ONTARIO POWER GENERATION

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July 3, 2013

File No: N-00531 (P)
CD# N-CORR-00531-06176

MS. KATHLEEN HEPPELL-MASYS
Director General
Directorate of Safety Management

MR. MARK DALLAIRE
Director General
Regulation Policy Directorate

Canadian Nuclear Safety Commission
280 Slater Street
Ottawa, On
K1P 5S9

Dear Ms. Heppell-Masys and Mr. Dallaire:

Ontario Power Generation Comments on Draft CNSC Regulatory Document REGDOC - 2.2.2 - Human Performance Management: Personnel Training

Thank you for the opportunity to provide comments on the Draft CNSC REGDOC 2.2.2. This letter will provide Ontario Power Generation's (OPG) comments on the document.

OPG has collaborated with AECL, New Brunswick Power Nuclear and Bruce Power to review proposed Regulatory Document 2.2.2 in detail and these comments are provided in Attachment A.

OPG's comments are related to the following areas that potentially expand requirements beyond industry current practices:

1) The addition of large numbers of jobs/positions where formal Systematic Approach to Training is currently used by adding requirements to include safety-sensitive occupations" and "safety-sensitive positions".

2) The addition of abilities and attitudes to the analysis required to identify knowledge. This could result in the basis for all current SAT based training to be expanded.

3) The addition of sub-tasks and task elements to the documentation of jobs. These are currently done at the task level only and as a result a large amount of rework could be required.

4) The addition of a requirement to analyze and document learning characteristics of target audiences. This is not done currently and could result in further documentation.

5) It does not appear that this proposed regulatory document is in keeping with the Federal Cabinet directive on streamlining of regulations which requires the benefits on new regulations justify the costs. The cost impact to OPG of this new regulatory document, (which has the potential to be significant with questionable benefit to public and environmental safety) appears to not have been considered in its development stage.

In addition to comments, suggested wording for the document is also attached (Attachment A).

In summary, OPG is concerned that the new regulatory requirements proposed in this document go beyond current industry practice making compliance very difficult with questionable benefit. As a result, we expect the implementation cost to our business will be a substantial. OPG is committed to assisting the CNSC in understanding our position and, therefore, I would like an opportunity to discuss this issue with you and your staff.

If you require further information or have any questions regarding details of this submission, please contact me or Mr. Greg Cornett, Manager, Training Planning and Design at (905) 829-1151 ext 5806.

Respectfully,

Al Shiever
Vice President, Learning & Development
Ontario Power Generation

Attach.

Reference:

1. CNSC email, info@cnsc-ccsn.gc.ca to B. Fleet, "Invitation to comment on draft REGDOC-2.2.2, Personnel Training," May 3, 2013, CD# N-CORR-00531-**06177**

Attachment A

Industry Comments
on REGDOC-2.2.2, Personnel Training

Industry Comments on Draft CNSC Regulatory Document REGDOC - 2.2.2 - Human Performance Management: Personnel Training.

The following comments have been compiled by a group of industry Training and Regulatory Affairs Managers. In the follow comments the term "industry" is taken to mean AECL, Bruce Power, New Brunswick Power Nuclear and Ontario Power Generation.

Industry Comments on REGDOC-2.2.2, Personnel Training

INDUSTRY MAJOR COMMENTS – Industry Major Comments are those comments on the proposed REGDOC that are deemed to have substantially increased compliance burden on the industry by changing current regulatory requirements and industry practice without any apparent safety driver. Failure to address these MAJOR comments will result in industry opposition to the proposed REGDOC during Commission Hearings and substantial exceptions taken during the licensing renewal process.

Prelude to Industry Major Comments – Unnecessary Regulation

The industry recommends that the CNSC discontinue the process to create and implement this draft REGDOC. The industry does not accept there is a need for this REGDOC. Our position is that existing REGDOCs, including RD-204, Certification of Persons Working at Nuclear Power Plant, and existing standards, including N286-05 and 12, Management System Requirements for Nuclear Power Plants provide sufficiently detailed regulatory requirements. However, should the Commission elect to move forward with this REGDOC, the industry requests that the items identified in the following pages as Industry Major Comments have a formal related impact analysis conducted by CNSC staff before the items identified become regulations or we request that these items be eliminated from the REGDOC before it is issued. Industry Major Comments all address substantial expansions on regulatory requirements. Industry Major Comments all address items where the industry's position is that they add no measurable safety margin to our operations and will substantially divert talent and resources away from more important work.

Industry Major Comment #1 – Substantial Scope Expansion Regarding Positions that Require Application of a Full SAT.

Section Reference: 1.2 Scope (also Section 3 and Glossary entry for safety-sensitive occupations' and 'safety-sensitive positions'.

Issue Discussion: Section 1.2 introduces 'safety-sensitive occupations' and 'safety-sensitive positions'. The intent of these terms is to define the scope of workers this REGDOC applies to. Further in Section 3 the proposed REGDOC clearly states that the list of workers in scope shall be proposed by the licensee and approved by the CNSC through the license process. We agree that this process is appropriate in that the licence application certainly addresses this issue. However, we do not support calling out in this REGDOC specific approvals during the licensing process as this adds no value and potentially adds a parallel process and potential confusion. Of important note is that we find the use of these terms (particularly with the expansive definition given in the proposed Glossary) contradictory to this process and of no value. Rather we request that the terms safety sensitive occupations and/or safety-sensitive positions be eliminated from this REGDOC. Instead we recommend the scope apply to those positions that directly operate or maintain the plant as these are the positions where the qualification is a significant component of our defence in depth approach to safety.

