

373



XA9949129

IAEA Activities on NPP Personnel Training and Qualification.

A. KOSSILOV

***International Atomic Energy Agency,
Vienna, Austria***



1998-06-16

1

Introduction - 1

- ◆ **Availability of sufficient number of competent personnel - one of the most critical requirements for SAFE and RELIABLE nuclear power plant operations and maintenance**

- ◆ **Competence of personnel is essential for reducing the frequency of events connected with human errors and equipment failures**

1998-06-16

2

Introduction - 2

- ◆ **The IAEA Guidebook on “Nuclear Power Plant Personnel Training and its Evaluation” incorporates the experience gained worldwide and provides recommendations on the use of the Systematic Approach to Training (SAT)**
- ◆ **SAT - the international best practice for attaining and maintaining the qualification and competence of NPP personnel and for the quality assurance of training**

1998-06-16

3

IAEA Guidance On NPP Personnel Training-1

- ◆ ***Approach to training:***
 - ◆ **SAT is a broad integrated approach emphasizing not only technical knowledge and skills but also human factors knowledge, skills and attitudes.**
 - ◆ **SAT promotes and strengthens **safety culture** and **quality culture** (IAEA Report on Safety Culture, INSAG-4)**

1998-06-16

4

IAEA Guidance On NPP Personnel Training-1

◆ ***Approach to training (cont):***

- ◆ The critical role of **operating personnel** has been emphasized by every country with a nuclear programme, and training programmes and resources have reflected this. **Maintenance training** which has received far less attention and resources to date must be improved through the use of SAT

1998-06-16

5

IAEA Guidance On NPP Personnel Training-2

◆ ***Evaluation of training programmes:***

- ◆ **Feedback from plant operational experience and industry wide operational experience**
- ◆ **Reports from inspectors and audits**
- ◆ **Feedback from plant supervisors, training programme graduates, instructors and trainees**
- ◆ **Observation of training and plant activities and other internal reviews**
- ◆ **The results of evaluation are used to confirm, improve or modify the training programmes and training process. Necessary plant improvements may be identified.**

1998-06-16

6

IAEA Guidance On NPP Personnel Training-3

◆ Quality assurance of training programmes:

- ◆ **SAT** has inherent quality assurance (QA) features
- ◆ **SAT** - a valuable tool in the overall NPP QA programme
- ◆ Neither SAT nor its QA features can be successfully implemented without **full support** of upper level **management**

1998-06-16

7

IAEA Guidance On NPP Personnel Training-4

◆ Introduction and use of SAT:

- ◆ The introduction of SAT requires adequate numbers of personnel having the necessary technical and teaching competence
- ◆ SAT - a flexible approach which can and should be adapted to the specific needs, conditions and resources of individual NPPs
- ◆ International guidance needs to be used in conjunction with expert advice and assistance as well as know-how transfer through technical visits and training courses

1998-06-16

8

*IAEA Activities on Training and Qualification
of NPP Personnel - 1*

◆ ***Regular Programme***

- ◆ **Transfer of know-how and experience on the introduction and use of SAT to develop, implement and evaluate training programmes**
- ◆ **OSART (Operational Safety Review Team) missions - assistance on enhancing the safety of NPP during construction, commissioning and operation (Related training aspects: training programmes, training facilities and equipment)**
- ◆ **ASSET (Assessment of Safety Significant Events Team) missions - assistance on enhancing operational safety through an effective policy of prevention of incidents at NPPs - root cause analysis related to human factors and their implications for training**

1998-06-16

9

*IAEA Activities on Training and Qualification
of NPP Personnel - 2*

◆ ***Technical Co-operation Programme***

- ◆ **Technical project on training and qualification of NPP personnel (Armenia, Hungary, Lithuania, Ukraine, Slovakia, Pakistan)**
- ◆ **Training Courses**
- ◆ **Training advisory services**

1998-06-16

10

IAEA Documents on Training and Qualification

- **Safety culture, Safety Series No. 75-INSAG-4 (1991)**
- **Staffing of Nuclear Power Plants and the Recruitment, Training and Authorization of Operating Personnel, Safety Series, 50-SG-01, Rev. 1**
- **Nuclear power plant personnel training and its evaluation. A Guidebook, TRS-380 (1996)**
- **Simulators for training nuclear power plant personnel, TECDOC-685 (1993)**
- **Guidebook on the education and training of technicians for nuclear power, TRS-306 (1989)**

