training organization have to have the collective capability to support all identified roles. It is well known that training is most effective when the trainees are motivated to learn. Therefore, instructors do have an important role in the learning organization by understanding the theories of single and double loop learning. Double loop learning is used when it is necessary to change the mental model on which a decision depends. Unlike single loops, this model includes a shift in understanding, from simple and static to broader and more dynamic, such as considering the changes in the surroundings and the need for expression changes in mental models.

The role of instructors covers a variety of activities which differ between Member States according to:

- The organization of the training department and number of instructors employed in it;
- The distribution of responsibilities between instructors, training management and training support;
- The involvement of instructors in job positions or activities at the NPP and their availability for training activities;
- Whether instructor activities are considered as a main role or as a secondary role;
- The training tools used;
- Cultural aspects such as social barriers, ability to change jobs and management systems.

The role of instructors varies in accordance with the instructor's category. These categories are detailed in Section 5.

4.1. ROLE OF THE INSTRUCTOR IN THE SYSTEMATIC APPROACH TO TRAINING

The approach taken in implementing a SAT methodology within a given operating organization will largely define the overall duties and responsibilities of the instructors within that organization. Detailed information on the implementation of SAT is provided in other IAEA publications [4], but the following sections outline typical responsibilities of instructors within the five main phases of the SAT process.

Instructors will perform tasks associated with the five SAT phases; the extent to which they support each phase will depend on the specific job description of that instructor. The tasks/ competencies constituting their specific jobs have to be identified and the SAT process used to satisfy their development needs.

The key roles of instructor in each phase will include:

- Analysis phase;
- Design phase;
- Development phase;
- Implementation phase;
- Evaluation phase.

4.1.1. Analysis phase

The Agency would recommend that instructors assist in the analysis of training needs by:

• Helping the facility management identify the training needs associated with plant job positions and tasks. These will include the required knowledge, skills and attitudes/abilities to perform tasks safety and efficiently;

- Conducting interviews with job incumbents to identify job tasks;
- Reviewing changes to plant hardware, configuration, operating procedures, etc., to identify any necessary updates to training requirements;
- Participating in 'table-top' or job competence analysis (requires significant facility experience);
- Providing training in analysis techniques to other staff;
- Overseeing the analysis of training needs for particular projects or job positions, undertaken by contractors and consultants;
- Reviewing feedback from plant events to identify gaps in training;
- Utilizing the output of training evaluation to review and revise training programmes.

The Agency recommends using SMEs to support analysis activities by defining job-specific requirements and providing specific data for the analysed job positions/tasks. SMEs may also review training needs analyses outputs. A formal TNA report may be the product of this phase of the SAT process.

4.1.2. Design phase

Using the TNA data, instructors and/or instructional technologists produce goals and/or learning or performance objectives and group these appropriately to identify discreet training modules.

The key roles of instructors during design phase are therefore to:

- Develop specific learning objectives based on the output of the TNA;
- Group the objectives into discreet and manageable training sessions and modules;
- Identify appropriate training settings and methodologies, together with any necessary training aids and environments;
- Integrate management expectations;
- Select training methods and media;
- Specify the training evaluation method to be used (cognitive or performance based assessments);
- Optimize the technical content, the duration and the chronology of the courses necessary to achieve the training objectives.

The Agency recommends involving instructors in the design phase by:

- Identifying overall training programme objectives as well as individual course objectives;
- Defining the training objectives in accordance with the knowledge level of learners;
- Developing and maintaining task lists and task-to-training matrices.

4.1.3. Development phase

Using the standards and procedures provided by the training function which ensure the application of SAT, instructors will develop all necessary training materials.

The key roles of instructors during development phase are:

• Producing training materials to support training objectives, including visual aids, lessons plans, procedures and exercise or activities as required;

- Defining the most appropriate media for training material based on technology available, learning goals and cost (see Section 4.3.);
- Developing assessment criteria and material/practical tests ensuring that the training objectives are adequately addressed in the training materials or practical tests;
- Optimizing the technical content, the duration, and the chronology of the sessions necessary to achieve the training objectives;
- Implementing the pilot delivery of training modules and programmes as required incorporating the feedback from this pilot into the final material;
- Maintaining currency of training material content.

SMEs may be required to support the development of training materials and to providing training facilities or resources.

4.1.4. Implementation phase

Instructors will provide effective consistent training, using proven techniques, including regular questioning and knowledge checks to ensure learners develop the identified KSA. They need to review information given and propose case studies, as appropriate, to test the trainees' ability to apply the knowledge and skills learned. In the case of simulator training and other hands-on training, the instructors have to create a realistic environment.

The key roles of instructors during implementation phase are:

- Implement effective and consistent training which satisfies training objectives;
- Prepare for effective delivery of presentations;
- Use approved materials and training facilities;
- Employ appropriate instructional techniques to support the learning material, including lecturing, facilitating discussions, providing tutorials, carrying out one-to-one support and review sessions and to operate technology-based learning;
- Model management expectations and support the policies of the operating organization, in particular safety management and safety culture, regulatory requirements and QA;
- Impart those knowledge, skills, attitudes and abilities necessary for success in the job environment. These have to include safety culture and human factors issues as well as the technical content;
- Emphasize operating experience and lessons learned;
- Use, and support the use of, human error preventive tools;
- Carry out remedial instruction with individuals and groups;
- Assess learners' progress and review their progress taking appropriate actions;
- Collect and review level 1 end-of-training reaction feedback comments from learners;
- Obtaining level 2 training evaluation (learning) by conducting an end of session / course training assessment and periodically (e.g. annually) synthesizing all the end-of-course assessments;
- Formally document assessment results.

4.1.5. Evaluation phase

It is recommended to continually review the effectiveness of training. This will include all 4 Kirkpatrick levels of evaluation as detailed in IAEA Technical Reports Series No. 380, Nuclear Power Plant Personnel Training and its Evaluation [3] and GSR part II rec 13/14 [5]. The involvement of individual instructors in the evaluation phases will depend on their specific allocated roles and the evaluation processes adopted by the facility.

When delivering training, instructors have to provide feedback to specific participants including any aspects of the training which were not demonstrated to be fully effective and especially where critical feedback is provided by the trainees themselves.

In any event, it is necessary for instructors to seek feedback from trainees on completion of any training activity for which they are responsible to ensure any shortcomings in the training provided are corrected. Procedures will provide for subsequent feedback on training effectiveness from the NPP and that the feedback is acted upon.

The key roles of instructors during evaluation are:

- Implement the learning evaluation methodology specified during the design and development phases;
- At the end of each training session/programme review training feedback and update training files such as training materials, participant handouts, and examinations;
- At the end of each training session/programme review training feedback and embrace instructor skills comments, engage in critical ongoing self-assessments to continually improve instructional performance;
- At the end of each training programme, identify improvements required to normal, abnormal, and emergency operation procedures and to maintenance procedures etc. Provide feedback to the procedure designers;
- Contributing to the assessment of the trainees:
 - The instructor is responsible for the knowledge of the trainees at the end of the session and has to participate in the assessment of the trainees;
 - The instructor contributes to the licencing process delivered by another authority (e.g. the NPP or the Safety or Regulatory Authority);
- Evaluating the conformity, efficiency and applicability of the training aids;
- Achieve timely closure on corrective actions.

It is the responsibility of line managers and leaders and supervisors in the SAT process to evaluate the impact of training on the skills, knowledge and attitudes of their staff. Due to their expert knowledge and insight instructors may also be required to support this evaluation of trainee performance. Instructors therefore may also:

- Evaluate the work and task implementation following the training observing the activities of the personnel and reporting performance deficiencies to the responsible managers and leaders;
- Participate in trainee performance assessment;
- Support remedial training interventions where performance shortfalls are identified.

Other training evaluation processes are the key to the provision of an effective training function. These will include the evaluation of the business impact of training solutions and processes to continually review and revise training programmes to meet the needs of the facility.

Depending on the specific arrangements of the facility instructors may be required to:

• Provide plant data for evaluation and take part in the analysis of training results and business impact;

- Take part in the evaluation of training effectiveness (using internal and external data for evaluation), and provide recommendations for improvement of training;
- Support the review of training equipment and simulator functionality to evaluate the impact of and specify replacement/upgrades;
- Support the construction and installation of new/upgraded training equipment and simulators then undertake commissioning and acceptance testing;
- Implement the corrective measures for improvement of plant performance through training;
- Support training and curriculum review committees as required;
- Take part in assessing quality of services provided by internal and external training organizations.

4.2. ROLE OF INSTRUCTORS IN PRESERVATION OF KNOWLEDGE

Knowledge management is an integrated, systematic approach to identifying, acquiring, transforming, developing, disseminating, using, sharing and preserving knowledge, relevant to achieving specified objectives. Knowledge management focuses on people and organizational culture to stimulate and nurture the sharing and use of knowledge.

An ageing workforce is a growing challenge in the nuclear industry. The preservation of knowledge is becoming more significant, specifically:

- How do we ensure a minimum level of KSA for young employees in order to be able to operate NPPs with a high level of safety and reliability;
- How do we capture the knowledge and skills of individuals who are about to retire.

It is the responsibility of all parties involved in the nuclear arena (e.g. international organizations such as the IAEA, and World Association of Nuclear Operators (WANO), and NPPs, training centres and research centres) to take action. As a consequence, the preservation of knowledge is an important activity that necessarily needs to be supported by instructors.

The instructor can play an important role in knowledge perseveration. The following responsibilities are to be considered:

- Contributing to the identification of the critical knowledge that needs to be retained;
- Participating in NPP activities and incorporating experience into training materials;
- Exchanging information with NPP experienced personnel to capture the know-how in training materials;
- Capturing NPP experience in training documentation where occasional instructors or SME's are used in training;
- Identifying and updating routinely the critical knowledge that is needed;
- Participating in the transformation of tacit knowledge to explicit knowledge.

Information on knowledge management, maintenance and the preservation of knowledge and expertise in nuclear science, and safety culture can be found in the variety of the IAEA reports and series [6], [7], [8].

4.3. ROLE OF THE INSTRUCTOR IN THE INTEGRATION OF NEW TRAINING METHODS AND TECHNIQUES

In a rapidly changing world the use of new technology in training is growing quickly and the opportunities for innovation are increasing. It is also important to consider the expectations of new workers joining the industry, who have grown up in an environment where their learning has not been driven by the traditional training methodology. Modern training tools have to be taken into consideration to attract and motivate young people. This may be a challenge for many experienced instructors, so it is important that the support and resources required to review and embrace new technologies are available to them. To adopt new training methods and techniques instructors will need to be involved in the following activities as appropriate to the organization.

4.3.1. Support of self-study

The training environment may also need to be adapted to the availability of NPP personnel. For this reason, self-study solutions utilizing advanced training tools are an alternative method in order to improve knowledge of personnel.

Although self-study modules are designed for independent learning, trainees may still require support from instructors, nuclear facility managers and leaders and personnel or from other trainees.

It is recommended that instructors support self-study learners through:

- Monitoring the trainees' progress through the module, to check that they are up to date with their work, to detect problems or difficulties at an early stage;
- Providing additional learning input where required;
- Ensuring that the learning material is accessible and the technology understood by the learner;
- Providing remedial training as appropriate to learners who have difficulties;
- Assisting in the identification of suitable supplementary resources such as reference material.

4.3.2. Supporting digital learning technology/e-learning

There is a range of learning media that are available to be utilized in training solutions. The use of these technologies will vary between organizations depending on their specific needs, resources and learning strategies. The role of the instructor in evaluating, integrating and supporting these technologies needs to be clearly understood, and the appropriate support provided.

It is important to recognize that available technologies change quickly, and arrangements and the capability need to be in place to ensure that these are suitably assessed.

The instructor's role in this area may include:

- Distance learning;
- Web-based, e-learning, computer-based training (CBT);
- Other media;
- Virtual technology;
- Blended learning.

4.3.2.1. Distance learning

In this method the trainee receives materials to study, learns the content and does assigned exercises. After completing the exercises, they are sent to an instructor for evaluation. At appropriate stages of the training, the instructor has to assess and review the progress with the learner and support their progress towards timely completion.

4.3.2.2. Web-based, e-learning, digital learning

Digital learning/e-learning is used extensively for independent learning (i.e. in self-study), as well as supporting classroom/workshop/laboratory and simulator training. The principle is the same as in Section 4.3.2.1. The difference consists in taking advantage of the web or the computer technology to improve the exchange of information and the interactivity of training.

When digital learning/e-learning is used for self-study, trainees are likely to require support from an instructor. The role of instructor is to:

- Clarify training objectives;
- Assist in the use of software/hardware;
- Monitor and review trainees' progress;
- Detect and resolve difficulties in the learning process;
- Verify that the training content is up-to-date;
- Facilitate the training process, creating interactive exercises, running group sessions, monitoring on-forums, etc. (depending on how the digital learning/e-learning is designed);
- Obtain reports on trainee progress and assessment results.

Digital learning/e-learning systems can be used also for preservation and transfer of knowledge to new generation.

4.3.2.3. Other media

There are numerous other training media that can be adopted including printed material, video, audio systems, learning blogs and forums through to simulations. Increasingly learning material is available on a mobile basis and can be created easily by both the instructor and by the learners themselves. Good examples exist where learners create learning material for other learners as part of their own learning.

4.3.2.4. Virtual technology

Virtual technology consists of simulated or computer-generated equipment or plant systems operated from a computer.

It can be used where for areas of the plant which are not available during normal operating conditions (high level of radioactivity, identified dangers, etc.). It can also be used to train field operators in normal or emergency operating conditions by modelling the time to go from one area to another.

Again, the use of virtual technology will depend on the organizations individual preferences and strategy. The role of the instructor includes:

• Use of modern computer techniques – tablets, phones, electronic boards (touch screen);

- Use of 3-D virtual environment to teach operational and maintenance skills;
- Use of modern software.

Potential specialist computer techniques and technology may require allocation of the development of training materials and aids to specialist 'developers' – people who have extensive computer knowledge and skills. The instructor's role is to support them in development of training scenarios, specifying the sequence of training activities (delivering of new training material, examples, exercises, tests, etc.).

4.3.2.5. Blended learning

Blended learning is a term that refers to the use of a range of the available media and training settings to provide an overall training package. The exact combination of training material and the media used will be specific to each training solution and will depend on cost, flexibility of training implementation, learners' needs, availability of material and capability of training organizations to adopt and use it, etc.

The instructor's role in the use of the range of learning technologies will depend on the organizational strategy for is use. However, the instructor role will include:

- Assessing the availability of learning media and technology against the requirements of the training organization;
- Integrating new learning technology into existing and new programmes;
- Providing advice and support to learners in the use of adopted media;
- Monitoring and reviewing learners progress;
- Providing specific tutorial support to learners and be able to provide bespoke tutorial support as dictated by the learners' progress;
- Supporting a 'hot line' learning support service to learners to ensure their learning is not restricted by formal schedule support;
- Reviewing learning effectiveness and adapt blended packages as required.

4.4. COACHING, MENTORING, AND SHADOWING

Instructors may be required to act as coach and /or mentor to learners in plant roles to support effective training.

Experienced instructors will however be required to participate in the development of new instructors. This will include:

- Defining the training needs of new instructors and agreeing development plans with them;
- Coaching and mentoring new instructors during their learning;
- Providing advice, exchanging pedagogical or technical information and routinely mentoring the new instructors;
- Reviewing progress with new instructors during their development;
- Ensuring that knowledge gained from experience in the role is captured and passed on to new instructors.

4.5. OTHER ROLES

Between other responsibilities and tasks, instructors may also have the following roles in their training organizations:
- Maintaining the simulator (simulator training instructors);
- Maintaining training aids (theoretical training instructors);
- Maintaining training equipment (practical training instructors);
- Coordinating the activities between the training organization and technical departments (procedure designers, simulator designers, etc.);
- Maintaining and developing their own competences;
- Identifying good practices performed in other training centres (benchmarking, exchanging experiences);
- Participating in peer reviews;
- Development of procedures for applying of SAT;
- Develop procedures concerning theoretical, practical and simulator training;
- Try out new processes;
- Try out modified processes.

The simulator instructors participate in NPP activities which include:

- Performing engineering analyses, procedures' validation, analysis of events using simulators, verification of processes and systems changes and modernizations;
- Participate in international projects concerning modernization and upgrading of the simulator;
- Feedback technical information to NPPs;
- Assist in incident investigations;
- Support emergency exercise simulations.

ANNEX XVII provides an example list of functions of simulator training instructor.

The roles of the theoretical and practical training instructors may involve:

- Training of subcontractors' staff for site access and work at NPP site;
- Training for performance of specific activities (ionizing radiation sources activities, decommissioning activities, industrial safety, human factor, etc.);
- Organizing students and vocational schools' pupil practices;
- Participating in international projects concerning SAT, knowledge management, etc.;
- Developing and using training games to point out the interfaces between different services (maintenance, operation, safety departments, etc.);
- Emergency exercises organized by the NPP in relation with the training organization or centre;
- Validating/testing and promotion of new plant procedures (used for normal or for emergency operation) or new methods;
- Analysing of work practices owing to changes in plant equipment or job duties.

5. CATEGORIES OF INSTRUCTORS

This section provides detailed information on the categories and specializations of training instructors. The categories of instructors defined by their roles are utilized by a training organization to provide the most effective training to the personnel. These categories vary according to the structure and training policy adopted by that organization.

It is recommended by the IAEA that the NPP training organization, or contracted training organization, define the formal approach to be used for NPP personnel training. This will affect

the number and type of instructors on demand. As described in 3 and 4 Sections, a variety of approaches may be required for NPP personnel training.

The staffing structure of the NPP and its organizational support will also have an impact on the categories of instructors used, for example the ratio of full-time, part-time, temporary and contracted instructors will vary. Different categories of instructor may be involved in the analysis, design, development, implementation or evaluation of training programmes. Typically, instructor teams consist of a mix of full-time and rotating staff. Section 6 describes recruitment of instructors.

It is also recognized that some NPP related topics such as training on NPP modifications, new procedures, etc. may require NPP specialists from operations, maintenance and other departments to become involved temporarily for short periods or to support training instructors. This will require flexible approaches for instructor staffing.

The following paragraphs describe the categories of instructors that may be utilized.

5.1. INSTRUCTOR CATEGORIES

5.1.1. Full-time instructors

Full-time instructors are individuals who are permanently assigned to the training organization; consequently, they are sometimes referred to as 'permanent instructor'. Depending on training policy and national requirements, the duties of full-time instructors will differ from one training organization to another.

In many cases, full-time instructors are involved in all training activities within their training organization. Typically, full-time instructors perform tasks associated with all five SAT phases, including TNA, JTA, design and development of training objectives and test items and material, etc. as well as the traditional implementation, or delivery, of training sessions and programmes.

For example, in Romania full-time instructors are individuals who are permanently assigned to the training organization and are involved in all training activities, but some have additional responsibilities such as training program coordinators and they perform activities related to analysis, design and development and evaluation of training programmes.

Some Member States utilize instructors who are seconded from their NPP permanent roles, usually in simulator instructor roles, to bring up-to-date experience into the training function and to add credibility, particularly with staff undergoing continuing training. These instructors are typically appointed for periods of 2 to 3 years. This supports recruitment into training roles, supports individual career progression and takes training expertise back to the facility.

For this category of instructors, formal training has to be given as described in 6 Section.

5.1.2. Part-time instructors

Part-time instructors are individuals who are formally qualified instructors, but who are involved in training only on an occasional basis. These personnel may belong to NPP departments and may include but not be limited to:

- Engineers from operations, maintenance, and other NPP departments;
- Managers and leaders of NPP departments;

• Control room operators (during their free time on shifts).

For this category of instructors, formal training has to be applied, but may be limited to the specific duties required, as described in Section 6.

Some of Member States use SMEs like part-time instructors. These instructors may also be referred to as 'occasional instructors'. SMEs as individuals qualified or previously qualified and experienced in performing a particular task provide expert support to the training organization. A SME may also be individual whose education, training, and/or experience is recognized as an expert on a particular technical area, subject or system. SME's may only deliver certain portions of training, typically delivering sessions or supporting development of specialist training content.

