



SAT PROJECTS' EFFECTIVENESS: MANAGERIAL ASPECTS

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Summary

Discussion provided below in the text and on the presentation transparencies is based on hands-on experience of SAT projects' implementation which have been or being conducted in several countries, and intended to develop or upgrade NPP personnel training.

We will "risk" to say that no comprehensive system, training system in particular, can work without feedback. A powerful tool to establish a controllability of a training process is to measure (using certain criteria) trainees' performance, training process, employees' qualification, on-job human performance, overall plant performance, and then (using certain algorithms) to provide feedback control to training and the whole organization with clear understanding and grading whether we deal with training-related root causes or not. In this way a training effectiveness may be considered as a feature that shows to what extent training is producing a desired result (e.g. developing needed skills, knowledge and attitudes, enhancing quality, safety and productivity, establishing cost-effective training, etc.).

In order to design a training system with the features of feedback control, the SAT projects are implemented. In this respect SAT is more "systems" rather than "systematic" approach. Obviously, the criteria to evaluate a training system should be established.

SAT implementation may be considered as a corrective action to fix the problems associated with the deficiencies in personnel competence or ineffectiveness of training system. But each corrective action or initiative related to a training system development should be generated and justified through normal process of evaluation and systematic needs analysis.

The effectiveness of a training development project shall be evaluated against the overall goal and specific objectives of a project. The ultimate overall goal of SAT project implementation is to develop or upgrade NPP personnel training programmes and the whole training system in order to provide reliable and effective NPP personnel training and qualification. In reality, the objectives of SAT implementation at many NPPs have been more specific and pragmatic, mostly derived from the features of SAT as a management tool. If we will consider an "effective" project in meaning of producing a desired effect or influence, then we ultimately need to clearly state what positive influence or impact on plant performance, production, engineering, organization, business conduct, personnel qualification, or training process quality do we expect from SAT project introduction. Criteria to evaluate SAT project implementation should be established.

A set of methodological, technical and organizational measures should be taken in order to successfully achieve the objectives of SAT project implementation, and therefore to positively impact on personnel training and the whole organization. These measures include a development of standards and criteria, use of job aids and procedures, training of personnel involved, identification of the role of managers and development of their attitudes, etc.

The following examples and actual practices are discussed in the presentation: systematic needs analysis, criteria to evaluate training system, specific objectives of SAT projects, and examples of the criteria to evaluate SAT project.



SAT Projects' Effectiveness: Managerial Aspects

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Presentation Outline

- ◆ **Role of evaluation and what we are evaluating**
- ◆ **Needs Analysis**
- ◆ **SAT as a corrective measure**
- ◆ **Evaluation activities and practices**
- ◆ **Key considerations**

Role of Evaluation



Can not be overemphasized !

- ◆ Allows to decide whether the training objectives have been achieved
- ◆ Whether a training programme been conducted meets the training needs
- ◆ Provides the feedback control of training to ensure that training improves performance on the job
- ◆ Provides a basis for incorporation of operating experience into training programmes, etc., etc., etc.

Finally, evaluation of training is an integral part of the whole process to manage a NPP in a safe, reliable and effective manner !

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What we are evaluating ?

- ◆ Trainees' performance ?
- ◆ Trainees' behavior ?
- ◆ Training session ?
- ◆ Training programme ?
- ◆ Former trainees' performance ?
- ◆ The whole training system ?
- ◆ Training development projects ?
- ◆ Impact of training on the whole organization ?

In broad meaning, an evaluation is measuring the outcomes against the expected results.

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Needs Analysis

Each initiative related to a training system development should be generated and justified through normal process of evaluation and systematic needs analysis !



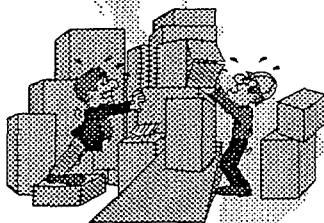
- ◆ Deficiencies / Fields for Improvement&Development
- ◆ Jobs and tasks affected
- ◆ Estimation of: impact on plant safety, frequency, personnel encouragement, personnel past success to perform an activity/task
- ◆ Identification of root cause
- ◆ Identification of the barriers
- ◆ Classification (training/non-training solution)
- ◆ Statement of a problem and development of the recommendations
- ◆ Evaluation of criticality, urgency, and attainability
- ◆ Implementation of the accepted recommendations, tracking and configuration management

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Practices of the first-run systematic needs analysis



- ◆ Package of needs analysis procedures and job aids
- ◆ 8-12 instructors, plant managers and SMEs
- ◆ Trained, coached and facilitated by 2-3 external consultants
- ◆ 2-3 weeks
- ◆ Document analyses, interviews, observations, 80-150 recommendations
- ◆ Pilot Training Review Committee

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Summary of actual Needs Analysis