1998-06-16

11

IAEA Documents on Training and Qualification

- ▲ **Experience in the Use of Systematic Approach to Training (SAT) for Nuclear Power Plant Personnel, TECDOC - in printing**
- ▲ **Selection, specification, design and use of various nuclear power plant training simulators, TECDOC-995, 1998**
- ▲ **Selection, Competency Development and Assessment of Nuclear Power Plant Managers, TECDOC - in printing**
- ▲ **Lessons learned with respect to NPP organization and staffing to improve performance, TECDOC - in printing**
- ▲ **IAEA World Survey of NPP Personnel Training, TECDOC - in printing**

1998-06-16

12

379

Conclusions

- ◆ **SAT - the international best practice for attaining and maintaining the qualification and competence of NPP personnel and for the quality assurance of training**
- ◆ **SAT promotes and strengthens safety culture and quality culture**
- ◆ **SAT - a flexible approach which can and should be adapted to the specific needs, conditions and resources of individual nuclear power plant**
- ◆ **Final responsibility for personnel competence lies with the plant manager**
- ◆ **National input to SAT implementation is essential**

1998-06-16

13

370

**New TECDOC
on**

**SAT ANALYSIS PHASE FOR
NPP PERSONNEL TRAINING:
METHODS AND EXAMPLES**

A. Kossilov, IAEA

06 June 1998

1

Purpose of the document

- **Importance of Analysis Phase**
- **Introduce Methods and Techniques**
- **Indicate Benefits/Weaknesses**
- **Present Exapmles of Results Obtained**

06 June 1998

2

384

Scope of the Document

- ◆ **Description of Methodologies**
- ◆ **Practical Examples**

06 June 1998

3

Target Audiences for the Document

- **Plant management**
- **Training managers**
- **Training Professionals**
- **Regulatory body staff whose duties related to training and qualification**

06 June 1998

4

Description of Methodologies

- ◆ **Selection of an Appropriate Methodology for Analysis**
- ◆ **Selecting an Analysis Technique**
- ◆ **Fundamental Elements of Analysis**
- ◆ **Types of Analysis**
- ◆ **Methods Used to Select Tasks for Training**
- ◆ **Linkage to Design Phase**

06 June 1998

5

Selected Examples of Analysis

- ◆ **Scope**
- ◆ **Format of the Selected Examples**
- ◆ **Traditional Task Analysis Method (JTA)**
- ◆ **Competency Analysis Method (JCA)**
- ◆ **Table Top Method with JTA or JCA**
- ◆ **Combined Methods**

06 June 1998

6

Appendices

- ◆ Worked Examples of JTA
- ◆ Worked Examples of JCA
- ◆ Worked Table Top Method Examples
- ◆ Worked Examples of Combined Methods

06 June 1998

7

CORE TEAM

- ◆ P. Haigh, BNFL Magnox Generation, UK
- ◆ R. J. Bruno, EXITECH Corp., USA
- ◆ J. -C. Hazet, EDF, France
- ◆ A. Yu. Kazennov, VIINEAS, Russia
- ◆ J. Yoder, U.S. DOE, USA
- ◆ A. Kossilov, IAEA
- ◆ T. Mazour, IAEA

06 June 1998

8

Project implementation

- ◆ **CS: 23 - 27 FEBRUARY 1998**
- ◆ **CS: 14 - 17 SEPTEMBER 1998**
- ◆ **AGM: 30 NOVEMBER - 4 DECEMBER 1998**
- ◆ **Project completion: FEBRUARY - MARCH 1999**



INTERNATIONAL ATOMIC ENERGY AGENCY
AGENCE INTERNATIONALE DE L'ENERGIE ATOMIQUE
МЕЖДУНАРОДНОЕ АГЕНТСТВО ПО АТОМНОЙ ЭНЕРГИИ
ORGANISMO INTERNACIONAL DE ENERGIA ATOMICA

WAGRAMER STRASSE 5, P.O. BOX 100, A-1400 VIENNA, AUSTRIA

TELEX: 1-12645, CABLE: INATOM VIENNA, FACSIMILE: (+43 1) 20607, TELEPHONE: (+43 1) 2060, E-MAIL: IAE0@IAEA1.IAEA.0R.AT

IN REPLY PLEASE REFER TO:

DIAL DIRECTLY TO EXTENSION:

PRIERE DE RAPPELER LA REFERENCE: 621-I2 AG-1016

COMPOSER DIRECTEMENT LE NUMERO DE POSTE: 22802

Dear Colleague:

At the request of the International Working Group on Training and Qualification of NPP Personnel (IWG-T&Q), the IAEA is now in the process of developing a document to provide examples of Systematic Approach to Training (SAT) analysis methods for various NPP job positions. The intent is to provide actual data, clearly showing the results of various SAT analysis methodologies, for use by organizations intending to establish or improve the SAT process as the basis for the training of NPP personnel.

In that regard, the IAEA seeks examples of SAT analysis methods. If you can contribute to this effort, please provide to me the information requested in the attachment to this letter. If possible, I would appreciate receiving this information in both hard-copy and magnetic media (MS WORD format is preferable.) One convenient way to provide the electronic information is as an attachment to an email message. If you have any questions or difficulties in preparing the information requested, please contact me or my colleague, Thomas Mazour.

If you are unable to contribute to this effort, but know someone in your organization or country who can, please forward this request to them.

Thank you for your assistance in this effort.

Very truly yours,



Andrei Kossilov

Nuclear Power Engineering Section
Division of Nuclear Power
P.O.Box 100, Wagramerstr. 5
A-1400 Vienna
AUSTRIA
Tel.: +43 1 2060 22802
Fax: + 43 1 20607
E-mail: a.kossilov@iaea.org
t.mazour@iaea.org

Attachment

Information Requested for SAT Analysis Examples
(Items 1 through 12 should be provided on the attached table)

1. **Job Position.** The job title of the position analyzed and a brief (one line) description of the job. (If you wish to provide information for more than one job position, please use separate tables).
2. **Country.** The country from which the example comes.
3. **Utility/NPP.** The name of the utility and/or NPP from which the example comes (if it is not desired that this information be included in the IAEA document, leave this item blank).
4. **Type of NPP.** E.g., : PWR, BWR, VVER, RBMK, PHWR, AGR.
5. **Type of analysis:** Select from one of the following:
 - job and task analysis (JTA)
 - job competencies analysis (JCA)
 - combined JTA/JCA
 - other (provide a brief description)

Also provide a brief (one or two sentence) indication of why this type of analysis was chosen.

6. **Total duration.** How long did it take to complete the analysis?
7. **Resources.** How many people (including contractors) were involved in the process and how much time did they devote? (e.g: 2 Chemistry Technicians (total of 15 person-days), 1 Operation Department Manager (total of 2 person-days)).
8. **Tools.** List any special tools that were used for this type of analysis (e.g: databases, templates, special analysis software).
9. **Procedures/References.** List the procedures that were used to implement the analysis and references used as the basis for the analysis process/procedures.
10. **Identification of attitudes.** It is generally recognized that it is more difficult to identify attitudes than skills and knowledge. If your analysis provided a particular way to identify attitudes please indicate briefly the content of this approach or provide references.
11. **Strengths.** Briefly identify the strengths of this analysis process.
12. **Weaknesses/difficulties encountered.** What weaknesses did you find in this analysis process? What difficulties did you encounter?

Additional Information

In addition to completing the table on the following page, please provide a description of all aspects of your SAT analysis phase. This description should include examples of the tasks, competencies, knowledge, skills and attitudes as well as associated learning objectives for some aspects of the job (e.g. duty area) . Preferably this information should not exceed 10 pages. In general this information should be in English. However, it is not necessary to translate task lists, or other computer printouts.

NOTE:

If possible, please provide the requested information in both hard-copy and electronic media (MS Word format is preferable).