Part-time instructors, including those who provide OJT in the facility, also need the appropriate instructional KSA as defined in Section 6. Although it is important to recognize that part-time instructors and/or SMEs, who are not fully qualified instructors, may provide training under the guidance and supervision of a competent instructor.

Part-time instructors may be used as SMEs to support analysis activities by:

- Defining job-specific requirements;
- Providing specific data for the analysed job position;
- Reviewing the documents including training needs analyses results;
- Working with the knowledge preservation team to contribute their individual and collective knowledge about work processes history and performance.

5.1.3. Contracted instructors

Contracted instructors are individuals who usually belong to an organization that is external the NPP organization and is contracted to provide training services. They are qualified instructors and are involved in training on a contractual basis. These personnel may include but not be limited to:

- Design or vending companies' engineers and technicians;
- Instructors of a contracted training organization;
- External consultants;
- Specialist instructors who possess knowledge and experience not available within the training or NPP organizations, for example management or leadership trainers;
- University lecturers.

For this category of instructors, their formal training has to be managed by their employers. The scope of such training may vary according to the scope of the training services being provided. However, it is necessary for the NPP training organization to have control procedures in place to ensure that contracted instructors competence is checked and confirmed as suitable. The main approach to instructor training as described in Section 6 has to be considered.

5.2. PERMANENT INSTRUCTORS AND NPP ROTATED INSTRUCTORS

There are typically two types of assignments (or contracts) between instructors and training organizations:

- Short-term assignments/contracts of between 6 months and 5 years. Where instructors are rotated between plant duties and instructor roles, returning to plant duties at the end of their agreed time. Short term assignments may be offered to instructors who rotate between the training function and a NPP or, in some cases, short term assignments are offered to experienced personnel who are used only occasionally as instructors but keep their job positions at the plant;
- Permanent assignments/contracts. Where instructors are recruited into permanent posts within the training structure. Individuals in these positions on the other hand, may be appointed for much of their working life on a permanent basis (sometimes termed 'life instructors').

For each type of assignment or contract for instructors there are advantages and disadvantages that need to be considered when specifying training organization structures.

Short-term assignment advantages include:

- Opportunities to retain up to date KSA regarding the NPP organization and policies and to impart these to the trainees;
- For experienced people, a higher level of technical skills may be retained and imparted to the trainees;
- For the instructor there is the security that they can maintain their job qualifications and return to plant based duties;
- Provision of feedback to the training programme;
- Add credibility, particularly with staff undergoing continuing training;
- Take training expertise back to the facility on completion of rotation.

Disadvantages include:

- There is a high pedagogical investment for a relatively low return in the training of instructors. This investment is required on an ongoing basis as individuals rotate through the instructor role;
- The technical investment needed from the NPP and the training function is high;
- Continuity of instructor knowledge may be lost. Often permanent instructors are used in combination with rotated instructors to prevent this especially in simulator training.

Long-term assignment advantages include:

- A high return on the investment especially for the organization (and the instructor);
- A high level of competence is gained in training expertise;
- Continuity of instruction is maintained.

Disadvantages include:

- Less opportunity to maintain current knowledge of NPP technical activities which may impact on training effectiveness if not managed;
- Lack of opportunity to raise questions on NPP policies and organizational matters;
- Difficulties in recruiting high quality staff into training roles.

5.3. SPECIALIZATION OF INSTRUCTORS

The functions and duty areas of instructors depend upon the training setting(s) in which they deliver training, and the jobs and subjects that are addressed in the training. For example, an instructor may deliver only classroom training on design and operation of facility systems. Another instructor may deliver training in both classroom and simulator training settings or in a classroom training setting and OJT.

These roles will require a large range of competences from fundamental theory delivery through to specialized in management instructors and instructional specialists. The specific functions and duties need to be defined in the instructor job descriptions.

An explanation of different specialities of instructors is provided in the following sections.

5.3.1. Simulator instructors

Simulator instructors are individuals who usually provide training in a simulator setting. Simulator training includes both FSS and part scope simulators, and also replica or desktop simulators.

Typically, the simulator setting requires an instructor to have a wider range of competences than that needed for classroom training. For example, a simulator instructor has to be able to provide both: classroom (pre-simulator) training, on-the-job (hands-on) training, and to facilitate debriefing sessions.

Briefing of a control room team is typically conducted prior to demonstration, practice or evaluation scenarios. These briefings may be conducted in the classroom or at the simulator. In most cases the instructor uses a simulator exercise guide as the lesson plan. These briefings usually cover team member assignments, plant initial conditions and immediately prior to the exercise, shift turnover and control panels walk downs by the trainees. For demonstration or training scenarios the training also includes all information about the specific scenario and any refresher theoretical, systems or components training needed to support the exercise.

Hands-on training is then provided on the simulator. The instructor may use the following methods of training:

- Demonstration;
- Practice;
- Evaluation.

It is anticipated that the attitude and professional demeanour of trainees and instructors reflect the professionalism expected in the main control room (MCR). To provide support in learning these areas, simulator instructors need to have both: an appropriate qualification and be able to demonstrate the required professional behaviours expected.

The number of instructors needed to conduct FSS scenarios also needs to be considered. Typically, one instructor is assigned to the simulator instruction station and one or more instructors to the simulator control room. For assessment scenarios, more instructors or separate assessors may be used to ensure an effective observation and critique of each control room job position. Formal assessments may not be carried out by simulator instructors.

After completion of a simulator session, a debriefing session (or post-simulator critique) is provided in order to review the trainees' performance. Post-exercise critiques and de-briefings on trainee performance represent an important form of instructor-trainee interaction at the end of the exercise.

Considering lessons learned by IAEA Member States, the following typical duties of simulator instructors may be considered but are not limited to:

- Preparing for simulator sessions, including:
 - Developing simulator exercise guides;
 - Reviewing existing training materials for pre-simulator sessions;
 - Preparing the full-scope simulator for training sessions;
 - Conducting pre-simulator sessions, including:
 - Applying different training styles in a class;
 - Preparing training materials;
 - Reviewing industrial or NPP experience;
- Conducting FSS training sessions, including:
 - Controlling the FSS;
 - Controlling a training session;
 - Applying different methods of training on the FSS;
 - Developing and conducting part-task training for trainees;
- Conducting examination sessions on the FSS;
- Performance monitoring of trainees, including:
 - Observing trainees' performances and FSS performance during a training session;
 - Evaluating trainees during a simulator session;
 - Preparing and conducting a post-simulator critique;
 - Evaluating FSS performance;
- Implementing the FSS Configuration Management Procedure;
- Participating in special operations and control of the main control room under direction from NPP management and the training manager;
- Testing of new operational procedures and methods;
- Supporting NPP emergency exercise training scenarios.

Simulator instructors can be former licenced operators, or licenced operators temporary transferred from operation department.

For example, in Romania and the UK both categories of simulator instructors are used.

5.3.2. Classroom instructor

Classroom instructors are individuals who provide training in a classroom setting on either a full-time or part-time basis. Instructor training programmes have to include relevant classroom training methods and techniques and hands-on practice of training in a classroom setting.

This title covers a broad range of instructors varying from a line organization SME working part-time as a classroom instructor using instructional materials and strategies developed by others to an individual who performs most of the duties of an instructional technologist (see Section 5.4.3).

The following typical duties of a classroom instructor may be considered but are not limited to:

- Preparing for a training session, including:
 - Participating in TNA;
 - Analysing job or task performance;
 - Defining KSA for a particular job position;
 - Developing classroom training materials;
- Conducting a classroom training session, including:
 - Managing the classroom trainees;
 - Applying adult learning principles;
 - Applying different training styles;
 - Utilizing an appropriate range of training media and techniques;
- Performance monitoring of trainees, including:
 - Observing trainees' performances;
 - Evaluating the overall training process;
- Improving training, based on feedback from trainees, training managers and leaders and NPP management.

ANNEX IX provides an example of classroom instructor competences.

5.3.3. On-the-job training instructor

OJT, or hands-on, training instructors are individuals who provide training mainly in a working environment. This kind of training may be conducted in a laboratory or workshop, on training equipment or at the actual working place of the trainee. OJT settings require specific instructor competences compared with those needed for classroom and simulator training. For example, before a hands-on session, the instructor may provide the briefing session in a classroom or in the work place. Then, the instructor conducts the hands-on exercise. The following is a typical sequence of hands-on training:

- Explanation or formal training in a classroom;
- Demonstration;
- Practice;
- Evaluation.

Guidance for OJT is given in NATIONAL ACADEMY FOR NUCLEAR TRAINING, Guidelines for On the Job Training and Evaluation, 91-006, Atlanta, Georgia (1991) [9].

ANNEX X provides an example OJT guide.

After completion of the training sessions, a trainee performance critique is provided. Finally, after accomplishing all the hands-on training sessions or course, a formal examination is conducted: a job competence assessment. This is typically carried out by an assessor who was not the training instructor.

Examples of good practice gained from IAEA Member States show typical duties of OJT instructors include but not be limited to:

- Preparing for hands-on sessions, including:
 - Developing and reviewing training and evaluation materials;
 - Preparing training tools (or equipment) needed for sessions;
- Conducting demonstration sessions, including:
 - Applying different demonstration techniques;
 - Applying the procedure and technical specification while demonstrating the operations or maintenance activity;
 - Setting clearly the attitudes and working behaviours expected;
- Conducting practice sessions, including:
 - Applying different training techniques;
 - Managing training tools or equipment used;
 - Controlling the training session;
- Performance monitoring of trainees, including:
 - Conducting evaluation sessions;
 - Observing trainees' performances and the performance of the training tools or equipment;
 - Checking the correct attitudes and behaviours are demonstrated during the task;
 - Evaluating trainees during an evaluation session.

5.4. OTHER SPECIALIST AREAS

Some training organizations have special staff, who undertakes training material development, simulator configuration management or maintenance, TNA, etc. Other member utilities integrate these duties into an instructor's day-to-day job. Lessons learned have shown that it is important to use real feedback from the NPP in order to continue to improve the delivery and effectiveness of training. Instructor participation in this continuing process is also essential.

5.4.1. Specialist SAT roles

Specialist staff may support some or all the phases of SAT depending on their individual role. An evaluation of changing skill needs to be done regularly. Based on lessons learned, typical competencies of instructors specializing in the support of SAT phases include but are not limited to:

- Analysing training needs. Include job and task/competency analysis for NPP job positions;
- Developing training objectives according to task analysis data;

- Developing instructor lesson plans;
- Developing or participating in the development of slides, films, CBT and other training aids and tools for specific training sessions;
- Analysing existing training materials;
- Providing interviews with NPP managers and leaders, training management, and job incumbents;
- Collecting and analysing training evaluation results;
- Updating and revising training programme content and supporting training material;
- Evaluation and adoption where appropriate of new training technology;
- Inclusion of operating experience feedback.

5.4.2. Simulator configuration management

Based on lessons learned, the following typical duties of instructors specializing in simulator configuration management may be considered but are not limited to:

- Managing training material configuration;
- Managing simulator technical documentation configuration;
- Managing simulator design data;
- Managing simulator modifications;
- Coordinating simulator configuration management with the NPP and training functions;
- Testing and acceptance of simulator modifications.

5.4.3. Instructional technologist

Some of the Member States use instructional technologists to provide a dedicated oversight of the application of SAT methodology.

The role of the instructional technologist may be to design, develop and evaluate training courses and instructional materials based on SAT. Other Member States utilize this role to provide an oversight of the work of instructors by ensuring SAT processes are being applied and by reviewing instructor competence. The exact responsibilities of the instructional technologist will depend on organizational requirements.

5.4.4. Knowledge management activities

As detailed in Section 4.2, knowledge management is an integrated, systematic approach to identifying, acquiring and preserving knowledge.

Training plays a key part in knowledge management. In some training organizations, for example in Romania and Bulgaria, specialist staff are used to support activities related to knowledge management.

The role of the instructor in knowledge management activities typically include, but are not limited to:

- Supporting identification of the critical knowledge;
- Participating in NPP activities and incorporating experience into training materials;
- Exchanging information with NPP experienced personnel to capture knowledge;
- Systematically capturing NPP experience in training documentation;
- Taking part in the transformation of tacit knowledge to explicit knowledge.

5.4.5. Digital learning/e-learning/blended learning

Also, digital learning/e-learning is widely used for both training and assessment. The development of digital learning/e-learning/blended learning for nuclear facility site personnel, as for all training, requires the application of SAT methodology, including selection (or development) and use of measurable training objectives and development of quality test items.

The development of training material using new technologies often requires specialist competences; these may be provided by specialist staff, often contractors, supported by qualified instructors or by developing additional instructor competences.

How this is supported varies between Member States in line with local organizational arrangements and strategies.

5.4.6. Mentors

The role of a mentor is essential to developing highly competent and motivated staff. The oversight of individual competence development by an experienced job incumbent provides not only learning guidance but also access to experience of the tasks and the opportunity for knowledge transfer. Typically, the mentor role is specialist task allocated to individual instructors. Mentors are typically used in two roles in the training organization:

- To support NPP learners in their development and to complete their qualification programmes;
- To provide support and guidance to new/less experienced instructors in their personal development.

ANNEX XI provides an example trainer classification model.

6. DEVELOPING INSTRUCTOR COMPETENCE

Safe and efficient operation of a nuclear facility relies on high quality and timely personnel training and qualification process. This concept depends on the availability of competent effective instructors.

This section sets out the identified best practice in Member States for the training of NPP instructors. The operating organization is recommended to establish a formal programme for selecting, training and qualification of instructors. All full-time instructors and most occasional or part-time instructors need to acquire instructional competences by completing a formal training programme designed for this purpose. Both initial and continuing training are needed to establish and maintain an instructor's competence. It is important to define precisely the instructor competence needed by the training organization for its short and long-term needs. SAT is recommended to be applied to this programme.

The following important criteria for instructor qualification have to be considered but not limited to:

- A high level of technical knowledge and skills;
- Good preparation for all lessons;
- The quality of the training materials being developed or reviewed by the instructor;
- The quality of lessons being delivered;
- The quality of post simulator critiques being prepared and delivered;

- Mastery of interpersonal communication skills;
- Mastery of observation skills;
- Acceptance of self-development;
- Use of reflective learning;
- Professionalism and the ability to promote high standards.

6.1. SELECTION AND RECRUITMENT OF INSTRUCTORS

There are several different approaches used when selecting and recruiting instructors, as exemplified in the US Department of Energy publication 'Guide to Good Practices for Training and Qualification of Instructors' [10] and in the National Academy for Nuclear Training publication 'Guidelines for Instructor Training and Qualification' [11]. The most common practice is to select and recruit instructors from candidates who have the relevant technical and pedagogical competences and who have sufficient credibility. In practice there are sometimes limitations in recruiting candidates with a suitable qualification. Because of national and cultural circumstances, it is possible that full-time instructors are selected from non-nuclear organizations such as universities or colleges. In such cases additional technical training will need to be provided for candidates in order to meet the qualification requirements.

Nevertheless, wherever possible it is good practice to recruit credible instructors directly from NPP departments or other nuclear facilities. Best practice shows that recruiting the best NPP staff into training roles ensures that all staff are trained to the highest standards and that the desired behaviours are role modelled.

The selection criteria for instructors need to include the required technical knowledge and skills, and also the KSA required from an instructor. These will be based upon the subjects to be instructed and the future jobs of the trainees, additionally candidates have to demonstrate the following:

- Good attitude towards training;
- Excellent communication skills;
- Aptitude for instructing;
- Extensive experience and credibility in NPP operations, maintenance or another NPP specialization being referenced to a particular category of NPP personnel;
- Keep to standards;
- Where appropriate a training qualification related to adult training, training process organization, etc.

The most appropriate qualification of instructors, an instructor training programme, is recommended to involve both: technical and instructional training. The balance between technical and instructional training will vary from individual to individual depending on their experience and existing competence.

Part-time or occasional instructors are selected based on their specific requirements which may be different to those needed for full-time instructors. Occasional instructors are typically highly technical professionals with a narrow specialization, so that they may need only instructional training in order to be able to provide training sessions in relevant training environments.

Each training organization establishes its own requirements for the selection, recruitment and training of instructors. Such requirements have to be included in the training administrative procedures or guides.

6.2. INSTRUCTOR TRAINING PRINCIPLES

As for all NPP personnel, instructors have to pass through a formal initial and continuing training programme. Initial training programmes need to be derived from a job task analysis and task or competency analysis. Continuing training programmes is recommended to be derived from an appropriate TNA, feedback from NPPs and training performance, and other inputs as defined in the following sections. Some training organizations use contractors to define instructor competences.

ANNEX XII provides an example of instructor job analysis.

An instructor training program may be implemented in different ways. It may be fully implemented by the NPP's training organization. Alternatively, where it exists, a central training organization or centre may be responsible for the training of all or some categories of instructors. It may be cost effective to use a contractor or university to provide training for some categories of specialized instructors.

Whatever the approach used, an instructor training programme is recommended to be developed using a SAT based methodology and to be derived from TNA.

The following approach may be applied when an instructor training programme is to be implemented within the NPP training organization:

- Conduct a TNA for the roles to be performed;
- Select the instructors to be trained;
- Conduct an instructor competence analysis;
- Carry out a gap analysis to develop a specific instructor training programme based on a task or competency list and provide training solutions;
- Train the selected instructors;
- Monitor the implementation of the instructor training programme;
- Evaluate the trainee, instructors and their training programme.

Cultural and other human-related aspects have to be considered when developing an instructor training programme to meet the specific needs of the facility.

6.3. INSTRUCTOR TRAINING

6.3.1. General approach

In general, each training organization has its own approach to instructor training which is best suited to meet the organizational, technical and cultural needs of each NPP. Best international practice shows the aims of instructor training to be:

- Provide initial technical training appropriate for the training programmes and subjects that are to be taught. This aim needs to be achieved prior to entering an instructor training programme;
- Provide the necessary training in the application of SAT methodology;
- Provide basic instructor training (BIT) to meet the expectations regarding fundamental instructional competences for all instructors. This may be achieved during an initial generic instructor training programme;

• Provide training relevant to the specific training modes and training settings. This aim is to be partially covered within the instructor initial training and then fully developed both during OJT and within instructor continuing training programmes.

The following main principles may be employed for the development of instructor training programmes.

6.3.2. Sequenced structured approach

The training programme is recommended to be based on training needs and job descriptions developed using, as appropriate, JTA or JCA for instructor positions. Task-to-training matrices may be used as a cross-reference.

An individual training programme for each instructor being trained has to be sufficient to qualify that candidate for the job after satisfactory completion of the entire training programme. An effective training programme needs to meet the expectations of the training department, the NPP and the candidate. A typical individual programme is recommended to include:

- Necessary technical competences (built from appropriate education, training and experience) shall be acquired;
- Training modules logically structured and sequenced in distinct parts or modules of the training. Best practice shows that a modular structure to the training programme will allow time to obtain reliable feedback from the training and to adequately control the training process. A modular structure allows a flexible training programme to be established to meet specific and individual needs;
- Specific specialized instructor training has to be delivered only after BIT;
- It is necessarily that each theoretical part of training is supported by practical OJT and independent work under close supervision by experienced instructors;
- Instructor training programmes is recommended to include the principle of Continuing Professional Development (CPD). Individual programmes of CPD for the instructors have to be established and implemented.

A typical example of an instructor training program content is provided in ANNEX XV. This example covers only the instructional part of an instructor training program, the technical aspects to be implemented in accordance with selected approach as above.

6.3.3. Initial instructor training

Instructors have to complete initial training through a training program designed for this purpose. Typically, the scope of initial training depends on the responsibilities of the training organization and the specialty of the instructor but will include some elements of generic instructor training. The initial training needs to include but not be limited to:

- Technical training;
- Instructional training;
- Specific specialist instructor training.

An example of an initial training programme for an instructor is given in ANNEX XIII.

An example of the OJT part of an initial training programme for instructors is given in ANNEX XV.

6.3.3.1. Technical training

Instructors need to have a comprehensive theoretical, as well as practical, understanding of all the aspects of the subjects they teach and the relationship of the subject to facility performance.

Usually, requirements for technical competences are identified when a training department is established and instructor job descriptions have been finalized, where possible candidates are selected with the appropriate technical skills. Where technical training is required a variety of approaches and a combination of methods can be employed to satisfy the requirements for technical competence development.