Currently the industry defines its jobs within its management systems as per individual licence applications. Introduction of new expansive terminology to define which positions require a SAT be applied to at nuclear facilities adds uncertainty unnecessarily. Current regulations are adequate in the industry's opinion in that they already require a SAT for Certified positions and require that licensee's training shall be systematically developed and implemented so that the required competency is achieved and maintained.

Additionally, current industry standards and CNSC inspection guides provide sufficient aids to the implementation of these regulations. The addition of a new REGDOC with an unclear and expansive scope to safety-sensitive occupations' and 'safety-sensitive positions' as defined in the Glossary of the proposed document could add dozens of positions to the positions currently deemed appropriate for a SAT and is not recommended or valued.

Suggested Change: We request the replacement of Section 1.2 paragraph 1 with the following:

"This regulatory document applies to workers in nuclear facilities who directly operate or maintain the plant during all facility conditions. The licensee shall define these positions in its training system."

Industry Major Comment #2 – Substantial Scope Expansion by adding Abilities & Attitudes Related Requirements.

Section Reference: Section 1. Introduction (also Section: 2 Item 1, 3 Item 4, 5.1.2, 5.1.3, 5.2.1, 5.2.2, 5.3.2, Glossary entry for Continuing Training, Job, Learning & teaching points.)

Issue Discussion: The proposed REGDOC substantially expands regulatory requirements regarding the use of a systematic approach to training (SAT) by requiring (shall) and recommending (may or should) "abilities and attitudes" be added to knowledge & skills attainment expectations throughout all phases of a SAT. This practice is not currently employed by the industry, is not part of current regulatory requirements, adds no measurable safety margin in the industry's opinion, is not practical to implement, and should not be added by this new regulation.

The cost to the industry of this regulatory expansion from current practice is unpredictable but certain to be enormous as abilities & attitudes would now be required to be identified and addressed for hundreds of task that compose dozens of positions that require a full SAT. Further, the value of this activity is doubtful in the opinion of the industry and is certainly unproven. In fact, the industry believes meeting this regulation may not be possible in that the distinction between Skills and Abilities is not discreet enough (even in the academic literature) to facilitate a distinction in our processes. Rather, we submit that sticking with Skills alone, as is current practice, is appropriate. Additionally, there is no precedent for the addition of Attitudes. The industry does not believe the identification or evaluation of Attitudes as proposed in this REGDOC is feasible by the industry. Certainly, some aspects of professionalism and its related attitudes are expected of staff; however this is and can continue to be accomplished without the expansive addition of Attitudes into the SAT process as proposed.

Suggested Change: We request the deletion of all reference to "abilities and attitudes" in the document. We recommend the document limit all phases of a SAT to Knowledge & Skills identification and attainment by staff.

Industry Major Comment #3 – Substantial Regulatory Expansion by Adding sub-tasks and task elements to our documentation of jobs tasks.

Section Reference: Section 3 Item 3.

Issue Discussion: Section 3 Item 3 of the proposed REGDOC requires that a job analysis shall "... determine all the .... subtasks and task elements involved". This is not a practice currently done by licensees and represents a substantial increase in regulatory expectations as compared to current Canadian and international practice with, in the opinion of the industry, no expected value. The current practice to identify tasks and task references (which adequately describe the task) has been sufficient for the past ten years and is sufficient internationally. The industry does occasionally document task elements when an adequate reference is not available. However, this is rare and would not meet the regulatory requirements as proposed.

The industry has been implementing a SAT for over ten years. The expectation that a job analysis will "determine all the .... subtasks and task elements involved" is not a practice currently done. The

impact to go back and re-perform all of our job analysis would cost millions of dollars, divert resources from more important work, and, in our opinion, not discernibly improve our programs.

Of additional concern in this Section 3 Item 3 wording is that the term "capability" is introduced in this section along with "job and duty" and adds no value in our opinion. Further its inclusion does raise questions as to what is intended by this additional term's inclusion.

Suggested Change: We request that Section 3 Item 3 be eliminated from the document which will remove the new regulatory requirement to determine subtasks and task elements during job analysis. We suggest that the revised Section 3 introductory paragraph in the full text recommendation at the end of this Attachment sufficiently requires the job analysis aspect of a SAT.

Industry Major Comment #4 – Substantial Regulatory Expansion by Adding a requirement to analyze and document learning characteristics of target audiences.

Section Reference: Section 2 Item 3.

Issue Discussion: The new requirement proposed is that "Training shall be tailored to the needs and the learning characteristics of the target population."

The industry position is that this needs to be a guiding (should) principle not a "shall" fundamental principle. No requirement to tailor to learning characteristics of audience has existed in prior regulations and compliance is not likely possible since our audiences vary significantly within a single course and from course to course with no time to adjust.

The industry has not found any basis in literature, previous legislation, or international standards for this being a "shall" principle. In fact the industry fails to see how this is a regulatory issue at all. There appears to be no safety impact and compliance would be problematic as this is completely new. Certainly, this is a good practice but making a good practice a guiding principle in the "shall" part of the REGDOC with wide application and compliance expectations is a large new burden with no safety value we can see. Cost impact is enormous and safety value is unproven and unlikely. Specific cost impact has not been evaluated as our industry position is that compliance would not be possible at any cost.

Suggested Change: We request that Section 2 Item 3 be eliminated from the document; this principle should be eliminated from all "shall" aspects of the proposed REG.