SAT Analysis Example Table

1 - Job Position	
2 - Country	
3 - Utility/NPP	
4 - Type of NPP	
5 - Type of analysis	
6 - Total Duration	
7 - Resources needed	
8 - Special Tools	
11 - Procedures/ References	
12 - Identification of Attitudes	
13 - Strengths	
14 - Weaknesses/ difficulties encountered	

IAEA-TECDOC-1024

**Selection, competency
development
and assessment of
nuclear power plant managers**

June 1998

Background

- ◆ **The environment in which NPPs are operating has continued to change, placing new demands on NPP managers to continue to maintain a high level of safety while at the same time finding new ways to work more efficiently and effectively.**

Background (continued)

- **It is in that context that more structured ways for the selection, competency development and assessment of NPP managers are proposed in this report.**
- **An integrated approach based on the competencies that these managers need in order to be successful is proposed.**

Purposes of the Document

- **Stress the importance of appropriate selection, development and assessment of NPP managers for the continued safe and efficient operation of NPPs.**
- **Describe an integrated approach to the selection, development and assessment of NPP managers.**
- **Provide the basis document for a self-assessment of current selection, development and assessment methods.**
- **Support the development of national normative documents.**
- **Provide examples of good practices.**

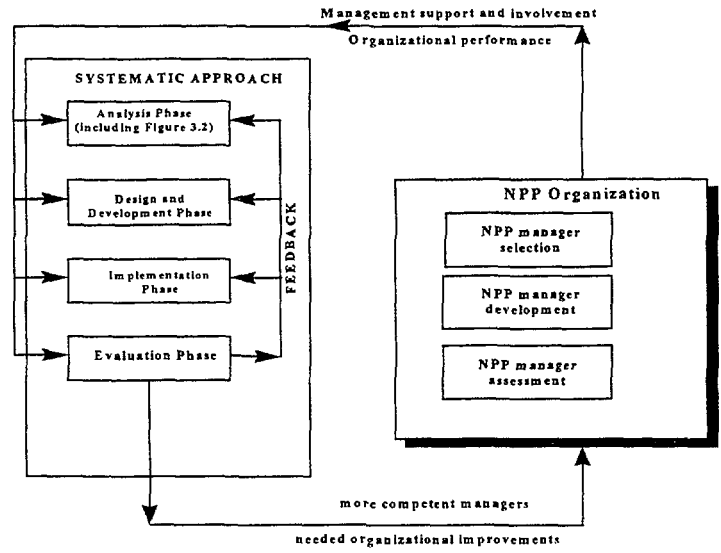
Basis for the Information Provided

- **Information was obtained from utilities that have experience in competency based management development programmes.**
- **Such utilities have found considerable benefit in providing such programmes.**

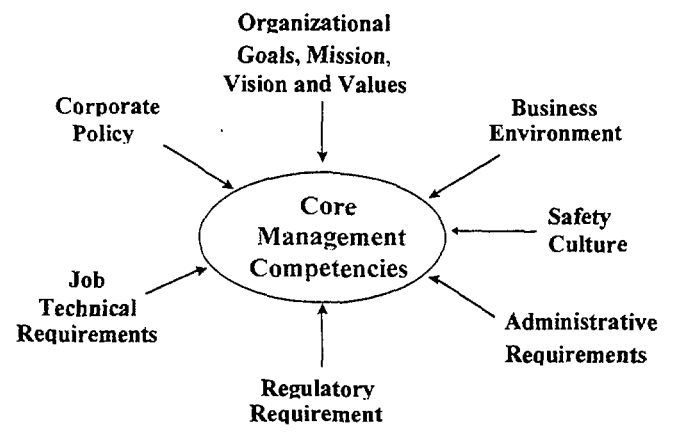
Target Audiences for the Document

- **Senior NPP and utility managers**
- **Management training specialists**

Systematic Approach Model



Factors influencing the competencies needed by managers



NPP Manager Competency Areas - 1

- **ACHIEVING RESULTS**
- **BUSINESS/COMMERCIAL FOCUS**
- **CHANGE MANAGEMENT**
- **COMMUNICATE**
- **INFLUENCE**
- **MAKING DECISIONS**
- **PEOPLE DEVELOPMENT**

NPP Manager Competency Areas - 2

- **PROCESS AND PROJECT MANAGEMENT**
- **PERSONAL CHARACTERISTICS**
- **SAFETY MANAGEMENT**
- **STAKEHOLDER FOCUS**
- **STRATEGIC THINKING**
- **TECHNICAL EXPERTISE**

IAEA FOLLOW-UP PLANS

- ◆ ? **National TC Project in Bulgaria**

- ◆ ? **Regional TC Project for Europe (1999-2001)**
**“Co-operation to Promote and Reinforce
Selection, Development and Assessment of NPP
Managers”**