Where instructors do not have the necessary technical experience, it is recommended that they meet all the training qualification requirements for the NPP positions they are to train. For example, a simulator instructor has to be trained and qualified to the level of a reactor operator.

Generally technical skills need to be developed before instructional training is undertaken, although progress through this depends on the Member State and may be completed in parallel.

All instructors are recommended to participate in continuing training programmes, which include the maintenance of technical competency in relevant areas; in some Member States the latter is subject to national or local regulations for instructor competence.

6.3.3.2. Instructional training

Instructor training generally comprises of two levels: initial and advanced. The content of initial instructor training programmes is typically generic in nature and is undertaken by all instructors joining a training organization. The content is based on defined instructor competence built into a training programme on the fundamentals of training techniques; this would typically address the role of the instructor and elements of instructional skills.

As instructors are developed further into their allocated roles specific training is provided and where appropriate more detailed instructional training is also undertaken and an understanding of learning theory and behavioural aspects of competence are developed.

Content of these training programmes varies considerably between Member States and is developed to meet the specific needs of the NPP that the training organization supports. This requires a deep understanding of the technical and cultural aspects of the plant.

After successful completion of initial training, including all the necessary tests and examinations, a candidate is regarded as successfully passing formal training. However, before formal acceptance by an instructor qualification panel, or a similar board, a candidate needs to receive formal OJT, working as an ordinary instructor but under close supervision of training supervisors or experienced instructors. This OJT may take some time; in some Member States it takes approximately from 4 to 20 weeks depending on the abilities of the candidate and national requirements. Where technical competence development is also required this may take considerably longer.

An instructor may be assigned to one or more duty areas based on the instructor specialization and experience. They can perform training activities in one or more duty areas once qualified while working towards additional specific qualifications in other areas.

6.3.3.3. Specialist instructor role training

On completion of the generic instructor training individuals undertaking specific training roles will need to be trained in the specific competences required. Individual training programmes developed systematically will identify these requirements.

Depending on the scope and responsibility of the training organization, specific instructor training is to be developed and delivered as required, for example:

- Using information and communication technology, blended learning in training and developing CBT materials;
- Conducting OJT (see Section 6.3.3.5);
- Simulator instruction (see Section 6.3.3.6);
- Laboratory and workshop instructor training is similar to the one above, but deals specifically with laboratory and workshop training. The course duration is usually of one week;
- Management and leadership training.

6.3.3.4. Part-time instructor training

Part-time or occasional instructors may not require the full training programme, and therefore, only basic training is required. These individuals often conduct training under the guidance and supervision of experienced trainers. Specific training is necessary to for these individuals to equip them for the role. This programme may be limited to the particular instructional techniques used for classroom training.

SMEs need to receive sufficient training, coaching and monitoring from qualified instructors to enable them to effectively conduct the identified training activity. This coaching can be provided separate from instructor training program. If SMEs are expected to instruct classes on a routine basis completion of applicable portions of instructor training programmes may be required.

Note: SMEs will include operators, engineers, technicians, scientists, trainers, event analysts, work planners, etc. who have knowledge, information or experience relevant to the processes under study. SMEs may, therefore, only be used to provide technical support to qualified instructors developing training material and require no formal instructor training or qualification.

6.3.3.5. On-the-job trainers

Individuals will provide OJT as a specialized role which does not require the full range of instruction competence. These individuals typically conduct and supervise OJT, walks-through and facility tours.

Specific training as an 'OJT instructor' typically of one week or less in duration is provided to in-plant personnel who are designated as responsible for conducting OJT. This training is recommended to include:

- Specific knowledge and skills in OJT training process management;
- The principles of OJT delivery, monitoring, observation;
- Development of OJT training materials, including qualification cards or OJT checklists;
- Evaluation of trainee performance;

- Assessment of trainees;
- Any theoretical and hands-on training required.

6.3.3.6. Simulator instructor training

Instructors who provide simulator-based training for operations personnel are recommended to have additional training in the operation of the simulator. This training has to include both operation of the simulator and its use as a training and performance assessment tool. The instructor needs to learn to operate the simulator (initialize, freeze, snapshot, etc.), to insert malfunctions, to understand the boundaries of fidelity of the simulator and to operate equipment used in support of the training session, e.g. video cameras, recording equipment. Unique aspects associated with simulator training, which included in the instructor training programme, are relevant to:

- Development of diagnostic skills;
- Teamwork within the shift;
- Observation of trainee performance and providing feedback;
- Development of simulator exercise guides (scenarios);
- Use of operating experience in simulator training;
- Use of human performance techniques;
- Performance of effective simulator exercise briefings and post-exercise critiques;
- Instructors are recommended also to possess appropriate competence in performance evaluation and improvement.

6.4. APPROVAL OF INSTRUCTOR COMPETENCE

The NPP training manager, or manager of the relevant training organization, in conjunction with other appropriate individuals, has to receive evidence that an instructor:

- Is technically qualified to present the material. Approval of such technical competence is recommended to be based on a demonstration of the appropriate technical KSA in the subject area(s) to be taught by the instructor;
- Has the instructional skills to perform training tasks as needed for a specific job position. Approval of KSA in instructional techniques needs to be based on demonstrated performance of training tasks for the specific instructor position;
- Demonstrates the desired organizational values and behaviours to support effective training delivery.

The final evaluation of all instructors is based on performance by observing a number of training sessions. Successful completion of instructor training programmes and appointment of instructors to their role have to be recorded formally in an instructor register or equivalent.

6.5. CONTINUING TRAINING

It is recommended to establish continuing training programmes to maintain, improve and advance both: the technical and training competences of qualified instructors. The continuing training programme for instructors needs therefore to consist of two elements: technical training and instructional skills training, as outlined below.

6.5.1. Continuing training for maintaining instructional skills

Continuing training for maintaining instructional competences aims to improve and advance the instructors' performance and typically includes:

- Refreshment of initial training topics;
- Acquiring knowledge and skills in the application of new training methods and technology;
- Use of advanced training tools and aids;
- Changes in training-related regulations or procedures;
- Operational experience in relevant areas.

Training content is also recommended to be based on feedback from regular observations and assessments of instructor performance and from evaluation of training programmes.

6.5.2. Continuing training for maintaining technical skills

The purpose of this training is to maintain technical qualification and familiarity with job requirements, facility changes, operating experience, technical documents, etc. Instructors need to maintain their job qualification by fully participating in the continuing training programme in the area of expertise for which they are providing instruction.

Instructors are recommended to periodically work in the facility in the discipline for which they are qualified and for which they instruct trainees. Time during scheduled outages may be used for this purpose. In the case of simulator instructors, for example, this in-facility time is necessary to be on-shift and include activities such as shutdown and start-up associated with facility outages (observation of activities, or if permitted to perform these activities).

Many operating organizations periodically rotate technical instructors between the training function and the NPP or assign plant personnel to the training staff for periods from one to three years.

6.6. MONITORING AND ASSESSMENT OF INSTRUCTOR PERFORMANCE

To monitor and assess instructor performance, appropriate assessment and performance monitoring procedures have to be implemented. These procedures concentrate on the following:

- Formal assessment of instructors (including, if relevant, assessment by a Regulatory Body, the NPP, human resources management, etc.);
- Periodic evaluation and coaching, feedback from other instructors, the NPP, etc.;
- Instructor's evaluation made by trainees, usually provided at the conclusion of a training course;
- Instructor's evaluation made by training management, normally undertaken regularly and in accordance with a formal procedure.

Instructor training programmes is monitored and formally evaluated for effectiveness, typically through training committees.

ANNEX XVI provides an example of instructor assessment criteria.

6.7. REMEDIAL TRAINING

Where instructors do not meet the required instructional or technical competence standards, remedial training will be provided to correct any shortfalls.

Remedial training is specific and target to the individuals' needs. This training may include, but not be limited to:

- Applying new training methods;
- Using new training equipment or tools;
- Use of instructional techniques;
- Updating skills in training analysis and development;
- Updating skills to monitor or evaluate trainees' performance.

Where remedial training for technical skills is required, this necessarily needs to be agreed with the NPP and provided in an appropriate location.

7. INSTRUCTOR PROFESSIONAL DEVELOPMENT

As with other NPP roles the CPD of training instructors is essential to the provision of a training function that is able to support NPPs achieve safe and reliable operations. This section provides an overview of best practice across Member States in instructor CPD.

Training managers and leaders that are recommended not only provide a programme for the training and qualification of instructors in technical and teaching abilities, including those who provide training in the facility, but also maintain adequate arrangements and support systems to ensure CPD is effective. Instructor CPD arrangements are usually in addition to the normal requirements of instructor continuing training programmes.

Sufficient time is necessary to be allocated for instructor development activities. A recognized good practice is for about 20% of instructor working hours to be allocated for instructor professional development.

It is important to recognize that recruitment and retention of high quality training staff can be challenged by a lack of career progression and personal development opportunities, remuneration arrangements and by the perceived status of training roles. It is the role of training management to have effective arrangements in place to sustain a high-quality training function that attracts high quality instructors.

Instructors' career paths have to take into account the individual's professional evolution in the job. Individual development plans for technical, and non-technical competence need to be developed for this purpose taking into account the needs of the operating organization, the training function and the individual.

7.1. METHODS OF UPGRADING PROFESSIONAL CAPABILITIES

The CDP of instructors can involve a range of formal and informal activities; by nature, these are specific to everyone's personal needs and ambitions. However, activities that instructors can be involved in to upgrade their training and personal capabilities will typically include but not be limited to coaching, mentoring, self-study, professional qualifications, introduction of new training techniques and methods, and other professional development.

7.1.1. Coaching

Coaching consists in helping new instructors during their learning phases by providing advice, exchanging pedagogical or technical information and routinely mentoring the new instructors. Instructors may need support and guidance to develop effective coaching competences.

7.1.2. Mentoring

Instructors are able to take responsibility for the professional development of other, usually new instructors or those who are changing their responsibilities. This activity is wider than the coaching role in that the mentor takes a wider responsibility for assessing the development needs, allocating activities, overseeing and assessing progress with the learner.

7.1.3. Self-study

CPD opportunities and environment may need to be adapted to meet the availability of instructors. For this reason, self-study solutions utilizing advanced training tools may be an alternative method in order to improve the knowledge of personnel and the availability of development opportunities within normal working patterns.

Efficient self-study may also require specific technical or SME support for the instructor and continuing monitoring of progress.

7.1.4. Professional qualifications

Instructors are often selected and recruited based on their technical competence as well as their potential as instructors; consequently, they may have no formal training qualification. Where appropriate, internal and/or external instructor qualifications are available, it would support individuals to pursue formal qualifications in the training field.

Management support is necessary to ensure instructors are able to commit to and complete this development.

Professional qualifications are available through a range of media, either by attending formal programmes or through self-study. Modern technology offers an increasing range of development options through what was been traditional identified as 'distance learning' where the trainee receives materials to study, learns the content and completes assigned exercises for assessment. Technology is evolving quickly and options need to be considered based on availability, commitment required to complete and, in particular, the individuals' personal preferences and circumstances. These 'blended learning' solutions may include one or more media including: video, audio, web-based, computer-based and virtual technology, etc.

7.1.5. Introduction of new training techniques and methods

The training environment may need to be adapted to new training equipment, new plant systems or equipment, or revised organizations or job positions at the NPPs. For these reasons improvements are required in terms of training methods or training programme content. This provides development opportunities for training staff to widen their areas of competence or to provide SME support.

Some examples are:

- New mocks-up with or without detailed job environments to provide practical, behavioural and supervision training opportunities;
- Training games to demonstrate interfaces between different services (maintenance, operation, safety departments, etc.);
- New part task or FSSs;
- Modern technologies provide huge potential for changing the learning environment. Opportunities to develop competence in these areas or to evaluate and introduce these technologies are recommended to be available within the requirements of the organization.

7.1.6. Other professional development

Other CPD options include:

- Attending conferences in the area of teaching techniques and new technologies;
- Conducting benchmarking activities;
- Supporting international 'expert' working groups;
- Attending management development training programmes;
- Attending human performance improvement training courses;
- Observing peer instructors;
- Validation/testing and promotion of new plant procedures;
- Analysis of work practice changes resulting from changes in plant equipment or job tasks.
- Adult learning models

7.2. CAREER PROGRESSION FOR INSTRUCTORS

NPPs and training organizations frequently face difficulties in recruiting instructors especially from an operations department where individuals have enhanced pay from shift work patterns. This applies, for example, where an operator or shift supervisor is required as a simulator instructor; this also applies to other instructor technical disciplines. Individuals may also have concerns about the job position that they will be offered on returning to the NPP or that the appointment into training is permanent. Consequently, individuals may have a greater interest in keeping their job positions at the NPP than to have new job positions as instructors.

Training organizations need to ensure that they are able to recruit and retain high quality instructors; this is significantly influenced by the career progression opportunities that are provided within the instructor's role. NPP's and training organizations have to have strategies to support this.

7.2.1. Career progression opportunities for instructors

Progression opportunities for instructors need to be available either within the training function or as a result of the training experience they have gained.

Options to be considered for instructors in training positions include but are not limited to:

- Maintaining the same salary or, where instructor salary is less than the NPP role gradually decreasing it over a period of time. For example, shift pay reduced over a period of 2 to 3 years rather than immediately;
- Compensating lower pay by offering interesting opportunities, such as involvement in international training projects;

- Providing instructors with a job position having a level of responsibility that will be the same as if they had kept their job position at the NPP;
- Similarly offering opportunities to participate in international exchanges (IAEA meetings or working groups, WANO meetings or peer-reviews);
- Offering opportunities to participate in national or international projects;
- Providing the instructors with additional (e.g. Human Resources) competences;
- Providing opportunities to broaden instructors' skills by involvement in other areas of training (cross-training);
- Offering opportunities to complete externally recognized training qualifications.

Options to re-integrate instructors at the NPP after spending time within a training organization to be considered as solutions:

- Establishing local arrangements between the NPP(s) and training organization(s) or centre(s) to formally recognize the added value of having experience as an instructor and to identify increased levels of responsibilities for future job positions;
- Providing role progression to rotated instructors on their return to plant. For example, an individual is identified for promotion in the plant, as part of that promotion they undertake a period as a simulator instructor;
- Providing instructors with job positions in which they can take advantage of their training background (management or expert job positions).

7.2.2. **Progression within the role**

As described in Section 6 instructors will have a range in tasks allocated to them and will be required to develop the appropriate competences to support these. These tasks can be used to define the level at which an instructor works and therefore the recognition and salary an instructor receives. These levels can be used to reward career progression of instructors both across and within specific appointments, for example an instructor taking on extra responsibilities for leading training events or programmes etc. or mentoring new instructors can be promoted within the post.

ANNEX XVII provides typical levels of instructor progression.

Implementing progression arrangements of this type provide real opportunities for instructors which will help to recruit and retain them. Effective progression arrangements also support the ongoing development of the training organization itself and the quality of service it is able to provide.

7.3. INVOLVEMENT OF INSTRUCTORS IN NPP ACTIVITIES

Whenever possible, it is important to involve instructors in NPP activities while they hold roles in the training organization. The frequency and the duration of these activities will be different from one Member State to another according to the needs of the individual, the specific job position and NPP circumstances.

For example, the frequency or duration may be:

- A specific number of days per month;
- Weeks per year;
- A percentage of working time.

The amount of involvement in plant activities will also depend on the duration of the assignment. In the case of long term assignments, it is important for the instructor to have regular involvement in NPP activities so that he/she is able to maintain and update his/her plant competences. In the case of a short-term assignments, the involvement could consist in preparing for the future job position.

Some examples of NPP activities are as follows:

- Participating event analysis in order to identify any training needs;
- Identifying and responding to NPP training needs or training requests;
- Participating in performance analysis;
- Cooperation in-facility projects teams;
- Performing their job position at the NPP;
- Replacing unavailable personnel at the NPP, if and when needed;
- Participating in operation activities during refuelling/outage at the NPP;
- Participating in working groups at the NPP (advices, councils, analysis of job activities);
- Participating in observation and coaching of NPP staff;
- Root cause analysis team member;
- Gap analysis team member;
- Knowledge transfer activities.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1. CONCLUSIONS

The following general conclusions have been developed based on the content of this publication, the responses to the Member State questionnaire and examples provided by those Member States. Conclusions are categorized against the specific sections of the report.

8.1.1. Role of managers and leaders

The ultimate responsibility for training of personnel is widely recognized as that of the line organization (i.e. with the operations, maintenance, engineering and other departments). Most facilities have a training policy and administrative control procedures that assign responsibility and delineate requirements for the selection, qualification and training of instructors. Overall training programmes are typically managed through training review committees and are approved by line managers and leaders for their organizations; managers and leaders routinely observe the conduct of training. The training review committees, with representatives from the line and training organizations, are typically used by Member States to assure the relevance and technical content of training programmes. Where central training organizations are used, good communications and clear lines of responsibility with the facilities are established. Often specific arrangements are put in place to maintain instructors' technical knowledge and awareness of current of plant conditions.

It is generally recognized that in order to ensure the highest quality of training and therefore competence of facility staff the best individuals have to be selected into training roles. It is recommended that instructors have both: technical and training skills, and be able to be a role model to learners. Consequently, almost all Member States, as a first choice, recruit their instructors from an NPP and train them to be instructors. Where individuals are recruited from other sources, such as universities, technical as well as instructor training has to be provided.

The selection of high quality instructors is supported in some Member States through formal administrative procedures.

8.1.2. Role of instructors

The detailed role of instructors varies between Member States, although instructor tasks fall into typical categories. Full-time instructors are generally involved in the implementation of a range if not all phases of the SAT processes. The use of SMEs from facilities to develop and deliver training is a common practice and helps improve the quality and relevance of training. Instructors may also be involved in other plant activities such as refuelling outages and event analysis, the role of the instructor in knowledge management activities has also become a more significant. Instructor knowledge and skills, with associated qualifications, are maintained by participating in the continuing training programmes for their discipline, periodic work assignments in the plant, or in some cases by maintaining their operator licence/authorization from the regulatory body. This practice helps maintain an instructor's credibility with plant personnel.

8.1.3. Categories of instructors

Most facilities use a combination of full-time, occasional (or part-time), and contracted instructors. Full-time instructors are generally qualified to support training activities across the full range of SAT activities and may provide training in a range of training settings, while the occasional or contracted instructors are typically used in specific training settings (i.e. classroom, laboratory, etc.). OJT is typically conducted by plant personnel who receive appropriate training on how to conduct this type of training.

8.1.4. Developing instructor competency

Member States have established initial and continuing training programmes for instructors using the SAT process and are typically based on a job or competency analysis. Most Member States have generic initial instructor training programmes supported by task specific training courses for classroom instructors, simulator instructors, laboratory instructors and OJT instructors. Courses are typically one to two weeks in duration, specific training for the use of training tools and equipment e.g. simulators and the supporting instructor OJT may take considerably longer. The courses are usually developed and delivered by the training organization (central or facility training organization) and in some cases, it may be provided by external suppliers. The use of technology, particularly in the range of media and simulation now available is an area where instructor training is evolving.

8.1.5. Instructor professional development

Member States either recruit and assign instructors as permanent instructors or provide for shorter term assignments (six months to several years). In either case, opportunities for CPD are usually provided. Many Member States require or encourage assignment or rotation of facility personnel through the training organization as a prerequisite to further advancement. This is considered to be a good practice because it provides the training organization with current subject matter expertise and credibility. Individual's plant knowledge and skills is also greatly enhanced. Many Member States also note that such personnel are more likely to be promoted due to their improved communication and interpersonal skills gained as a result of their experience in the training organization. The effective recruitment of instructors and the development of an effective training organization require motivated staff, who have current plant knowledge and feel valued in their role.

8.2. RECOMMENDATIONS

8.2.1. Role of managers and leaders

Training of personnel is one of the best ways to ensure management's expectations for technical knowledge and that positive attitudes in plant workers are developed. Good training and high-quality instructors also promote and improve safety culture. Managers and leaders have actively support and take ownership of their training programmes. Direct involvement in training activities, setting of expectations and adequate resourcing of training are essential. It is necessary for facilities to consider establishing standards or practices for periodic and planned review, approval and observation of training. In most Member States line managers and leaders are involved in training and routinely participate in the selection and assignment of instructors to the training organization.