ADDITIONAL COMMENTS – Additional Comments are those comments on the proposed REGDOC items that are deemed to either:

1. modify terminology to that agreed to by industry representatives to better reflect current vernacular; or
2. add clarity to concepts not universally interpreted in the same manner by industry representatives; or
3. increase consistency of terminology throughout the document; or
4. eliminate repetitive or redundant content; or
5. further and fully implement comments / request / recommendations already identified a Industry Major Comments.

Prelude to Additional Comments

The full scope of our "additional comments" can only be seen by reviewing in detail the full text recommendation at the end of this Attachment against the proposed text made available for public comment. This full text recommendation shows all changes requested / recommended by the industry. The following is only to highlight certain comments or recommended changes shown in the full text recommendation that follows.

Industry Additional Comment #1 – Definition of Training System and Consistent Description Throughout Document.

Section Reference: Section 1. Introduction (also 1.1, Section 3 introductory paragraphs, Section 5 introductory paragraphs, and Glossary)

Discussion: The introduction states "training system, as defined in this regulatory document…" – however, training system is not defined in this document. Section 1. states that "A training system provides the basis for defining, designing, developing, implementing, evaluating, recording, and managing…". However this is different from the items in the Preface which was "analysis, design, development, implementation, evaluation, documentation and management".

Suggested Change: Define "training system" in Glossary. Utilize consistent wording from one section to another so that no variance can arise. Suggest using wording from Section 1 in Preface. Full text recommendation adds definition to glossary and moves to consistent wording throughout document.

Industry Additional Comment #2 – Performance Oriented Principle should not apply to "all" training.

Section Reference: Section 2. Item 1 Performance oriented principle.

Discussion: Since Section 2 is a "shall" Section, the term "All" is not appropriate and needs to be removed. Not "all" instruction is performance oriented. This REGDOC, if adopted at all, should not address "all" training but rather the training required under the scope of the REGDOC. Further, licensees should not be instructed to preclude additional training that may not be "essential". Additionally, again abilities & attitudes needs to be removed from document. Also "nuclear-safety-specific needs" is not defined and not needed as this item is redundant with "essential knowledge and skills".

Suggested Change: Change Principle to read as follows:

"Performance oriented: Training is preparation for performance on the job. Instruction shall focus on essential knowledge and skills required to meet job requirements over the lifecycle of the facility."

Industry Additional Comment #3 – Training System Requirements Introduction Clarity

Section Reference: Section 3. Introductory paragraphs.

Discussion: Section 3 Paragraph 1: Wording used to describe a training system should be consistent with earlier document sections.

Section 3 Paragraph 2: Paragraph should be eliminated and necessary content moved to Section on Scope. See previous Industry Major Comment #1 for specific Scope wording recommendation. Expansion of positions via this paragraph is the subject of Industry Major Comment #1. The licence renewal process is adequate to define licensee systems to address compliance and adding wording in this, or any, specific REGDOC that speaks to approval during this process has the potential to add confusion or create parallel processes.

Section 3 Paragraph 3: Paragraph should be eliminated and necessary content moved to paragraph one. Reference to vendors and contractors adds confusion, not clarity. Licensees are accountable for meeting REGDOCs implicitly without regard to how suppliers are used to do so and stating this adds confusion in that it may be construed to mean that contractors must use a SAT to qualify their staff. If this REGDOC is meant, in fact, to require that vendors are required to use a SAT to train their staff, this is an substantial expansion of current requirements and deserves far greater clarity in the REGDOC and an additional opportunity for comment.

Section 3 Paragraph 4: No comment on the wording of this paragraph which is acceptable to the industry as is. However, the wording of this paragraph (which allows some flexibility on the required details when a SAT is used) does lead to confusion when the "shall" list of 13 items follows. Are these items always "shall" or is flexibility allowed? Is a question that should not result from a new REGDOC. Therefore, the industry has recommended 6 of the 13 items be removed from the "shall" list. The requirement for these items is adequately provided for in the revised introductory paragraphs.

Suggested Change: Change Section 3 paragraph 1 to read as follows:

"Licensees shall ensure workers are competent to do the work assigned to them through the use of a training system to systematically analyze, design, develop, implement, evaluate, document and manage new training and the revision of existing training, including continuing training, for workers in positions that directly operate or maintain the facility during all facility conditions as identified in the licensing process."

Industry Additional Comment #4 – Training System Requirements Listed Item Eliminations

Section Reference: Section 3. Listed Items 1 through 5 plus Item 11.

Discussion: Items 1 through 5 and item 11 should be eliminated from the REGDOC as unnecessary and largely redundant with Principles in Section 2 or the introductory paragraphs to this Section. (Meaning, these items are not seen to add clarity or content to the document and are therefore not needed.) Further, the "shall" nature of these items is seen as contradictory to introductory paragraph #4 by the industry.

Additionally: Item 2 introduces "competencies", which is likely to be interpreted as a new and additional regulatory requirement and this is not likely the intent. This terminology is not commonly used in the industry. We request that should this REGDOC be published, terminology in the document use Qualification or Knowledge & Skills and not use competencies (noun).

Item 3 importantly includes the detail within the item that requires a job analysis "to determine all the .... subtasks and task elements involved" and this is not a practice currently done by licensees and represents a substantial increase in regulatory expectations as compared to current Canadian and international practice with little or no expected value as discussed in Industry Major Comment #3. Additionally, the term capability is introduced here along with job and duty and adds no value in our opinion but does raise questions and confusion as to what is intended by this additional term's inclusion.