No	Class of the problem cause		Ratio to the total number of problems (in percent)
1	Deficient documents	Deficiencies in regulations (including those for training)	6%
		Job description deficiencies	6%
		Deficiencies in procedures and other technical documentation	17%
	Total for deficient documentation		29%
2	Deficiencies in plant systems and equipment		10%
3	Deficiencies in Quality Assurance and Control		21%
4	Deficiencies in administrative policies, expectations for subordinates, organizational structure, or human resources management		28%
5	Deficiencies in Human Performance Evaluation System, Root Cause Analysis, or plant problem identification		11%
6	Insufficient level of personnel qualification		60%

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Summary of actual Needs Analysis (continued)

No.	Class of problem cause	Ratio to the total number of problems (%)
1	Lack of knowledge and skills in management and supervision	11%
2	Deficiencies in operating skills	12%
3	Lack of knowledge and skills in repair and maintenance activities	9%
4	Deficiencies in teamwork and diagnostics	8%
5	Lack of knowledge of plant systems and their relationships	9%
6	Lack of knowledge of plant procedures	5%
7	Attitudes, professional ethics, knowledge of and adherence to safety culture principles	7%

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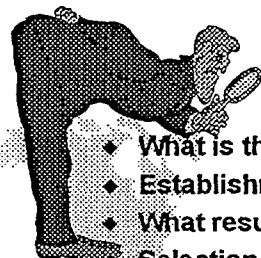
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SAT as a corrective action to fix the problems associated with: (examples)

- ◆ Unreliable or not performance-oriented training
- ◆ Vast exams resulted in loss of time and money
- ◆ Insufficient control of training
- ◆ Poor QA/QC in training area
- ◆ Deficient configuration management of training
- ◆ Ill-considered resource planning and evaluation

Why SAT is highly recommended ?

- ◆ Without an evaluation (integral part and the most important SAT activity) plant would never realize its training-related actual problems
- ◆ Long-term strategic investment to establish plant TQM



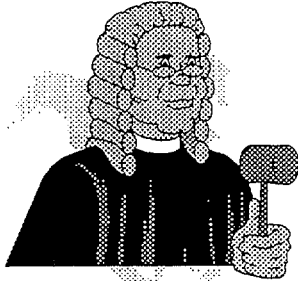
Evaluation activities

- ◆ What is the object or process of evaluation ?
- ◆ Establishment of evaluation objectives and criteria
- ◆ What results/outcomes/indicators to monitor and measure?
- ◆ Selection of evaluation types and methods
- ◆ Collection and processing of "raw data" (using necessary information and screening "triggering events")
- ◆ Matching data collected
- ◆ Identification and resolving the conflicts
- ◆ Application of the evaluation criteria
- ◆ Producing and approving an evaluation report

Judging the effectiveness is one of the evaluation intents.

Critical element - evaluators' qualification!

Evaluating training development projects



The effectiveness of a training development project shall be evaluated against the overall goal and specific objectives of a project !

- ◆ “Effective” project - in meaning producing a desired effect
- ◆ “Effect” - in meaning of the influence

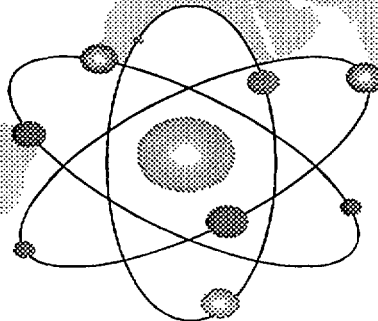
What positive influence or impact on plant performance, production, engineering, organization and business conduct do we expect from SAT project introduction?

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The ultimate overall goal of a SAT project is to develop or upgrade NPP personnel training programme(s) or the whole training system in order to enhance plant safety and efficiency by means of reliable personnel training and qualification



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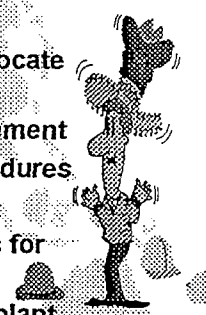
In reality, the objectives of SAT implementation at many NPPs have been more specific and pragmatic, mostly derived from the features of SAT as a management tool:

- ◆ Link training with actual plant needs
- ◆ Increase an accountability of training
- ◆ Establish reliable and standardized assessment of the trainees
- ◆ Get a mechanism for training system evaluation to allocate the resources in reasonable manner
- ◆ Incorporate QA features in personnel training management
- ◆ Obtain clear administrative and implementation procedures
- ◆ Establish qualification of training staff
- ◆ Justify and receive from various sources the resources for training system
- ◆ Develop and reinforce the attitudes towards training, plant managers' at the first place
- ◆ Establish a common and rather standardized basis to effectively communicate within the plant families and with various external organizations

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Job aids to evaluate comprehensive SAT projects

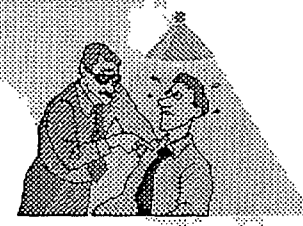
- ◆ Special evaluation form
- ◆ Based on Russia's and international experience
- ◆ Totally - 127 hierarchical evaluation criteria
- ◆ In-process and project final evaluation

The objectives and criteria should be established from the beginning but not at the end of a project !