8.2.2. Recruitment and retention of instructors

Facility personnel's training is highly dependent on the availability of competent instructors. However, in most Member States, an assignment to the training organization often results in lower pay and benefits then a job at the plant. It is important that training staff are not disadvantaged by an assignment to training. Plant management have to consider methods to remove this disincentive. For example, incentives such as providing comparable compensation or bonuses, more professional development opportunities or making training assignments a career path for promotions may be possible to implement, depending on individual country employment requirements or practices.

8.2.3. Development of part-time/occasional instructors

This is an increasingly important role in the provision of an effective training function. The use of high quality experienced facility and external staff to support full-time instructors provides a balance of specific training expertise with current credible technical expertise. The use of part-time instructors also provides a more flexible resource to meet the demands of the facility. Part-time instructors training programmes ensure that these individuals are fully equipped to provide training at a level appropriate to their role. As in many Member States use has to be made of this type of instructor.

8.2.4. The role of the modern instructor

Technology is evolving rapidly and increasingly change and innovation are becoming part of normal business, the role of the instructor needs to change with it. New generations of recruits into nuclear facilities have grown up in a world based on technology, training functions need to adapt to this. Learning styles are changing and the range of learning media available is growing. Instructors need to be developed and supported through these changes to be able to review and assess learning media and adapt it to the needs of the business. An increasing emphasis on knowledge management will also involve the training organization instructors in ongoing and new activities. Instructors are uniquely qualified to gather 'undocumented' worker knowledge and skills from workers before they retire, this capability is recommended to be developed.

8.2.5. Learning technology

Training functions need to have the capability to utilize modern technology to gain full advantage. Managers and leaders will need to provide resources to assess and incorporate new

technologies into the learning organization. Where a range of learning media is available, 'blended learning' solutions are evolving. Instructors may be required to support self-learning material through tutorials and focused learning interventions; this is a significant change from traditional delivery skills. NPP management will need to provide resources for the continuing training of instructors and their professional development to reflect the learning technology to be used by that organization.

APPENDIX I. SURVEY MONKEY - MEMBER STATE QUESTIONNAIRE

TABLE 2. MEMBER STATE QUESTIONNAIRE Image: Comparison of the second second

Question #	Question	
Q1	Contact information	
Q2	Who is responsible for training activities in your utility/country?	
Q3	How is training organized in your Utility/Country?	
Q4	Is the role of instructors included in your training policy?	
Q5	Are there national standards or norms regarding identification, selection and training of instructors in your utility/country?	
Q6	Who is responsible for, and who coordinates instructor training in your utility/country? Please explain the interfaces.	
Q7	Do you use occasional (part-time) instructors?	
Q8	What categories of instructors are used in your utility/country?	
Q9	Does the training organization have a direct relationship with the regulatory body in your utility/country?	
Q10	Describe any direct relationship between the training organization and the regulatory body in your utility/country.	
Q11	Do you have a policy of rotating/seconding instructors from NPP's? If yes, please describe your policy/arrangements. If rotated/seconded instructors (full-time) are used, what is typical period of rotation?	
Q12	Where are your instructors recruited from?	
Q13	If you use different sources when recruiting instructors, what are the approximate percentages?	
Q14	Describe your recruitment process. Also, what, if any, are the roles of training and/or NPP managers in the recruitment (of instructors) process? Please describe. Provide any existing procedures.	
Q15	What formal entry level requirements exist when recruiting instructors in your utility/country? Please provide with example.	
Q16	How many instructors per year do you recruit? Please use multiple answers if your utility/country is in different phases.	

TABLE 3. MEMBER STATE QUESTIONNAIRE

Question #	Question	
Q17	What are your experiences of recruiting instructors? Please describe the problems and any solutions you have developed.	
Q18	Describe any specific incentives to recruit instructors, e.g. financial promotion in your utility/country. Provide a summary comparison of salaries/grades for differences between instructors and between instructors and NPP staff (e.g. is there a difference between instructors' wages and their comparably competent NPP colleagues?).	
Q19	What kind of instructor task/job/competence lists do you have? Please provide with documents to L. Halt.	
Q20	In your utility/country, what are the roles/typical duties of instructors? Please try to do a ranking (1-7) below.	
Q21	Do you have formal training programmes for instructors? Please provide programme summaries/curriculum to L. Halt.	
Q22	Describe your process for integration of a new instructor into the training organization. Please provide any formal programme/procedures to L. Halt.	
Q23	Please describe, what kind of requirements you have for any organization or individuals who provide instructor training.	
Q24	What are your arrangements or process for initial authorization/certification of instructors? Are there any differences for different staff groups? Please provide samples of the following to L. Halt.	
Q25	What is the process in your utility/country of defining any new competences needed by instructors, e.g. new simulator, new training tools, techniques, instructor broadening?	
Q26	How and how often do you evaluate the performance of instructors? Please provide details of any procedure or proformas used.	
Q27	Do you monitor/set targets for any instructor performance parameter e.g. % time providing training, number of lessons developed/year, % time self-development?	
Q28	What are the key responsibilities of each category of instructor in the SAT process as used in your organization (e.g. in each of the 5 phases)?	
Q29	What is the typically situation for instructors in your utility/country? Do they return or transfer to NPP's after a period of time in training? Please describe.	
Q30	What are the arrangements for the rotated/seconded instructors NPP related training in your utility/country? Please describe below.	

(cont.)

TABLE 3. MEMBER STATE QUESTIONNAIRE

Question #	Question
Q31	What job positions are typically proposed for an instructor returning to an NPP in your utility /country? Please describe.
Q31	What job positions are typically proposed for an instructor returning to an NPP in your utility /country? Please describe.
Q32	Is experience in the role of instructor identified as a desirable for other roles in the organization?
Q33	Please describe any specific training strategy or projects regarding first type of NPP in country, first type of NPP or Major modifications.
Q34	What kind of techniques and tools are used within your utility/organization?
Q35	What are the challenges in your organization using new techniques and tools?

(cont.)

APPENDIX II. CODE ELEMENTS FOR COUNTRY NAMES

TABLE 4. ABSTRACTED FROM ISO-3166 PART 1 (1997)

AM	Armenia
BG	Bulgaria
BR	Brazil
СН	Switzerland
DE	Germany
EG	Egypt
FI	Finland
GB	United Kingdom
HU	Hungary
KR	Korea [*]
MY	Malaysia
MX	Mexico
РК	Pakistan
RO	Romania
RU	Russian Federation
SK	Slovakia
SE	Sweden
TR^*	Turkey
UA	Ukraine
US^*	United States of America
ZA	South Africa

* modified according IAEA's recognized country names and abbreviations

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GLOSSARY

Aim - In training, an alternative term for terminal objective. See terminal objective.

- Analysis (1) The fourth level in the cognitive domain or knowledge Area that involves breaking down an idea into its constituent parts and examining their inter-relationships.
 (2) A method of subdividing a problem to be able to make decisions; examples are algorithms, network analysis, critical path analysis.
- Analysis phase The initial phase in the systematic approach to training (SAT) that serves as the foundation for training programme design, development, implementation and evaluation. The analysis phase assesses performance requirements or deficiencies, to be able to identify the competencies, in terms of knowledge, skills and attitudes, needed for an individual or group to effectively and efficiently perform the job or jobs being analysed. See *systematic approach to training*.
- Aptitude The ability to learn when given the opportunity and suitable training, also the inherent (or learned) ability to do something. See *ability*.
- Assessment A structured activity by which the knowledge and/or skills and/or attitudes of an individual are measured using one or more methods. The exact purpose of assessment (confirming competence, predicting future performance, etc.) determines which assessment method is used. Assessment is conducted at the end of a training session or course or entire training programme to determine the extent to which trainees have met the training objectives. See *knowledge*, *skills*, *attitudes* and *assessment method*. See also *evaluation*.
- Assessor An individual, assigned for conducting an assessment, who is fully qualified at, or above, the level to be attained by the trainee in the area to be assessed. See *Assessment*.
- Attitudes The observable characteristics of individuals resulting from their personal emotions, values and feelings that determine ways in which they interact with others and their work, and so affect their interpersonal relationships and approach to their job and safety issues. Together with knowledge and skills, Attitudes provide the full requirements to competently undertake a given job or task. Attitudes are sometimes termed Affective Abilities. See *affective domain, interpersonal ability, knowledge* and *skills*.
- Audio-visual A description of materials or systems that use both sound and vision. An audio-visual presentation uses, for example, audiotapes with slides, videotapes or films as the medium.
- Authorization The granting of written permission, by an appropriate authority, to perform specified work or a document granting such permission. See *certification*, *licence* and *licencing*.
- **Basic principles simulator** A simulator that illustrates general concepts, demonstrating and displaying the fundamental physical processes of a facility. This type of simulator can provide an overview of facility behaviour or a basic understanding of the main operating modes. The simulation scope focuses on the main systems; auxiliary or support systems are often not simulated, or are simulated in a very limited way. The main goals using of a Basic Principles Simulator are to help trainees understand fundamental physical processes, basic operation of complex systems, and the overall operations of a facility. See *simulator*.
- **Basic training (**also termed **fundamental training).** Training that provides knowledge, skills and attitudes for basic competence (e.g. for a mechanic or electrician) that is not job or facility specific.
- **Behaviour** The observable and measurable activity of an individual or group. In the behavioural approach to learning, behaviour is the primary component of an objective. See *behavioural approach* and *training objective*.
- Blended learning Learning that utilizes a 'blended' solution of learning media which typically includes elements of CBT, self-study and tutorials etc.

- **Certification** In some training practices, the process by which an authoritative organization/body provides written endorsement of the satisfactory achievement of competence of an individual. Certification can follow the satisfactory completion of a performance based training programme or of a theoretical course of study. In other practices, this process is termed Qualification. See *qualification*.
- **Classroom training -** A training setting in which lectures and discussions are led by an instructor, normally with formal seating in a lecture room. Classroom Training is an example of Off-Job Training.
- **Coaching** Providing a trainee or trainees with guidance and feedback, primarily on learning methods, to encourage the successful completion of a task. Coaching normally helps trainees to adopt a new technique or to master an existing one. See also *mentoring*.
- Competent Adequately qualified for a job or task.
- **Competence (competency) -** (a) The ability to put skills, knowledge and attitudes into practice in order to perform activities or a job in an effective and efficient manner within an occupation or job position to identified standards.

(b) A combination of knowledge, skills and attitudes in a particular field, which, when acquired, allows a person to perform a job or task to identified standards. Competence (Competency) may be developed through a combination of education, experience and training.

(c) A term 'competency' is also used for a generic task or a function (e.g. for nuclear facility manager jobs).

- **Computer based training -** Computer-delivered training involving interaction between a computer and a learner in which the computer provides data or questions and the learner responds. See also *E-learning*.
- **Continuing Professional Development (CPD)** Following the successful completion of an individual's initial training programme and appointment to a job position, a structured programme of additional education, experience and training; this normally continues throughout the working life of an individual to enhance that individual's competence and opportunity for career advancement.
- **Continuing training -** A systematic training programme, provided after initial training, which is necessary to maintain and enhance competence for a particular job. Continuing training includes the consequences of equipment modifications and procedural changes, and lessons learned from internal operating experience and relevant external experiences. See *initial training* and also *refresher training*.
- **Course (training course)** A segment of training addressing a particular area or group of topics. A Training Course is made up of several instructional units or training modules; several courses comprise a programme. See *instructional unit and module*.
- Curriculum A set of subject areas covered within a specified course of study.
- **Debrief -** A review after an activity of the activity itself and the outcomes, comparing the performance and actual outcome with the expectations. In training terms this enables the instructor and trainee to evaluate the activity and learning experience as well as the outcomes. In training this is also termed *postactivity* (assessment, exercise etc.) *brief.* See also *brief.*
- Demonstration The performance of a task or sequence of actions during a training or assessment session.
- **Design phase -** The second phase of a systematic approach to training in which the outcomes of the Analysis Phase are used to prepare specifications for training programme development and implementation: the design phase includes determining expected trainee entry level competence, identifying training objectives, developing test items and tests, selecting training settings and developing training programme description.
- **Development phase** The third phase of a systematic approach to training, following the Design Phase, that involves establishing learning activities; selecting training methods, modes and media; reviewing and selecting existing course materials; developing new training and assessment materials; developing and ensuring instructor competence; reviewing, piloting, validating, improving as necessary and approving training material and tests.

- **Diagnostic skill** The ability to analyse and evaluate a condition or situation and, if required, identify appropriate action. Although the word skill is used, inferring working only within the psychomotor domain, much of the work is in the Affective and Cognitive Domains. See *ability, analysis, evaluate, affective domain, cognitive domain* and *psychomotor domain*.
- **Discussion** A guided conversation between trainees with direction provided by an instructor or group leader, often as a facilitator; discussion is typically used as a training method in a classroom situation with a small group of trainees.
- **Distance learning -** Learning undertaken under conditions where the learner and instructor are separated by distance and/or time. Distance Learning may involve the use of computer systems, the Internet, radio or television broadcasts, video presentations and correspondence courses, even library books.
- **Duty -** The obligation, moral and/or legal, stated or implied, to perform a particular activity such as a job or task. Duty is often, incorrectly, used where Task Element, Task or Job is the proper term. See *job*, and *task*.
- **Effectiveness (of training)** An indication of improved facility performance and/or human performance resulting from trainees participating in the training. Not to be confused with Efficiency of Training. See *efficiency of training*; see also *suitability of training*.
- E-learning (a) Services which are delivered, enabled or mediated by information and computer technologies for the purposes of conducting education or training; and the technology and services which help create, manage and deliver those activities.
 (b) The learning process error of huminternation with digitally delivered content, convices and support
 - (b) The learning process created by interaction with digitally delivered content, services and support.
- Evaluation (a) A series of activities used to measure the adequacy and effectiveness of a training session, course or programme. Evaluation can be Once-Off, Periodic or Continuous, depending on the frequency of the activity. See *assessment*.
 (b) The sixth and highest level in the cognitive domain. See *cognitive domain*.
- **Evaluation criteria -** The standards used when analysing, comparing and evaluating a performance, process or product.
- **Evaluation phase -** The final phase of a systematic approach to training, following the implementation phase, in which effectiveness and quality of the nuclear facility training programmes and of the entire training system is evaluated; data for improvement of the training programmes and entire training system is generated; necessary changes to the conducting of SAT process and performance of the whole training system are initiated; and recommendations for improvement of the facility performance are generated as well.

Evaluation levels are typically referred in 4 levels as described in the Kirkpatrick evaluation model.

- **Examination -** An assessment in the form of a formal series of questions or tests which trainees must complete, usually in a fixed time and normally under controlled conditions, to ensure there is no unauthorized collaboration. Examinations are often administered at the conclusion of a training course or programme. Less formal tests take place during or after training sessions and lessons. See *assessment*.
- Experience (a) Work undertaken in a relevant topic and/or at a relevant facility during specific activities. Observation or presence only is not experience.
 (b) Practical work activities that, from reinforced practice, have resulted in the acquisition of identifiable knowledge, skills and attitudes.
- Facilitator A training instructor or group leader whose role is to stimulate discussion among trainees, rather than directly imparting information. This may be achieved by listening, asking questions, providing ideas, suggesting alternatives and identifying possible resources. See *discussion*.
- Feedback (a) Information that is generated from any activity or element of an activity and considered when modifying that or a related activity for future use. In SAT, or any curriculum development model, information derived from evaluation of one phase of the training system is fed back to any phase, to correct programme deficiencies, to improve training effectiveness and adapt to changes in conditions
and requirements.

(b) Information, based on observation or research, given to trainees concerning the adequacy of their performance in a training event or work activity.

- **Formal training -** Training provided in a structured manner or in an organized situation by a recognized instructor, rather than in an Open Learning situation. Classroom training based upon a lesson plan is an example of Formal Training.
- **Full-scope simulator** A simulator incorporating detailed modelling of those systems of the referenced facility with which the operator interfaces in the actual control room environment; replica control room operating consoles are included. See *simulation* and also *facility-referenced simulator*.

Fundamentals training - An alternative term for Basic Training. See basic training.

- Gap The difference between an established standard and actual results or performance.
- Human error An error in judgement or an incorrect action by an individual or a group.
- Human resource development Capacity building activities included in the workforce planning, nuclear training and SAT, nuclear leadership and stakeholders' involvement.
- Implementation phase The fourth phase of a systematic approach to training, following the Development Phase, which includes delivery of the training, and assessment of trainee performance.
- **Initial training -** A systematic training programme designed to ensure that individuals possess the necessary competence prior to being assigned independent job responsibilities. See also *continuing training*.
- **In-facility training -** Training that takes place at a facility during construction, commissioning, operation or decommissioning, though not necessarily at the trainee's actual work area (which is on-the-job training). In-Facility training is also termed On Facility Training. In-Facility training is an example of on-site training. See *on-the-job training* and *on-site training*.
- **Instruction** The provision, delivery or implementation of information in the cognitive and/or affective and/or psychomotor domains.
- **Instructor** A competent and authorized individual who delivers training, assess trainees and is involved in the evaluation of training sessions, modules, courses and programmes and who may also participate in analysis, design and development activities. Also termed a trainer.
- **Instructor qualification** A process of determining and verifying that an individual meets the required instructional and technical competencies, or the written confirmation of this. See *instructor* and *qualification*.
- In training evaluation A continual evaluation of training programmes which is performed while training is in progress. See *Evaluation*.
- Job The duties and tasks identified for, and performed by, an individual. See duty and task.
- Job analysis A method used to obtain a detailed listing of the duties and tasks of a specific job. See *job*, *duty* and *task*.
- Job and task analysis A combination of Job Analysis and Task Analysis. See job analysis and task analysis.
- Job competency analysis A type of analysis used for identification of knowledge, skills and attitudes required to perform a job to required standards. JCA concentrates on the analysis of generic tasks or functions rather than on analysis of tasks. See *job* and *job analysis*.
- **Job description -** A description of the characteristics of a particular job. A Job Description often also includes the characteristics required by the job incumbent to competently perform that job together with the duties that are a part of the job. See *job*.

- Knowledge (a) The mental constructs used in acquiring and understanding facts, and the application and reassembling of facts to think creatively, solve problems and make judgements. Together with Attitudes and Skills, knowledge provides the full requirements to undertake a given job or task. Knowledge is sometimes termed Cognitive Ability.
 - (b) The lowest level in the cognitive domain. See *cognitive domain, attitudes* and *skills*.
- Knowledge management an integrated, systematic approach to identifying, acquiring, transforming, developing, disseminating, using, sharing and preserving knowledge, relevant to achieving specified objectives. KSA – the combination of attributes required to effectively perform a specific job function.
- Knowledge, skills and attitudes the combination of attributes required to effectively perform a specific job function.
- Laboratory/workshop In training, a setting of an actual or simulated laboratory or workshop. Laboratory training is an example of hands-on training. See *hands-on training*.
- Learning A relatively permanent and measurable change in behaviour, taking place as a result of deliberate or chance instruction, study or experience. See *behaviour*, *experience* and *instruction*.
- Learning strategy The approach used by a learner to achieve an objective, including using techniques for improving memory or study. Learning Strategy is not necessarily related to Instructional Strategy. See also *instructional strategy*.
- Lecture A formal method of instruction by which trainees learn passively rather than by active participation, or a training session in which an instructor provides information orally to a group of learners. A lecture is one example of a training session. See *session*.
- Lesson A discrete small unit of instruction on a particular topic or subject area having a series of related objectives (enabling objectives) that support one or more Terminal Objectives, normally led by an instructor. A lesson is one example of a training session. See *objectives, instructor* and *session*.
- Lesson plan An instructor's document that outlines instructor and trainee activities, training objectives, content and resources necessary for the consistent delivery of instruction during a lesson. See *instructor*, *objectives* and *lesson*.
- **Mentoring** Providing new or inexperienced job incumbents with guidance and feedback, primarily concerning methods to implement their responsibilities. Mentoring is often provided by either experienced job incumbents or line managers of job incumbents, as a collateral duty, rather than a full-time responsibility. See also *coaching*.
- Module A self-contained instructional unit that is designed to satisfy one or more training objectives. A module consists of one or more sessions. See *session*.
- **Needs analysis -** In training, a method used to determine based on analysis of facility and personnel performance gaps potential training needs for an individual or group. The results of needs analysis are evaluated during training needs analysis to confirm training needs and to approve training related solutions. See *training needs* and *training needs analysis*.
- Nuclear facility Any facility such as a uranium mine, fuel fabrication plant, nuclear installation, nuclear power plant, nuclear repository or any other facility using sources of ionizing radiation including agricultural, commercial, educational, industrial, medical processing and research facilities.
- **Observation -** In training, a method used for observation of task performance; or for the training purpose, when a trainee observes facility or personnel performance and discusses this performance with an instructor.
- **Occasional instructor** An individual who is a qualified instructor and is involved in training on an occasional basis, but whose full-time job position is not that of an instructor. See *instructor*.
- **On the-job-training** Training that takes place at or in the trainee's work area in the job environment. On-thejob training (OJT) is typically conducted by currently qualified job incumbents.