Item 5 again refers to "competencies" and we request that should this REGDOC be published, the terminology stay with Qualification or Knowledge & Skills.

Item 11 unnecessarily singles out one curriculum content item. We suggest this is inappropriate as content is expected to be systematically derived and the mention of one item and not others may lead to assumptions about content derivation that is inappropriate.

Suggested Change: Eliminate Section 3 Items 1 through 5 and Item 11.

Industry Additional Comment #5 – Training System Requirements Changes to Listed Items 6 through 13 other than 11

Section Reference: Section 3. Listed Items 6 through 13 other than Item 11.

Discussion: We have only small comments on items 6 through 13 other than item 11 (see above). Comments are all incorporated into the suggested wording provided below and in the full text that follows. Mostly we again request the concept and terminology around "competencies" not be used.

Suggested Change: Replace Items 1 through 13 with revised items 1 through 7 as defined below:

Licensees shall:

1 . ensure that trainers meet and maintain documented qualifications, particularly in the areas of subject matter expertise and instructional skills

2. ensure that formal evaluations are used to confirm and document that each trained worker is qualified to perform the duties of his or her position

3. implement a training change management process that will systematically analyze procedural and equipment changes, changes in job descriptions, and operating experience feedback (including facility and industry-wide events) in order to identify changes to the tasks and task lists, and to assess potential training implications leading to modifications of training

4. ensure continuing training is provided to workers and that it includes updates stemming from the change management process

5. evaluate training regularly and incorporate the results of the evaluations into a training improvement process

6. ensure that workers' records in support of training and qualifications are established and maintained

7. ensure that workers have a level of training related to nuclear safety including but not limited to radiation safety, fire safety, onsite emergency arrangements, and conventional health and safety corresponding to the duties of their position and employment

Industry Additional Comment #6 – Section 5 Guidance Changes

Section Reference: Section 5 all parts.

Discussion: Section 5 is a "may" section. Therefore comments are limited to changing terminology to current industry terminology and to carrying forward Industry MAJOR comments made on Sections 1 through 4.

Suggested Change: See full text of Section 5 provided at end of this Attachment.

Additional Comment #7 – Abbreviations & Glossary Changes

Section Reference: Abbreviations TLO and Glossary Addition of training system and modification of several items.

Discussion: We have only one comment on Abbreviations; we request LO be changed to TLO. In the Glossary, we have added one definition: training system. We have eliminated two definitions: 'safety-sensitive occupations' and 'safety-sensitive positions'; see Industry Major Comment #1. We

have changed wording in several places to implement Major Comment #2 regarding the use of "abilities & attitudes". We have made smaller comments to the following items to improve clarity relative to current industry terminology: duty area, qualification, task, task list, trainee characteristics, and training development plan.

Comments are all incorporated into the suggested wording provided in the full text that follows.

Suggested Change: See full text of Abbreviations and Glossary provided at end of this Attachment.

FULL TEXT COMMENTS

Follows is a full text that incorporates all suggested / requested changes. Again, it is the industry position that the CNSC discontinue the process to create and implement this draft Regulatory Document. We do not accept that there is a need or a safety case for this Regulatory Document. Our position is that existing Regulations (including RD-204, Certification of Persons Working at Nuclear Power Plant) and standards (including N286-05 &12, Management System Requirements for Nuclear Power Plants) plus the PROL Renewal application process together provide sufficient regulation governing personnel training.

However, if the following text is adopted, we can accept the REGDOC even though our position is that it is not needed by the industry and adds no measurable value.

In the following full text comments wording we request / recommend be removed is identified as follows:

~~**wording we request / recommend be removed**~~

In the following full text comments wording we request / recommend be added is identified as follows:

wording we request / recommend be added

Personnel Training

1. Introduction

The purpose of training in the nuclear industry is to ensure that workers are competent and qualified to perform the duties of their position. As required by the General Nuclear Safety and Control Regulations, workers shall be trained to carry on the licensed activity.

A training system provides the basis for ~~defining, designing, developing, implementing, evaluating, recording and managing~~ *analysis, design, development, implementation, evaluation, documentation and management of* training for workers at nuclear facilities. It provides a method for meeting the training needs of workers and ensuring that the right people receive the right training at the right time. With a training system, as defined in this regulatory document, it can be demonstrated that all required knowledge *and* skills ~~abilities and attitudes~~ have been attained, through the process of performance-based assessment and program evaluation. Without a training system, there is the risk that important elements of training will be omitted and the operating state of the facility will not be reflected in the training programs.

1.1 Purpose

This regulatory document sets out the requirements of the Canadian Nuclear Safety Commission (CNSC) for licensees regarding the development and implementation of a training system. It also provides guidance on how these requirements should be met.

1.2 Scope

This regulatory document applies to workers in nuclear facilities who ~~are employed in safety-sensitive occupations and/or safety-sensitive positions~~ *directly operate or maintain the plant during all facility conditions. The licensee shall define these positions in its training system.*

In addition, this regulatory document applies to the entire lifecycle of the facility including site selection, design, construction, commissioning, operation, refurbishment and decommissioning. It can apply to individual structures, systems and components, as well as to the entire facility.