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Example 1 of actual SAT project evaluation

◆ **Objective-criterion cross-reference: 1-11**

◆ **Criterion:**

Responsibilities for training and qualification are clearly defined for the following personnel: Plant Manager, Plant Department Managers, Plant Training Manager, Outside training Contractors

◆ **Current Status:**

Responsibilities clearly defined except for outside training contractors

◆ **Evaluation: Y-N**

W - Qualification of training contractors is not subject to the overall quality policies. QAP for training itself needs improvement

S - New job position (Deputy Plant Manager for training) has been established. Positive step increasing Training Center status and towards delegating tasks

Example 2 of actual SAT project evaluation

◆ **Objective-criterion cross-reference: 2-25**

◆ **Criterion:**

Specific and customized SAT model is defined and proved its usability

◆ **Current Status:**

SAT model (based on JCA) proposed by the Contractor is in place

◆ **Evaluation: N**

W - Many problems have been identified with this model. The model proposed is more knowledge based and should be more performance based

Example 3 of actual SAT project evaluation

◆ **Objective-criterion cross-reference:** 4-29.3

◆ **Criterion:**

Training Objectives (TOs) derived from analysis data and the traceability is established

◆ **Current Status:**

Analysis phase and TO development have been finished formally

◆ **Evaluation:** N

W - Traceability is very poor

Example 4 of actual SAT project evaluation

◆ **Objective-criterion cross-reference:** 7-36

◆ **Criterion:**

Non-training evaluation feedback has been provided to NPP for other management initiatives

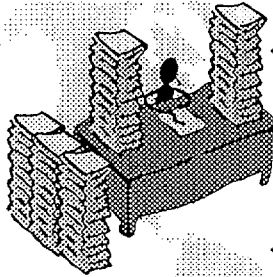
◆ **Current Status:**

Feedback provided about plant documentation, QA, plant systems and plant organization

◆ **Evaluation:** Y

S - Provided very good feedback about plant technical documentation, regulations, plant operating and maintenance procedures, Technical Specification. The most critical ones have been discussed at Training Review Committee meetings.

Evaluating a training system



- ◆ Any project has its beginning and the end. But ... Evaluation of training programme/system is being conducted continuously ! SAT project must establish a basis for it
- ◆ Job aid for self-assessment has been developed:
 - Sources: adopted from IAEA, WANO and U.S. DOE documents + our own experience
 - 113 specific criteria applied to 8 high-level objectives

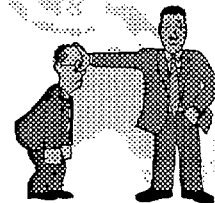
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Actual evaluations of NPP training systems have convincingly shown that from 40 to 80 percents of all problems in NPP personnel training are associated with the administrative issues, management, training organization, and plant managers' competencies including their attitudes towards training !

- ◆ Mechanism to evaluate the management and organization of training in necessary detail shall be established
- ◆ "Owners" of training programmes and training evaluation - ownership
- ◆ Self-assessment and self-correction
- ◆ Corresponding manager competencies (QA/QC, RCA, CM, auditing, etc.)



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Examples of specific criteria to evaluate management and organization of training:

Criterion 1-5: Procedures to organize, develop, implement, evaluate and revise training exist and based on SAT. Personnel training is conducted adhering to these procedures.

Criterion 1-11: Plant managers personally participate in:

- training needs analysis
- development of the requirements for training programmes
- evaluation of training, auditing of training programmes, training materials, training tools, and training session conduct, including regular observation of training sessions
- conduct of training as adjunct instructors

Criterion 1-24: Full-time instructors' salaries are sufficient to motivate these personnel and to involve high-qualified individuals.

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SAT procedures

- ◆ **Must be established for all SAT phases, including Evaluation and Revision Phase**
- ◆ **Shall be developed or customized with an involvement of the procedure users**
- ◆ **Should consist of two sets:**
 - **Administrative SAT procedures**
 - **Implementation SAT procedures**
- ◆ **Project Team shall be trained and qualified in procedure use**
- ◆ **Instructors, Trainees, Managers, and Evaluators shall be adequately trained as well to properly conduct evaluation activities (one of the most challenging issues)**

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Key considerations

- ✓ **Critical issues: Needs, Desire, Funds.**
- ✓ **Quality of training is manageable and applies to all training activities as well as results.**
- ✓ **Analysis and evaluation are the cornerstones for the quality and efficiency of training.**
- ✓ **Rule: 20/80**
- ✓ **Evaluation criteria as the whole SAT - make it yours ! Adopt, adapt, customize, implement.**
- ✓ **Outstanding role of all plant managers.**