- **Operating experience -** Experience concerning the operation or maintenance of equipment, facility or a system, including human factors, safety-related issues and events. See *experience*.
- **Pedagogy** The teaching of learners as children rather than as adults (which is termed andragogy). Pedagogic teaching assumes that the learners have little or no experience of the topics being taught and so the teaching is instructor or teacher focused. See also *andragogy*.
- **Performance** The display or achievement of ability in undertaking a specific activity. In training, the conditions of performance and the standards required are normally specified. Performance is the main output used in the behavioural approach to learning or training, where the actual performance is compared with the expected, pre-specified performance under stated conditions and standards. See *ability*, *behavioural approach*, *conditions* and *standards*.
- **Performance evaluation -** The evaluation of performance of an individual or group. In the training context performance evaluation is often used to determine the success of trainees on a specific activity as a result of a training programme, and for weak areas to be identified. See *evaluation* and *performance*.
- **Performance evaluation tools -** Performance tests, observations or evaluation of performance records that enable a Performance Evaluation to be undertaken. See *performance evaluation*.
- **Facility personnel -** Individuals working at a particular facility, either permanently or temporarily. See also *site personnel*.
- **Post-training evaluation** Evaluation of a training programme undertaken (typically) three to six months after the completion of a training programme. See *evaluation* and *training programme*.
- **Practical exercise** A technique used during a training session that permits trainees, through hands-on participation, to acquire and practice the knowledge, skills and attitudes necessary to successfully perform one or more training objectives. See *objectives*.
- **Pre-exercise brief** A Brief in preparation for an exercise, e.g. on a simulator, or as a rehearsal for emergency procedures or enacting an emergency plan. See *brief*.
- **Professionalism -** The admired characteristics and high standards as displayed by an individual usually qualified in a particular discipline or learned profession.
- **Qualification -** A formal statement that an individual possesses the education, training and experience required to meet specified job performance requirements. A formal statement of competence. The qualification may enable an individual to work independently, depending on local and national policies. Also used to identify a process of formal confirmation that an individual (e.g. a trainee) meets qualification requirements. See *competence*.
- **Regulatory Authority -** The authority, body or organization (usually national) that is empowered by legislation to conduct regulatory work, including establishing and publishing regulations, inspecting compliance and issuing relevant certificates, licences and authorizations for specified activities. Also termed a Regulatory Body.
- **Remedial training** Training designed, developed and implemented specifically to correct a trainee's demonstrated errors in, or inappropriate application of, knowledge, skills or attitudes.
- **Self-study** Learning by a student alone without the presence of an instructor but normally using structured training materials. Self-Study may be complemented by occasional or regular tutorial sessions in which an instructor answers queries, conducts an assessment or provides guidance for further self-study. In training practices, used to indicate both a training setting and as a training method. See *training method* and *training setting*.
- Session The smallest unit of a training course with clearly defined training objectives. A training session may be a Lesson of a Simulator Exercise, and may include a lecture, Role Play, Exercise or Self-Study period. See *course, training objective, lesson, lecture, role play, exercise* and *self-study*.

- Setting The environment or location in which learning, instruction or training takes place, including classroom, laboratory, workshop, simulator, the actual work place (i.e. during OJT), and self-study training environment. A decision on an appropriate setting to be used for a specific training session is made at the Design Phase of SAT. See *design phase* and also see *mode*.
- Skills The physical and manipulative actions following the mental signal needed to perform an activity or task. A term often incorrectly applied to abilities. Together with Attitudes and knowledge, Skills provide the full requirements to undertake a given job or task to specified standards. Skills are sometimes termed Psychomotor Abilities. See *psychomotor domain*, Attitudes and knowledge.
- Subject matter expert An individual who, by virtue of education, training, and/or experience, is a recognized expert on a particular subject, topic, or system or who is acknowledged as being highly competent in performing a particular task. A Subject Matter Expert may be one of a team of experts. See *team of experts*.
- **Systematic approach to training -** The systematic approach to training is a training approach that provides a logical progression from the identification of the knowledge, skills and attitudes required to perform a job to the development and implementation of training to achieve these competencies, and subsequent evaluation of this training. Often referred to by the acronym SAT.
- **Task -** A measurable, well-defined unit of work, with an identifiable beginning and end. Several Tasks, which may be arranged within a duty area, are components of a job. See *job* and *duty area*.
- **Task analysis -** The formal identification of the knowledge, skills and attitudes that are required to competently perform tasks associated with a particular job. See *knowledge, skill, attitude, task* and *job* and see also *job analysis*.
- **Task performance evaluation** A formal evaluation of task performance to determine a trainee's ability to independently perform a task. Task performance evaluation in some training practices is viewed as separate and distinct from On-the-job training. However, in some training practices, TPE is used both for evaluation of task performance by a job incumbent on-the-job, and also in the same meaning as a trainee performance assessment in the actual job environment (that may be in laboratory, workshop, simulator or OJT training setting) when Job Performance Measures are used by the designated assessors for assessing a trainee performance. See *job performance measure* and *on-the-job training*.
- Trainee An individual who has been assigned to undergo training. See training.
- **Trainer -** An appropriately competent and authorized individual who facilitates the learning process for trainees by participating in a systematic approach to training. Also termed an instructor. See *training* and *facilitator*.
- Training A combination of activities, including coaching and instruction, with the purpose to prepare an individual or a team to perform a specific task or job or series of jobs, usually through achieving a set of training objectives. Training, with education and experience, is used to develop an individual's competence. Training may be undertaken in-facility, On the job, On-Site, Off-Job, Off-Facility or Off-Site. See *in-facility, on the job, on-site, off-job, off-facility* and *off-site*.
- **Training Committee -** A panel of nuclear facility managers that collects and analyses nuclear facility performance information to evaluate the effectiveness of training; routinely meets to formulate recommendations needed to improve the effectiveness of training; verifies that recurring training problems are identified and preventive measures are planned and implemented. Also termed a Training Review Committee. Several Training Committees may be established at large nuclear facilities (e.g. the facility Training Committee, and individual Training Committees to deal with the training of various job classifications). Experienced job incumbents and even employees recently completed training may be invited to take part in these Training Committees.
- **Training method -** A particular method of providing instruction such as by lecture; demonstration; observation; practice; walkthrough; drill; discussion / facilitation; oral questioning; role playing; computer based training / e-learning; self-study; fulfilment of the projects.

- **Training needs -** The discrepancy that can be met by training, between the competence required by an individual or group to be able to perform a specified job or jobs, and the actual competence of that individual or group. However, a training need may be identified in terms of Knowledge, Skills and Attitudes to be developed through particular training for an individual or group; and/or new or modified task or competency requiring training; and/or new or modified training programme needed. See *competence* and *training*.
- **Training needs analysis -** A regular and systematic process used to evaluate potential training needs, to suggest and approve training solutions, and where it is possible to suggest other management initiatives to improve facility performance. Training Needs Analysis (TNA) is performed within SAT Analysis phase. TNA is initiated by potential training needs generated based on facility and personnel performance deficiencies and also by other information triggering TNA (such as facility equipment modifications, changes to procedures, new jobs, operating experience, etc.). Training related outputs of TNA may be the need in a new training programme for the certain job or the need in modification of existing training programme; new or modified task or a competency to be addressed in the training (for the existing training programmes when a valid task or competency list is available); and/or particular KSA to be addressed in the training to improve performance. See *analysis phase, needs analysis* and *training need*.
- **Training organization** An organization established to perform the analysis, design, development, implementation and evaluation of training. Line managers and facility personnel have their responsibilities in undertaking the analysis, design, development, implementation and evaluation of training, particularly, in Analysis Phase and Evaluation Phase of SAT process.
- **Training policy** A formal, written statement issued by senior management of an organization containing, as a minimum, the goals and scope of training. It may also address the organization and responsibilities for its implementation and the methods of monitoring and controlling its effectiveness.
- **Training procedures -** Written instructions that describe the philosophy, principles, management and organization of, and methodology and responsibilities involved in, preparing, administering, implementing and evaluating a training programme. Training procedures are based upon and consistent with a training policy. See *training policy*.
- **Training programme -** A planned and organized set of training activities, devised to achieve all training objectives for a particular job, incorporating initial and continuing training.
- Virtual reality Computer technology that replicates an environment, real or imagined, and simulates a user's physical presence and environment in a way that allows the user to interact with it.
- **Walkthrough** A method of oral assessment in the trainee's work area where the assessor and trainee 'walk through' or alongside the facility and the assessor asks the trainee questions relating to items of equipment or facility relevant to the trainee's training objectives.

ABBREVIATIONS

BIT BNRA	basic instructor training Bulgarian Nuclear Regulatory Agency
CBT CPD	computer based training continuing professional development
FSS	full-scope simulator
IAEA INPO	International Atomic Energy Agency Institute of Nuclear Power Operators
JCA JTA	job competency analysis job and task analysis
KSA	knowledge, skills and attitudes
LMS	Learning Management System
MCR	Main Control Room
NPP NTG	nuclear power plant Nuclear Training Group
OJT	on the-job training
P&TC	Personnel and Training Centre
QA	quality assurance
SAT SME	systematic approach to training subject matter expert
TES TNA TPE TPRC	Training/Evaluation Standard training needs analysis task performance evaluation Training Programme Review Committee
VR	Virtual Reality
WANO	World Association of Nuclear Operators

ANNEX I.

EXAMPLE OF FACTORS TO CONSIDER IN FORMULATING

A TRAINING POLICY

Qualified personnel are vital to NPP safety and reliability. To develop qualified personnel, the training staff should emphasize analysis, design, development, implementation, evaluation and revision of training and qualification activities for facility personnel. Facilities should periodically evaluate and revise training programmes due to changes in standards, technology, procedures, requirements, job assignments and qualifications of new personnel.

I-1. TRAINING MISSION, GOALS, AND OBJECTIVES

The training organization should have a mission with clearly written goals and supporting objectives that establish the required elements of the training system. The training mission and philosophy should be consistent with facility commitments and policies and should apply to all organizations that share responsibility for training. Long term goals, objectives and policies necessary to accomplish the training mission should be clearly defined, published and distributed to all organizations that contribute to their accomplishment. The training mission, goals, objectives and policies should be reviewed periodically and updated as necessary to reflect changing needs.

Overall training objectives or goals should be developed by the training organization with input from the appropriate line managers. The objectives should be specific, clearly stated, and results-oriented such that their accomplishment can be measured. The number of developed objectives should be a manageable amount. Training objectives should be reviewed in a periodic self-assessment and any weaknesses in the methods should be revised.

The following is a partial listing of training objectives that might be used for a training programme:

- Develop and provide quality performance-based initial and continuing training to prepare personnel to perform duties in a safe and reliable manner;
- Develop and provide initial and continuing training to subcontract personnel who support facility operation and outside agencies used to assist during site emergencies;
- Assist line management in ensuring that subcontract personnel are qualified and their use does not result in degraded facility safety or reliability;
- Establish and maintain a training organization staffed with qualified personnel who are capable of accomplishing their assigned tasks;
- Provide the settings, equipment, and materials necessary for effective support of training activities;
- Assist the line organization in the training and qualification of facility personnel;
- Provide training that meets the needs of facility personnel;
- Encourage line managers to take responsibility for training programme content and oversight with assistance from the training organization;
- Develop and provide a mechanism to identify and analyse performance problems. Review facility and industry operating experience and training trends (e.g. continued team performance weaknesses during facility walkthroughs) to identify the need for training programme changes or improvements;

• Routinely evaluate training effectiveness and correct identified weaknesses.

The objectives that support training goals should be used to establish plans, priorities, and budgets and should be reviewed and revised as periodic self-assessments identify weaknesses.

II.1. TRAINING POLICIES AND PROCEDURES

Training policies and procedures should support the accomplishment of the training mission, goals and objectives by providing general guidance and detailed directions. Policies typically describe the conditions that guide the decision-making process (i.e., thoroughness, prudence, openness and responsiveness). Procedures describe how specific tasks will be accomplished. Policy statements and procedures should be developed on topics such as the following:

- Analysing tasks, designing and developing training materials, implementing and evaluating the effectiveness of training activities;
- Identifying personnel qualification and training needs according to position descriptions, job assignments, previous education, training, and experience;
- Assessing the level of expertise of subcontract personnel and temporary employees performing work at the facility;
- Pursuing job related education activities;
- Handling of individuals whose performance is marginal or unsatisfactory during training (i.e. remedial training);
- Describing training department and line organization responsibilities for the training and qualification of facility employees;
- Incorporating into training lessons learned from facility and industry operating experiences;
- Conducting consistent training and evaluation in the classroom, laboratory, simulator, and OJT;
- Communicating between training and line managers (e.g. curriculum committees, peer review groups);
- Maintaining training records of personnel training and performance;
- Controlling and administering tests to maintain evaluation integrity;
- Training and qualifying instructors;
- Scheduling of training activities and determining make-up requirements;
- Maintaining control of training equipment;
- Exceptions;
- Facility evaluation criteria;
- Vendor short courses or use of vendors for training.

Training procedures should describe the types of training and training programmes to be conducted, training programme prerequisites and the training audience. The procedures should clearly indicate the training needed for each job position and the sequence in which it is to be completed. The procedures also may reflect the facility's division of labour policies, position descriptions and work assignment practices.

ANNEX II.

EXAMPLE OF A BASIC TRAINING POLICY



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2 Nuclear Generation Training Policy

Policy Statement

The EDF Energy Nuclear Generation training policy statement describes Nuclear Generation's vision of training and its role in supporting safe and reliable plant operation via the knowledge and skills of its most valuable asset—its employees.

The vision: Creating world leading nuclear professionals, equipping our people with the knowledge, skills and behaviours to support a high performing business.

The mission: Provide the right training to the right people at the right time.

Training is a critical tool supporting personnel investment and performance improvement. As such, Nuclear Generation is committed to, and accountable for, developing and sustaining training programmes that meet organisational and personnel needs. A systematic approach to training is essential to ensure that training needs are accurately identified, training is effectively delivered to the right audience, and line managers are integrally involved.

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Brian Cowell, Generation Managing Director For and on behalf of the Generation Executive Team

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³ Nuclear Generation Training Policy

EDF Group Principles

- Anticipate and support changes in the EDF Group's professions, and adapt the skills required to prepare for tomorrow.
- 2. Harness training to enhance the Group's performance.
- 3. Prepare and support employee career development, looking at their job descriptions today and tomorrow, and fostering their mobility and employability.

Nuclear Generation Policy Standards

- Training is a key leading indicator to succession management and the long term health of the organisation.
- 2. Line managers are responsible for the effective training and qualification of their personnel.
- Line managers monitor personnel performance to ensure that training contributes to safe and reliable plant operation and to identify training opportunities and solutions.
- Training reinforces management standards and expectations. Training programmes integrate key messages and expectations (e.g. Human Performance) to embed future and expected behaviour.
- Training provides the knowledge and skills needed for independent job performance and incorporates operating experience from previous internal and external events.
- 6. Training resources (personnel and facilities) meet the needs of the organisation.
- Training is developed and conducted following consistent, rigorous processes to ensure effectiveness.
- 8. Personnel assigned training responsibilities are the organisation's best and can influence others to a higher level of performance.
- All personnel within the organisation have a responsibility, and a role to play, in the Systematic Approach to Training to deliver these key elements.
- 10. Training processes, programs, and content will be standardized across the fleet to the extent possible and practical. INPO ACAD 02-001, Revision 0, The Objectives and Criteria for Accreditation of Training in the Nuclear Power Industry, will provide the standards to which training aspires. Satisfactory achievement of these objectives, as determined by independent evaluation, will be the measure of long-term progress/success.

References

Bibliographical References

- INPO ACAD 02-001
- Politique RH du Groupe EDF Training and Skill Development

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4 Nuclear Generation Training Policy

Implementing References

BEG/ICP/TRNG/001 - Systematic Approach to Training: Principles and Responsibilities

Definitions

Word or Phrase	Definition
ACAD	INPO Academy Document

Change History

Version	Date	Changes Made
006	01/01/2014	Editorial change to reflect new template and re-endorsements by new managing director
007	01/01/2017	3 Yearly periodic review. Editorial change to reflect new executive sponsor. Addition of EDF Group Training Principles
008	05/10/2017	Editorial amendment to replace Stuart Crooks with Brian Cowell as Generation Managing Director

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ANNEX III.

EXAMPLE OF A BASIC TRAINING PROGRAMME DESCRIPTION

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Nuclear Generation Training Programme Description

Training Instructor

Originated By:	Andy Roesen	Date:	Dec 2015
	On behalf of the Training Specialist Peer Group		
Reviewed By:	Elliot John	Date:	Dec 2015
	On behalf of the Training Managers Peer Group		
Approved By:	Scott Kerr	Date:	Dec 2015
	Fleet Training Manager		

REVISION	AMENDMENT	IMPACT LEVEL	DATE
010	Simulator Training requirements clarified under sections 4.2.4, 4.4.6 & 4.4.8	Minor	Dec 2015

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- 2 RESPONSIBILITIES
- **3 DEFINITIONS**
- 4 REQUIREMENTS
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- 4.2 Initial Training
- 4.3 Initial Qualification
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- 4.5 Exemptions
- 4.6 Remediation
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- 7 ATTACHMENTS

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1 PURPOSE

The purpose of the Instructor Training Programme Description (TPD) is to establish the requirements for initial and continuing training of instructors.

The programme is designed to train Fleet Certified Instructors (FCI) and Site Certified Instructors (SCI) to provide training and evaluation in accordance with the Systematic Approach to Training and EDF Energy Training Specifications.

Workshop and External Instructors and OJT/TPE and Mentoring is covered in separate company specifications.

2 RESPONSIBILITIES

2.1 Training Programme Owner (Fleet Training Manager)

- Establish and maintain the Fleet Certified Instructor training programme to improve instructional performance.
- Periodically monitor and assess training in all settings to ensure training needs are being met.
- Participate in and review the analysis and design of training courses and the development of materials.
- Own and maintain all documents that support the Systematic Approach to Training Quality Management System (SAT QMS).
- Arrange for the implementation and evaluation of fleet instructor training.

2.2 Training Manager (Site)

- Ensure the qualification of instructors at the site (initial and continuing), and set expectations for trainee qualification progress.
- Conduct training observations and evaluations of instructor performance in all settings to ensure training needs are being met.
- Provide oversight of the Instructor CRC

2.3 Training Specialist Peer Group

- Periodically review and recommend changes to the Instructor Training Programme Description (TPD), Task to Training Matrix (TTM) and qualification manual.
- Validate and prioritise training needs for instructors.
- Identify topics for and develop instructor continuing training.

2.4 Training Specialist

- Report instructor staffing, training and qualification status to the site Training Manager.
- Qualify to perform all the duties and responsibilities of the Fleet Certified Instructor.
- Evaluate instructor performance.
- Participate as members of the Training Specialist Peer Group.
- Implement continuing training for instructors.
- Mentor instructors.

Support the Instructor CRC

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2.5 Instructor

- Achieve and maintain instructional and technical qualifications.
- Perform instructional and administrative duties and responsibilities in accordance with the company Training Specifications and industry standards.
- Adhere to and reinforce company Training Standards and Expectations.
- Participate in site STC, TAC and CRC activities as appropriate to evaluate and determine training needs.
- Participate in training sessions and workshops as assigned, to develop and improve effective instructional techniques.
- Participate in training programme self-assessments as appropriate.