1.3 Relevant legislation

The provisions of the Nuclear Safety and Control Act (NSCA) and regulations that are relevant to this regulatory document include:

1. paragraph 12(1)(a) of the General Nuclear Safety and Control Regulations, which states every licensee shall "ensure the presence of a sufficient number of qualified workers to carry on the licensed activity safely and in accordance with the Act, the regulations made under the Act and the licence"

2. paragraph 12(1)(b) of the General Nuclear Safety and Control Regulations, which states every licensee shall "train the workers to carry on the licensed activity in accordance with the Act, the regulations made under the Act and the licence"

2. Principles

The training system developed and implemented by each licensee shall adhere to the following ~~three~~ *two* fundamental principles:

1. Performance oriented: Training is preparation for performance on the job. ~~All~~ Instruction shall focus on essential knowledge *and* skills ~~abilities and attitudes~~ required to meet job requirements over the lifecycle of the facility.

2. Systematically developed: Training shall be defined, produced and maintained through an iterative and interactive series of steps, leading from the identification of a training requirement to the confirmation that the requirement has been satisfied.

~~3. Tailored to audience: Training shall be tailored to the needs and the learning characteristics of the target population.~~

3. Requirements for a training system for nuclear facilities

~~Licensees shall use a training system to systematically define, design, develop, implement, evaluate, record and manage all training, including continuing training, for all workers who are employed in safety-sensitive occupations and/or safety-sensitive positions.~~

~~The licensee shall propose to the CNSC, through their license application, all safety-sensitive occupations and/or safety-sensitive positions to which this regulatory document applies and the CNSC will review and approve these occupations and/or positions through the licensing process.~~

~~The training system shall be applied during the analysis, design, development, implementation, evaluation, documentation and management of new training or the revision of existing training. It shall be used whether the training is defined, designed, developed, implemented, evaluated, recorded and managed internally by licensees or externally through vendors or contractors.~~

Licensees shall ensure workers are competent to do the work assigned to them through the use of a training system to systematically analyze, design, develop, implement, evaluate, document and manage new training and the revision of existing training, including continuing training, for workers in positions that directly operate or maintain the facility during all facility conditions as identified in the licensing process.

The level of analysis, documentation and actions may vary in proportion to the relative importance to safety, safeguards and security; the magnitude of any hazard involved; the lifecycle stage of the facility; the mission of the facility; the particular characteristics of the facility; and any other relevant factors.

Licensees shall:

~~1. establish and implement a training system that ensures their training programs are systematically defined, designed, developed, implemented, evaluated, recorded and managed~~

~~2. use a training system to provide a logical progression from an analysis of the training requirements and identification of the qualifications and competencies required for~~

~~performing a job, to the design, development, implementation, evaluation and management of training. This shall include the respective training materials, and the subsequent evaluation~~

~~and continuous improvement of the training courses and training programs~~

~~3. identify all performance requirements of a capability, job or duty by conducting a job analysis to determine all of the tasks, subtasks and task elements involved~~

~~4. define and document the necessary general worker training, initial job training and continuing training requirements for workers, based on a task analysis of the knowledge, skills, abilities and attitudes required to perform the duties of their position~~

~~5. ensure that appropriate training is designed, developed and implemented to meet the qualification and competency requirements~~

~~6~~*1* . ensure that trainers meet and maintain documented qualifications ~~and competency requirements~~, particularly in the areas of subject matter expertise and instructional skills

~~7~~*2*. ensure that formal evaluations are used to confirm and document that each trained worker is qualified ~~and competent~~ to perform the duties of his or her position

~~8~~*3*. implement a training change management process that will systematically analyze procedural and equipment changes, changes in job descriptions, and operating experience feedback (including facility and industry-wide events) in order to identify changes to the tasks and task lists, and to assess potential training implications leading to modifications ~~in the training programs~~ *of training*

~~9~~*4*. ensure continuing training is provided to workers and that it includes updates ~~to training programs~~ stemming from the change management process

~~10~~*5*. evaluate ~~the~~ training ~~programs~~ regularly and incorporate the results of the evaluations into a training ~~program~~ improvement process

~~11. ensure that workers have been trained in current procedures and in relevant system and equipment configurations and are competent to perform the duties of their position~~

~~12~~*6*. ensure that workers' records in support of training and qualifications are established and maintained

~~13~~*7*. ensure that workers have a level of training related to nuclear safety including but not limited to radiation safety, fire safety, onsite emergency arrangements, and conventional health and safety corresponding to the duties of their position and employment.

4. Record management for a training system

Licensees shall develop and manage documentation related to all phases of their training including ~~but not limited to~~ *but not limited to:* task lists, task-to-training matrices, training objectives, ~~training plans, training delivery plans, lesson plans, verification tools, program evaluation data and records and decision documents regarding any changes to the training courses and training programs~~. *lesson plans, evaluation tools, training evaluation, and changes to training.*

Licensees shall ~~also~~ maintain ~~training~~ records on the training and qualifications of all workers. These records shall be managed and controlled, and may be requested by CNSC staff at any time. ~~Additionally, workers' supervisors and managers shall have immediate, unencumbered and readily available access to the records.~~ The training record for each worker, including temporary workers and contractors, shall include ~~all qualifications and certifications held, the expiration dates for time-sensitive qualifications and certifications, and all requalification or recertification requirements.~~ *all qualifications and certifications granted by or relied on by the*

licensee to fulfill requirements of this document. Records shall include expiration dates for time-sensitive qualifications and certifications, and all requalification or recertification requirements.

5. Guidance on the systematic approach to training

~~**Licensees may adopt the systematic approach to training (SAT) methodology to meet the requirements in section 3.0 of this document. SAT is a proven and highly successful education and training methodology, which, when implemented as outlined below, will meet the requirements of this regulatory document. It is also widely known as the instructional systems design model (ISDM).**~~

Systematic Approach to Training (SAT) is a proven and highly successful education and training methodology, which licensees may adopt to meet the requirements in section 3.0 of this document. SAT is also widely known as the instructional systems design model (ISDM) or Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model.