3 DEFINITIONS

Definitions are found in the EDF Energy Nuclear Generation Training Specifications.

4 REQUIREMENTS

4.1 Eligibility Requirements (Prerequisites) for Training Instructors

- Qualify in their specific technical area (e.g. Mechanical Maintenance Instructor will be qualified as a Maintenance Technician or higher).
- Satisfy post profile qualification and experience entry requirements.
- Demonstrate interpersonal skills that facilitate effective training.

4.2 Initial Training

- 4.2.1 Instructor initial training shall include classroom training and mentoring. The requirements for each level are listed below. See Attachment A for initial instructor training components.
- 4.2.2 Fleet Certified Instructor (Role) requirements are:
 - FCISAT GEN, Systematic Approach to Training Fundamentals.
 - Mentoring Position Specific Guides as identified in the Task-to-Training Matrix (BEG/TRNG/TTM/501/001) and in the Training Instructor Qualification Manual (BEG/TRNG/QM/501/0002/01) before working independently in these areas.
 - FCIITS GEN, Instructional Techniques & Standards.
 - Satisfactory performance documented on BEG/FORM/TRNG/400/06C, Classroom/Workshop Instructor Evaluation, completed post FCIITS GEN, by the site Training Manager, Training Group Head, Training Specialist or designated Fleet Certified Instructor.
 - It is an expectation that an FCI should gain the authorisation as an NP Leader within 12 months of appointment, although it is not a requirement of the role.

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4.2.3 Site Certified Instructor (Role)

- Site Certified Instructors are not full time instructors but subject matter experts who assist in training delivery. SCIs shall complete the following requirements prior to working independently in the assigned training area:
 - Site Certified Instructor Workshop (FCISCI GEN).
 - Mentoring Position Specific Guides identified in the Task-to-Training Matrix (BEG/TRNG/TTM/501/001) and in the Training Instructor Qualification Manual (BEG/TRNG/QM/501/0002/01) before working independently in these areas.
 - Satisfactory performance documented on BEG/FORM/TRNG/400/06C completed by the site Training Manager, Training Group Head, Training Specialist or designated Fleet Certified Instructor during the first training delivery session.
- 4.2.4 Simulator Instructor (Role) requirements are:
 - The Pre-Requisite requirement to become a Simulator Instructor is to have the FCI or SCI role and to have operational control room experience.
 - Advanced simulator instructor GEN. (Essential)
 - Local site specific instructions covering the use and operation of the simulator. This can be in the form of mentor guides or other documentation. (Performance).
 - Exercise observation BEG/FORM/TRNG/400/06B. (Essential)

4.3 Initial Qualification

- 4.3.1 EDF Energy staff performing instructional duties at all locations will be qualified based upon successful completion of the portions of the Instructor Training Programme applicable to the position they are assigned. Qualification records are documented in the SAP database.
- 4.3.2 If equivalent work experience or qualification documentation is provided, the exemption process may be used.
- 4.3.3 Qualification of supplemental personnel who are contracted to perform instructional duties at EDF Energy Power stations will be evaluated on a case-by-case basis according to the duties to be assigned.

4.4 Continuing Training

4.4.1 Continuing Training should maintain and improve instructional and technical skills following initial qualification. For instructional skills, continuing training is used to correct instructor weaknesses and develop ELY MARKED Parent Doc. Ref: BEG/SPEC/TRNG/200

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desired competencies in the various training settings.

- 4.4.2 Activities that maintain and improve instructional skills may be conducted in group settings (lecture/discussion, role-playing methods, coaching etc) or may be accomplished through self paced instruction and one-on-one sessions with instructor training personnel. Subjects appropriate for continuing training include the following:
 - Refresher topics from initial instructor training as defined by the Task to Training Matrix.
 - New and advanced instructional techniques, methods, technologies, training equipment and media.
 - Changes to regulations, standards or procedures
 - Organisational changes that may affect job responsibilities and interrelationships.
 - Performance deficiencies identified during instructional evaluations.
- 4.4.3 Technical training is provided that will maintain and develop technical skills and ensure knowledge of trainee job responsibilities to all personnel who act as subject-matter instructors. Personnel who provide plant-specific training are kept current on plant and industry events and changes such as plant modifications, policies and procedures. Those with technical skill deficiencies receive upgrade training as appropriate.
- 4.4.4 In order to maintain familiarity with plant configuration, technician practices and procedure guidance, instructors shall complete a minimum of 32 hours of in-plant time per calendar year in their specific discipline. In-plant time should be documented on BEG/FORM/TRNG/710, Instructor In-plant Time.
- 4.4.5 Fleet Certified Instructors and Site Certified Instructors shall be evaluated at least once per three (3) year period in each setting in which they have been qualified to teach using BEG/FORM/TRNG/400/06C.
- 4.4.6 Simulator Instructors shall be evaluated at least once per three (3) year period in the simulator setting using BEG/FORM/TRNG/400/06B.
- 4.4.7 Site Certified Instructors may be assigned to attend applicable portions of the Fleet Certified Instructor continuing training sessions, based upon management observations of training and instructor evaluation results.
- 4.4.8 Simulator instructors shall have at least 1 day of continuing training over a 3 year period to ensure standards are maintained for the Simulator instructor role.

4.5 Exemptions

Exemptions for equivalent training or demonstrated job knowledge shall be completed in accordance with BEG/SPEC/TRNG/400, Systematic Approach to Training – Implementation Phase and completion of BEG/FORM/TRNG/400/02, Exemption Process.

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4.6 Remediation

Remediation shall be completed in accordance with BEG/SPEC/TRNG/400, Systematic Approach to Training – Implementation Phase and completion of BEG/FORM/TRNG/400/03, Remediation Training.

5 RECORDS

5.1 Training and qualification records shall be collected and maintained in the SAP database.

6 REFERENCES

- 6.1 ACAD 97-014, Guidelines for Instructor Training and Qualification.
- 6.2 BEG/SPEC/TRNG/100, Systematic Approach to Training Analysis Phase
- 6.3 BEG/SPEC/TRNG/200, Systematic Approach to Training Design Phase
- 6.4 BEG/SPEC/TRNG/300, Systematic Approach to Training Development Phase
- 6.5 BEG/SPEC/TRNG/400, Systematic Approach to Training Implementation Phase
- 6.6 BEG/SPEC/TRNG/401, OJT/TPE/Mentoring
- 6.7 BEG\SPEC\TRNG\500, Systematic Approach to Training Evaluation Phase
- 6.8 BEG/ICP/TRNG/001, Systematic Approach to Training Principles and Responsibilities
- 6.9 BEG/TRNG/TTM/501/001 Instructor Task To Training Matrix (TTM)

7 ATTACHMENTS

7.1 Attachment A, Instructor Initial Training Course Listing.

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ATTACHMENT A

INSTRUCTOR TRAINING and QUALIFICATION

CLASSROOM				
Course / Lesson Plan Title	Course / Lesson Plan #			
SYSTEMATIC APPROACH TO TRAINING FUNDAMENTALS	(FCISAT GEN)			
Introduction to Instructor Training	BEG/TRNG/LP/501/0001/01			
Analysis Fundamentals	BEG/TRNG/LP/501/0001/02			
Design Fundamentals	BEG/TRNG/LP/501/0001/03			
Development Fundamentals	BEG/TRNG/LP/501/0001/04			
Implementation Fundamentals	BEG/TRNG/LP/501/0001/05			
Evaluation Fundamentals	BEG/TRNG/LP/501/0001/06			
MENTOR GUIDES (Essential)				
Training Needs Analysis	BEG/TRNG/MPSG/501/0002/17			
Course Design and Development	BEG/TRNG/MPSG/501/0002/18			
Examinations	BEG/TRNG/MPSG/501/0002/19			
Evaluations	BEG/TRNG/MPSG/501/0002/20			
MENTOR GUIDES (Performance)				
Job and Task analysis	BEG/TRNG/MPSG/501/0002/21			
OJT/TPE Guides	BEG/TRNG/MPSG/501/0002/22			
Mentor Guides	BEG/TRNG/MPSG/501/0002/23			
Exemption process	BEG/TRNG/MPSG/501/0002/24			
Make Up process	BEG/TRNG/MPSG/501/0002/25			
Remediation process	BEG/TRNG/MPSG/501/0002/26			
Job orientation guide	BEG/TRNG/MPSG/501/0002/27			
INSTRUCTIONAL TECHNIQUES & STANDARDS (FCIITS GEI	N)			
Introduction to Instructional Techniques & Standards	BEG/TRNG/LP/501/0003/01			
How People Learn	BEG/TRNG/LP/501/0003/02			
Training Observations and Feedback	BEG/TRNG/LP/501/0003/03			
Learning Styles	BEG/TRNG/LP/501/0003/04			
Training Delivery Medium	BEG/TRNG/LP/501/0003/05			
Floor craft	BEG/TRNG/LP/501/0003/06			
Practical Sessions				
SITE CERTIFIED INSTRUCTOR (FCISCI GEN)	San the second second second			
Site Certified Instructor Workshop	BEG/TRNG/LP/501/0011/01			

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ANNEX IV.

EXAMPLE OF MANAGER AND SUPERVISOR RESPONSIBILITIES

IV-1. MANAGER - NUCLEAR TRAINING

- Ensures the overall effectiveness of Nuclear Training Group (NTG) personnel;
- Approves instructor certification;
- Evaluates instructors in accordance with this procedure;
- Approves the training curriculum for each position in the NTG;
- Serves as the Instructor Curriculum Committee Chairperson and approves the meeting minutes.

IV-2. MANAGER – ACCREDITATION AND SUPPORT

- Manages the effectiveness of the instructor qualification and certification program;
- Maintains a training matrix for the NTG, which identifies the curriculum for nuclear training as required by NDAP-QA-0010.

IV-3. SUPERVISOR - NUCLEAR INSTRUCTION/SUPERVISOR – OPERATIONS AND TECHNICAL INSTRUCTION

- Task qualifies instructors in accordance with this procedure;
- Recommends instructors for professional instructor certification;
- Evaluates instructors in accordance with this procedure;
- Reviews and concurs with the curriculum for NTG personnel;
- Serves as the Instructor Curriculum Committee Vice-Chairperson and assigns competent personnel from each instruction group to the committee. The supervisor-nuclear instruction/supervisor-Operations Instruction shares the responsibility with the manager-Accreditation and Support for developing training curriculum for each NTG position. This includes maintaining the curriculum current by performing periodic reviews to ensure completeness;
- Approves instructor development training material;
- Reviews the technical content of training courses for instructional personnel or assigns a competent employee to perform the review;
- Supports the development of instructor training courses;
- Evaluates and reviews the effectiveness of the curriculum;
- Approves instructor technical qualifications.

IV-4. NUCLEAR TRAINING SUPERVISORS

- Implement this procedure;
- Assign completion dates to instructors for their professional and specialty qualifications;
- Ensure instructors in their group complete instructor certification within one year of NTG start date;
- Ensure training is attended as required to enable the instructors to achieve qualification;
- Ensure all instructors attend continuing training;
- Recommend instructors for professional certification;
- Task qualifies instructors in accordance with this procedure.

ANNEX V.

EXAMPLE OF A TRAINING PROGRAMME REVIEW COMMITTEE

TERMS OF REFERENCE

The TPRC acts as a focal point to establish and maintain the application training standards in their area, they will oversee and resource the following activities:

- Assessing the need to conduct a job or task analysis for new, or changed process activities, equipment or tasks or for personnel performance problems;
- Producing Identified TNA, and overseeing the development training to meet these needs;
- Approving modifications to training programme content, length or sequencing;
- Specification, review and approval of continuing training programmes;
- Monitoring learner progress in successfully completing initial and continuing training;
- Carrying out the evaluation of training in accordance with training evaluation guidance at levels 1, 2, 3 and 4 as appropriate,
- Ensuring that training programmes support staff being suitably qualified and experienced to safely perform allocated tasks;
- Reviewing business and personnel performance issues for opportunities where training solutions can be applied;
- Carrying out of self-assessments of training performance and the initiation and monitoring of corrective actions;
- Reviewing student feedback;
- Reporting of training performance and submitting proposals for approval/agreement to the TPRC.

ANNEX VI.

EXAMPLE OF CRITERIA FOR RECRUITING INSTRUCTORS

The training centre manager shall identify the optimal number and composition of personnel needed to discharge the assigned instructional duties in an effective and efficient manner. To be able to support efficient training, qualified replacement individuals for key positions shall be developed in a Succession Plan:

- 1. The minimum qualification requirements for instructors include:
 - (a) A university degree or equivalent is acceptable in an appropriate discipline;
 - (b) A job-related educational background or an appropriate technical area of study for a minimum of two (2) years;
 - (c) Successful performance in related job positions at nuclear facilities or other appropriate experience for a period of not less than one (1) year;
 - (d) Successful completion of an approved instructor training programme, and participation in continuing training to maintain and enhance their technical and instructional skills;
- 2. The number of personnel on the training staff and their qualification requirements will vary depending on the nuclear facilities it is intended to support. If contractor personnel are used, either to meet short term temporary needs or for long term staff augmentation, the training centre shall establish proper monitoring and control to ensure these external personnel perform to the expected standards. The tasks, responsibilities, authorities and interfaces with the training staff and others shall be clearly defined and understood by all. Contractor personnel shall be trained and qualified for the tasks to be performed and held to the same performance standards as training personnel performing similar tasks. Contractor personnel shall be indoctrinated in appropriate facility policies and procedures and shall adhere to the policies and procedures to the same degree as facility personnel;
- 3. Training staff members shall possess the knowledge, skills and attitudes required to fulfil their assigned duties, especially with regards to their technical knowledge and skills whether employees of the NPP, contractor employees, or employees at a training centre;
- 4. Instructors shall demonstrate and continuously improve their instructional capabilities in all applicable training settings. Specific attention shall be paid to andragogic skills.
- 5. Subject matter experts may be used to conduct instruction as adjunct or temporary instructors on an occasional basis. In these cases, qualified training personnel shall ensure that training quality is maintained through appropriate assistance and monitoring;
- 6. Personnel who conduct OJT and evaluations shall be cognizant of facility policies, procedures, methods, and standards for conducting effective OJT and task performance evaluations;
- 7. Instructional skills and technical competences of instructors shall be evaluated regularly in applicable training settings;
- 8. Continuing instructor development maintains and improves needed technical and instructional knowledge and skills, and addresses weaknesses resulting from evaluations of instructor performance:
- At least annually, evaluates the instructor competencies to conduct training in all applicable settings;
- Develops the personnel in their group to ensure an effective and safe work force;

- Requests training for their personnel in a timely manner;
- Identifies training for each discipline and position, to include the Emergency Plan training and the needs of the individual;
- Completes the instructor certification and specialty qualifications within the required timeframes.

VI-1. INSTRUCTOR

- Take responsibility for their own professional development;
- Ensure they are qualified to independently perform assigned tasks;
- Complete the instructor certification within the required timeframe;
- To conduct OJT, must complete qualification sheet;
- Request evaluations, at least annually, in each instructional setting that they will be teaching.

VI-2. EVALUATORS

- Evaluators will complete Evaluator training form. They must be qualified in the task that they are evaluating;
- Sign the qualification sheet after instructor has satisfactorily met the specified evaluation criteria.

ANNEX VII.

EXAMPLE OF AN ORGANIZATION CHART FOR KOZLODUY NPP

TRAINING CENTRE



FIG. VII-1. Organization chart for Kozloduy NPP Training Centre.

The plant Executive Director (plant manager) of Kozloduy NPP plc bears the responsibility for staff qualification and provision of the required training. The director delegates authorities and tasks to the different managers within the plant and specialized division at Kozloduy NPP – Personnel and training centre (P&TC) Division. The P&TC Division is a special training organization. The centre assists the plant manager to ensure the fulfilment of all regulatory requirements for providing specialized training for activities with nuclear facilities and sources of ionizing radiation and on this basis Kozloduy NPP obtains a licence issued by the national regulatory body - the Bulgarian Nuclear Regulatory Agency (BNRA).

P&TC Division is an individual structural unit within Kozloduy NPP plc which is subordinated to the Production Director and has the following main functions:

- Prepare, organize, perform, control and record the entire training centre activity for adequate contribution to safe, reliable and efficient operation;
- Within the frame of the available materials and technical recourses as well as using the training centre's staff qualification, the training centre fulfils or supports the fulfilment of the engineering analysis, projects and other tasks, related to operational safety of nuclear power installations.

The organizational structure of the P&TC Division is presented in the flow diagram (see FIG. VI-1).

P&TC Division includes 4 functional units, consisting of 2 departments and 2 groups, and 6 sub-sections:

- Planning and Organization Department:
 - Analyses and Planning Section;
 - Organization Group;
- Training Department:
 - Simulator training Section;
 - Theoretical training Section;
 - Practical training Section;
 - Engineering Support Section;
- Maintenance and Development of Material Resource Group;
- Quality Assurance Group.

The functions and tasks of the Planning and Organization Department involve development of guiding and organizational documents related to the training and qualification of Kozloduy NPP staff, and control over their application; coordination of, participation in and methodological support to plant line managers and P&TC Division instructors and training supervisors in the analysis of the training needs; support in the development of training programmes and planning of personnel training; and analysis of the training provided. The Planning and Organization Department is responsible for organization of the training process; keeping and maintaining of training and qualification records.

The functions and tasks of the training Department involve implementation of theoretical, practical and simulator training, development of training materials and aids, simulator operation and maintenance. The instructors from Simulator and Practical Training Sections take an active role in training needs analyses, training design and evaluation as well. Additionally, the department provides and uses the simulators for analysis of plant performance and validation of emergency procedures, procedures for normal operation and working programmes, and participates in the implementation of these activities.

The allocation of necessary logistic resources and technical support of the training (including maintenance of training means and building services) are the main responsibility of the Resources Maintenance and Development Group.

The development and implementation of the quality system; organization and maintenance of the central archive of the controlled and archived documents and training materials; and management of the library are the main responsibilities of the Quality Assurance Group.

ANNEX VIII.

EXAMPLE LIST OF FUNCTIONS OF SIMULATOR TRAINING INSTRUCTOR

List of functions of Simulator training Instructor at Kozloduy NPP training centre:

- *Education* MSc;
- *Area of higher education* Technical sciences;
- *Subject* Nuclear power engineering;
- *Technical experience* not less than three years as Unit Shift supervisor or Station Shift supervisor;
- Hold an individual licence for WWER-1000 simulator instructor.

VIII-1. GENERAL DESCRIPTION

The WWER-1000 simulator instructor plans, develops, implements, and evaluates specialized training to acquire knowledge and skills necessary for effective and efficient operation of NPP with WWER-1000 type reactor, as well as controls units' operation in all possible modes.

VIII-2. FUNCTIONS AND RESPONSIBILITIES

VIII-2.1. Functions related to the nuclear facilities safe operation

- The WWER-1000 simulator instructor plays a key role in: ensuring the compliance between the behaviour of the simulator and reference unit; verifying proposals for upgrading the reference unit equipment and systems; checking the Main Control Room (MCR) operating procedures; training and maintaining the MCR operators' qualification;
- The WWER-1000 simulator instructor collects, processes, and analyses information about errors, incompleteness or inadequacy of behaviour, attitude, skills, and knowledge during simulator sessions;
- The WWER-1000 simulator instructor ensures the fulfilment of the nuclear and radiation safety requirements through planning, development and implementation of effective and efficient simulation training in all WWER 1000 operating modes;
- Controls the fulfilment of the nuclear and radiation safety requirements through observations and records the tasks execution during the simulator sessions;
- Elaborates documents required for simulator training;
- Offers solutions resulting in safety improvement and operations' optimization through the programmes implementation to validate the equipment, systems and units in different operating modes;
- Ensures the fulfilment of the nuclear safety and radiation protection requirements and conditions of the BNRA related to personnel training;
- Provides a task assessment during simulator training sessions;
- Develops and/or implements measures to improve operators' safety, reliability and efficiency;
- Provides for prerequisites for personnel qualification maintaining and enhancement in accordance with the Personnel training and qualification System;
- Reports in cases of nuclear and radiation safety violation.