The SAT methodology is the industry standard for training development and is the most widely practiced model in existence today. SAT is a holistic process and a proven best practice for the analysis, design, development, implementation, evaluation and management of training.

A SAT-based training system provides interdependent functions consisting of analysis, design, development, implementation and evaluation. It is this cyclic process, as depicted in Figure 1, that enables training to be systematically ~~**defined, designed, developed, implemented and evaluated**~~ ***analyzed, designed, developed, implemented, evaluated, documented and managed*** in order to not only meet operational and organizational requirements, but also to react quickly to changes in those requirements.

Figure 1: Overview of a systematic approach to training (no comment on figure 1.)

5.1 Analysis phase

The analysis phase is the foundation of any training course or training program and includes inputs from operational staff, end-users, subject matter experts (SMEs) and training development experts. Its purpose is to specify the required outcome of the training in terms of essential on-the-job performance as defined by role documents, procedures or written instructions. The analysis should consider the following points:

- rationale and purpose of training
- scope of the training
- target audience
- training method
- location of the training
- timeframe by when the training must be complete

~~**There are various components required to facilitate a full training analysis as described in the following paragraphs.**~~

The fundamental processes of the analysis phase are briefly described in the following paragraphs.

5.1.1 Training needs analysis

A training needs analysis (TNA) is normally triggered by a performance gap or deficiency which has identified training as the solution. Engineering design and equipment changes, operational changes, revised procedures, and modifications to regulatory requirements are examples of changes that would generate performance gaps. A TNA systematically assesses the job performance requirements against actual existing performance (gap analysis) and identifies specific areas that require training.

5.1.2 Job and task analysis

To identify all performance requirements of a ~~**capability,**~~ job or duty ***area,*** a job analysis should be conducted to determine all of the tasks~~**, subtasks and task elements**~~ involved with all states of the nuclear facility, including normal operations, accident conditions and emergency situations. The end result of a job analysis is a list of tasks that should be completed to perform the job correctly. Task difficulty, importance and frequency are considered to determine which tasks need to be part of training and to determine the initial and continuing training content. Task analysis should be conducted to determine the method of task performance and associated knowledge ***and*** skills ~~**and abilities**~~.

5.1.3 ***Terminal*** Learning objectives

Terminal Learning objectives (***T***LOs) are statements of the ~~**desired knowledge, skills, abilities and attitudes**~~ ***Tasks*** that workers must be able to demonstrate after completing the training. ***T***LOs should be measurable and define exactly when, what and how well the trainee must be capable of performing on the job upon completion of the training.

A ***terminal*** learning objective should include:

1. a performance statement: states the task to be performed ~~**using one observable verb**~~
2. a condition statement: describes conditions under which the performance must be completed
3. standards: state ~~**at least one**~~ measurable criterion which describe how well the performance should be completed

5.1.4 Target audience analysis

A target audience analysis determines the numbers and categories of workers to be trained and, where possible, the characteristics of the individuals who will receive the training (e.g., current job experience and prior background, experience, education and training). This information ensures that the training is designed, developed and implemented at the correct level, and assists with determining any necessary training prerequisites.

5.2 Design phase

The design phase should include the selection and description of the training and an environment that will enable the trainees to achieve the ***T***LOs determined in the analysis phase. The design phase starts with the results of the analysis phase and ends with a plan for the development of the training. The design phase takes the output from the analysis phase and specifies how the information will be presented and how the knowledge ***and*** skills ~~**abilities and attitudes**~~ will be tested.

The fundamental processes of the design phase are briefly described in the following paragraphs.

5.2.1 Trainee characteristics

As a result of the analysis phase, the target audience should have been broadly defined. Trainee characteristics should be described in terms of their entry-level knowledge *and* skills ~~abilities and attitudes~~ and those characteristics likely to affect their responses to particular instructional activities. Information obtained in this process will guide subsequent decisions such as those regarding appropriate instructional sequences, methods and media.

5.2.2 Instructional program design

The instructional program design determines ~~in more detail~~ he knowledge *and* skills ~~abilities and attitudes~~ required to perform a task ~~which is defined in enabling objectives (EOs)~~. These *knowledge and skills lead to* enabling objectives (EOs) *which document the required knowledge and skill*. These enabling objectives are then grouped and sequenced into the order most suitable for learning.

5.2.3 Enabling objectives

EOs are the principal units of learning and constitute a major step towards achieving the associated *T*LOs. EOs are sub-components of the *T*LOs. EOs represent manageable units of work: units that are coherent in terms of logic, learning of work, have a suitable scope and are appropriate for testing learning progress. Like the *T*LO, the EO is composed of three essential parts:

1. The performance statement; an observable action ~~such as "Operate a global positioning system" or "Install the Personnel Record Management software." It should be~~ *normally* stated as one action associated with a single verb. If the action is complicated or if more than one verb is used, then the ~~task~~ *EO* needs to be broken down further into other EOs with simple actions.

2. The conditions statement; a description of the setting or conditions under which the ~~task~~ *action* is to be performed ~~(e.g., "given a PC with presentation software", "denied reference" and "without supervision")~~. Ideally, the conditions should mirror those in the workplace where the operation is performed.

3. The standard; one or more measurable criterion stating the level of acceptable performance of the task in terms of quantity, quality or time limitations. It should answer questions such as: "How many?" "How fast?" or "How well?" ~~(e.g., the italicized portion of "Given a PC with presentation software, create a presentation with at least six slides in less than 30 minutes")~~

5.2.4 Learning assessment plan

A learning assessment plan describes the use of ~~testing in support of the training and~~ formal evaluation*s within a qualification program*. The learning assessment plan determines how progress toward, and achievement of, the required performance is checked and verified. While an assessment should be based upon the performance defined in the *T*LO*s and EOs*, limiting factors, such as time, may not permit direct observation of the full range of the desired performance. The assessment plan describes how a valid and reliable sample of trainee performance will be measured and evaluated.

5.2.5 Instructional strategies

The instructional strategy is the combination of media, methods and environment used in the delivery of training. The advantages and disadvantages of each instructional strategy, as applied to the *T*LO*s*

and EOs, should be examined to ensure that the most effective solution is selected to ensure task performance as indicated in the *T*LO*s*.

5.2.6 On-the-job training

On-the-job training (OJT) requirements should be considered when one or more of the *T*LO*s* may not be suitable for traditional instruction methods. This typically occurs when the training environment cannot simulate the operational task. If OJT is necessary, then OJT learning objectives, complete with performance statements, conditions and standards, should be produced. Subsequently, each OJT learning objective should be formally assessed using on-the-job evaluation (OJE).

5.2.7 Training *development* plan

~~**The training plan describes the training and documents the decisions made during the design phase on items such as the EOs, teaching points, method of instruction for each EO, key learning events, sequence of instruction, and assessment procedures.**~~

The training development plan documents the decisions made during the design phase. Outcomes and decisions regarding items covered in sections 5.2.1 through 5.2.6 should be documented and used during the development phase.

5.3 Development phase

The development phase involves the procurement or production of effective instructional materials in accordance with the training *development* plan.

~~**The development phase incorporates the following processes.**~~

The fundamental processes of the development phase are briefly described in the following paragraphs.

5.3.1 Procurement/production of instructional materials

~~**The i**~~*I*nstructional materials should support the learning activities. Such items include instructor lesson plans, interactive courseware such as computer-based training (CBT) and training aids of all types including equipment, references, job aids and testing materials. The instructional materials should include the following, where necessary:

1. Trainee manuals: These are reference handbooks to be used and *often* retained by the trainees.

2. Instructor guides: These are instructional specifications for use by the instructor during training preparation and delivery. They outline the specific training steps that must be provided to satisfy the training *development* plan. ~~**EOs are linked to detailed steps and procedures in the trainee manuals, user guides and any online documentation.**~~

3. Handouts: These additional aids can supplement the trainee manuals in areas identified as difficult and/or particularly important.

4. CBT or other media: These are to be used where they are a recommended solution based on the instructional analysis and the selection of the instructional strategy.

5. Question banks and some sample tests ~~**in a numbered sequence**~~: When used during the training, these should include guidance on where and when they should be used.

5.3.2 Assessment tests

Assessment tests, which address the requirement for formal evaluation, cover both progress and final testing. In general, there are two types and both should be developed.

Knowledge or cognitive assessments: Usually written, these tests can include multiple choice, multiple response, dichotomous or binary (i.e., yes/no; true/false), matching, resequencing, and open-ended questions.

Performance or skill-based assessments: These are practical tests based on realistic scenarios of the most important and significant skills and abilities derived from the ***T***LOs and EOs.

5.3.3 Conduct of trials (pilot courses)

To assess the effectiveness of the training and related materials, these materials should be reviewed by SMEs, tested with individuals who are representative of the target training audience, and approved by the appropriate managers. The training and instructional materials should be revised according to the findings of the trials.

5.4 Implementation phase

The implementation phase is to enable the trainees to successfully perform the tasks to the standards defined in the ***T***LOs. This phase encompasses both the instructor preparation phase as well as the actual delivery of the training.

It should include:

1. ~~**detailed**~~ lesson plans ~~**(produced by the instructors)**~~ based on the training plan and the instructor guides prepared during the development phase
2. set-up of the training environment
3. continual monitoring to ensure that learning is taking place
4. arrangements for follow-on training, where necessary

5.5 Evaluation phase

The evaluation phase involves the assessment of the effectiveness and efficiency of the training as delivered and verification of whether the trainees have mastered the ***T***LOs and acquired the competence needed to perform the job safely.

The evaluation phase includes the following:

1. Formal trainee evaluation: The trainees' abilities to perform the tasks, as defined in the ***T***LOs, should be measured through tests and assessments. This activity can be included as a process within the implementation phase.

2. Content and delivery: All instructional activities are monitored so that corrective actions, including trainee evaluations, can be taken if necessary. Sources of feedback include the trainees, the instructors, the support staff and the responsible managers and supervisors.

3. Effectiveness: This means the graduates' ability to perform, in the workplace, the tasks for which they were trained. The primary sources of this information are the graduates and their supervisors. Additionally, information may be available through various sources ranging from needs assessments and lessons-learned reports to incident reports and rework statistics. Managers and supervisors should have continuous input to the training.

4. Change management: In accordance with the principles of a SAT methodology, inputs such as new or revised regulatory requirements, engineering design and equipment changes, operational changes, revised procedures, modifications and operating experience feedback (including facility and industry-wide events) should be regularly fed into the appropriate processes through the analysis phase.