VIII-2.2. Responsibilities related to the implementation of training plans, schedules and tasks

- The WWER-1000 simulator instructor performs TNA to solve a certain problem in WWER-1000 unit operations and elaborates Terms of reference for training programme/plan development including training settings, training objectives and contents in accordance with the plant training centre quality management system requirements;
- Develops training materials for theoretical and simulator training pursuant to approved Terms of references (lesson plan, simulator training session guide, presentation, etc.) in accordance with the plant training centre quality management system requirements;
- Delivers presentations, theoretical and simulation training through the entire set of simulator sessions (simulator description, demonstration, team and/or operators' individual assessment) in compliance with preliminary developed and approved training plans, schedules and materials in accordance with the plant training centre quality management system requirements;
- Monitors, registers and evaluates tasks performance during simulator training sessions in terms of team work as a whole and/or operator individual performance, and identifies gaps or inadequacies in attitudes, behaviour, skills, knowledge, etc. in order to correct them during the following sessions or further training or drills;
- Analyses human errors made to identify the root cause and proposes corrective actions to prevent their occurrence at the unit;
- Guides the post-exercise debrief to achieve effective use of simulator sessions in identifying gaps and good practices in the equipment, systems and units' operation as a whole, as well as qualification improvement of teams and operators;
- Controls simulator from the instructor room for the purposes of simulator using and testing;
- Develops and conducts training of trainers on specific topics;
- Analyses the efficiency and effectiveness of training plans, schedules and tasks implementation and proposes corrective measures;
- Completes record keeping in a timely manner of all activities completed in accordance with the plant training centre quality management system requirements.

VIII-2.3. Responsibilities related to provision of the functioning of the configuration management system with the reference units and simulator licence maintenance

- The WWER-1000 simulator instructor analyses the reference unit modifications to determine the need for simulator upgrade in terms of the personnel training needs and validate the MCR operating and management procedures;
- Prepares Terms of reference and specifications for simulator upgrade based on analysis, as well as acceptance test procedures of the simulator modification implemented;
- Participates as SME in working groups at various stages of upgrading and acceptance of modification on the simulator model;
- Participates in the acceptance tests on the simulator upon upgrading completion and/or in simulator readiness check;
- Participates in simulator modification tests stipulated by the regulatory body's requirements for maintaining the simulator licence for licenced MCR operators' training;
- Registers non-conformance reports on: the behaviour of the simulator, equipment state and simulator MCR layout on the one hand, and the behaviour of the reference unit, equipment and unit MCR layout on the other hand;

- Checks whether the registered non-conformances of the simulator compared to the reference unit are corrected;
- Records the activities implemented in ensuring the functioning of the configuration management system and simulator licence maintenance.

VIII-2.4. Responsibilities related to validation of WWER-1000 operating procedures

- The WWER-1000 simulator instructor participates in the preparation and implementation of procedure validation programmes for equipment, systems and units control in different operating modes;
- Participates in the preparation and implementation of engineering programmes to be implemented or verified at the simulator.

VIII-2.5. Responsibilities related to qualifications maintenance and enhancement

- The WWER-1000 simulator instructor maintains his/her licence as a simulator instructor according to the BNRA requirements and Kozloduy NPP plc internal documents;
- Continuously enhances his/her qualification as a simulator instructor.

VIII-2.6. Administrative functions

- The WWER-1000 simulator instructor adheres to the normative and technical documents requirements, regulations, procedures and managers' orders;
- Analyses and evaluates the operating experience and participates in the Simulator section future activities planning;
- Reports to the simulator section manager or his/her deputy any circumstance which may affect the performance quality or deadline of the tasks assigned.

VIII-2.7. Responsibilities related to industrial safety

- The WWER-1000 simulator instructor takes care for his/her own and colleagues' safety;
- Uses the equipment given and information provided in a safe manner;
- Adheres to the industrial safety and fire safety requirements;
- Fulfils its obligations under the emergency plan in case of its actuation.

ANNEX IX.

EXAMPLE OF CLASSROOM INSTRUCTOR COMPETENCES

The following list of representative competencies should be reviewed for applicability to a facility's classroom instructor training program. Competencies that are omitted should be evaluated for inclusion in other instructor training programs. Those competencies that apply should be converted to facility-specific terminal and enabling learning objectives. Once in the learning objective format, training and evaluation tools may be designed. A classroom instructor training course should develop the following representative competencies:

- Principles of adult learning and motivation:
 - Discuss the factors under an instructor's control that affect learning during classroom instruction;
 - Demonstrate techniques that promote learning and motivation of learners;
- Classroom instructional methods:
 - Discuss the advantages of providing a proper learning environment;
 - Discuss the following with regards to physical seating arrangements:
 - Types of seating arrangements and advantages and/or disadvantages of each;
 - The importance of matching seating arrangements to learning objectives and the instructional method(s);
 - Discuss the advantages and disadvantages of the lecture method;
 - Briefly discuss the instructor's role in the following instructional methods which may be used to supplement or support the lecture method:
 - Roleplay;
 - Case studies;
 - Exercises (games);
 - Discussions;
 - Practical classroom demonstrations;
 - Tutoring by instructors or peers;
 - Facilitate/conduct examples of each of the above instructional methods;
 - Discuss the techniques a classroom instructor may employ when responding to trainee questions;
 - Demonstrate proper techniques for control of the class describe techniques the classroom instructor may utilize to optimize student learning;
 - Discuss methods an instructor may utilize to deal with difficult students;
 - Conduct classroom training using approved materials;
 - Demonstrate effective training techniques;
 - Demonstrate use of audience feedback and questioning techniques;
 - Respond appropriately to trainee questions;
 - Discuss uses of audio/visual aids;
 - Demonstrate use of audio/visual aids;
 - Demonstrate use of the summary process for reinforcing understanding;

- Conduct an evaluation of a lesson presented by another instructor;
- The classroom instructor:
 - Discuss the entry level technical qualifications for classroom instructors;
 - Explain the need for classroom instructors to develop and demonstrate professional skills/attitudes at all times when dealing with trainees;
 - Discuss the importance of the classroom instructor and the SME working closely with instructional technologists to identify content, resources, and constraints for proposed training;
- Lesson plans:
 - Develop a lesson plan based on a terminal learning objective by applying concepts of adult learning and motivation to lesson development;
- Learning objectives:
 - Develop a learning objective containing the three components;
 - Discuss how training settings are selected based on the task statement's action verb;
 - Group example learning objectives by training setting;
 - Discuss the relationships that affect sequencing of learning objectives;
 - Sequence example learning objectives;
 - Discuss how sequencing learning objectives affects student learning;
 - Explain how learning objectives are utilized in training programs;
- Instructional materials and media:
 - Discuss the methods used to select appropriate instructional materials and media to support a classroom lesson;
 - Select appropriate audio/visual/instructional aids explain how to procure training equipment, mock-ups, models, and training aids;
 - Demonstrate the correct use of instructional materials and media;
- Training program evaluation:
 - Describe the purpose of training program evaluation;
 - Discuss the methods used to evaluate training effectiveness at the individual trainee and program levels;
 - Discuss the content of forms that monitor student reaction to training;
 - Discuss how trainee reaction forms are utilized for program modifications;
 - Discuss how post-training feedback from trainees and their supervisors are utilized to refine training programs;
 - Discuss how records of trainee performance may be used as a basis for training program modification;
- Written examinations and test item development:
 - Discuss the purpose(s) of testing;
 - List the types of commonly used measuring instruments;
 - Explain why tests should be based on learning objectives;

- Discuss the types and uses of test items (questions);
- Discuss the advantages/disadvantages of each test item format;
- Discuss why the selection of test item format should be based on the learning objective's action verb;
- Discuss how test items are developed and the reason(s) for references, an answer key (which includes directions for partial credit for grading essay questions), assigning item point values, establishing conditions, and specifying criteria;
- Develop at least one example of each test item type;
- Evaluate and discuss example test items;
- Discuss the need for the development of test specifications to create written examinations;
- Define 'validity' and 'reliability';
- Discuss the need for validity and reliability of test items and examinations;
- Discuss the reason(s) why an instructor should proctor all written examinations;
- Discuss facility policy regarding cheating on examinations;
- Discuss facility policy regarding the reuse of written examinations (considering examination compromise) discuss the use of test item banks (either computerized or on paper) to generate examinations;
- Discuss methods to reduce subjectivity and ensure uniformity when grading essay questions;
- Discuss the reasons for reviewing examinations with trainees;
- Trainee stress/stress management:
 - Describe symptoms that may identify the need for counselling;
 - Arrange a counselling session;
 - Demonstrate counselling through roleplay utilizing individual and small group counselling techniques;
 - Utilize techniques to summarize and end a counselling session;
- Qualification of trainees:
 - Describe the evaluation processes which may be utilized to qualify a trainee at the completion of a training program (comprehensive written examinations, operational evaluation with a first line supervisor, oral board, etc.).
ANNEX X.

ON-THE-JOB TRAINER COMPETENCES

The following list of representative competencies should be reviewed for applicability to a facility's OJT instructor training program. Competencies that are omitted should be evaluated for inclusion in other instructor training programs. Those competencies that apply should be converted to facility-specific terminal and enabling learning objectives. Once in the learning objective format, training and evaluation tools may be designed. An OJT instructor training course should develop the following representative competencies:

- OJT training:
 - General:
 - Define 'on-the-job training';
 - Explain how OJT differs from 'job experience';
 - Discuss the relationship of OJT to other instructional methods or training settings;
 - Discuss the advantages and disadvantages of OJT;
 - Discuss methods by which disadvantages may be minimized or eliminated;
 - Discuss the planning of a performance-based OJT program;
 - Discuss the need for monitoring a student's progress during enrolment in an OJT program;
 - Training portion of OJT:
 - Describe the 'training portion' of the OJT process;
 - Discuss the reasons for and the process by which the OJT instructor may 'tailor' an OJT lesson to an individual trainee based on the trainee's knowledge and skills at the start of the lesson (trainees that can perform some/all of the learning objective don't need to be 'taught' what they already know);
 - Review trainee records to determine completion of prerequisite training;
 - Conduct OJT using approved materials;
 - Demonstrate use of the summary process for reinforcing trainee understanding;
 - Conduct an evaluation of another instructor's OJT lesson delivery;
 - Evaluation portion of OJT:
 - Define 'performance test' (may also be referred to as a 'practical factor');
 - Describe the purpose of a performance test;
 - Explain why and how knowledge and skill(s) are assessed during a performance test;
 - Discuss the performance test levels of accomplishment (perform, simulate, observe, and discuss);
 - Explain how the content of a performance test is determined and subsequently controlled;
 - Develop a training standard to control the content of a performance test;

- Discuss the contents of an OJT checklist (also called qualification card), including the guidance that should be provided for the trainee and the OJT instructor;
- Discuss the development of an OJT checklist;
- Discuss how performance tests are conducted when several levels of accomplishment are specified on the OJT checklist, i.e., perform/simulate;
- Describe the OJT performance test process including requirements to document level of accomplishment;
- Discuss the techniques utilized to assess knowledge during a performance test;
- Discuss techniques utilized by the OJT instructor to critique trainee performance;
- Conduct a performance test using an approved evaluation standard;
- Evaluate an OJT instructor administering a performance test;
- Records management:
 - Discuss the importance of maintaining adequate OJT program records;
 - Describe the OJT instructor's responsibilities with regard to the documentation of training and evaluation of employees;
 - Discuss the process used to document OJT and performance testing processes;
- The OJT instructor:
 - Describe the attributes of a competent OJT instructor;
 - Discuss the entry level technical qualifications for OJT instructors explain the need for OJT instructors to develop and demonstrate professional skills/attitudes at all times when dealing with trainees;
 - Discuss the importance of the OJT instructor working closely with instructional technologists to identify required content, resources, and constraints for proposed training;
 - Discuss the importance of advising a trainee's supervisor or manager of training concerns;
 - Explain why resourcefulness and creativity on the part of an OJT instructor are necessary;
 - Explain the OJT instructor's role in the total training effort;
- Learning objectives:
 - Discuss how the sequencing of learning objectives may affect student learning;
 - Explain how learning objectives are utilized in OJT programs;
 - Develop a learning objective containing the three component parts;
- Principles of adult learning and motivation:
 - Discuss the factors which are under an instructors control that affect learning and motivation during OJT;
 - Demonstrate techniques that promote learning and motivation of learners;

- OJT guides:
 - Define OJT guide;
 - Explain how OJT guides differ from classroom lesson plans;
 - Describe the reasons for utilizing an OJT guide to conduct OJT;
 - Develop an OJT guide that is based on a terminal objective using the concepts of adult learning and motivation;
 - Explain why it is not usually possible to assign fixed time allotments to OJT topics;
- Qualification of trainees:
 - Describe the evaluation processes which may be utilized to qualify a trainee at the completion of a training program (comprehensive written examinations, operational evaluation with a first line supervisor, oral board, etc.).

ANNEX XI.

THEORETICAL AND PRACTICAL TRAINING INSTRUCTORS LEVELS AT

KOZLODUY NPP TRAINING CENTRE

TABLE XI-1. TRAINING INSTRUCTORS LEVELS

Functions/ Job Position/Level	Trainer Specialist 1	Trainer Senior Specialist 2	Trainer Expert 3	Trainer Senior Expert 4	
Education	MSc	MSc	MSc	MSc	
Area	Technical science	Technical science	Technical science	Technical science	
Technical experience	3 years at NPP	5 years at NPP	6 years at NPP	6 years at NPP	
Conduct of training					
Classroom training	Provide (minimum four basic and two specialized courses)	Provide (minimum five basic and five specialized courses)	Provide Analyse performance Monitor performance	Provide Analyse performance Monitor performance	
Laboratory/Workshop training	Provide practical exercises in laboratories/ workshops and mock-up hall	Provide practical exercises in laboratories/ workshops and demonstrations cabinets	Provide Monitor performance Support training performance methodologically	Provide Control training performance	
Development of training	materials and aids				
Classroom training materials and aids	Take part in development	Develop	Develop Organize activities	Develop Control activities	
Laboratory/Workshop training materials and aids	Take part in development	Develop	Develop Verify developed materials	Develop Control development activities	
Development of terms of reference for training materials			Elaborate	Elaborate	
Verification of developed training materials and aids	Check Verify Propose measures for improvement	Check Verify Propose measures for improvement	Check Verify Propose measures for improvement Agree	Check Verify Propose measures for improvement Approve	
Update of training materials and aids	Take part in update	Update	Update	Control update activities	
Methodological activities					

TABLE XI-1. TRAINING INSTRUCTORS LEVELS

Functions/ Job Position/Level	Trainer Specialist 1	Trainer Senior Specialist 2	Trainer Expert 3	Trainer Senior Expert 4
Methodological support	Support development	Support development	Support development	Support development
and aids development			Support application of developed materials and aids	Support application of developed materials and aids
Methodological support		Support development	Support development	Support development
of contractors			Support application of developed materials and aids	Support application of developed materials and aids
Analysis and evaluation	of training effectiveness			
Analysis and evaluation	Take part in activities	Take part in activities	Analyse	Analyse
of training effectiveness activities			Evaluate	Evaluate
			Propose measures to improve effectiveness	Propose measures to improve effectiveness
Examinations commissions and specialized committees			Take part	Take part
Design/Planning				
Individual training	Design	Design	Design	Design
programmes		Coordinate performance	Organize performance	Organize performance
Other plans and programmes	Take part in design/planning	Take part in design/planning	Design Organize performance	Design Organize performance
Knowledge management			organize performance	organize performance
Knowledge management				Take part
Activities concerning do	cuments			
Documents elaboration	Take part in documents	Take part in documents	Develop documents	Develop documents
and verification	elaboration and verification	verification	Verify developed documents	Verify developed documents
Apprentice (internship) o	organization and coordinat	ion		
Apprentice (internship)	Take part in preparation	Take part in preparation	Organize	Organize
	and performance	and performance	Monitor	Monitor
Qualification				
Self-qualification	Maintain	Maintain	Maintain	Maintain
	Improve	Improve	Improve	Improve

ANNEX XII.

INSTRUCTOR JOB ANALYSIS

Key – Arabic numeral (i.e., 3 = duty area)

- Arabic numeral with decimal (i.e., 3.8 = tasks relating to duty area)

1	ANALYSE TRAINING NEEDS	Difficulty	Importance	Frequency
1.1	Conduct a needs analysis			
1.2	Conduct job analysis			. <u></u>
1.3	Interpret job analysis data			. <u></u>
1.4	Revise/modify existing job analysis			. <u></u>
1.5	Conduct a task analysis			. <u></u>
1.6	Interpret task analysis data			. <u></u>
1.7	Revise/modify existing task analysis			. <u></u>
1.8	Evaluate requests for training			. <u></u>
1.9	Develop questionnaires to determine student and management needs			
1.10	Analyse student and management questionnaires			
2	CONDUCTING TRAINING	Difficulty	Importance	Frequency
2.1	Prepare instructional setting			
2.2	Review lesson plan			
2.3	Schedule resources and facilities			
2.4	Verify training schedule			
2.5	Verify training equipment is operable			. <u></u>
2.6	Administer diagnostic test			. <u></u>
2.7	Evaluate diagnostic test results			. <u></u>
2.8	Use instructor guide			. <u></u>
2.9	Conduct plant walk-throughs and field trips			. <u></u>
2.10	Perform demonstrations			. <u></u>
2.11	Conduct lab sessions			. <u></u>
2.12	Conduct lecture			
2.13	Conduct discussion			. <u></u>
2.14	Conduct seminars			. <u></u>
2.15	Conduct role-playing exercises			
2.16	Conduct hands-on exercises			. <u></u>
2.17	Apply case studies			
2.18	Use a flip chart			
2.19	Use a videotape			

2.20	Use a black (white) board			
2.21	Use slides			
2.22	Use transparencies			
2.23	Question trainees orally during lesson to determine their progress			
2.24	Respond to trainee questions			
2.25	Monitor computer based training			
2.26	Team teach with other instructors			
2.27	Monitor/facilitate independent study activities			
2.28	Monitor/facilitate individualized instruction			
2.29	Conduct training for on-the-job training evaluator			
2.30	Supervise on-the-job training			
2.31	Administer quizzes periodically to determine trainee progress			
2.32	Administer written exam			
2.33	Administer oral exam			
2.34	Administer performance test			
2.35	Proctor written exam			
2.36	Gather feedback from trainees on effectiveness of training			
2.37	Assess your own training session			
2.38	Tutor trainees			
2.39	Conduct training programs for outside agencies			
2.40	Recognize and respond to disruptive trainee behaviour			
3	DESIGNING TRAINING	Difficulty	Importance	Frequency
3.1	Plan/organize a training documentation tracking system			
3.2	Develop a work plan for training program development			
3.3	Function as a program/curriculum development team member			
3.4	Function as a program/curriculum development project coordinator			
3.5	Coordinate a training program			
3.6	Apply adult learning theory and instructional principles to develop mentor training program			
3.7	Construct learning objectives			
3.8	Modify existing learning objectives			
3.9	Sequence learning objectives			
3.10	Choose training method			
3.11	Determine instructional setting			

3.12	Modify existing training methods			
3.13	Modify existing training materials			
3.14	Modify existing lesson plans			
3.15	Modify existing exam questions			
3.16	Choose type of media and supplies to be used			
3.17	Review existing (packaged) training programs for applicability			
4	DEVELOPING TRAINING	Difficulty	Importance	Frequency
4.1	Modify existing trainee workbook/exercise guides			
4.2	Develop trainee/exercise guides			
4.3	Modify existing trainee handouts			
4.4	Develop trainee handouts			
4.5	Modify existing audio-visual materials			
4.6	Develop flipcharts			
4.7	Develop transparencies			
4.8	Develop slides			
4.9	Develop diagnostic tests			
4.10	Develop an evaluation plan for training programs			
4.11	Develop hands-on/practical exercises			
4.12	Develop standards for performance tests			
4.13	Write performance test items			
4.14	Write multiple choice test items			
4.15	Write matching test items			
4.16	Write completion test items			
4.17	Write essay test items			
4.18	Write oral test items			
4.19	Write test instructions			
4.20	Develop test answer keys			
4.21	Develop a test specification matrix			
4.22	Develop a training standard document			
4.23	Develop a training matrix			
4.24	Perform pilot session using draft training materials			
4.25	Revise draft training materials based on pilot session feedback			
4.26	Write lesson plans for classroom setting			
4.27	Write on-the-job guides for on-the-job setting			
4.28	Develop computer based training			
4.29	Write a program description			
4.30	Coordinate vendor training			