Abbreviations

CBT	computer-based training
CNSC	Canadian Nuclear Safety Commission
EO	enabling objective
~~**LO**~~	~~**learning objective**~~
TLO	***terminal learning objective***
OJE	on-the-job evaluation
OJT	on-the-job training
NSCA	Nuclear Safety and Control Act
SAT	systematic approach to training
SME	subject matter expert
TNA	training needs analysis

Glossary

~~**ability**~~

~~**The competence or state of being able to perform a task to a specified standard.**~~

~~**attitude**~~

~~**The personal feelings, perceptions, values and interests of an individual that allow a job or task to be performed safely and in accordance with the ethics of the organization, to the best ability of that individual.**~~

continuing training

A structured curriculum that maintains and enhances ~~**knowledge, skills, abilities and attitudes**~~ ***knowledge and skills*** and addresses areas such as equipment changes and procedure changes; skill weaknesses; infrequently used and difficult ~~**knowledge, skills and abilities**~~ ***knowledge and skills***; and lessons learned from operating experiences. Update training, requalification training and refresher training are also considered continuing training.

course

A series of learning events.

Duty ***area***

One of the job incumbent's main ***areas of*** activity, or a grouping of closely related tasks.

instructional strategy

The combination of media, methods and environment used in the delivery of training:

- method: the type of learning activity or instructional event
- media: the means of delivering instructional activities to the trainee, such as computers or printed texts
- environment: where learning activities take place, i.e., classroom, workplace, home

job

The work performed by the incumbent in a position, or by a group of incumbents in a position who perform essentially the same duties and tasks and require similar ~~**knowledge, skills, abilities and attitude**~~ ***knowledge and skills*** to perform those tasks.

knowledge

The theoretical and/or practical understanding of a subject matter required to perform work.

learning

A change in behaviour that occurs as a result of the acquisition of ~~**knowledge, skills, abilities and attitude**~~ ***knowledge and skills***.

lesson plan

A guide, used by instructors, to ensure that instruction follows a specific, goal-oriented plan.

licensing basis

A set of requirements and documents for a regulated facility or activity comprising:

- the regulatory requirements set out in the applicable laws and regulations
- the conditions and safety and control measures described in the facility's or activity's licence and the documents directly referenced in that licence
- the safety and control measures described in the licence application and the documents needed to support that licence application

nuclear facility

A facility as defined in the Nuclear Safety and Control Act.

on-the-job evaluation

Performance demonstration by a trainee of knowledge, skills and work practice standards required to perform a task using the approved procedure and the prescribed standards. The evaluation is conducted on the job ~~as a part of job performance~~.

on-the-job training

The training undertaken in the actual work environment to obtain required job-related knowledge and skills.

pilot course

A ~~full~~ trial of an instructional program prior to its implementation in training.

program evaluation

An assessment of the merit or value of an instructional program. Program evaluation is a systematic process designed to collect data to assess whether instruction has satisfied the objectives of the

instructional program in the most effective and efficient manner:

- formative evaluation is conducted on an ongoing basis during the development and implementation of new instructional programs, to make improvements to the program and to correct errors and deficiencies
- summative evaluation occurs after an instructional program has been implemented, to report on the effectiveness and efficiency of the design, development and implementation of instruction. Summative evaluation examines all aspects of an instructional program.

qualification

A recognized level of ~~ability~~ *mastery of task performance* in a work-related field, which is normally acquired through successful completion of training.

~~safety-sensitive occupation~~

~~An occupation in a nuclear facility, the impaired performance of which, by any worker in the occupation, could result in a significant incident affecting the health and safety of persons, property or the environment. This occupation also includes all employees who are regularly required to rotate through or regularly provide relief to persons in safety-sensitive positions.~~

~~safety-sensitive position~~

~~A position in a nuclear facility, the impaired performance of which could result in a significant incident affecting the health and safety of persons, property or the environment.~~

skill

A mental and/or physical activity that requires a measured degree of proficiency.

task

A discrete segment of work having two or more steps, performed by an individual, which has a definite beginning and end, and which constitutes a logical and necessary part of a duty *area* and/or job.

task list

The list of tasks that make up the requirements in a job *or duty area*. The list should also include critical supporting ~~elements~~ *references* that provide insight into the scope and difficulty of the tasks.

teaching points

The elements that make up an evaluation objective: discrete steps, ~~abilities,~~ factors or concepts requiring separate demonstration or explanation that the trainee must master/learn/do.

test

An event during which a trainee is asked to demonstrate an aspect of task performance, ~~skill, knowledge or attitude~~ *skill or knowledge*.

trainee characteristics

The target population for whom the proposed training is intended as well as relevant information about the trainees concerned, such as the aptitudes, special skills, education, previous related training and personal data (e.g., age, ~~rank~~). Defining trainee characteristics is a recommended component of ~~the task analysis and instructional analysis processes~~ *a SAT*.

trainee evaluation

The assessment of progress made by participants during an instructional program (formative evaluation) and of their achievement at the end of the program (summative evaluation).

training/instruction

Learning that is provided in order to improve performance on the job.

~~training plan~~

~~A document that describes how a training program is intended to meet the requirements of the learning objectives.~~

training development plan

A document that describes how the output of the analysis and design phases is intended to be used during development to meet the requirements of the TLOs and EOs.

training program

A structured collection of courses required to achieve a qualification or certification to perform work.

training system

A structured systematic approach to the analysis, design, development, implementation, evaluation, documentation and management of training.

vendor/contractor

A person who is either contracted by a licensee to develop or deliver training, or who delivers training to a licensee's staff with the intent of meeting a required qualification or competency being granted upon completion of the training.

workplace

Any place where work is done.