4.31	Produce video tape presentations			
5	EVALUATING TRAINING	Difficulty	Importance	Frequency
5.1	Grade trainee quizzes/exams			
5.2	Review exam results with trainees			
5.3	Analyse trainee exam results			
5.4	Analyse post-training feedback from program graduates			
5.5	Analyse post-training feedback from program instructors			
5.6	Analyse post-training feedback from supervisors/managers			
5.7	Evaluate effectiveness of training equipment			
5.8	Evaluate effectiveness of training materials			
5.9	Revise training materials based on evaluation results			
5.10	Evaluate effectiveness of training methods		. <u></u>	
5.11	Revise training methods based on evaluation results			
5.12	Evaluate other instructors			
5.13	Evaluate vendor training			
5.14	Evaluate incoming plant modifications to determine potential effect on training programs			
5.15	Participate in writing an accreditation self- evaluation report			
5.16	Conduct a course evaluation			
5.17	Conduct a program evaluation			
5.18	Analyse personnel performance problems in-plant			
5.19	Analyse procedural problems in-plant			
5.20	Analyse equipment problems in-plant			
5.21	Conduct item analysis/test analysis on exam questions			
6	MAINTAINING INSTRUCTOR PROFICIENCY AND CERTIFICATION	Difficulty	Importance	Frequency
6.1	Attend internal and external seminars and conferences for personal/professional development			
6.2	Maintain current knowledge of technical instructional development			
6.3	Review changes in training related administrative procedures			
6.4	Participate in periodic in-plant observation sessions			
6.5	Read/review training articles			

6.6	Communicate effectively through speech			
6.7	Communicate effectively through writing			
6.8	Communicate effectively by listening			
6.9	Maintain current knowledge of plant modifications			
6.10	Interpret bargaining unit agreements			
6.11	Maintain/update instructor qualification records			
6.12	Maintain membership in professional organizations			
7	OPERATING THE SIMULATOR	Difficulty	Importance	Frequency
7.1	Develop team-oriented learning objectives			
7.2	Select simulator scenarios for training from an existing inventory			
7.3	Determine plant/simulator differences			
7.4	Determine simulator limitations			
7.5	Construct a scenario content outline			
7.6	Develop scenarios			
7.7	Test or dry-run scenarios			
7.8	Test simulator modifications			
7.9	Validate procedures on the simulator			
7.10	Perform daily operations readiness procedures			
7.11	Power-up the simulator complex			
7.12	Initialize the simulator for training			
7.13	Brief trainees prior to a simulator session			
7.14	Conduct exercise preview			
7.15	Direct and guide drill exercise			
7.16	Operate the instructor control console			
7.17	Operate remote instructor controls			
7.18	Perform restart/recover procedure			
7.19	Perform shutdown procedure			
7.20	Secure the simulator complex			
7.21	Collect data for evaluation/critique			
7.22	Evaluate trainees' visual awareness while operating simulator			
7.23	Evaluate individual crew member performance			
7.24	Evaluate crew/team performance			
7.25	Evaluate individuals/crews integrated plant operations knowledge level			
7.26	Evaluate scenario effectiveness			
7.27	Facilitate trainee critique of drill exercise			
7.28	Conduct and reinforce team skill training			. <u></u>

7.29	Maintain individual reactivity manipulation completion cards			
7.30	Maintain operations requalification records			
7.31	Maintain simulator records			
7.32	Write up a simulator problem report			
7.33	Provide procedure/design feedback to engineering			
7.34	Evaluate simulator vs plant fidelity			
8	OPERATING TRAINING SUPPORT EQUIPMENT	Difficulty	Importance	Frequency
8.1	Operate a video camera			
8.2	Operate a video recorder			
8.3	Operate a movie projector			
8.4	Operate a slide projector			
8.5	Operate a lettering machine			
8.6	Operate computer terminal and employ necessary software			
9	PERFORMING ADMINISTRATIVE TASKS	Difficulty	Importance	Frequency
9.1	Maintain/update trainee attendance records			
9.2	Maintain/update trainee grades and exam scores			
9.3	Maintain/update program development files			
9.4	Maintain/update training documentation tracking system			
9.5	Prepare a budget			
9.6	Requisition materials and supplies and review upon receipt			
9.7	Attend training meetings			
9.8	Interpret training procedures			
9.9	Maintain knowledge of appropriate company/plant policies and procedures			
9.10	Interpret regulations or rules promulgated by Federal or state agencies for training requirements			
9.11	Schedule classes			
9.12	Appraise managers and supervisors of training concerns			
9.13	Notify instructors and supervisors of new training programs			
9.14	Utilize reference library resources			
9.15	Write memos/letters/reports			
9.16	Maintain/update task-to-training matrix			
9.17	Prepare and submit company required documentation			

9.18	Initiate waivers for training			
9.19	Review company/plant procedures for changes			
9.20	Review industry information from regulatory sources			
9.21	Review industry information from other facilities			
10	PROVIDING COUNSELLING	Difficulty	Importance	Frequency
10.1	Counsel trainees concerning training related problems			
10.2	Counsel trainees in career planning			
10.3	Discuss trainee performance with trainee			
10.4	Provide remedial training materials to trainees			
11	UNDERSTANDING ORGANIZATIONAL RELATIONSHIP	Difficulty	Importance	Frequency
11.1	Establish and maintain positive working relationships with line supervision			
11.2	Establish and maintain a positive working relationship with instructional staff			
11.3	Facilitate changing policies and procedures			
11.4	Make formal presentations to management of plans for training and development of programs and projects			
11.5	Write memos and announcements about training activities			
11.6	Establish rapport and credibility with key personnel in the organization			
11.7	Use knowledge of company/plant organizational structure			
11.8	Understand how training relates to other company/plant functions			

ANNEX XIII.

TYPICAL CONTENT OF INITIAL INSTRUCTOR TRAINING PROGRAMME

Fundamental of instructor skills:

- Understanding the role of an instructor;
- Arranging the classroom (or other training setting) to match the training sessions;
- Applying adult learning theory;
- Selecting and using appropriate training techniques;
- Using lesson plans and training materials;
- Conducting lectures;
- Conducting discussions;
- Conducting practical demonstrations;
- Assisting trainees in solving problems associated with learning;
- Assessing trainees' knowledge and /or performance;
- Maintaining and using individual trainee records and training programme records.

More advanced instructor skills programmes may include:

- Designing training programmes;
- Planning and developing lessons;
- Developing lesson plans;
- Selecting, developing and modifying training material;
- Developing training evaluation methods;
- Presenting laboratory instruction;
- Managing individualized instruction;
- Conducting walks-through and plant tours;
- Supervising OJT;
- Identifying and managing trainee stress;
- Communications techniques during training;
- Working in a group;
- Adult training: generic and specific aspects;
- Conflict resolutions;
- Learning objectives;
- Preparation for a training session;
- Introductory part of a training session;
- Organization of tests or quizzes;
- Trainee performance assessment;
- Use of training handouts and training tools;
- Managing the training process;
- Pedagogical techniques in providing training;
- Methods of training;
- Evaluation of trainee performance;
- Preparation for practical lessons;
- Providing practical lessons;
- Evaluation of a course;

- Understanding the basics of a nuclear facility integrated management system and the role of training as one of important supporting processes;
- Possessing working knowledge on principles and practices of SAT;
- Understanding the organization and management of training for the nuclear facility;
- Understanding the role of the instructor;
- Understanding how adults learn;
- Analysing trainee needs;
- Incorporating operating experience in the training;
- Using appropriate training methods and techniques;
- Using effective questioning techniques;
- Using various training aids;
- Developing and conducting case studies;
- Conducting practical demonstrations;
- Communicating and cooperating with the facility line managers;
- Using training monitoring and training effectiveness evaluation techniques;
- Applying quality management to training (including documenting the training, generating and maintaining training reports and records);
- Understanding the concepts of organizational and safety culture;
- Applying human and organization performance improvement techniques.

ANNEX XIV.

EXAMPLE OF GENERAL INSTRUCTOR TRAINING PROGRAMME



FIG. XIV-1. Example of General Instructor Training Programme.

ANNEX XV.

INSTRUCTOR ON THE -JOB TRAINING PROGRAMME

XV-1. OJT GUIDES

Example from DOE-HDBK-1206-98 Guide to good practice for On-the-Job Training Department of Energy United States of America (p.14).

Performance-based training programs should require the use of OJT guides to ensure consistent delivery of training. An OJT guide is a document that outlines instructor and trainee activities, learning objectives, training content, and the resources (equipment, material, etc.) necessary for the consistent conduct of training. The contents of an OJT guide for a specific task should be based on the training standard portion of the training/Evaluation Standard (TES). An OJT guide should identify trainee prerequisites, learning activities, training equipment and materials needed for training and specific guidance for their use. OJT guides also provide specific direction to the instructor for guiding the learning process. The relationship of an OJT guide to the TES is depicted in FIG. XIV-1.



FIG. XV-1. OJT Guide.

Some may question the necessity of OJT guides. However, one of the most frequently asked questions is: "How can we ensure consistent training from one instructor to the next?" One way to ensure this is using the OJT guide. It may be a part of the OJT checklist or a stand-alone document; in either case it should reference the specific task it supports and should be organized and formatted to enhance the one-on-one learning process.

OJT guides should not contain copies of facility procedures. Rather, they should reference the appropriate procedures and provide the instructor with guidance to enhance the learning process. This practice helps ensure that the system/facility is operated only with approved procedures (which adds realism to the training), rather than with training materials, and will minimize revisions to the OJT guide as facility procedures are revised.

OJT guides should be prepared by instructional technologists with the assistance of the OJT instructor serving as the SME. They should be reviewed by an additional SME who was not directly involved in their development, and should be approved prior to use by supervisory members of the training staff and the work group for which the training was developed.

There are numerous factors which can have a significant influence on a trainee's learning and motivation during the OJT process. Instructional technologists should use these factors as they develop OJT guides. Appendix C in DOE-HDBK-1206-98 Guide to good practice for On-the-Job Training Department of Energy United States of America discusses learning and motivation as they apply to OJT.

There are many OJT guide formats that could be successfully used for OJT. They normally consist of a cover page, a body and a conclusion.

The cover page should provide the instructor with the following information:

- Task title, number, and estimated time to complete the training;
- Tools, materials, equipment, and references required;
- Safety precautions and procedural limitations;
- Reference to relevant facility procedures, facility conditions, and whose permission is required;
- Terminal and enabling objectives trainee prerequisites;
- Notes to the instructor guidance/suggestions;
- OJT guide review and approval signature(s).

The body is the blueprint for the instructional process and is comprised of the following major sections:

- Introduction;
- Explanation;
- Demonstration;
- Practice under supervision.

The conclusion of the training is comprised of the following elements:

- Summary;
- Additional motivation;
- Documentation of training.

ANNEX XVI.

INSTRUCTOR EVALUATION FORM

TABLE XVI-1. EXAMPLE OF INSTRUCTOR EVALUATION FORM

INSTRUCTOR EVALUATION FORM	Date				
Instructor Name:		Position:			
Evaluator Name:		Position:			
Course Evaluated:		Lesson Evaluated:			
Evaluation Type: Evaluator has subject matter expertise: Evaluator is BIT - certified:	AnnualYESYES	UnscheduledNONO	□ Follow-Up		

SECTION I. ITEMS	
ITEM RATING LEGEND:	- -
P – Pass	Instructor has met the criteria as outlined. No more than three of the criteria elements were rated as Needs Improvement.
P/C– Pass with Comment	Instructor has met the criteria as outlined but the evaluator has provided some specific remarks to improve the performance of the instructor. These comments are provided in the remarks section.
NI – Needs Improvement	Instructor has been rated in more than three criteria elements. This rating is given if the <u>item is not accomplished or accomplished with some difficulty</u> . Comments are provided in the remarks section to justify this rating.
NA – Not Applicable	Items that do not apply to the lesson presented. Please do NOT leave 'NA' items blank but checkmark 'NA' item so we know the item was not overlooked.
INSTRUCTIONS:	

1. Rate each criteria item using the item rating legend above. If the item is not applicable, check the 'NA' box.

2. All 'P/C' and 'NI' ratings require a short comment in the remarks section. Include item number for each comment.

3. Rate Blocks A, B, C and D with an overall rating of Pass or Needs Improvement.

TABLE XVI-2. EXAMPLE OF INSTRUCTOR EVALUATION FORM

	ITEM RATIN		G	
	Р	P/C	NI	NA
A. LESSON PRESENTATION OVERALL RATING:				
Prepared instructional setting appropriately (seating, equipment, materials, etc.)				
Conducted classroom instruction using current approved materials (Instructor Guide)				
Included motivation, and overview in the 'Introduction'				
Explained lesson information in an organized manner				
Emphasized key learning points (goals and objectives)				
Used good transition when presenting a new topic				
Used appropriate stories, examples/illustrations to clarify material				
Questioned students during lesson to determine student understanding				
Reviewed lesson objectives in lesson 'Summary'				
Used training aids effectively				
Used correct terminology (avoided or explained acronyms)				
Remarks:				
B. INSTRUCTOR DEMEANOUR OVERALL RATING:				
Presented professional appearance				
Demonstrated a thorough knowledge of the subject				
Conveyed a positive attitude towards training / students				
Related well with students				
Displayed natural mannerisms, used gestures appropriately				
Maintained eye contact, talked directly to students				
Verbalized clearly, was easily heard, used correct grammar, used appropriate rate of speaking				
Listened and responded appropriately when students commented or asked questions				
Maintained control of the class				
Applied safety precautions at all times				
Addressed problems appropriately and in a timely manner				
Managed time effectively				
Remarks:				

TABLE XVI-2. EXAMPLE OF INSTRUCTOR EVALUATION FORM

	ITEM RATING			G
	Р	P/C	NI	NA
C. DEMONSTRATION / PERFORMANCE OVERALL RATING:				
Demonstrations				
Followed the appropriate performance checklist when demonstrating a performance skill / task				
Clearly explained each step				
Correctly demonstrated each step				
Student Performance (Practical Exercises)				
Clearly explained exercise objectives and instructions				
Monitored the exercise and kept the student / group on track				
Followed performance checklist during student practice				
Identified student strengths / weaknesses during student practice				
Provided appropriate, timely feedback during student practice				
Remarks:				
D. EXERCISES / SCENARIOS OVERALL RATING:				
Followed preparation procedures appropriately for assigned tasks				
Clearly explained the exercise objectives and instructions				
Performed assigned tasks well				
Worked well with other key exercise team personnel (exercise director, controllers, other instructors, support personnel, interpreters, role players, students)				
Used appropriate performance checklist(s) during the exercise				
Identified student strengths / weaknesses during exercise performance				
Provided meaningful and positive feedback				
Remarks:				

TABLE XVI-3. EXAMPLE OF INSTRUCTOR EVALUATION FORM

(cont.)

SECTION II. EVALUATOR COMMENTS (based on Section I item ratings)

INSTRUCTIONS:

1. Refer to the item number for each comment.

2. Please provide additional pages if this space is not sufficient.

SECTION III. EVALUATION ACKNOWLEDGEMENT

Evaluator Name	Signature	Date
Evaluator Name	Signature	Date

Instructor Comments:

SECTION IV. CORRECTIVE ACTION PLAN

If the overall performance rating is 'needs improvement' a corrective action plan must be developed and documented in the space below. A corrective action plan will list corrective action(s), identify and define resources available to assist the instructor in meeting acceptable performance, establish a deadline for meeting the requirements of the corrective action plan, and establish actions taken if performance is not improved.

TABLE XVI-3. EXAMPLE OF INSTRUCTOR EVALUATION FORM

(cont.)

Т

SECTION V. CORRECTIVE ACTION PLAN ACKNOWLEDGEMENT				
Course manager Name	Signature	Date		
Instructor Name	Signature	Date		
Instructor Comments:				

ANNEX XVII.

EXAMPLE OF INSTRUCTOR LEVELS OF PROGRESSION

TABLE XVII-1. LEVEL OF QUALIFICATION

Representative Job Title	Level	Representative Job Description	Representative Course Title	Representative Competences
Manager of training and Development Program Leader	Level VI	 A. An administrator or manager who plans and directs the work of subordinate trainers. Functions as an employee development/problem solving consultant where training is a possible alternative to achieve an organizational goal. Does training cost estimating and training proposals? Evaluates training results and trainers. Provides or arranges for materials, outside consultants, etc. B. Preparation for this position includes all those expectations proceeding as well as training management courses emphasizing program planning and evaluation, training research, and various generically related management/administration courses that go beyond directing people and include organizational development. Advanced degree ¹. 	Research Methods Program Planning and Evaluation Administration of Occupational Education Personnel Management Organizational Development	Develop yearly and multi-year plans and budgets. Select competent staff, control resources, supervise staff, motivate, schedule activities, keep records, maintain public relations.
Course Designer Training Analyst Lead Instructor /Coordinator	Level V	 A. A senior, experienced trainer who functions as a lead trainer. Develops curriculum, may teach and mentor new trainers, teaches advanced coursework. Does assessment and evaluation training. B. Significant training/teaching experience. Advanced coursework in learning theory, instructional design, needs research, front end analysis. Beginning management orientation. Bachelor's degree¹. Includes level IV. 	Supervision/Human Relations Individual and Organizational Behaviour Employee Behaviour and Assessment Program Evaluation and Corrective Action Assessing Employee Performance	Do front end analysis and research. Analyse data and translate into program design. Write proposals. Arrange and conduct staff continuing training. Evaluate instructional designs and vendor products.

¹ Specialized experience and education may be submitted on an individual basis.

TABLE XVII-1. LEVEL OF QUALIFICATION

Representative Job Title	Level	Representative Job Description	Representative Course Title	Representative Competences
Instructor Instructional Developer	Level IV	 A. Works under the direction of a senior/experienced trainer or supervisor. Provides formal classroom instruction to employees from various departments. Develops course work and instructional materials. B. Teaching/training knowledge background includes courses with such titles as 'Methods of Teaching Adults', 'Occupational Analysis', 'Course Construction', 'Learning Theory', and the like. A fairly heavy dose of both 'how to' and 'why' with the 'why' being accepted as essential. Includes Level III. 	Methods of Occupational Training Occupational Analysis and Course Construction (Front end analysis) Analysis and Design Instructional Development	Use competency- based models and various assessment techniques. Evaluate learning objectives and multi-media materials. Utilize SAT and vendor materials.
Trainer/ Lecturer	Level III	 A. An individual who works full- time or part-time in training. Primarily a SME working as a classroom trainer using instructional materials and strategies developed by others. B. Training preparation: Instructional methods, learning theory. Overview of course development. Includes Level II 	Instructor Training	Implement group interaction methods. Classroom teaching techniques. Train and test using materials prepared by others.
Foreman/ supervisor	Level II	 A. Supervisor or foreman who is expected to regularly indoctrinate new employees in organization expectations, and, on occasion, to update and provide information in semiformal department meetings and conduct job-specific training. Occasionally asked to provide information about his/her department to employees of other departments in a rather formal setting. B. The 'Instructor Training' course plus appropriate material covering information on andragogy, front end results analysis and developing learning materials. More 'how to' information, but including some 'why'. Includes Level I. 	Instructor Training	Use group interaction methods, select strategies to meet learning needs, use elements of performance based training to develop an instructional program. Use audio-visual equipment.

TABLE XVII-1. LEVEL OF QUALIFICATION

Representative Representative Level Representative Job Description Representative Job Title Course Title Competences Suitably Level I A. SME working as an OJT **OJT** Instructor Use effective qualified and instructor, using materials developed Training learning experienced by others, who conducts OJT and concepts. personnel in the employee performance testing. Demonstrate a specialist work B. Would benefit from a trainer job skill. area 'OJT Conduct course, i.e., Instructor Training'. A course that deals with performance the 'how to' rather than the 'why', tests. one-on-one instructional methods, and performance testing.

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International Atomic Energy Agency Vienna ISBN 978-92-0-108018-9 ISSN 1011-4289